Fort Bliss, Texas and New Mexico, Mission and Master Plan

PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

Volume I:

Final

Executive Summary and Chapters 1 through 14

United States Army

U.S. Army Training and Doctrine Command

U.S. Army Air Defense Artillery Center and Fort Bliss

December 2000

This Programmatic Environmental Impact Statement (PEIS) provides information to help commanders, directors, heads of organizations located on Fort Bliss, other users of installation facilities and their staffs to make environmentally sound operating and siting decisions. The broad decisions evaluated in this document are reflected in the *Real Property Master Plan (RPMP)*, the *Integrated Natural Resources Management Plan (INRMP)*, the *Integrated Cultural Resources Management Plan (ICRMP)*, and activities envisioned in the *Training Area Development Concept (TADC)* and other installation initiatives.

Fort Bliss is a U.S. Army Training and Doctrine Command (TRADOC) installation located on approximately 1.12 million acres in Texas and New Mexico. The installation's principal mission is the U.S. Army Air Defense Artillery (ADA) Center and Fort Bliss (USAADACENFB). The USAADACENFB was established in its current form during 1957. Fort Bliss is a multi-mission installation providing support for training, testing, maneuver, mobilization, and deployment in a single-service, joint, or combined arms environment. Ongoing peacetime force structure realignments and weapons system development continue to affect the composition of the Fort Bliss mission and, consequently, management actions necessary to meet mission requirements.

Volume I, *PEIS*, is organized as follows:

- Chapter 1 discusses the purpose and need to revise land use and enhance management of the land, airspace, and infrastructure of Fort Bliss to optimize the ability to support current and future missions while sustaining its stewardship of natural and cultural resources.

- Chapter 2 provides a discussion of the regulatory requirements for master planning as they relate to NEPA.

- Chapter 3 describes the proposed action and alternatives analyzed in the PEIS. A foldout is provided at the end of the chapter to assist the reader's understanding of military use of the land.

- Chapter 4 provides an overview of the baseline environmental conditions of Fort Bliss and the potentially affected environment.

- Chapter 5 addresses the potential impacts of implementing the alternatives described in Chapter 3, when compared to baseline conditions presented in Chapter 4.

- Chapters 6, 7, 8, 9, 10, 11, 12, and 13 present mitigation and summary of environmental consequences, the list of preparers and contributors, persons consulted, agency consultations, List of repositories and distribution list, references, glossary, and an index, respectively.

- Chapter 14 at the end of the document contains foldouts to assist the reader's understanding of acronyms used throughout the PEIS.

Volume II, *Appendices*, contains Appendices A through K of the PEIS:

Appendix A provides background information about NEPA and presents an impact evaluation methodology for use on Fort Bliss. Appendix B gives background on cumulative impacts affecting the installation and discusses comprehensive landscape monitoring using satellite imagery. Appendix C summarizes Fort Bliss' status under the most recent base closure evaluation. Appendix D presents memorandums of agreement and understanding between the Army and federal land management agencies. Appendices E through G present technical resource data for soils, biology, and noise. Appendix H contains information about environmental justice. Appendix I summarizes 1996 Fort Bliss road closures. Appendix J is an air quality compliance judgement and order between the State of Texas and Fort Bliss. Appendix K contains Fort Bliss water conservation policy documents.

Volume III, *Public Comment and Response Document,* contains the responses to public comments received during the public comment period. Boxes containing numbers in the margins of Volumes I and II indicate where text has been changed in response to a comment from Volume III. These boxes appear like this: $\boxed{1}$

Fort Bliss, Texas and New Mexico, Mission and Master Plan Final Programmatic Environmental Impact Statement

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Fort Bliss Mission and Master Plan Final Programmatic Environmental Impact Statement

Volume I

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COVER SHEET

a. Responsible Agency: U.S. Army, Fort Bliss

b. Proposals and Actions: The broad missions currently assigned to units and organizations stationed at
Fort Bliss would continue as presently assigned for both peacetime and under mobilization. However, the
management approach to the fulfillment of these missions and the associated land use requirements can
vary in the future. Existing mission activities and reasonably foreseeable mission and activity changes
projected for Fort Bliss have resulted in proposed changes to the planning process, plans, and initiatives
being undertaken by the installation. The Army is considering the No Action Alternative which describes
ongoing missions and planned development or maintenance activities without the implementation of
plans associated with the proposed action. Alternative 1 includes all the actions described in the No
Action Alternative and addresses revised components of the *Real Property Master Plan* and 18
implementation of two contributing plans, the *Integrated Natural Resources Management Plan* and the
Integrated Cultural Resources Management Plan, and Chapter 3.0, *Current Conditions*, of the *Training
Area Development Concept*. This alternative includes ongoing missions and a number of short- and long-
range construction projects and resource management practices with the potential to affect the installation
environment. Alternative 2 includes all the actions in the No Action Alternative and Alternative 1. In
addition, it addresses the use of an additional 13.5 square miles for controlled access Field Training 18
Exercise sites on the installation proposed in Chapter 4.0, *Future Development Concept*, of the *Training
Area Development Concept*. These would be located on suitable terrain within specific training areas in 19
the Tularosa Basin and Otero Mesa portions of McGregor Range. Alternative 3, the Army's preferred
alternative, includes all the actions in the No Action Alternative, Alternative 1, and Alternative 2. In 18
addition, it addresses installation initiatives, potential mission activities based upon installation
capabilities (Chapter 4.0 of the *Training Area Development Concept)*, and potential construction projects
that are not funded nor included in the Army Planning Cycle through the year 2002. Additional *National
Environmental Policy Act* documentation will be required once the characteristics of any specific mission
changes proposed in the future are identified.

c. Comments and Inquiries: Written comments regarding this document should be directed to:

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d. Designation: Final Programmatic Environmental Impact Statement

e. Abstract: This Final Programmatic Environmental Impact Statement has been prepared in accordance with the *National Environmental Policy Act*. The document includes analyses of the potential environmental consequences and mitigation that the proposed changes to the planning process, plans, and initiatives may have on land use, infrastructure, airspace, earth resources, air quality, water resources, biological resources, cultural resources, noise, safety, hazardous materials and items of special concern, socioeconomics, and environmental justice. The findings indicate that potential environmental impacts from the proposed action and the alternatives may include changes to land use, increased soil erosion, slight impacts to biological resources and cultural resources, and cumulative impacts to water resources.

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EXECUTIVE SUMMARY

Objectives of the Programmatic Environmental Impact Analysis Process

The U.S. Army Air Defense Artillery (ADA) Center and Fort Bliss (USAADACENFB) is a multi-mission, U.S. Army Training and Doctrine Command (TRADOC) installation located on approximately 1.12 million acres in Texas and New Mexico. Ongoing peacetime force structure realignments and weapons system development continue to affect the composition of the mission and, consequently, management actions necessary to meet mission requirements. This *Programmatic Environmental Impact Statement* (PEIS) describes potential environmental impacts and mitigation actions associated with land use and management decisions regarding installation assets, capabilities, and infrastructure to support current and future missions. These proposed decisions are reflected in the *Real Property Master Plan* (RPMP), the *Integrated Natural Resources Management Plan* (INRMP), and *Integrated Cultural Resources Management Plan* (ICRMP), and land use designations and activities envisioned in the *Training Area Development Concept* (TADC) and other installation initiatives.

This document provides information to help commanders, directors, heads of partner organizations, other users of Fort Bliss facilities and their staffs make environmentally sound operating and siting decisions. To the degree possible given existing data, it evaluates the potential environmental impacts of essential mission and supporting management activities on Fort Bliss. In doing so, this document strives to meet several objectives:

- Develop a PEIS to analyze land use and infrastructure management programs and policies. Because it is a programmatic document, the PEIS presents a broad analysis, rather than presenting detailed analyses of specific projects and sites. This statement will be a foundation on which to base (or tier) subsequent environmental documentation for actions proposed in the mission, facility, cultural, and natural resource management programs.

- Describe the master planning process including several contributing plans and provide a framework for implementation of those plans.

- Describe environmental effects associated with a number of project types and activities typically proposed and implemented at Fort Bliss.

- Provide impact assessment methods and criteria for use by future action proponents and other planners to ensure consistent analysis in tiering from this PEIS.

- Provide a description of the existing environment with sufficient detail to form the basis for future environmental documents.

Purpose and Need for the Proposed Action

The purpose of the proposed action is to revise land use planning and enhance management of the land, air space, and infrastructure of Fort Bliss to optimize the ability to support current and future missions while sustaining its stewardship of natural and cultural resources. Current and likely future missions assigned to organizations at Fort Bliss support the land force elements within the *U.S. Armed Forces Joint Vision 2010* developed by the U.S. Joint Chiefs of Staff (USJCS). This vision of the future embodies strong threads of continuity with the contemporary strategic and operational environment. Among these threads are American goals and interests, as well as missions, tasks, strategic concepts, and the quality of U.S. Armed Forces (USJCS, 1995).

While a general planning horizon for the master planning process is 20 years, the period beyond the 6-year cycles of the Army's planning, programming, and budgeting system is highly speculative. Mission, facility, and cultural and natural resource management planning at Fort Bliss are continuing processes requiring periodic updates to installation plans. As missions evolve, the supporting facilities and resource management programs change to effectively support variations in missions, operational procedures, and environmental stewardship requirements. The land use and management proposals analyzed in this PEIS provide a framework for the continued evolution of these plans and procedures in the context of Fort Bliss ongoing missions and existing land and airspace boundaries.

- The RPMP is a series of documents which describes the current composition of the installation and the plans for its orderly long-range development.

- The current and revised components of the RPMP provide Fort Bliss a systematic comparison of existing on-post facilities with projected needs. This comparison contributes to the decisions, which may result in projects or actions necessary to establish future directions for the installation development. In addition, other plans contribute to mission and facility master planning activities at Fort Bliss.

- The INRMP implements the natural resources program on Fort Bliss, Texas and New Mexico, from 1998 through 2002. The program helps ensure the conservation of Fort Bliss' natural resources, as well as compliance with related environmental laws and regulations. This plan also helps ensure the maintenance of lands upon which quality training may be completed to accomplish Fort Bliss' critical military mission.

- The ICRMP establishes routine procedures for addressing projects in compliance with federal laws, regulations, and executive orders requiring the protection or management of historic resources while minimizing the effect on military training and mission support activities. Historic preservation compliance requirements are integrated with the planning and conduct of military training, construction, maintenance, real property, land use decisions, and other undertakings. This plan requires renewal in fiscal year (FY) 01 with a new or revised plan prepared by Fort Bliss.

- Other activities such as integrated training area management (ITAM), engineering, and physical security may affect the location and physical requirements found in component plans.

- The master planning process considers the local and adjacent community development plans when considering support facilities that may affect existing planning and zoning activities.

The formal plans that contribute to the master planning process at Fort Bliss address known mission requirements. The installation also prepares a pre-planning document to assist in the long-range application of Fort Bliss' capability to support potential Army and other U.S. Department of Defense (DoD) requirements. The TADC is a part of the installation process for determining facilities, planning, managing and directing the future short- and long-term development of the Fort Bliss Training Complex to meet the Army's varied training needs.

Based upon the currently assigned missions, policies, goals, and objectives of the installation, the Long-range Component (LRC) of the RPMP for Fort Bliss, Texas and New Mexico was revised in May 1997. It is proposed as a guideline for the future development of the installation for the next 20 years, or until amended. The alternatives within this PEIS reflect the need for integrated, comprehensive planning to effectively use this land resource for military preparedness. These proposed management practices are based on Fort Bliss' changing role as a result of Army restructuring, the implementation of plans that facilitate the accomplishment of Army missions, and integration of the Army's stewardship of its cantonment area and training lands.

Over the past several years, the Army has been reducing its strength and restructuring its forces and facility resources. This smaller, restructured force will be improved through enhancements and selected modernization to support the *National Military Strategy of the United States* (USJCS, 1997). As a result of the departure of the 3rd Armored Cavalry Regiment (ACR), the facility requirements of Fort Bliss have shifted from those necessary to house and maintain the readiness of a large force requiring extensive armor and rotary wing aircraft support capabilities. As a result of the arrival of the 31st, 35th, and 108th ADA brigades, the currently assigned, smaller, force requires wheeled and limited tracked vehicle support capability with some requirements for fixed-wing aircraft support.

As the Army has downsized, the global political environment also has resulted in the U.S. Armed Forces being restructured from a forward-deployed force to a continental, United States-based force capable of rapid overseas projection to various regional "hot spots" or conflicts around the world. Fort Bliss has been designated as one of the Army's Power Projection Platforms (P3). Implementation of the RPMP and other plans addressed in this PEIS will enhance Fort Bliss' capability to support the power projection and mobilization missions.

Proposed Action and Alternatives

Four alternatives have been identified for analysis in this PEIS. These alternatives build upon one another to provide the Army with a range of planning actions that may be implemented. Missions assigned to Fort Bliss considered in this document are those assigned as of 1996 and anticipated at that time to occur during the period 1996 through 2002. The descriptions of current, broad mission activities as they relate to land use planning and environmental effects are described in the No Action Alternative. Adoption of the proposed RPMP, INRMP, ICRMP, and Chapter 3.0 of the TADC (U.S. Army, 1998a) as discussed above is the only change from the No Action Alternative described in Alternative 1. Alternative 2 is Alternative 1 plus the land use changes required to develop additional controlled access field training exercise sites on the Fort Bliss Training Complex. Alternative 3 is Alternative 2 plus adoption of the land use changes required by Chapter 4.0, *Future Development Concept* of the TADC. Specific future mission changes that may be directed by the Army to take place at Fort Bliss are not known at this time. Additional *National Environmental Policy Act* (NEPA) documentation will be required once the characteristics of any proposed specific mission changes are identified. Table ES-1 summarizes the alternatives.

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The following structure frames the alternatives: mission activities, facility construction and demolition, environmental resource management, and real estate actions.

- Mission Activities encompass the wide range of mission and mission support activities taking place on the main cantonment, ranges, and training areas.

- Facility Construction and Demolition includes construction, facility renovation, rehabilitation, and related infrastructure improvements planned prior to this PEIS on the main cantonment, ranges, and training areas. It also includes demolition of existing facilities planned under the *Fort Bliss FY 97 Demolition Plan* on the main cantonment, Logan Heights, William Beaumont Army Medical Center (WBAMC), Biggs Army Airfield (AAF), and McGregor Range.

Table ES-1. Summary of Alternatives

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No Action Alternative	*Alternative 1*	*Alternative 2*	*Alternative 3*
• No implementation of Army short- and long-range plans or resource management plans. • The Fort Bliss current missions, certain planned developments, and on-going maintenance activity.	• All actions in the No Action Alternative, plus implementation of Army short- and long-range plans and resource management plans: – RPMP Component Plans. – RPMP Contributing Plans. – INRMP. – ICRMP. – Training area land uses as designated in Chapter 3 of the TADC.	• All actions in the No Action Alternative and Alternative 1, plus: – Identification and use of an additional 13.5 square miles for field training exercise (FTX) sites on McGregor Range, proposed in Chapter 4 of the TADC. – Additional NEPA documentation required.	• All actions in the No Action Alternative, Alternatives 1 and 2, plus: – Potential training capabilities and other installation initiatives described in Chapter 4 of the TADC: brigade-size training exercises, missile launch facility and impact area, additional FTX sites, National Guard Training Center, enlarge current active impact area through consolidation with selected historic impact areas on the east slopes of the Organ Mountains. – Additional NEPA documentation required.

- Environmental Resource Management embraces the current Fort Bliss management programs for natural and cultural resources. This also includes ITAM, which is the installation's method to integrate mission requirements with potential impact management for soil and vegetative cover. Fort Bliss has Memorandums of Understanding (MOUs) with the Bureau of Land Management (BLM) and the U.S. Forest Service (USFS) describing management responsibilities of natural and cultural resources for military and nonmilitary purposes on McGregor Range.

- Real Estate Actions include four typical types of real estate outgrants and disposition of excess property.

The alternatives addressed in the PEIS are:

- The No Action Alternative describes the current mission and organizations assigned to Fort Bliss, and certain planned developments and maintenance activities at the installation. The current mission and real estate action categories of Fort Bliss are common to all alternatives. Therefore, only potential actions in addition to those discussed under the No Action Alternative are presented in Alternatives 1 through 3.

- Alternative 1 includes all the actions described in the No Action Alternative plus implementation of certain short- and long-range plans, construction and demolition projects, and environmental resource management plans with potential to affect the environment of the installation. These include the four components of the *Fort Bliss RPMP,* three contributing plans and the current land use designations proposed for the Fort Bliss Training Complex in Chapter 3.0 of the TADC.

  <u>RPMP Component Plans</u>
  - The LRC provides a concise overview of the installation and its mission, describes how the master planning process works, establishes goals and objectives for future development of the installation, and develops a land use plan for the installation. It provides the basic building blocks upon which all other RPMP components are based.
  - The Short-range Component (SRC) integrates real property master planning into the Army's operational planning process.
  - The Capital Improvement Strategy (CIS) is the installation Commander's plan for using and investing in real property to support the installation's missions.
  - The Mobilization Component (MC) identifies the mobilization capabilities of the installation's billeting, utility, communications, transportation, training, and other support facilities.

  <u>RPMP Contributing Plans</u>
  - The *Long-range Family Housing Plan* provides the planning guidance for maintaining sufficient, adequate family housing for assigned military personnel.
  - The INRMP contributes to the master planning process through ensuring consideration of the conservation of Fort Bliss' natural resources during training, construction, demolition, and other mission support activities as well as compliance with related environmental laws and regulations.
  - The ICRMP contributes to the master planning process through ensuring consideration of the protection or management of historic resources with the least effect on military training and mission support activities as well as compliance with related laws and regulations.

  Chapter 3.0, *Current Conditions*, of the TADC describes the current mission activities performed at Fort Bliss training areas considered in Alternative 1 and groups them into 10 mission- and training-related land use categories and environmental management and public access categories.

- Alternative 2 includes all the actions described in the No Action Alternative, those described in Alternative 1 plus the mission requirement to identify and use an additional 13.5 square miles for controlled access FTX sites on McGregor Range proposed in Chapter 4.0, *Future Development Concept*, of the TADC. Additional NEPA documentation regarding site-specific issues will be required once the proposed sites are identified. 24

- Alternative 3, the Army's preferred Alternative, includes all the actions described in the No Action Alternative, those described in Alternatives 1 and 2 plus other potential training capabilities described in Chapter 4.0 of the TADC and other installation initiatives. The TADC describes changes in mission activities that could be assigned to Fort Bliss based upon installation capabilities considered in Alternative 3. As with Alternative 1, these potential activities affect land use designations of the training areas. These capabilities are grouped into the same 10 mission- and training-related land use categories and environmental management and public access categories. Specific future mission changes that may be directed by the Army to take place at Fort Bliss are not known at this time. Additional NEPA documentation will be required once the characteristics of any specific mission changes proposed in the future are identified.

Issue Guide

The public scoping process produced many useful comments and input to this PEIS. Several specific issues were raised frequently. Military and nonmilitary uses of the Fort Bliss Training Complex and public access to Otero Mesa, the Sacramento Mountain foothills, and the Organ Mountains were addressed most frequently in verbal and written comments. Table ES-2 lists those primary issues, and references the sections in the PEIS that provide information relating to that particular issue.

Comparison of Alternatives by Resource and Potential Direct and Cumulative Impacts

Table ES-3 summarizes the findings and environmental consequences of the No Action Alternative and Alternatives 1, 2, and 3 for affected resources. Cumulative impacts under each alternative are in a bold font. This side-by-side comparison of alternatives reveals the differences and similarities among the resources with regard to direct, indirect, and cumulative impacts identified in the PEIS. Proposed mitigation for potential impacts is also shown in Table ES-3.

Mitigation

Mitigation measures for adopting the various planning actions are themselves programmatic as they address broad potential impacts from adopting the proposed land use planning process. Appropriate mitigation for specific projects will be determined in NEPA documentation at the time of project definition.

The development of the TADC considered the installation's *Standard Operating Procedures (SOPs) for Weapons Firing and Maneuver Area Use* (U.S. Army, 1996f). These procedures influence the extent of an impact by limiting the degree, magnitude, or location of a specific training action. For example, missile or artillery firing scenarios may be limited such that the target intercept point or impact area is located to avoid or minimize impacts to cultural or natural resources, or to maintain surface danger zones (SDZs) within installation boundaries.

Examples of ongoing Army programs for land rehabilitation include ITAM and actions following major training exercises that evaluate and restore training lands to conditions that both contribute to training and maintain environmental conditions. Land rehabilitation activities will be implemented to the fullest within funding constraints.

Major adverse effects of current mission and mission support actions are, in large part, avoided through the project management procedures incorporated into the proposed training area, real property, and environmental resource management plans. Certain current mission activities result in broad impacts that will be mitigated within available funding constraints:

- Impacts on Water Resources. Fort Bliss will continue to actively participate in a water conservation and facility retrofit program. The program includes retrofitting of low-flow toilets and showerheads, reduction of turf areas in family housing, use of desert landscaping, water-thrifty design of new construction, and replacement of old water mains and laterals. The program

Table ES-2. Public Scoping Issues by Programmatic Environmental Impact Statement Section

Issue Raised	*Fort Bliss Mission and Master Plan PEIS Section*
Land Use	
Military and nonmilitary use of Otero Mesa and Sacramento Mountain foothills portion of McGregor Range	2.2, 3.2.3.2, 3.4, 3.5.3.2, 3.6.1, 4.1.2.1, 4.3.3, 4.4.3, 4.4.4, 4.7.3, 4.9, 5.1.1.2, 5.1.1.4, 5.1.9, Appendix B
Public access to Otero Mesa and Sacramento Mountain foothills portion of McGregor Range	3.2.3.2, 4.1.2.1, 4.1.2.3, 4.7.3, 4.9, 5.1.1.2, Appendices B and I
Proposed U.S. Air Force (USAF) option to construct a tactical target complex on Otero Mesa portion of McGregor Range	2.2, 3.2, 3.2, 5.1.1.4, 5.1.4 , 5.1.5, 5.1.6, 5.1.8, 5.1.9, 5.1.10, 5.1.11, Appendix B
Otero Mesa and Sacramento Mountain foothills portion of McGregor Range returned to the public domain	3.6.1
40,000 acres of Doña Ana Range–North Training Areas returned to the public domain to be managed as a wilderness area	3.6.2, 5.1.1.4
Disposition of Castner Range	4.1.2.1, 4.11.3.6, 5.1.1.2
Cultural Resources	
Protection of archeological and historic sites	3.3.5, 4.9, 5.1.9, Appendix B
Consultation with the Mescalero Apache Tribe and Tigua Pueblo	3.3.5, 4.9, Appendix B
Biological Resources	
Preservation of ecosystems and biodiversity on Otero Mesa and other Army lands	3.3.5, 4.8, 5.1.8, Appendices B and F
Preservation of Culp Canyon Wilderness Study Area (WSA) and Areas of Critical Environmental Concern (ACECs)	4.1.2.1, 4.8, 5.1.1.2
Grazing and fire effects on rare and endemic plants	4.8, 5.1.8, Appendices B and F
Rare and endemic plants, the local ecosystem, forests, and woodlands of the Organ Mountains	4.8, 5.1.8, Appendices B and F
Potential impacts outside of WSAs on scenic, biological, and recreational values of the Organ and Franklin mountains ACECs	4.1.2.2, 4.8, 5.1.1.4, 5.1.8
General Environmental Concerns	
Regional water resources	4.7, 5.1.3.5, 5.1.7, Appendix B
Air quality	4.6, 5.1.6, Appendix B
Hazardous materials	4.12, 5.1.12
Environmental restoration	4.12.3.1
Safety	
Ordnance and explosive hazards	3.6.1, 3.6.2, 4.1.2.3, 4.11, 5.1.11
Live fire safety areas and buffer zones	3.2.3.2, 3.5.1, 3.6.1, 3.6.2, 4.11, 5.1.11
Planning	
Army treatment of archeological and historical sites in planning documents	3.3.4, 4.9, Appendix A
Fire management and grazing management in planning documents	3.3.4, 4.8, Appendix A
Socioeconomic data for Otero and Doña Ana counties, New Mexico	4.13, 4.14
Traffic	
Traffic near the Fort Bliss Main Cantonment Area	4.2.1.1, 5.1.2.1, 5.1.2.5

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Table ES-3. Proposed Mitigation for Potential Impacts of Alternatives by Resource

Resource	*No Action Alternative*		*Alternative 1*		*Alternative 2*		*Alternative 3*	
	Impact	*Mitigation Action*	*Impact*	*Mitigation Action*	*Impact*	*Mitigation Action*	*Impact*	*Mitigation Action*
LAND USE								
Land Use Planning								
Main Cantonment	Adverse planning impacts result from perpetuating existing functional incompatibilities in land use designations. **Industrial and airfield development on Biggs AAF and the El Paso International Airport (EPIA) could have cumulative adverse noise and traffic effects on residential land uses of Biggs AAF.**	Address incompatibilities on a project-by-project basis.	**The RPMP, INRMP, and ICRMP would result in positive direct and cumulative environmental impacts by providing a planning framework that would improve land use relationships in the main cantonment and compatibility with land uses near the main cantonment.**	No mitigation required. Buffering would be incorporated into site design where adjacent uses are incompatible.	**Same as Alternative 1.**	Same as Alternative 1.	**Same as Alternative 2** except that siting a Military Operations Urbanized Terrain (MOUT) training complex near Biggs AAF would conflict with existing land use due to use of smoke/obscurants.	Same as Alternative 2 except need additional project-specific NEPA evaluation and mitigation determination by project proponent.
Fort Bliss Training Complex	Adverse planning impacts from perpetuating general land use designations of the training complex. **Potential conflict between military training and public use of the training areas on Otero Mesa portion of McGregor Range.** **USAF tactical target complex development will adversely affect public use access and grazing on certain portions of McGregor Range.**	Address incompatibilities on a project-by-project basis. Scheduling practices to minimize conflicts and enhance notification of military use. Increase scheduling notification and coordination efforts regarding grazing and BLM, and public access.	**The INRMP, ICRMP, and TADC would result in positive direct and cumulative environmental impacts by providing an improved framework for managing land use, considering a wide range of resources.**	No mitigation required.	**Same as Alternative 1 except there would be minor, additional impacts to public use and BLM-administered grazing and resource programs at new controlled access FTX sites.**	Increase scheduling notification use of FTX sites and coordination efforts regarding BLM and public access.	**Same as Alternative 2 except:** • **Surrounding land use would be affected by noise from increased aircraft operations throughout the training complex and from rail activities on Doña Ana Range–North Training Areas.** • **Growth in adjacent communities and military operations requiring currently unused installation capabilities may result in growing land use incompatibilities.**	Same as Alternative 2 except need additional project-specific NEPA evaluation and mitigation determination by project proponent.

Note: Direct and indirect environmental impacts are show in this text style. **Cumulative environmental impacts are shown in this text style.**

Table ES-3. Proposed Mitigation for Potential Impacts of Alternatives by Resource (Continued)

Resource	*No Action Alternative*		*Alternative 1*		*Alternative 2*		*Alternative 3*	
	Impact	*Mitigation Action*	*Impact*	*Mitigation Action*	*Impact*	*Mitigation Action*	*Impact*	*Mitigation Action*
Land Use Planning (Continued)								
Fort Bliss Training Complex (Continued)							• **Expansion of military capabilities may potentially restrict some activities on or access to portions of Fort Bliss. The primary nonmilitary uses that would be affected are grazing and public recreation.** • Increased probability of debris deposition from Tactical Ballistic Missile (TBM) targets and resulting impacts on land use. • Road improvements on McGregor Range would benefit public access and fire protection. • Firing of IB Army Tactical Missile Systems (ATACMS) would affect existing safety buffers on/off installation, requiring extension into incompatible land uses.	

Note: Direct and indirect environmental impacts are show in this text style. **Cumulative environmental impacts are shown in this text style.**

Table ES-3. Proposed Mitigation for Potential Impacts of Alternatives by Resource (Continued)

Resource	*No Action Alternative*		*Alternative 1*		*Alternative 2*		*Alternative 3*	
	Impact	*Mitigation Action*	*Impact*	*Mitigation Action*	*Impact*	*Mitigation Action*	*Impact*	*Mitigation Action*
AESTHETICS AND VISUAL RESOURCES								
Main Cantonment and Fort Bliss Training Complex	Potential adverse impacts on the Main Cantonment Area may occur if resources are removed from areas adjacent to or within historic districts without consideration of the visual context of replacement construction as sited in accordance with RPMP and Installation Design Guide (IDG) objectives.	Address incompatibilities on a project-by-project basis.	The ICRMP would result in a positive environmental impact by providing an improved framework for considering and reviewing projects within and adjacent to historical districts.	No mitigation required.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 2 except that potential changes in visual context from construction of a rail spur would be inconsistent with visual resource management (VRM) objectives.	Same as Alternative 2 except need additional project-specific NEPA evaluation and mitigation determination by project proponent.
EARTH RESOURCES								
Soils								
Main Cantonment and Fort Bliss Training Complex	**Erosion due to impacts of construction, training complex maintenance, or ground disturbing environmental resource management activities on highly erodible soil.**	Finish survey of soil erosion. Monitoring with satellite imagery.	**Same as No Action Alternative.**	Same as No Action Alternative.	**Same as Alternative 1 except level of use within designated controlled access FTX sites could increase compaction of soils and possible increased erosion at FTX sites on susceptible soils.**	Same as Alternative 1 except need additional project-specific NEPA evaluation and mitigation determination by project proponent.	**Same as Alternative 2 except additional potential increases in the level of use within areas designated for off-road training would occur.**	Same as Alternative 2 except: • Apply INRMP and project siting according to TADC land use designations to reduce soil erosion. • Need additional project-specific NEPA evaluation and mitigation determination by project proponent.

Note: Direct and indirect environmental impacts are show in this text style. **Cumulative environmental impacts are shown in this text style.**

Table ES-3. Proposed Mitigation for Potential Impacts of Alternatives by Resource (Continued)

Resource	*No Action Alternative*		*Alternative 1*		*Alternative 2*		*Alternative 3*	
	Impact	*Mitigation Action*	*Impact*	*Mitigation Action*	*Impact*	*Mitigation Action*	*Impact*	*Mitigation Action*
WATER RESOURCES								
Main Cantonment and Fort Bliss Training Complex	**Demand for direct (2.4 percent) and indirect (5.3 percent) military use for all purposes is about 7.7 percent of all cumulative water demand supplied to the El Paso-Cuidad Jaurez region from the Hueco Bolson, the Mesilla Bolson, and the Rio Grande. The City of El Paso currently obtains 44 percent of its water from the Hueco Bolson, which could be substantially depleted by 2025; the remainder comes from the Mesilla Bolson and the Rio Grande. Fort Bliss withdraws approximately 3.6 percent of the total annual pumpage from the Hueco Bolson. This results in a slight acceleration of the decline in groundwater levels from regional cumulative water use. While the effects of pumpage of wells at Fort Bliss on the El Paso metropolitan area are slight, water conservation remains a major concern on Fort Bliss.**	Participate in regional water planning with regional water authorities.	**Same as No Action Alternative.**	Same as No Action Alternative.	**Same as Alternative 1.**	Same as Alternative 1.	**Same as Alternative 2 except that water demand for Fort Bliss would exceed that under previous alternatives. Size of increase would be dependent on personnel increases and construction projects selected. Additional use at cantonment would require increase pumpage from Army wells; however, the impact on regional water resources continues to be slight, relative to regional water demand.**	Same as Alternative 2 except need additional project-specific NEPA evaluation and mitigation determination by project proponent.

Note: Direct and indirect environmental impacts are show in this text style. **Cumulative environmental impacts are shown in this text style.**

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Table ES-3. Proposed Mitigation for Potential Impacts of Alternatives by Resource (Continued)

Resource	*No Action Alternative*		*Alternative 1*		*Alternative 2*		*Alternative 3*	
	Impact	*Mitigation Action*	*Impact*	*Mitigation Action*	*Impact*	*Mitigation Action*	*Impact*	*Mitigation Action*
BIOLOGICAL RESOURCES								
Fort Bliss Training Complex	Disturbance to ecosystems from military activities such as off-road vehicle training, fire, ordnance or debris impact, and soil erosion. **Cumulative impacts to Fort Bliss ecosystem from nonmilitary use on co-use lands and by trespass grazing elsewhere in the training complex.** **Impacts resulting from inconsistent coordination due to the use of a specific unit rather than a broader fire management plan.**	Monitoring with satellite imagery. Cooperate with and share available information with BLM and USFS grazing managers. Address fire management inconsistencies on a case-by-case basis.	**Same as No Action Alternative except cumulative impacts would be similar to those under the No Action Alternative, but would be reduced somewhat by implementation of the INRMP.**	Same as No Action Alternative.	**Same as Alternative 1 except there would be direct disturbance and cumulative impacts to ecosystems resulting from additional land designated for controlled access FTX sites.**	Same as Alternative 1 except need to determine site-specific mitigation through additional NEPA evaluation and implementation of appropriate mitigation by project proponent.	**Same as Alternative 2 except:** • **Cumulative impacts from increase in the level of use for off-road training in designated areas.** • **Increased impact in ungrazed grassland below Otero Mesa.**	Same as Alternative 2 except need to determine site- specific mitigation through additional NEPA evaluation and implementation of appropriate mitigation by project proponent.
CULTURAL RESOURCES								
Main Cantonment and Fort Bliss Training Complex	**Off-road maneuver, surface impact, construction and demolition, facility maintenance, and development of a tactical target complex may impact cultural resources.**	Manage effects on cultural resources on a case-by-case basis.	**Same as No Action Alternative except that implementation of the ICRMP would result in positive environmental impacts resulting from the enhanced cultural resource management.**	No mitigation required.	**Same as Alternative 1 except:** • **Greater cumulative impacts than the No Action Alternative or Alternative 1.** • Development of additional con-trolled access FTX sites would adversely impact archaeological resources within the site.	Same as Alternative 1 except need to determine site-specific mitigation through additional NEPA evaluation and implementation of appropriate mitigation by project proponent.	**Same as Alternative 2 except increased level of land use and potential cumulative impacts on cultural resources as the Fort Bliss Training Complex capabilities are more fully utilized.**	Same as Alternative 2 except need proponent determination of site-specific mitigation through additional surveys to support NEPA evaluation and implementation of appropriate mitigation by project proponent.

Note: Direct and indirect environmental impacts are show in this text style. **Cumulative environmental impacts are shown in this text style.**

will be continued and expanded where feasible into such areas as recovery and limited use of treated wastewater, and metering of end users. Active enforcement and public education programs will be a major part of the installation water conservation effort.

The Army will continue its exploration program for geothermal resources at Davis Dome near McGregor Range Camp (see Section 4.7.1.2). The geothermal water has the potential to produce 3 megawatts (MW) of electric power that could be used to power a desalination plant producing 7 mgd (million gallons per day) of drinking water from the saline aquifer at a significantly lower cost than Fort Bliss now pays for water. This source would be used to augment or replace water currently pumped from the Hueco Bolson.

– Impacts on Environmental Resources. The Army will provide personnel and equipment, within funding constraints, to implement the ICRMP and INRMP in a manner that reduces adverse impacts to cultural, vegetation, and wildlife resources due to increased demolition or construction, soil and/or vegetation disturbances, ORV maneuvers, weapons strikes, and fires.

Supplemental Analyses

Because this PEIS presents a broad analysis, rather than presenting detailed analyses of specific projects and sites, it is a foundation on which to base (or tier) subsequent environmental documentation for actions proposed in the mission, facility, cultural, and natural resource management programs. Specific future mission changes that may be directed by the Army to take place at Fort Bliss are not known at this time. The appropriate NEPA documentation will be required once the characteristics of any specific mission and mission support changes proposed in the future are identified. Appendix A provides a methodology for determining appropriate NEPA documentation.

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Purpose of and Need for Action

1.0

1.0 PURPOSE OF AND NEED FOR ACTION

Fort Bliss is a multi-mission, U.S. Army Training and Doctrine Command (TRADOC) installation located on approximately 1.12 million acres in Texas and New Mexico (Figure 1.0-1). The installation's principal mission is the U.S. Army Air Defense Artillery (ADA) Center and Fort Bliss (USAADACENFB). However, ongoing peacetime force structure realignments and weapons system development continue to affect the composition of the Fort Bliss mission and, consequently, management actions necessary to meet mission requirements. This Programmatic Environmental Impact Statement (PEIS) describes potential environmental impacts and mitigation associated with land use and management proposed decisions regarding installation assets, capabilities, and infrastructure to support current and future missions. These proposed decisions are reflected in the *Real Property Master Plan (RPMP)*, the *Integrated Natural Resources Management Plan (INRMP)*, the *Integrated Cultural Resources Management Plan (ICRMP)*, and activities envisioned in the *Training Area Development Concept (TADC)* and other installation initiatives. The following section provides general background for this proposal (Section 1.1). Subsequent sections discuss the purpose (Section 1.2) and need (Section 1.3) for the implementation of these management plans. Section 1.4 identifies the decisions to be made. The scope and use of this PEIS are discussed in Section 1.5. A foldout of the Acronym List is provided in Chapter 14 of this volume.

1.1 BACKGROUND

Fort Bliss, for which the U.S. War Department issued Order #58 in 1848, first occupied leased land in 1849 in what is now downtown El Paso. Military units responsible for patrolling the U.S.-Mexico border were stationed at this border outpost. The post was moved six times until it settled on the present site of the Main Cantonment Area on land donated by the City of El Paso on La Noria Mesa in 1893. The installation has since been home to infantry, cavalry, and air defense units. The basic mission remains as it has been for the 55 years since 1942 when the installation became a center for anti-aircraft artillery (AAA) training. The USAADACENFB was established in its current form during 1957. Fort Bliss is a multi-mission installation providing support for training, testing, maneuver, mobilization, and deployment in a single-service, joint, or combined arms environment.

Fort Bliss is part of an Army total force consisting of an active component (Regular Army), a reserve component (Army Reserve and National Guard), and Army civilian employees. Army units are organized into combat, combat support, and combat service support categories. Combat units include active and reserve component divisions, separate brigades, and special operations forces. Combat support forces (communications, intelligence, and military police are examples), and combat service support forces (logistics such as supply and maintenance, transportation, and medical support) are assigned throughout the force structure. Increasingly, the Regular Army depends on the reserve components for early deployment of combat, combat support, and combat service support. Combat service support forces are normally organized and fight as a part of an army, corps, division or Joint Task Force (JTF). Units stationed at Fort Bliss include combat and combat service support.

The Bottom Up Review, conducted in October 1993, directed the U.S. Army (hereinafter referred to as the Army) to reduce its active force from 12 to 10 divisions. The Army's force structure plan stabilizes the force at an active duty end strength of 495,000 soldiers as the Army transforms into the force for the twenty-first century. Realignments affecting Fort Bliss included the 3rd Armored Cavalry Regiment (ACR) relocation from Fort Bliss to Fort Carson, Colorado, and the relocation of three air defense brigades to Fort Bliss *Army Force Structure Realignment Programmatic Environmental Assessment*,

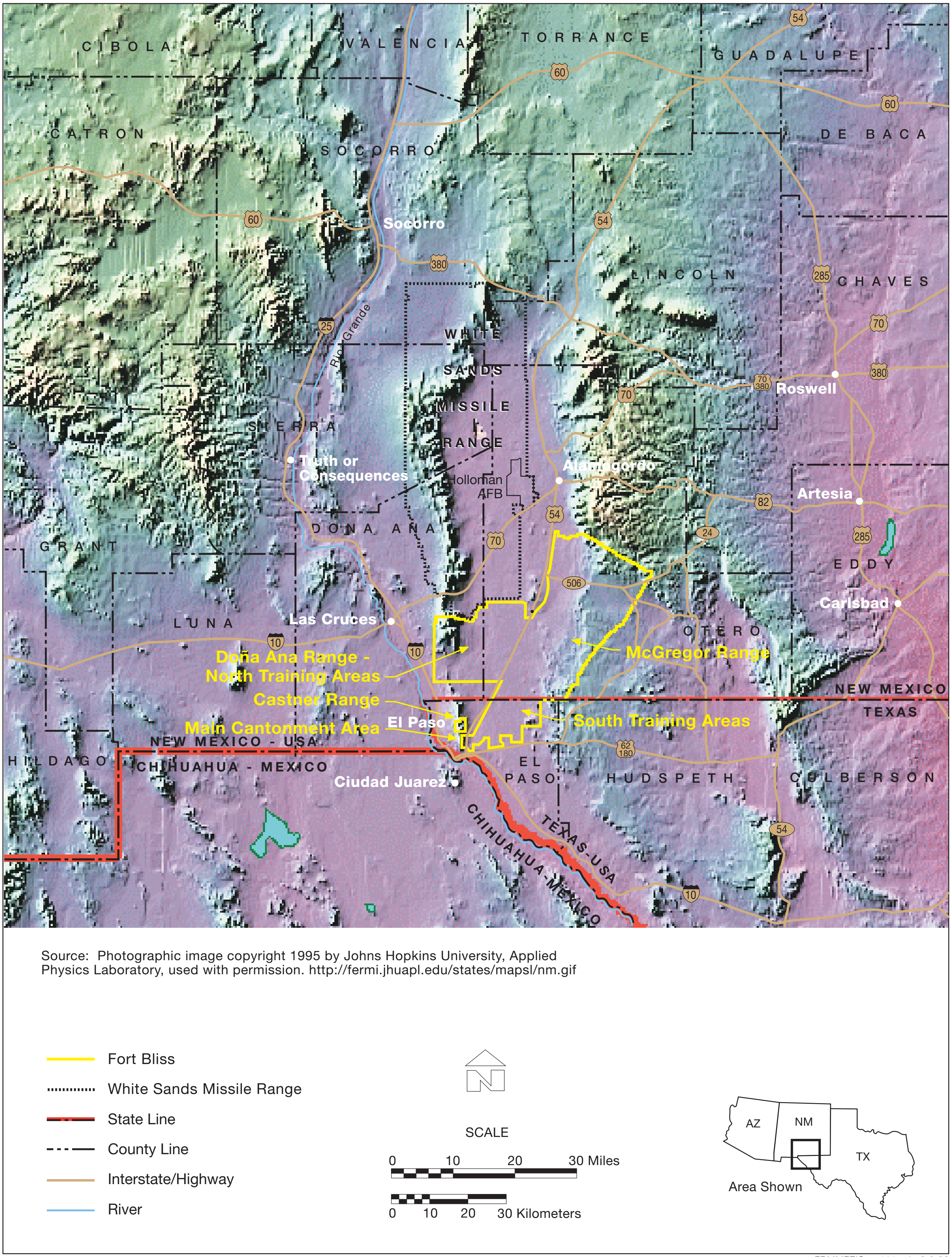


Figure 1.0-1. Fort Bliss, Texas and New Mexico.

(U.S. Army, 1995a) creating the ADA Center of Excellence. Today, the central mission of Fort Bliss is to provide training to protect the deployed force and selected geopolitical assets from aerial attack, missile attack, and surveillance. Key elements of this mission include:

- Serving as a Power Projection Platform (P3);
- Serving as an ADA proponent;
- Serving as a test bed and training installation for joint and combined warfare employing state-of-the-art technologies;
- Becoming a model installation to support a variety of missions; and
- Developing interservice, intergovernmental, and civic partnerships.

1.2 PURPOSE OF THE PROPOSED ACTION

The purpose of the proposed action is to revise land use and enhance management of the land, airspace, and infrastructure of Fort Bliss to optimize the ability to support current and future missions while sustaining its stewardship of natural and cultural resources. Current and likely future missions assigned to organizations at Fort Bliss support the land force elements within the *U.S. Armed Forces Joint Vision 2010* developed by the U.S. Joint Chiefs of Staff (USJCS, 1995). This vision of the future embodies strong threads of continuity with the contemporary strategic and operational environment. Among these threads are American goals and interests, as well as missions, tasks, strategic concepts, and the quality of U.S. Armed Forces. The *National Military Strategy of the United States* (USJCS, 1997) sets the stage for combined operations where U.S. forces fight in concert with regional allies and for joint operations where the Army and other U.S. and/or allied services fight as a team. The Chief of Staff of the Army, through the Department of the Army (DA), assigns missions to various Army elements of Joint Commands as well as to Army Major Commands such as TRADOC and U.S. Army Forces Command (FORSCOM), which have organizations stationed at Fort Bliss to support the national vision and strategy.

Mission, facility, and cultural and natural resource management planning at Fort Bliss are continuing processes requiring periodic updates to installation plans. As missions evolve, the supporting facilities and resource management programs change to effectively support variations in missions, operational procedures, and environmental stewardship requirements. The land use and management proposals analyzed in this PEIS provide a framework for the continued evolution of these plans and procedures in the context of Fort Bliss ongoing missions and existing land and airspace boundaries.

The RPMP is a series of documents which describes the current composition of the installation and the plans for its orderly long-range development. The current and revised RPMPs provide Fort Bliss a systematic comparison of existing on-post facilities with projected needs. This comparison results in the projects or actions necessary to establish future directions for the installation's development. The documents comprising the RPMP include the following four component plans:

- **Long-range Component** (LRC), which provides a concise overview of the installation and its mission, describes how the master planning process works, establishes goals and objectives for future development of the installation, and revises the previous land use plan for the installation. This PEIS addresses proposed revisions to the LRC.

- **Capital Investment Strategy** (CIS), which includes the Tabulation of Existing and Required Facilities is the installation Commander's plan for using and investing in real property to support the installation's missions. The CIS is a continually evolving mechanism for implementing the goals and objectives of the LRC.

- **Short-range Component** (SRC) integrates real property master planning into the Army's operational planning process. The ideas, plans, and policies from the LRC and CIS, to be implemented during the next 6 years, are developed into specific actions. These projects are then assigned to program years for funding and implementation according to their individual priorities. Because the SRC is a reflection of the LRC, this PEIS provides a foundation for tiering of specific SRC projects.

- **Mobilization Component** (MC) identifies the mobilization capabilities of the installation's billeting, utility, communications, transportation, training, and other support facilities. The MC also assesses and describes the existing capacities relative to peak and sustained mobilization requirements, and identifies new facility requirements, modifications and/or expansion requirements to support mobilization needs according to the most recent mobilization training requirements specified by TRADOC. The existing Fort Bliss MC is based upon 1989 guidance from TRADOC that depicted the conditions prior to the relocation of the 3rd ACR from Fort Bliss. The MC has not been updated. The mobilization guidance used for this PEIS reflects updated guidance as presented in the *Fort Bliss Mobilization Plan* dated October 1996 (U.S. Army, 1996a).

In addition, other plans contribute to mission and facility master planning activities at Fort Bliss:

- **Integrated Natural Resources Management Plan (INRMP)** implements the natural resources program on Fort Bliss, Texas and New Mexico from 1998 through 2002. Preparation of an INRMP is a requirement of the *Sikes Act of 1960* (16 U.S. Code (USC) 670a et seq.) as amended through 1997. The program helps ensure the conservation of natural resources on Fort Bliss, as well as compliance with related environmental laws and regulations. This plan also helps ensure the maintenance of quality training lands upon which to accomplish the critical military mission of Fort Bliss. This plan applies to organizations internal and external to Fort Bliss that are involved with, or interested in, the management or use of natural resources on Fort Bliss. This application includes active duty units, directorates, private groups, and individuals. The INRMP is an integral part of the Fort Bliss Master Plan. The newly developed INRMP is incorporated in the analysis contained in this PEIS.

- **Integrated Cultural Resources Management Plan (ICRMP)** establishes routine procedures for addressing projects in compliance with federal laws, regulations, and executive orders requiring the protection or management of historic resources with the least effect on military training and mission support activities. Historic preservation compliance requirements are integrated with the planning and conduct of military training, construction, maintenance, real property, land use decisions, and other undertakings. Procedures for routine projects are programmatically reviewed by the federal Advisory Council on Historic Preservation (ACHP) and the Texas and New Mexico State Historic Preservation Officers (SHPOs). The plan is also made available to the public for comment. The newly developed ICRMP is incorporated in the analysis contained in this PEIS.

- Other procedures such as those used by Fort Bliss in performing integrated training area management (ITAM), facility engineering, and physical security may affect the location and physical requirements of activities addressed in the plans.

- The master planning process also considers local community development plans when planning support facilities and may affect planning and zoning activities of adjacent local communities.

The formal plans that contribute to the master planning process at Fort Bliss address the known mission requirements. The installation also prepares a pre-planning document to assist in the long-range application of the capability of Fort Bliss to support potential Army and other U.S. Department of Defense (DoD) requirements. The TADC describes the current training capabilities and potential future projects that will enhance these capabilities.

The TADC is a part of the installation process for determining facilities, planning, and management and direction for the future short- and long-term development of training areas on Fort Bliss relative to the needs of range complex users. The TADC, as presented in this PEIS, is a dynamic planning document focused on mission capabilities of the Fort Bliss Training Complex in a land use context. The analysis of the TADC in this PEIS focuses on identifying the potential effects of various training and test activities to assist decision makers in managing the use of the installation's training areas.

The actions presented in the RPMP and its contributory plans, as well as pre-planning activities at Fort Bliss, guide the development and use of facilities and ranges in accordance with the assigned missions, policies, goals, and objectives of the installation. The Army has developed planning goals and objectives to guide the preparation of installation RPMPs Army-wide, which are included in the *Army Long-range Facilities Plan*, the *Army Installation Management Action Plan,* and the *Army Plan* (U.S. Army, 1997a).

Fort Bliss has incorporated these Army goals and concepts into the installation land use and management plans as follows:

- Improve functional efficiency by locating interrelated activities in proximity to one another and separating incompatible activities from one another.

- Improve morale, recruitment, and retention by providing an attractively built environment, both indoors and out, in work, living, and recreation areas.

- Develop and operate the installation in harmony with the surrounding community.

- Coordinate the on-post natural and cultural environment in a manner consistent with effective military training and adherence to environmental guidance and laws.

- Ensure that facility and land uses are adaptable to and can expand to accommodate new missions, weapons systems, and training.

- Lay out facilities and land uses so, as to preserve and enhance areas suitable for ceremonies, distinguished visitors, allied nation liaisons, and other external relations.

- Improve traffic circulation and functional effectiveness by rationalizing and improving the roadway network, reducing intra-cantonment travel, and encouraging pedestrian circulation.

- Eliminate, replace, or upgrade the remaining World War II temporary mobilization facilities.

- Explore and capitalize on opportunities for regional cooperation on infrastructure systems.

- Improve P3 capabilities (the ability to project land forces from the U.S. to augment forward-deployed forces or establish a U.S. presence in a theater of operations) by providing adequate air and rail deployment facilities.

Based upon the installation's goals and objectives, the LRC of the RPMP for Fort Bliss, Texas, was revised May 1997 and is proposed as a guideline for the future development of the installation for the next 20 years, or until amended. The LRC of the RPMP for Fort Bliss, Texas, will be updated as necessary.

Copies of the LRC of the RPMP, INRMP, ICRMP, and TADC have been placed in regional libraries along with this PEIS. The public may review these documents in regional libraries listed in Chapter 10.

1.3 NEED FOR THE PROPOSED ACTION

The proposed action reflects the need for integrated, comprehensive planning to effectively use this land resource for military preparedness. The proposed management practices are based on the changing role of Fort Bliss as a result of Army restructuring, the implementation of plans such as the RPMP and its components that facilitate the accomplishment of Army missions, and integration of Army stewardship of its cantonment area and training lands.

Over the past several years, the Army has been reducing its strength and restructuring its forces and facility resources. This smaller, restructured force will be improved through enhancements and selected modernization to support the *National Military Strategy of the United States* (USJCS, 1997). The combat forces and supporting capabilities are built on five fundamental foundations:

- quality men and women;
- readiness through training;
- enhancements in mobility, battlefield surveillance, command and control, and the ability to employ precision weapons;
- modernization within budget constraints; and
- balanced force structure and infrastructure (USJCS, 1995).

Fort Bliss has undergone several changes as a result of the Army restructuring. With the departure of the 3rd ACR and the arrival of the 31st, 35th, and 108th ADA brigades, the facility requirements of Fort Bliss are shifting from those necessary to house and maintain the readiness of a large force requiring extensive armor and rotary-wing aircraft support capabilities, to a smaller currently assigned force requiring wheeled and limited tracked vehicle support capability, with some requirements for fixed-wing aircraft support.

As the Army has downsized, the global political environment also has resulted in the U.S. Armed Forces being restructured from a forward deployed force to a continental United States-based force capable of rapid overseas projection to various regional "hot spots" or conflicts around the world. Fort Bliss has been designated as one of the Army's P3s. To deploy elements of the 11th, 31st, 35th, and 108th ADA brigades and reserve or National Guard units, Fort Bliss requires an airfield capable of out-loading 72 C5A and 8 C-141 aircraft in 72 hours. Additionally, adequate paved parking for vehicles, rail, storage, administrative, and troop housing and dining facilities are required. Depending upon contingency plans, Fort Bliss may be called upon to deploy units as part of a mobilization of forces. Fort Bliss will not know the extent of its participation in the mobilization until data are released by higher authority.

Implementation of the RPMP and other plans addressed in this PEIS will enhance the capability of Fort Bliss to support the power projection and mobilization missions. This action also will result in demolition and new construction of facilities throughout the Main Cantonment Area.

Current and planned Fort Bliss activities in support of the *National Military Strategy* (USJCS, 1997) could potentially impact the entire installation. Within this area are many known archaeological sites, some of which may be determined eligible for the National Register of Historic Places (NRHP). Also in the area are known federally listed endangered or threatened species. Implementation of the INRMP and ICRMP is proposed to improve the integration of the Army's stewardship of lands upon which it must train with its programs to meet the assigned missions that support national military readiness.

1.4 DECISIONS TO BE MADE

This PEIS provides the analysis and documentation of environmental effects and mitigation under the *National Environmental Policy Act (NEPA)* (Public Law [PL] 91-190) process to enable the Secretary of the Army to make an informed choice among alternative land management approaches. The Army has selected Alternative 3 as the preferred alternative. However, regardless of the alternative selected, the broad missions of units and organizations stationed at Fort Bliss would continue as presently assigned for peacetime and during mobilization. The management approach for the fulfillment of these missions and the associated land use requirements can vary in the future. The specific actions and alternatives that are to be considered include:

No Action Alternative. The decision to implement this alternative would result in no change from existing land use patterns. The natural resource management practices would continue as they have before development of the INRMP. Similarly, the cultural resource management practices would continue as they have before development of the ICRMP. The TADC would not be adopted.

Alternative 1. Implementation of this alternative would result in the known requirements for missions and supporting facilities being managed through adoption of:

- the revised land use designations in the RPMP and types of projects in the master planning process;
- the practices described in the INRMP;
- the practices presented in the ICRMP; and
- the current missions and uses described in the TADC.

Alternative 2. Implementation of this alternative would result in all the land management actions described in Alternative 1 being carried out. In addition, Alternative 2 would implement a mission requirement to develop additional controlled access field training exercise (FTX) sites on McGregor Range.

Alternative 3. Implementation of this alternative would carry out the actions described in Alternatives 1 and 2. In addition, Alternative 3 could result in implementation of land use designations that establish planning concepts for several long-range enhancements to training capabilities at Fort Bliss. The TADC describes these enhancements and envisioned uses. Table 3.5-1 in Chapter 3 lists these enhancements and ranks them according to their likelihood of implementation.

1.5 SCOPE AND USE OF THIS PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

This document provides information to help commanders, directors, heads of partner organizations, and other users of Fort Bliss facilities and their staffs to make environmentally sound operating and siting decisions. To the degree possible given existing data, it qualitatively and quantitatively evaluates the potential environmental impacts of essential mission and supporting management activities on Fort Bliss. In doing so, this document strives to meet several objectives:

- Develop a PEIS to analyze land use and infrastructure management programs and policies. Because it is a programmatic document, the PEIS presents a broad analysis, rather than presenting detailed analyses of specific projects and sites. This statement will be a foundation on which to base (or tier) subsequent environmental documentation for actions proposed in the mission, facility, cultural, and natural resource management programs.

- Describe the master planning process including several contributing plans and provide a framework for implementation of those plans.

- Describe environmental effects associated with a number of project types and activities typically proposed and implemented at Fort Bliss.

- Provide impact assessment methods and criteria for use by future action proponents and other planners to ensure consistent analysis in tiering from this PEIS. Appendix A describes the key terms and decision flow charts of this screening process and associated criteria for potential impact analysis.

- Provide a description of the existing environment with sufficient detail to form the basis for future environmental documents.

Requirements, Processes, and Criteria Under NEPA

2.0

2.0 REQUIREMENTS, PROCESSES, AND CRITERIA UNDER NEPA

This chapter provides a discussion of the regulatory requirements for master planning as they relate to NEPA in Section 2.1. Environmental documents that are related to this PEIS are listed in Section 2.2. The public involvement process undertaken during preparation of this document is described in Section 2.3. The PEIS (Section 2.4), and the programmatic evaluation criteria (Section 2.5) used to evaluate the missions and management plans under consideration to assist in the execution of the missions also are discussed.

2.1 REGULATORY REQUIREMENTS

This PEIS is prepared in compliance with NEPA PL 91-190, 42 USC 4321-4347, as amended), the Council on Environmental Quality (CEQ) *Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] 1500–1508)*, and Army Regulation (AR) 200-2, *Environmental Effects of Army Actions*. CEQ regulations encourage agencies to tier their environmental documents to prevent repetitive discussions and focus their decision-making processes on the important and relevant issues at each level of review (40 CFR 1502.20). The process of tiering refers to covering general issues in a broad document, such as this PEIS, with further focused documents used to address more specific decisions incorporating detailed, action-specific information. AR 200-2 encourages the use of tiering and the incorporation of existing documentation by reference to eliminate repetitive discussions, reduce the bulk of documentation, and allow reviewers to focus on central issues.

AR 210-20, *Master Planning for Army Installations*, describes the RPMP and its components as decision documents that must be assessed for environmental effects as prescribed by AR 200-2, *Environmental Effects of Army Actions*. Interrelated management actions include:

- Revision of the LRC of the RPMP (U.S. Army, 1997a);
- Envisioned changes in the intensity of use of the land resource described in the Fort Bliss TADC (U.S. Army, 1998a) and other installation initiatives; and
- Implementation of the ICRMP (U.S. Army, 1998b) and INRMP (U.S. Army, 1998c). Evaluation of these changes in land, facility, and cultural and natural resource management practices suggest that this document be developed on the programmatic level (PEIS).

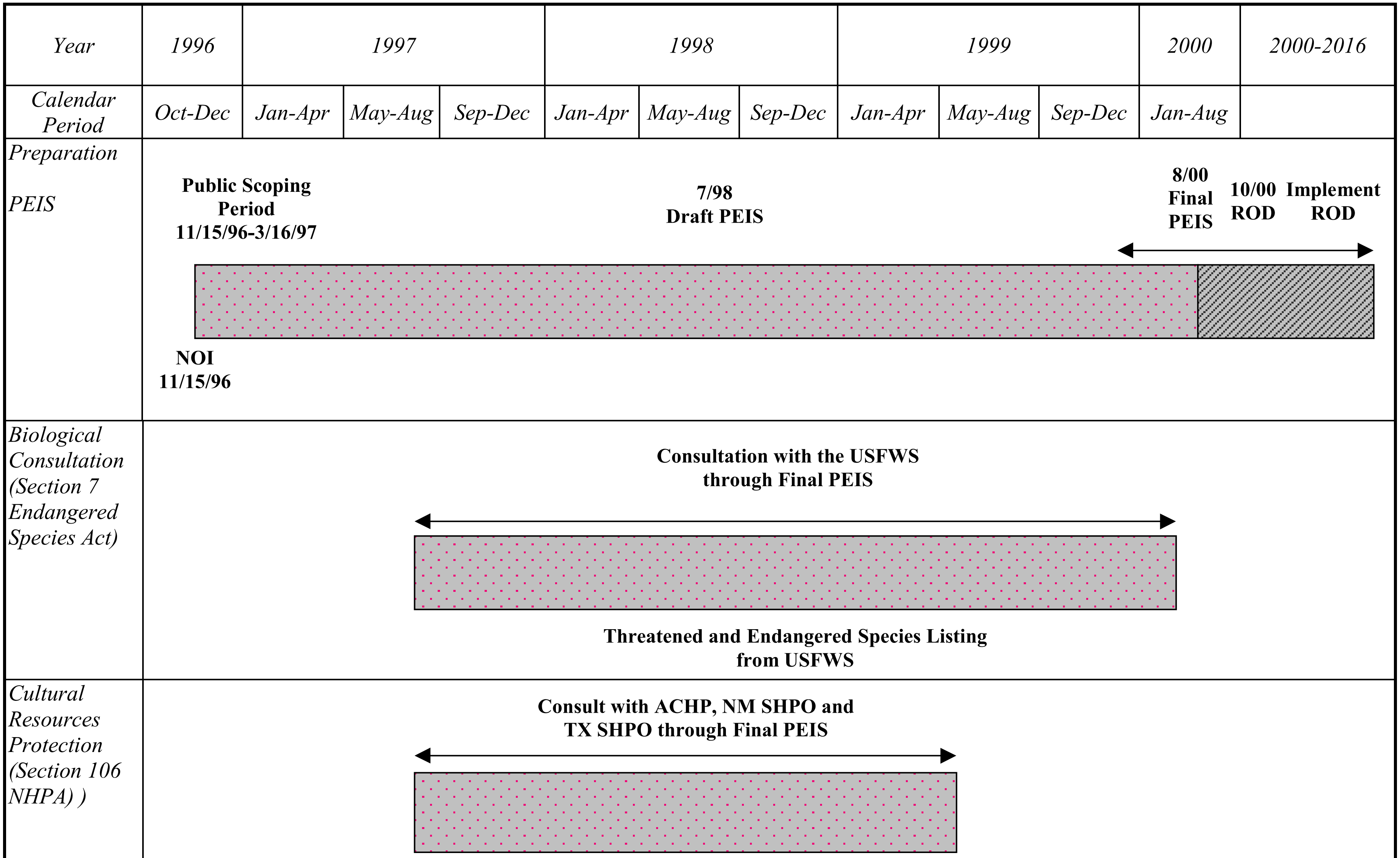
The tiered approach described in AR 200-2 is designed to allow a decision maker to focus on the key issues concerning individual construction or development projects, training exercises, or mobilization operations. When new projects are proposed or new training exercises contemplated, the programmatic review elements developed for this PEIS may be applied to determine whether supplemental environmental documentation is required.

The NEPA process is intended to help public officials make decisions that are based on understanding environmental consequences, and take actions that protect, restore, and enhance the environment. Other Federal Statutes that may apply to the proposed action are listed in Table 2.1-1. Table 2.1-1 provides an overview, not an exhaustive list of federal rules and requirements pertaining to federal agency planning in general, and the NEPA process in particular. Fort Bliss strives for compliance with applicable state regulations. Figure 2.1-1 illustrates the relationship between the PEIS development process and required consultations. 171

Table 2.1-1. Other Major Federal Environmental Statutes, Regulations, and Executive Orders Applicable to Federal Projects[1]

Environmental Resource	*Statutes*
Air	Clean Air Act (CAA) of 1970 (PL 95-95), as amended in 1977 and 1990 (PL 91-604) 40 CFR 52-99
Noise	Noise Control Act of 1972 (PL 92-574) and Amendments of 1978 (PL 95-609) 40 CFR 201-211
Water	Federal Water Pollution Control Act (FWPCA) of 1972 (PL 92-500) and Amendments: Clean Water Act of 1977 (PL 95-217), 40 CFR 100-140 and Water Quality Act of 1987 (PL 100-4), 40 CFR 401-471, and Safe Drinking Water Act of 1972 (PL 95-523) 40 CFR 141-149 and Amendments of 1986 (PL 99-339) and Amendments of 1996 (PL 104-182)
Land	Federal Land Policy and Management Act (FLPMA) of 1976 (PL 94-579) Engle Act of 1958 (43 USC 155) Military Lands Withdrawal Act (MLWA)(PL 99-606) Land Withdrawal regulations (43 CFR Part 2300) Public Rangelands Improvement Act of 1978 Wilderness Act of 1964 (PL 88-577) National Forest Management Act of 1976 (PL 94-588)
Biological Resources	Migratory Bird Treaty Act of 1918 Bald and Golden Eagle Protection Act of 1940 Fish and Wildlife Coordination Act of 1958 (PL 85-654) Sikes Act of 1960 (PL 86-797), 1974 (PL 93-452) and Amendments 1986 (PL 99-561), 1997 (PL 105-85) Title XXIX Executive Order (EO) 13112, Invasive Species Endangered Species Act of 1973 (PL 93-205) and Amendments 1988 (PL100-478) Fish and Wildlife Conservation Act of 1980 (PL 96-366) Lacey Act Amendments of 1981 (PL 97-79)
31 Wetlands and Floodplains	Section 401 and 404 of FWPCA of 1972 (PL 92-500), 40 CFR 100-149 EO 11988, Floodplain Management-1977 EO 11990, Protection of Wetlands-1977 Emergency Wetlands Resources Act of 1986 (PL 99-645) North American Wetlands Conservation Act of 1989 (PL 101-233)
Cultural Resources	National Historic Preservation Act(NHPA) of 1966 (PL 89-665) and Amendments of 1980 (PL 96-515) and 1992 (PL 102-575) EO 11593, Protection and Enhancement of the Cultural Environment-1971 EO 13007, Indian Sacred Sites – 1996 Archaeological and Historic Preservation Act of 1974 (PL 86-523) American Indian Religious Freedom Act (AIRFA) of 1978 (PL 95-341) Antiquities Act of 1906 Archaeological Resources Protection Act (ARPA) of 1979 (PL 96-95) Native American Graves Protection and Repatriation Act (NAGPRA) of 1990 (PL 101-601)
Solid/Hazardous Materials and Waste	Resource Conservation and Recovery Act (RCRA) of 1976 (PL 94-5800) as amended by (PL 100-582), 40 CFR 240-280 Superfund, 40 CFR 300-399 Toxic Substances Control Act , 40 CFR 702-799 Federal Insecticide, Fungicide, and Rodenticide Control Act, 40 CFR 162-180 Emergency Planning and Community Right-to-Know Act (EPCRA), 40 CFR 300-399
Environmental Justice	EO 12898, Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations EO 13045, Protection of Children from Environmental Health Risks and Safety Risks

[1.] This table is an overview of federal rules and regulations pertaining to federal agency planning. State regulations may also apply.



PEIS = Programmatic Environmental Impact Statement; NM SHPO = New Mexico State Historic Preservation Officer; NOI = Notice of Intent; ACHP = Advisory Council for Historic Preservation; TX SHPO = Texas State Historic Preservation Officer; ROD = Record of Decision; USFWS = U.S. Fish and Wildlife Service;NHPA = National Historic Preservation Act.

Figure 2.1-1. Consultation Associated with Programmatic Environmental Impact Statement.

2.2 RELATED ENVIRONMENTAL DOCUMENTS

Previously prepared Environmental Assessments (EAs) and Environmental Impact Statements (EISs) with their implementing decision documents that address ongoing actions, issues, or baseline data at Fort Bliss are incorporated by reference into this PEIS as appropriate. Examples of such NEPA documentation are:

- The *Land Use Withdrawal McGregor Range, Fort Bliss, Texas, Environmental Impact Statement (U.S. Army, 1977)* describes the evaluation of environmental effects of the renewal of the previous withdrawal, which terminated August 20, 1977. Congress renewed the McGregor Range land withdrawal for 15 years following the implementation of the *Military Lands Withdrawal Act of 1986.*

- The *Resource Management Plan Amendment, McGregor Range* (Bureau of Land Management [BLM], 1990a) and the *Proposed Resource Management Plan Amendment/Final Environmental Impact Statement for McGregor Range* (BLM, 1989a), prepared by the BLM to address the degree of public use of resources and the intensity of BLM resource management on land withdrawn for military use at McGregor Range.

- The *Final Programmatic Environmental Impact Statement for the Joint Training Exercise Roving Sands at Fort Bliss, Texas and New Mexico and White Sands Missile Range (WSMR), New Mexico* (U.S. Army, 1994a) addressed the potential cumulative impacts associated with conducting the joint training exercise (JTX) for five annual exercises.

- The *Army Force Structure Realignment Programmatic Environmental Assessment* (U.S. Army, 1995a) describes the environmental effects of relocating the 3rd ACR from Fort Bliss to Fort Carson, Colorado, and the relocation of the 108th, 31st, and 35th ADA Brigades to Fort Bliss.

Several other actions at Fort Bliss that have NEPA documentation completed or under development are incorporated into this PEIS by reference and included in the cumulative effects analysis.

- *Environmental Assessment for the Fort Bliss Site 10 Road Repair, Upgrade, and New Road Construction on McGregor Missile Range, Otero County, New Mexico* (U.S. Army, 1996b). This EA evaluated the proposal to repair or upgrade 21.6 miles of existing road and construct 4.9 miles of new road in the Tularosa Basin on McGregor Range south and west of Otero Mesa.

- *Environmental Assessment for Exploration of Geothermal Resources at Davis Dome, Otero County, New Mexico* (U.S. Army, 1996c). This EA evaluated the characterization of a potential geothermal resource located in the area of McGregor Range Camp. The project included excavation of up to five trenches and installation of up to three subsurface boreholes to a depth below the water table. The maximum area of disturbance was expected to be no more than 20 acres.

- *Environmental Assessment for Theater High Altitude Area Defense (THAAD) System Activation of Objective Battalions Fort Bliss, Texas*, *Basing* (U.S. Army, 1995b). This EA presents the evaluation of a proposed action to activate two battalions of THAAD personnel at Fort Bliss.

- *Environmental Assessment, Military Intelligence Battalion (Low Intensity) (MIBN [LI]) Relocation from Naval Training Center, Orlando, Florida, to Fort Bliss, Texas*, (U.S. Army, 1995c). This EA evaluated the relocation of the MIBN (LI), a subordinate battalion of the 513th Military Intelligence Brigade to Fort Bliss as an imperative of PL 101-510 as amended and the Base Realignment and Closure (BRAC) 1993 report that directed the closure of the Naval Training Center at Orlando, Florida.

- *Environmental Assessment for Army Strategic Mobility Program Facilities at Fort Bliss, Texas and New Mexico* (U.S. Army, 1997b), which is scheduled for completion during 1998. This EA describes five primary Army Strategic Mobility Program (ASMP) projects and three secondary projects at or near Biggs Army Airfield (AAF) that support the P3 CIS (U.S. Army, 1996d). The primary ASMP projects include construction and repair of: an aircraft loading apron, an air deployment facility complex, an ammunition hot load facility, a tactical vehicle overpass, and a rail deployment facility. The secondary projects include: demolition, relocation, and construction of a fire fighting area, and demolition and relocation of a contractor storage area.

- *Environmental Impact Statement, Proposed Expansion of German Air Force Operations at Holloman AFB, New Mexico* (United States Air Force [USAF], 1998). Fort Bliss has jurisdiction over the land and airspace comprising McGregor Range in New Mexico. The USAF, Air Combat Command (ACC) prepared an EIS on a proposal to expand German Air Force (GAF) operations at Holloman Air Force Base (HAFB), New Mexico, through the bed down of an additional 30 PA-200 Tornado aircraft at the base. The proposed action includes construction of various facilities at HAFB and the establishment of a new air-to-ground tactical target complex for delivery of inert and subscale munitions by USAF and GAF units. Three options for the new air-to-ground target complex were considered that included two locations on the McGregor Range portion of the Fort Bliss range complex. On May 29, 1998, the USAF adopted the proposed action and selected Otero Mesa as the location for the tactical target complex. The tactical target complex includes a 5,120 acre impact area and a 180 square mile safety area. The description of the Otero Mesa option and the associated environmental impact analysis is presented in the EIS (USAF, 1998).

In addition, this PEIS provides information that was incorporated into the Legislative Environmental Impact Statement (LEIS) required for the McGregor Range Military Land Withdrawal Renewal Application. The land comprising McGregor Range was withdrawn from the public domain for military use beginning in 1957 and continued by the MLWA of 1986 (PL 99-606). The current withdrawal expires November 6, 2001. To renew the withdrawal, the DA submitted an application for renewal to the Department of the Interior (DOI) and published a Draft LEIS on October 27, 1998. During January 1997, a Memorandum of Agreement (MOA) between Fort Bliss and the New Mexico State Office, BLM, was signed in which the BLM agreed that Army mission activities would be analyzed in the *Mission and Master Plan PEIS.* This analysis was incorporated, to the extent applicable, in the baseline analyses associated with the *McGregor Range, New Mexico Land Withdrawal Renewal LEIS* (U.S. Army, 1998d). McGregor Range was withdrawn from the public domain for period of 25 years from November 6, 2001 through PL 106-99, October 5, 1999.

Figure 2.2-1 illustrates the temporal relationship of the *USAF EIS* (USAF, 1998), the *Fort Bliss Mission and Master Plan PEIS*, and the *McGregor Range, New Mexico Land Withdrawal Renewal LEIS* (U.S. Army, 1998d).

2.3 PUBLIC INVOLVEMENT

Public involvement with this environmental impact analysis process is ongoing through scoping, review of the Draft Programmatic Environmental Impact Statement (DPEIS), public hearings on the draft, and an opportunity for public comment on the final document. Scoping meetings and public hearings were held in communities near Fort Bliss as shown on Figure 2.3-1.

2.3.1 The Scoping Process

Public scoping meetings to solicit public input for preparation of a PEIS on the overall missions and activities at Fort Bliss were held at the locations and dates shown in Table 2.3-1.

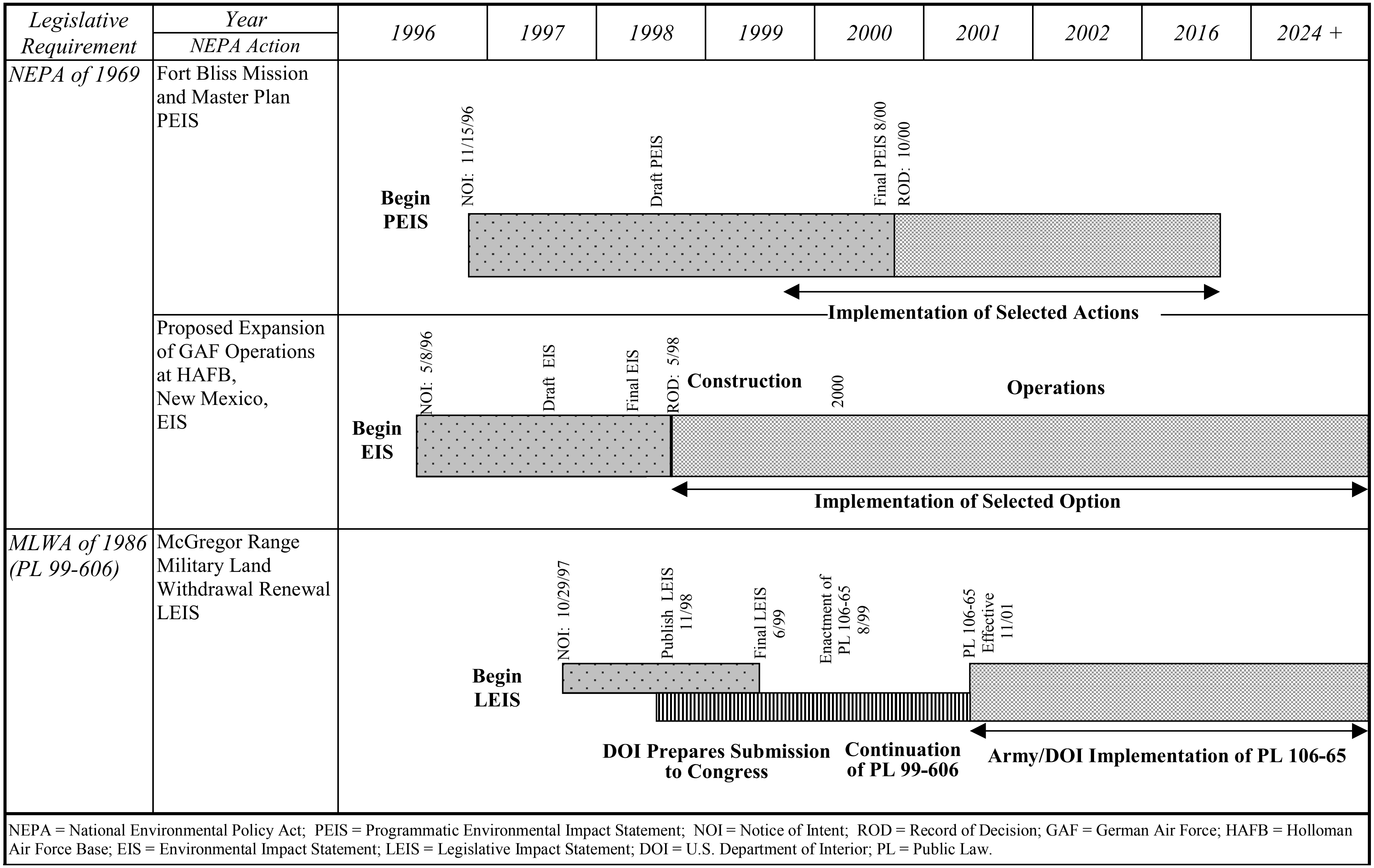


Figure 2.2-1. Parallel Major Federal Actions on Fort Bliss.

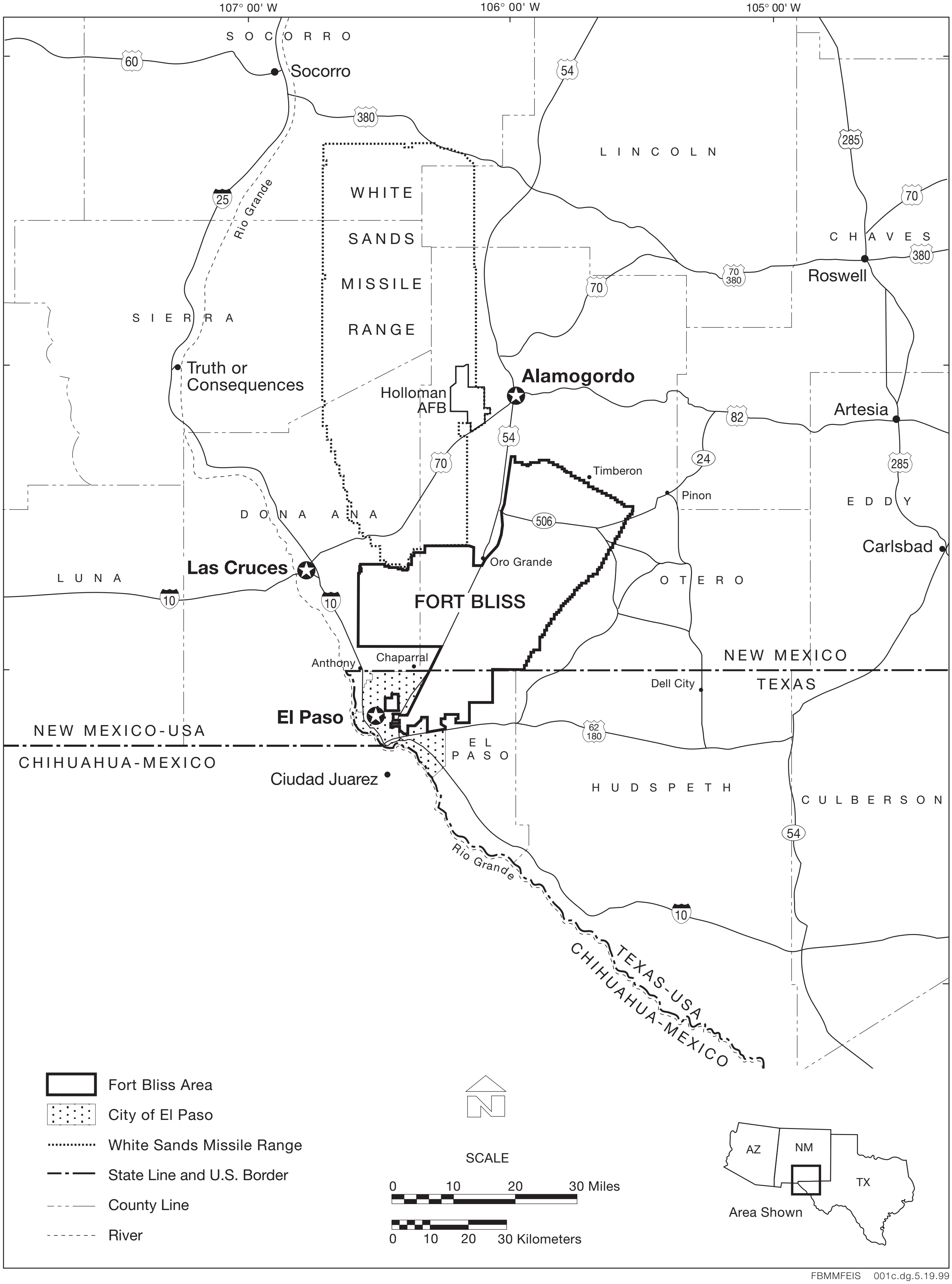


Figure 2.3-1. Scoping Meeting and Public Hearing Locations.

Table 2.3-1. Meeting Dates and Locations

Location	*Date*	*Site*
El Paso, Texas	Monday, January 13, 1997	Marriott Hotel 1600 Airway Boulevard
Alamogordo, New Mexico	Tuesday, January 14, 1997	Alamogordo Holiday Inn 1401 S. White Sands
Las Cruces, New Mexico	Wednesday, January 15, 1997	Las Cruces Hilton 705 S. Telshor Boulevard

Public scoping meetings were held to obtain an understanding of the views of interested federal and state agencies, special interest groups, and private individuals regarding issues to be addressed in the PEIS. The meetings described here were a part of the Army's scoping period, which began on November 15, 1996, with publication in the *Federal Register* of a Notice of Intent (NOI) to prepare the PEIS. The formal closing date for the scoping period was extended to March 16, 1997.

Meeting notification letters were mailed on December 18 and 19, 1996, to 1,000 identified interested parties and property owners in El Paso County, Texas, and Otero and Doña Ana counties, New Mexico, throughout the states of Texas and New Mexico, and across the United States. Flyers were sent to the postmasters of several small communities surrounding Fort Bliss asking them to post the meeting notification in a public place. Newspaper advertisements were published on Sunday, December 29, 1996, in the *El Paso Times,* the *Alamogordo Daily News,* and the *Las Cruces Sun-News*. In addition, the ad was run on Monday and Tuesday, December 30 and 31, 1996, in the *El Paso Times* and the *El Paso Herald Post*; Wednesday, January 1, 1997, in the *Hot Ticket;* and Thursday, January 2, 1997, in *Vecinos*, a Spanish language newspaper.

Prior to the three formal scoping meetings Fort Bliss representatives provided press releases, briefings, and information sessions to government agencies, elected officials and others potentially impacted by the proposed action. Notification of the extension of the scoping period was published during the first week of February 1997.

At the public scoping meetings, the Army received verbal and written input from 38 individuals, special interest groups and government agencies, out of a total of 128 attendees. The first scoping meeting in El Paso, Texas, had 32 participants. Four people provided oral comments. The second scoping meeting, held at Alamogordo, New Mexico, drew the largest number of attendees. Eighteen of 63 participants provided written and oral comments at the meeting. Out of 33 attendees at the third scoping meeting, held at Las Cruces, New Mexico, 10 people made oral comments.

2.3.2 Issues Identified

The following is a summary of issues and/or concerns that were expressed during scoping via meetings and letters. Comments were received from individual citizens, special interest groups, and BLM representatives. The appropriate resource analysis of environmental consequences in Chapter 5 considers these public comments as they relate to each alternative. Public access to portions of the range complex and uses of this land were addressed most frequently in verbal and written comments. Other resource areas addressed include archaeological and biological resources, and environmental and safety concerns. Table 2.3-2 portrays the issues raised and the sections of this document where the concern is addressed.

The issues regarding land use, planning, and biological and cultural resource management relate directly to the Fort Bliss objective of adopting revisions to the RPMP and implementing the INRMP, ICRMP, and TADC.

Table 2.3-2. Public Scoping Issues by Programmatic Environmental Impact Statement Section

Issues Raised	*Fort Bliss Mission and Master Plan PEIS Section*
Land Use	
Military and nonmilitary use of Otero Mesa and Sacramento Mountain foothills portion of McGregor Range	2.2, 3.2.3.2, 3.4, 3.5.3.2, 3.6.1, 4.1.2.1, 4.3.3, 4.4.3, 4.4.4, 4.7.3, 4.9, 5.1.1.2, 5.1.1.4, 5.1.9, Appendix B
Public access to Otero Mesa and Sacramento Mountain foothills portion of McGregor Range	3.2.3.2, 4.1.2.1, 4.1.2.3, 4.7.3, 4.9, 5.1.1.2, Appendix B, Appendix I
Proposed USAF option to construct a tactical target complex on Otero Mesa portion of McGregor Range	2.2, 3.2.3.2, 5.1.1.4, 5.1.4 , 5.1.5, 5.1.6, 5.1.8, 5.1.9, 5.1.10, 5.1.11, Appendix B
Otero Mesa and Sacramento Mountain foothills portion of McGregor Range returned to the public domain	3.6.1
40,000 acres of Doña Ana Range–North Training Areas returned to the public domain to be managed as a wilderness area	3.6.2, 5.1.1.4
Disposition of Castner Range	4.1.2.1, 4.11.3.6, 5.1.1.2
Cultural Resources	
Protection of archeological and historic sites	3.3.5, 4.9, 5.1.9, Appendix B
Consultation with the Mescalero Apache Tribe and Tigua Pueblo	3.3.5, 4.9, Appendix B
Biological Resources	
Preservation of ecosystems and biodiversity on Otero Mesa and other Army lands	3.3.5, 4.8, 5.1.8, Appendices B and F
Preservation of Culp Canyon Wilderness Study Area (WSA) and Areas of Critical Environmental Concern (ACECs)	4.1.2.1, 4.8, 5.1.1.2
Grazing and fire effects on rare and endemic plants	4.8, 5.1.8, Appendices B and F
Rare and endemic plants, the local ecosystem, forests, and woodlands of the Organ Mountains	4.8, 5.1.8, Appendices B and F
Potential impacts outside of WSAs on scenic, biological, and recreational values of the Organ and Franklin mountains ACECs	4.1.2.2, 4.8, 5.1.1.4, 5.1.8
General Environmental Concerns	
Regional water resources	4.7, 5.1.3.5, 5.1.7, Appendix B
Air Quality	4.6, 5.1.6, Appendix B
Hazardous Materials	4.12, 5.1.12
Environmental Restoration	4.12.10
Safety	
Ordnance and explosive hazards	3.6.1, 3.6.2, 4.1.2.3, 4.11, 5.1.11
Live fire safety areas and buffer zones	3.2.3.2, 3.6.1, 3.6.2, 4.11, 5.1.11
Planning	
Army treatment of archeological and historical sites in planning documents	3.3.4, 4.9, Appendix A
Fire management and grazing management in planning documents	3.3.4, 4.8, Appendix A
Socioeconomic data for Otero and Doña Ana counties, New Mexico	4.13, 4.14
Traffic	
Traffic near the Fort Bliss Main Cantonment Area	4.2.1.1, 5.1.2.1, 5.1.2.5

2.3.3 Draft Programmatic Environmental Impact Statement

In July 1998, the USAADACENFB distributed more than 300 copies of *the Draft Mission and Master Plan PEIS* for review by federal, state, and local agencies, Native American groups, interested organizations, and private citizens. The formal comment period lasted 90 days, ending November 5, 1998. As part of this comment process, the Army held public hearings in El Paso, Texas, and Alamogordo and Las Cruces, New Mexico, on September 8, 9, and 10, 1998, respectively. In addition, an environmental justice outreach program was conducted as part of the EIS process. The purpose was to expand participation of potentially affected populations and identify their concerns. This outreach program included a notification letter and a fact sheet, which were provided to all recipients in English and Spanish.

Volume III - Public Comments and Response Document, of the *Final PEIS*, presents the full text of the public comments on the DPEIS received by the Army and the Army's responses. It includes 295 comments received via mail, fax, e-mail, and public hearing transcripts and statement.

2.4 PROGRAMMATIC ENVIRONMENTAL IMPACT ANALYSIS PROCESS

This document programmatically analyzes projects and actions included in revised and concept plans for Fort Bliss. A focusing process was used to determine how to programmatically analyze the environmental impact of the type of projects anticipated to occur on Fort Bliss. The following sections describe the process in detail.

2.4.1 Programmatic Focusing Process

An initial programmatic approach is taken to address the projects or actions that are embedded in the revised and developing plans. This first step is to determine the locations of the projects in the Main Cantonment Area, including Biggs AAF, the Fort Bliss Training Complex, and other major planning areas for assigned or partner organizations stationed at Fort Bliss. A set of four typical project categories (mission, construction and demolition, environmental resource management, and real estate actions) were assigned for comparison with the land use designation for the area to focus the environmental impact analysis. Section 2.5 describes the broad land use screening process that uses environmental overlays with land use planning criteria to identify and evaluate potential alternatives.

The next step is to identify missions and supporting projects within the annual, 6-year, and 20-year planning horizons of the master planning process. Alternatives described in Sections 3.2 through 3.5 of this PEIS identify and describe a variety of known requirements for mission activities, master plan projects, environmental resource management actions, and mobilization plans either underway or planned for Fort Bliss. In addition, the types of missions and projects that are envisioned during the planning horizon but not currently planned are described in Section 3.6. These missions and projects are representative of the capabilities of the installation to support actions that could be proposed, identified, and evaluated in the future at Fort Bliss.

Projects and activities typical of the plans being evaluated programmatically in the PEIS were selected. If the action is identified in the installation's implementation of the following components of the Army master planning and Planning, Programming, and Budgeting processes, then the projects and activities are evaluated as current mission requirements:

- Army Long-range Planning Guidance;
- Army Long-range Facilities Plan;

- The Army Plan;
- Program Objective Memorandum;
- Program Budget Guidance;
- Structure and Manpower Allocation System; and
- Army Stationing and Installation Plan (ASIP), (U.S. Army, 1996e).

A program or project is then evaluated to determine if it fits within current land use designations. Exclusionary criteria are applied to a geographic database (using Geographic Information System [GIS] overlays as appropriate) to eliminate areas that do not meet minimum suitability criteria. This step was used during the development of RPMP components (U.S. Army, 1997a).

A screening estimate of environmental impacts or changes in land use and intensity of use as represented by implementation of programs or projects is prepared. The proponent must then determine if NEPA documentation for the specific action proposed for siting has already been adequately accomplished, or if further NEPA documentation is required. Appendix A describes in more detail this set of criteria to determine environmental documentation decisions relative to the revised land use designations and enhanced management actions evaluated in this PEIS.

2.4.2 Region of Influence

The region of influence (ROI) addressed in the PEIS varies among environmental resource categories. For example, the ROI for ground disturbing activities is generally limited to the immediate vicinity of the disturbance, while impacts on wildlife depend in part on the distance and distribution of affected species. Different environmental resources have different ROIs. Therefore, the ROI is defined according to affected areas and resources, not according to the geographic distance of proposed activities. The ROI is defined in one of three ways as appropriate:

- The Main Cantonment Area, (including Biggs AAF) and/or the Fort Bliss Training Complex.

- Off-post areas surrounding Fort Bliss that would be affected by on-post activities, including areas affected by airfield, range, training area, or installation noise. Also includes communities experiencing socioeconomic effects from Fort Bliss assigned or temporary duty (TDY) personnel and expenditures associated with training and operations.

- Areas under and immediately adjacent to restricted airspace on the ranges, training areas, and entrance points of military training routes to Fort Bliss airspace, and airspace interfaces between Biggs AAF and the El Paso International Airport (EPIA). 32
40

2.4.3 Impact Evaluation

The scope of analysis within each of these ROIs will be directly related to the severity of consequence. The analysis of impacts within Fort Bliss will be on a programmatic basis designed to address types of actions rather than each specific activity presented in the RPMP and the contributory plans. An interdisciplinary team of experts analyzed the proposed action and alternatives against the existing current conditions described in Section 4.0, *Affected Environment*.

Four alternatives are presented in Section 3.0, *Description of the Proposed Action and Alternatives (DOPAA)*. Direct and indirect effects of a program or project are evaluated through the following steps:

1. Identify significant issues associated with the proposed action and develop and present qualitative and quantitative analyses of impacts.

2. Establish the geographic scope of the analysis.

3. Evaluate the effects of the proposed action on environmental resources or ecosystems of concern against effects of current activities during a base period and estimate potential impacts in the future.

In addition to programmatically evaluating direct and indirect effects from these alternatives, cumulative effects from various sources are also evaluated. The CEQ regulations define cumulative impact as:

> the impact on the environment which results from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions (40 CFR 1508.7).

The four steps used in cumulative effects analysis include:

1. Identify the significant cumulative effects issues associated with the proposed action and define the assessment goals. The goal is to develop and present qualitative and quantitative indications of cumulative effects. The cumulative environmental impacts addressed in this PEIS are described in Chapter 5.0 and Appendix B.

2. Establish the geographic scope for the analysis.

3. Establish the time frame for the analysis. The time frame for the cumulative effects analysis is a series of points in time; past, present, and reasonably foreseeable future. Past years include two points in time. The initial period, 1990, was selected to provide a perspective prior to the force restructuring of the mid-1990s and to correspond with a U.S. census year and its corresponding data availability. The period selected as the baseline for comparative purposes, 1996, is considered the present and was the most recent year of data available at the time of PEIS preparation. Reasonably foreseeable periods include the year 2002, the last year of the Army's Planning, Programming, and Budgeting cycle that was available during the preparation of this document. The Army's master planning cycle also includes a 20-year horizon that would be reached in the year 2016. Specific project descriptions of activities during this long-term planning period are highly speculative.

4. Identify other actions affecting the resources or ecosystems of concern. Other actions that primarily occur in this region are associated with WSMR, HAFB, BLM, U.S. Forest Service (USFS), tribal governments, state and local government agencies, and private organizations and individuals. Activities identified for the cumulative effects analyses in this document are discussed in Section 5.0, *Environmental Consequences and Cumulative Effects.*

The availability of data often determines how far in the past effects are examined. Because the data describing past conditions are usually scarce, the analysis of past effects is often relatively qualitative (CEQ, 1997).

The evaluation of projects and training exercises is also based upon the best available information. Data from 1995 and 1996 are used to establish the environmental and socioeconomic baseline. In addition, some data are not available because ongoing or planned studies are not complete. For example, long-term, site-specific biological investigations associated with the INRMP, and cultural surveys associated with the ICRMP, will not be complete within the development period of this PEIS.

To evaluate the wide variety of mission, support facility, and resource management actions that occur daily on Fort Bliss, a set of programmatic evaluation criteria were developed and are discussed in Section 2.5.

2.5 PROGRAMMATIC EVALUATION CRITERIA

Four primary elements in the programmatic evaluation criteria are used to focus the analyses of the three dynamic planning alternatives:

- installation authorized strength;
- the planning horizon;
- equipment used in support of the mission; and
- land use and facilities required to house and maintain the personnel and equipment used to support the Fort Bliss mission.

The following discussion of these elements is intended to provide the reader with a foundation for comparing the alternatives.

2.5.1 Installation Strength

Troop strength at Fort Bliss may vary within the current mission, which has peacetime and mobilization components. During peacetime, troop strength changes as the Army force structure is realigned in response to the *National Military Strategy* (USJCS, 1997).

The ASIP provides planned troop strengths for a 6-year period and is updated on an annual basis. While the data series are generally similar, the data for each future year change slightly as the Army's planning cycle progresses. The most recent proposed strength data available during development of this PEIS is from the ASIP for Fiscal Year (FY) 96 to FY 02, dated September 17, 1996.

Although peacetime strength levels are presented, the sustained, full mobilization troop strengths described in the *Fort Bliss Mobilization Plan* (U.S. Army, 1996a) are assumed to be the maximum authorized strength for purposes of analysis in Chapter 5.0, *Environmental Consequences and Cumulative Effects*. Both peacetime and mobilization strength levels are discussed in the sections describing each alternative.

2.5.2 The Planning Horizon

While the planning horizon for the master planning process is 20 years from FY 96 through FY 16, the period beyond FY 02 is speculative and will vary as Army planning progresses to meet world-wide challenges beyond the annual and 6-year cycles of the Planning, Programming, and Budgeting system. Sustained, full mobilization as described in the *Fort Bliss Mobilization Plan* (U.S. Army, 1996a) is assumed to represent the maximum planned capacity for the period from FY 03 through FY 16. The 1990 strength and equipment data are presented to provide a perspective of the recent changes in the installation mission and activities relative to the planning horizon of this PEIS.

2.5.3 Equipment

As the mission changed from an installation housing FORSCOM's 3rd ACR to one with four FORSCOM ADA Brigades, the equipment mix used at Fort Bliss also changed. The current and full mobilization levels of these equipment categories are provided as a part of the discussions of alternatives in Section 3.0.

2.5.4 Land Use and Facility Requirements

Land use and facility requirements are based upon the stationing strengths and training requirements of units assigned to the installation or who train on the 1.12 million acres that comprise Fort Bliss, Texas and New Mexico. This land area supports the activities described in the installation's RPMP, INRMP, ICRMP, TADC, and other installation initiatives. Section 4.1 *(Land Use)* describes the existing status of the installation land and facilities. Appendix A of the TADC further describes the size, location, and uses of the cantonment, ranges, and training areas during 1990 and 1996 to the extent data are available.

2.5.5 Land Use Screening

Land use screening measures help Fort Bliss create a blueprint to respond to future Army missions and community aspirations while providing the capability to train, project, sustain, and reconstitute today's force. Fort Bliss has two major land use areas: the Main Cantonment Area including Biggs AAF where most administrative, logistical, and personnel support activities occur, and the Fort Bliss Training Complex where most training and test activities occur. These two areas are further divided into land use categories that delineate the general type of use for a specific portion of the installation's land resource.

As discussed in Section 1.2, the RPMP is composed of four component plans: the LRC, CIS, SRC, and MC. The process of revising the RPMP involved identifying the existing land uses on the installation and evaluating the functional relationships between adjacent uses. Land use incompatibilities and location factors described in Section 4.7.3.1, *Incompatible Land Uses*, of the LRC were used to evaluate and resolve the most severe conflicts. Environmental overlays developed in the revised RPMP identify environmental conditions that allow installation planners to identify known environmental constraints associated with siting facilities on a particular location. In addition, the environmental overlays allow training planners to locate wetlands, steep slopes, buffer zones, and restricted areas to aid in maximizing different types of training requiring different types of terrain. This evaluation led to the proposed land use plan described in the LRC of the RPMP.

Proposed revisions to the *Fort Bliss Land Use Plan* were developed concurrently with the unit Tabulation of Existing and Required Facilities (TAB). The TAB quantifies the facility requirements of units proposed to be stationed at Fort Bliss by 2001. Existing and proposed facilities are compared to calculated allowances to estimate facility shortfalls or surpluses by Facility Category Group (FCG). The TAB describes approximately 225 FCGs. Unit representatives were interviewed to determine where each unit should be located relative to other land uses on the installation. The land use alternatives presented in the proposed *Land Use Plan* are based upon facility user requirements as well as land use planning principles. Functional relationships between 12 land use categories were evaluated to improve traffic flow and improve the segregation of incompatible land uses (U.S. Army, 1997a). Table 2.5-1 defines the 12 land uses of the *Land Use Plan*, which are specific to the RPMP.

The CIS is the installation Commander's plan for using and investing in real property to support the installation's missions. The P3 CIS (U.S. Army, 1996d) is an example of the CIS. The P3 CIS describes the facilities, by FCG, that are required to meet the installation's power projection mission and compares the requirement to the existing facilities on-post. The P3 CIS consists of developing and reviewing various alternatives for meeting facility shortfalls and recommending preferred alternatives from a master planning viewpoint.

Most of the Fort Bliss land resource (99 percent) is outside the Main Cantonment Area. The land on the installation field training complex (South Training Areas, Doña Ana Range–North Training Areas, and

Table 2.5-1. Land Use Definitions Specific to the Real Property Master Plan

Land Use	*Definition*
Airfield	Airfield-related facilities including landing and takeoff areas, aircraft maintenance areas, airfield operations and training facilities, and navigational traffic aids.
Maintenance	Facilities and shops for maintenance and repair of all types of Army equipment found at the depot, installation, and Table of Organization and Equipment (TOE) levels.
Industrial	Facilities to house activities for manufacturing Army equipment and material, utility plants, and waste disposal facilities. Includes Director of Logistics (DOL), repair shops, and facilities engineering shops.
Supply/Storage	Depot, terminal, and bulk-type storage for all classes of Army supply.
Administrative	Headquarters and office buildings to accommodate offices, professional and technical services, records, files, and administrative supplies.
Training/Ranges	Academic training areas required to support entry level and continuing education, and fire and movement/training areas.
Troop Housing	Unaccompanied enlisted and officer personnel barracks, including dining, administration, supply, outdoor recreation, and community retail and service facilities.
Family Housing	Facilities to house military families, along with support and recreational facilities.
Community Facilities	Commercial and service facilities, the same as are associated with towns in the civilian community.
Medical	Facilities providing for both inpatient and outpatient medical and dental care for active duty and retired personnel.
Outdoor Recreational	Outdoor athletic and recreational facilities of all types and intensities of use.
Open Space	Safety clearances, security areas, utility easements, water areas, wetlands, conservation areas, forest stands, and grazing areas.

Source: U.S. Army, 1997a.

McGregor Range Training Areas) is mostly undeveloped and consists of a mosaic of overlapping military and nonmilitary uses. The scope and intensity of military use varies considerably within the broad category of training/ranges specified within the RPMP.

The environmental impact on the training lands also varies accordingly. Training activities vary from unrestricted maneuvering by tracked vehicles to artillery/rocket impact zones to less intensive activities such as parachute drop zones and on-road only travel by wheeled vehicles. The TADC proposes land use categories to specify mission activities in more detail than that included in the RPMP.

2.5.6 Impact Analysis Structure

This PEIS will focus impact analysis on four broad mission, mission support, or environmental management categories of activities or projects at Fort Bliss. The four categories are:

- Mission Activity
  - Training Exercises or Mission Operations
  - Test Activity

- Facility Construction and Demolition
  - Facility Renovation or Rehabilitation
  - Infrastructure Improvement
  - Facility Demolition
- Environmental Resource Management
  - ITAM
  - Integrated Natural Resource Management
  - Integrated Cultural Resource Management
- Real Estate Actions
  - Property Transfers
  - Leases

2.5.7 NEPA Screening for Future Projects

This section briefly describes a screening process leading to a decision as to the required level of NEPA documentation of future proposed projects as required by AR 200-2. The results of this screening process may identify requirements for additional NEPA documentation to implement the proposed action.

Step 1. Develop the DOPAA.

The proponent of an action to occur on Fort Bliss must prepare a statement of the purpose and need for the proposed action and a detailed DOPAA to the action for use during the screening process. The DOPAA must include the answers to what, where, when, and how. For example: (what) a new proposal for military training ranges and training areas; (where) South Training Areas, Doña Ana Range–North Training Areas, specifically the multi-purpose range Areas 5 through 7; (when) once per quarter for 4 days; and (how) involving 30 personnel, 4-wheeled vehicles with trailers and generators, the training will involve command and control exercise, field operations, and live firing of a certain quantity of munitions or missiles. In the case of a project that requires construction, demolition, or other ground-disturbing activities, answers to these four questions are also required. In addition, reasonable alternatives to the proposed action are necessary. Additional detail regarding the NEPA screening process for use by proponents of future actions is included as Appendix A.

Step 2. Determine if the Proposed Action is Eligible for a Categorical Exclusion.

The proponent will screen the DOPAA against the criteria for a Categorical Exclusion (CX) as defined in AR 200-2 *Environmental Effects of Army Actions* (Appendix A, Attachment 1). The DA has determined that actions covered by CXs (e.g., routine maintenance activities, construction that does not significantly alter land use, classroom training, routine movement of personnel) do not have individual or cumulative impact on the environment, and therefore do not require an EA or EIS. The proponent will submit the results of the CX screening to the Directorate of Environment (DOE) who will determine whether NEPA coverage by a CX is appropriate.

Step 3. Determine if the Proposed Action Has Been Programmatically Evaluated.

Sections 3.3 and 3.4 identify and describe a variety of known requirements for mission activities, master plan projects, resources management actions, and mobilization plans either underway or planned for Fort Bliss. In addition, Section 3.5 discusses the types of missions and installation capabilities that could be considered during the planning horizon but are not currently planned. A discussion of programs analyzed in this PEIS is included in Appendix A. When considering potential impacts of the proposed action, the proponent should review the environmental consequences of the programmatic actions listed in Table A-1

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and described in Chapter 5 of the PEIS (*Environmental Consequences and Cumulative Effects*). This review should focus on determining if the proposed action's potential impacts have already been programmatically evaluated. Specific projects consistent with the capabilities in Section 3.4 and most of Section 3.5 will require additional NEPA documentation (CX, EA, EIS). The Fort Bliss DOE will confirm that the existing conditions and potential impacts have not changed, and that conclusions regarding the appropriate program or plan evaluated in this PEIS are valid in regard to the action being proposed. **204**

Step 4. Review Flow Charts and Impact Evaluation Matrices.

If the proposed action has not been specifically evaluated in this PEIS and is not subject to a CX, the proponent, in coordination with the DOE, should evaluate the potential for environmental impact associated with the action (Appendix A). It is anticipated that many of the environmental impacts on the various resource categories (such as air quality, biology, and cultural resources) described in this document will be similar to those expected for future mission activities and supporting projects. Proponents should review their proposed activity to determine if it is of a similar type and scale as those described in this PEIS, if it will be sited in proximity to an activity or project evaluated in this document, and if the potential impacts are similar to those described in this document. Following completion of the impact evaluation matrices (Appendix A), the proponent should coordinate with the DOE to identify activity or project similarities. The DOE will evaluate the similarities that may reduce the level of assessment required for evaluating potential environmental impacts. Based upon this determination, the proponent should identify and determine the type of impacts the proposed action will have on individual resource categories.

Step 5. Enumerate Impacts and Propose Mitigation Measures.

The proponent, in coordination with the DOE, enumerates the categories and specific actions that are judged to result in potentially significant adverse impacts. At this point, the proponent may modify the activity or project to avoid specific impacts. Mitigation measures may be proposed to address potential impacts. If project modifications are proposed, the proponent re-evaluates the impact of the project beginning at Step 3.

Step 6. Develop Additional Environmental Documentation.

After enumerating the potential impacts, activity or project modifications, and potential mitigation actions with the proponent, the DOE will determine whether any additional environmental documentation is required. This PEIS includes information describing missions, land use, resource management practices, and cumulative effects that may be used to support the development of more focused, project-specific environmental analysis without re-creation of the general background information described in this document. If an action is determined to be adequately addressed through its similarity to the programs described in this PEIS, a Record of Environmental Consideration (REC), which describes the proposed action and explains why no additional environmental analysis or documentation is required, may be developed. More extensive environmental documentation for specific activities or projects may require a separate EA and Finding of No Significant Impact (FONSI), or an EIS in the absence of a FONSI, and a related Record of Decision (ROD). These include programs not of a similar type, those beyond the scale of those programs described in this document, or those proposed for siting outside the proximity of actions evaluated in this document. A REC would be used to provide the environmental information from this PEIS for the decision-maker's consideration. **204**

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Description of the Proposed Action and Alternatives

3.0

3.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

Each alternative discussed in this section is composed of various military activities that typically occur on Fort Bliss. These activities have been grouped into the following structure:

- **Mission Activities** encompass the wide range of mission and mission support activities currently taking place on the main cantonment, ranges, and training areas.
- **Facility Construction and Demolition** include construction, facility renovation, rehabilitation, and related infrastructure improvements planned prior to this PEIS on the main cantonment, ranges, and training areas. It also includes the demolition of existing facilities planned under the *Fort Bliss FY 97 Demolition Plan* on the main cantonment, Logan Heights, William Beaumont Army Medical Center (WBAMC), Biggs AAF, and McGregor Range.
- **Environmental Resource Management** embraces the current Fort Bliss management programs for natural and cultural resources. This also includes ITAM for addressing potential impacts to soil and vegetative cover.
- **Real Estate Actions** include four typical types of real estate outgrants and disposition of excess property.

Section 3.1 provides a brief overview of the alternatives. Sections 3.2 through 3.5 discuss the No Action Alternative and the manner in which Alternatives 1 through 3 vary from activities and management practices described as No Action. Section 3.6 discusses alternatives considered but not carried forward for full analysis.

3.1 OVERVIEW OF ALTERNATIVES

The alternatives are discussed in terms of the impact analysis structure defined in Section 2.5.6. The Army has not yet selected a preferred alternative. The alternatives addressed in the PEIS are:

- The **No Action Alternative:** This alternative describes the current mission and organizations assigned to Fort Bliss (Figure 3.1-1), and certain planned developments and maintenance activities at the installation. The current mission and real estate action categories of Fort Bliss are common to all alternatives and are discussed primarily under the No Action Alternative.

- **Alternative 1** includes all the actions described in the No Action Alternative plus implementation of certain short- and long-range plans, construction and demolition programs, and environmental resource management plans with potential to affect the environment of the installation. These include the four components of the *Fort Bliss RPMP*, three contributing plans, and the current mission land use designations included in the TADC.

  <u>Components</u>
  - Long-range Component (LRC)
  - Short-range Component (SRC)
  - Capital Investment Strategy (CIS)
  - Mobilization Component (MC)

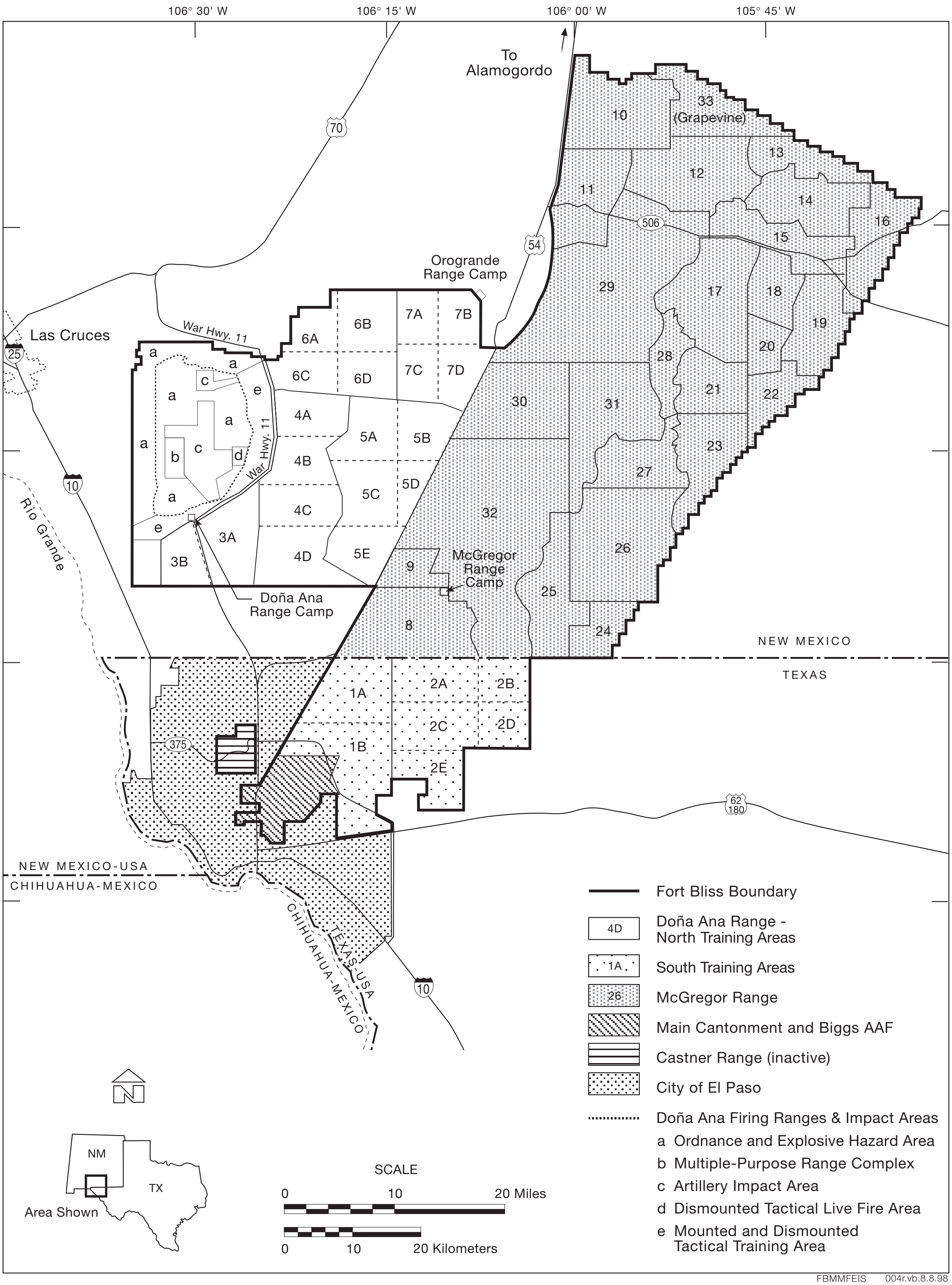

Figure 3.1-1. Fort Bliss.

Contributing Plans

- *Long-range Family Housing Plan*
- *Integrated Natural Resources Management Plan (INRMP)*
- *Integrated Cultural Resources Management Plan (ICRMP)*
- Chapter 3.0, *Current Conditions*, of the *Training Area Development Concept* (TADC)

- **Alternative 2** includes all the actions described in the No Action Alternative, those described in Alternative 1, plus the mission requirement to identify and use an additional 13.5 square miles for controlled access FTX sites on McGregor Range identified in Chapter 4.0, *Future Development Concept*, of the TADC. 37

- **Alternative 3** is the Army's preferred alternative and includes all the actions described in the No Action Alternative, those described in Alternatives 1 and 2, plus potential training capabilities contained in Chapter 4.0 of the TADC and other installation initiatives.

Further description of each alternative is found in Sections 3.2 (*No Action Alternative*), 3.3 *(Alternative 1)*, 3.4 *(Alternative 2)*, and 3.5 *(Alternative 3)*. Table 3.1-1 summarizes the plans and concepts that would be adopted under Alternatives 1, 2, and 3. 12

Table 3.1-1. Summary of Fort Bliss Short- and Long-range Plans and Concepts to be Adopted under Alternatives 1, 2, or 3

Plan or Concept	*Contents*	*Description*
• *Real Property Management Plan* (RPMP) consists of four components and three contributing plans.	*Component:* a. Long-range Component (LRC). b. Capital Improvement Strategy (CIS). c. Short-range Component (SRC). d. Mobilization Component (MC). *Contributing Plans*: e. Long-range Family Housing Plan. f. Integrated Cultural Resources Management Plan (ICRMP). g. Integrated Natural Resources Management Plan (INRMP).	a. Provides a concise overview of installation mission, describes master planning process, specifies optimum land use, provides basis for other components. b. Guides the installation's investments in real property to support missions. c. Integrates real property master planning into Army operational planning. d. Transforms expansion capability analyses of LRC into concrete plans for facility allocation and acquisition. e. Addresses construction and demolition of family housing between FY 93 and 14. f. Provides framework for routine cultural resource management and coordination with others. g. Provides framework for ongoing natural resource management, ensures conservation and compliance, helps maintain quality training lands.
• *Training Area Development Concept* (TADC) describes current training complex capabilities and potential future training enhancements within a land use zoning context.	a. System for classifying training area land use and mission intensity. b. Current training conditions. c. Future development concept. d. Size, location, uses of training complex. e. Summary of range/weapon compatibility.	a. Establishes 10 mission and training-related land use categories for training complex. b. Describes current missions, training area activities, land use and level of use (intensity). c. Describes future missions, potential training area activities, and projected changes to land use. d. Details training activities. e. Specifies where current weapons systems are used on the training complex.

3.2 NO ACTION ALTERNATIVE

The No Action Alternative describes the current mission assigned to Fort Bliss, approved planned development, and maintenance activities at the installation. Fort Bliss is one of 17 installations under the management of TRADOC. It is the home of the USAADACENFB, the U.S. Army ADA School, and over 30 partner units and organizations (formerly referred to as tenant units or organizations). It is the largest Army training installation and is the only troop training installation in the continental United States capable of supporting long-range overland missile firings. Activities supported by Fort Bliss include troop and equipment maneuvers as well as air defense and air-to-ground training. Fort Bliss is comprised of a complex of facilities, training areas, and ranges to support training and test activities of the U.S. Army and other organizations. The main components of this installation include the Main Cantonment Area, which houses most support facilities and includes Biggs AAF, Castner Range, and the Fort Bliss Training Complex which includes the South Training Areas, the Doña Ana Range–North Training Areas, and the McGregor Range (Figure 3.1-1). Castner Range is no longer used for training activities. Much of this range contains ordnance and explosive hazards and is being restored as funding becomes available. Because it is inactive, Castner Range is not considered a part of the Fort Bliss Training Complex and, therefore, has a limited discussion in this document. For additional detail on the size, location, and uses of the Fort Bliss Training Complex, refer to the TADC (U.S. Army, 1998a).

Fort Bliss currently administers, trains, and deploys active Army, National Guard, Army Reserves, and other uniformed service personnel and units. In addition, federal, state, and local law enforcement agencies train on Fort Bliss. Periodic exercises presently involve units stationed at other installations and from other uniformed services, law enforcement agencies, and allied nations.

Units are organized, trained, and equipped for deployment in the continental United States for a national emergency or crisis, as well as for overseas deployment. By establishing and operating marshaling areas on Fort Bliss, this includes support to the Aerial Port of Embarkation (APOE) at Biggs AAF, the Rail Deployment Facility near Biggs AAF, and when required, support to the Sea Port of Embarkation (SPOE) at Beaumont, Texas. These capabilities allow Fort Bliss to function as a platform for rapid projection of military power by either rail or aircraft.

Currently, four ADA Brigades assigned to the FORSCOM are stationed at Fort Bliss. The 11th ADA Brigade supports 3rd Army requirements. The 108th ADA Brigade supports XVIII Airborne Corps requirements, the 31st ADA Brigade supports III Corps requirements, and the 35th ADA Brigade supports I Corps requirements. In addition to their primary support missions, the ADA Brigades may be called upon to support other Army component commanders' worldwide contingency missions, and to provide personnel and equipment to meet training, support, and test requirements.

Fort Bliss Garrison Command operates under the USAADACENFB to oversee, maintain, and operate the multi-mission installation. Fort Bliss Garrison Command accomplishes this through its public works and logistics, master and engineering planning, material maintenance, supply and services support, transportation, and environmental compliance, scheduling, and management activities. The U.S. Army Combined Arms Support Battalion (USACASB) provides the management, control, maintenance, and operation of the Fort Bliss field training areas: the South Training Areas, Doña Ana Range–North Training Areas, and McGregor Range Training Areas. The organization's responsibilities also include airspace (Restricted Areas R-5103 and R-5107A), range camps (Doña Ana, McGregor, and Orogrande) and associated facilities and equipment. Throughout this document, the USACASB refers to the training area operational organization.

The U.S. Army ADA School on fort Bliss educates and trains U.S. military students (active and reserve component), civilians, and selected allied forces students in air defense artillery and other subjects that support the air defense mission. The ADA School also develops and publishes air defense artillery concepts, doctrine, organizations, material requirements, and training literature to meet the needs of the U.S. ADA forces worldwide. The 6th ADA Brigade supports the ADA School by training soldiers in ADA operator and maintenance Military Occupation Specialties through advanced individual training, and supports training of other Army, National Guard, Army Reserves, U.S. Marines Corps, allies, and other students.

Biggs AAF provides full airfield services for all U.S. military services, Department of Justice, and other government flight detachments. As an integral part of the ability of Fort Bliss to support national power projection, Biggs AAF is an aerial departure point for all deployable units at Fort Bliss, as well as approximately 115 Army Reserve/National Guard units.

Other major organizations currently located on the installation include:

- The Test and Experimentation Command's (TEXCOM) ADA Test Directorate, which provides the ADA Center with an independent organization capable of conducting air defense weapons experimentation, force development, and operational testing.

- Joint Task Force Six (JTF-6), a military command stationed at Fort Bliss, provides support to various law enforcement agencies with drug interdiction missions.

- The U.S. Army Sergeants Major Academy, prepares Army Noncommissioned Officers (NCOs) for assignments as battalion, brigade, and division staff NCOs and First Sergeants. Selected NCOs from the Army, other U.S. services, and international forces attend courses in preparation for assignments as Sergeants Major and Command Sergeants Major.

- The WBAMC, a part of the U.S. Army Medical Command, provides full-service (inpatient and outpatient), medical treatment for all military services in Arizona, New Mexico, and West Texas. Medical air evacuation services throughout its service area are provided from Biggs AAF.

- Fort Bliss is the home station for the GAF Command in the United States and Canada, and the German Air Defense School.

A THAAD Battalion (BN) is planned for ongoing stationing at Fort Bliss during the period from 1996 to 2002. NEPA documentation for the THAAD BN is in the *Environmental Assessment for Theater High Altitude Area Defense System Activation of Objective Battalions, Fort Bliss, Texas* (U.S. Army, 1995b).

3.2.1 Peacetime Strength and Equipment

The most recent Fort Bliss authorized strength data available for this PEIS are from the ASIP for FY 96 through FY 02 dated September 17, 1996 (U.S. Army, 1996e). The ASIP data are planning guidance that changes frequently, but generally in small increments. Therefore, for this PEIS, the ASIP data have been rounded to the nearest ten authorized positions.

As the peacetime mission changed from an installation supporting the 3rd ACR, to one with four ADA Brigades, the personnel strength of the installation also changed. A U.S. census year perspective, prior to the relocation of the 3rd ACR, can be gained from strength data as of FY 90 (Table 3.2-1). With the realignment of the 3rd ACR and the three ADA Brigades, Fort Bliss experienced a net loss of 1,108 military and 71 civilian personnel (U.S. Army, 1995a). Further, Army reductions resulted in the

Table 3.2-1. Peacetime Authorized Strength, Fiscal Year 90 and Fiscal Year 96 through Fiscal Year 02

	FY 90	*FY 96*	*FY 97*	*FY 98*	*FY 99*	*FY 00*	*FY 01*	*FY 02*
Military								
Officers	1,960	1,470	1,520	1,520	1,540	1,510	1,470	1,520
Warrant Officers	340	190	250	250	250	240	240	250
Enlisted	16,000	8,980	9,670	9,520	9,790	9,440	9,190	9,820
Total Military	*18,300*	*10,640*	*11,430*	*11,280*	*11,580*	*11,190*	*10,890*	*11,590*
Nonmilitary Employees								
U.S. Civilians	4,650	4,120	3,990	3,930	3,980	3,980	3,980	3,980
Other Civilians	3,130	3,400	3,430	3,430	3,430	3,430	3,430	3,430
Total Civilians	*7,780*	*7,520*	*7,420*	*7,350*	*7,400*	*7,400*	*7,400*	*7,400*
Total Population	*26,080*	*18,160*	*18,860*	*18,640*	*18,980*	*18,590*	*18,300*	*18,990*

Notes: The data is rounded to the nearest ten, therefore totals may not add.
Source: U.S. Army, 1990 through 1996 Fort Bliss Statistics.

authorized strength of Fort Bliss dropping from 26,080 in FY 90 to 18,160 in FY 96. Table 3.2-1 presents the peacetime authorized strength in FY 90, FY 96, FY 97, and that anticipated for Fort Bliss from FY 98 through FY 02.

A prototype THAAD BN was activated in October 1996. Sixty-two personnel from existing ADA battalions at Fort Bliss were assigned as a User Operational Evaluation System (UOES) BN with an additional 295 soldiers to be authorized after demonstration/validation flight testing. The UEOS BN would be enlarged to a strength of 700 in FY 02 after which a second battalion activation in FY 04 and after would add an additional 700 personnel to bring the total military strength at Fort Bliss to approximately 12,290 during calendar year (CY) 04.

The relocation of the MIBN (LI), a subordinate battalion of the 513th Military Intelligence Brigade, to Fort Bliss is an example of unit movements due to BRAC actions based upon evaluations of installation capabilities. Appendix C illustrates the evaluation of Fort Bliss capabilities during *The Army Basing Study, Base Closure and Realignment, 1995* (U.S. Army, 1995d, e). This relocation resulted from the closure of the Naval Training Center at Orlando, Florida, and is expected to be complete in 1998. This battalion is included in the ASIP strengths presented above. The NEPA documentation for this action is in the *Environmental Assessment, Military Intelligence Battalion (Low Intensity) Relocation from Naval Training Center, Orlando, Florida, to Fort Bliss, Texas* (U.S. Army, 1995c).

For the time period from FY 05 through FY 16, or the remainder of the planning horizon, the installation staffing is assumed to remain as projected for FY 04 or after. Mobilization and its potential effects on Fort Bliss strength levels are discussed in Section 3.2.2.

During 1990, prior to the relocation of the 3rd ACR, the equipment mix of units and organizations assigned to Fort Bliss was approximately 551 tracked vehicles, 2,872 wheeled vehicles, 724 trailers, 607 generators, 75 helicopters, and no fixed-wing aircraft. The realignment of the 3rd ACR resulted in the transfer of 1,204 wheeled vehicles, 544 tracked vehicles, and 73 helicopters from Fort Bliss to Fort Carson. Table 3.2-2 illustrates that by 1996 with the ADA Brigades at Fort Bliss, the approximate on-post wheeled vehicle count had increased by 330, while tracked vehicles decreased by 540 and helicopters decreased by 70 (U.S. Army, 1995a).

Table 3.2-2. Fort Bliss Equipment Change 1990 and 1996

Equipment Category	*1990*	*1996*	*Net Change*
Tracked Vehicles	551	7	-544
Wheeled Vehicles	2,872	3,200	+328
Helicopters	75	2	-73

During FY 96, units and organizations assigned to Fort Bliss had both tactical and commercial vehicles authorized through their TOE, Table of Distribution and Allowances (TDA) and commercial vehicles authorized or leased by the General Services Administration (GSA) motor pool that serves the units and organizations located on Fort Bliss. This equipment included approximately 7 tracked vehicles; 3,200 wheeled vehicles; 560 trailers; 560 generators; and 2 helicopters (assigned to WBAMC). Additional equipment may be located on the post awaiting authorization, deployment, or maintenance, or may be authorized equipment for one of the tenant organizations located on the installation. As a result of the relocation of the MIBN(LI), by 1999 the equipment authorizations would increase to approximately 7 tracked vehicles; 3,250 wheeled vehicles; 580 trailers; 580 generators; 2 helicopters; 16 unmanned aerial vehicles (UAVs); and 13 fixed-wing aircraft. During the year 2002, the assigned equipment could increase slightly to 7 tracked vehicles; 3,360 wheeled vehicles; 610 trailers; 640 generators; 2 helicopters; 16 UAVs; and 13 fixed-wing aircraft. Equipment assigned to units mobilizing through Fort Bliss is discussed in Section 3.2.2.

3.2.2 Mobilization Strength and Equipment

Mobilization is the process of assembling and organizing national resources to support national objectives in time of war or other emergencies. Mobilization involves the deployment of active, Reserve, and National Guard units and individuals, and conversion of installations to long-term mobilization mission training, medical, and support centers. There are five levels of mobilization, each designed to deal with increasing magnitudes of conflict.

- Selective Mobilization is the expansion of active forces by mobilization of Reserve units and/or individuals in response to a domestic emergency. Initiated by the President, or Congress upon special action, this call-up does not involve contingency plans for deploying units overseas in response to an external threat to national security.

- Presidential Selective Reserve Call-Up is the augmentation of active forces by up to 200,000 individuals of the selected reserve for up to 270 days to meet operational mission requirements. Crisis response involves both a Presidential Selective Reserve Call-Up and deployment of portions of the active and reserve armed forces.

- Partial Mobilization is the augmentation of active forces but falls short of full mobilization. The President can mobilize up to one million ready reservists for up to 24 months to meet the requirements of war or other emergencies involving an external threat to national security. Congress can initiate partial mobilization levels up to full mobilization. The number of personnel and duration of mobilization initiated by the President may be extended by Congress.

- Full Mobilization activates all Reserve and National Guard units and individual reservists in the existing approved force structure to meet the requirements of war. Full mobilization requires the existence of a national emergency and passage of a public law or joint resolution by Congress declaring war.

- Total Mobilization is the expansion of the active armed forces by organizing and/or activating additional units beyond the existing force structure and other resources needed for their support. Total mobilization meets the requirements of a war or another national emergency or external threat to the national security. Analysis of the total mobilization scenario is beyond the scope of this PEIS because total Army strength under this condition is undetermined and would require congressional action.

In support of mobilization activities, 32 officers and senior NCOs of the ADA BN Team from the Regional Training Brigade (stationed at Fort Carson, Colorado) were stationed at Fort Bliss during April 1997. This team enhances the installation's role in training and readiness for National Guard units including the New Mexico National Guard. During periods when various phases of mobilization occur, the number of personnel assigned to Fort Bliss for various periods will increase. Table 3.2-3 presents the mobilization strength anticipated for U.S. Army Reserve and National Guard units assigned to Fort Bliss during the phases of deployment and mobilization leading to a sustaining base for full mobilization. The Reserve and National Guard units are assigned in three packages: Force Support, Regional Conflict, and Sustaining Base.

Table 3.2-3. Mobilization Authorized Strength

	Force Support	*Regional Conflict*	*Sustaining Base*	*Total*
U.S. Army Reserve	340	1,820	5,620	*7,780*
National Guard	1,950	4,330	2,160	*8,440*
Total	*2,290*	*6,150*	*7,780*	*16,220*

Note: Rounded to nearest ten, therefore totals may not add.
Source: U.S. Army, 1997b.

During the various phases leading to full, sustained mobilization, the Fort Bliss mission consists of deployment of active, Reserve, and National Guard units, and the associated expansion of the installation's training mission. The 131 Reserve and National Guard units mobilizing at Fort Bliss include all Reserve and National Guard units in New Mexico as well as 9 units from Texas with the remaining units from 15 other states. The WBAMC would also have a mobilization mission to care for 1,960 wounded personnel.

The nature of deployments and mobilization is such that it is unlikely the total number of personnel assigned at Fort Bliss during a mobilization would include both the peacetime strength plus that associated with Reserve and National Guard units that are expected to deploy from or be stationed at Fort Bliss. However, for this PEIS the FY 02 strength of 19,000, plus the total mobilization strength of 16,220 provides the largest installation population anticipated at this time for this environmental analysis or 35,220 military and civilian personnel. This peak population includes deploying forces, therefore, it is a temporary maximum level. The more stable maximum installation population is based on the ASIP (19,000) (U.S. Army, 1996e) plus the sustaining base strength (7,780) or 26,780 military and civilian personnel.

Mobilization activities at the installation could involve substantial increases in the number of personnel assigned to Fort Bliss on a temporary basis (as described in Table 3.2-3). The additional personnel (comprised mostly of U.S. Army Reserve and National Guard members) associated with deployment and mobilization are categorized into three groups: Force Support Package, Regional Conflict, and Sustaining Base. Only the last group, Sustaining Base personnel, would remain at Fort Bliss for the duration of any conflict. Personnel of the other two groups would remain at the installation for relatively short periods of time prior to their deployment. In the absence of specific information regarding the duration of stay and the levels of expenditures by personnel during such times, a number of programmatic assumptions are made to enable quantitative analysis to be accomplished. For purposes of analysis, it is assumed that the duration of the hypothetical regional conflict would be 1 year. It is assumed that the number of Sustaining Base personnel at the installation will increase by 7,780. Personnel associated with both the Force Support Package (2,290) and Regional Conflict (6,150) categories (8,440 total personnel) are assumed to remain at the installation for an average of 1 month. Thus, the 8,440 such personnel equate to 703 full-time equivalent personnel.

Units mobilizing through Fort Bliss would have authorized approximately 30 tracked vehicles; 1,550 wheeled vehicles; 470 trailers; and 270 generators. As with the equipment authorized for units assigned to Fort Bliss, only portions of the equipment set would be used at any one time as unit training is scheduled. The units assigned to Fort Bliss as a part of the mobilization-sustaining base have no vehicles, trailers, or generators authorized.

3.2.3 Mission Activities

Fort Bliss real property master planning is based on the assigned installation missions. The LRC of the RPMP specifies optimum land use for enhanced mission accomplishment and quality community support.

The nature of land use on the Main Cantonment Area is essentially urban, ranging from industrial through commercial, to community facilities, troop and family housing, and open space/outdoor recreational. All 12 categories of land uses are found within the Main Cantonment Area. Existing land uses as the installation had evolved through 1996 are shown on Figure 3.2-1. The land use pattern under the current *Fort Bliss Land Use Plan* (U.S. Army, 1997a) within the Main Cantonment Area is shown on Figure 3.2-2.

Land use on the remainder of Fort Bliss outside the Main Cantonment Area (99 percent) includes the South Training Areas, the Doña Ana Range–North Training Areas, and the McGregor Range. Land uses in these areas are generally described as Training/Ranges in the current installation-wide land use plan.

Castner Range was established in 1926, and throughout its history, it was used by the Fort Bliss combat garrison for all types of small arms, explosives, and field artillery uses, demonstrations or disposals. Later, when Fort Bliss became an Air Defense School, training emphasis shifted to various air defense weapons and away from the types of ordnance previously used at Castner Range. All organized weapons firings were discontinued on Castner Range during 1966.

In 1971, 1,247 acres were surveyed for ordnance and determined to be safe for transfer to the City of El Paso. On August 16, 1983, the GSA declared the remaining 7,081 acres as undisposable because of the ordnance and explosive hazards still present.

Mission activities take place within this land use context on the Main Cantonment Area and the Fort Bliss Training Complex. Ongoing mission activities occur throughout the installation with the exception of Castner Range. Routine ongoing mission support activities are listed in Table 3.2-4. Examples of these low-impact activities include: recreation and welfare activities that do not involve off-road vehicle (ORV) movement; routine repair and maintenance of buildings, roads, airfields, grounds, and other facilities, except when requiring application or disposal of hazardous or contaminated materials; and training of an administrative or classroom nature.

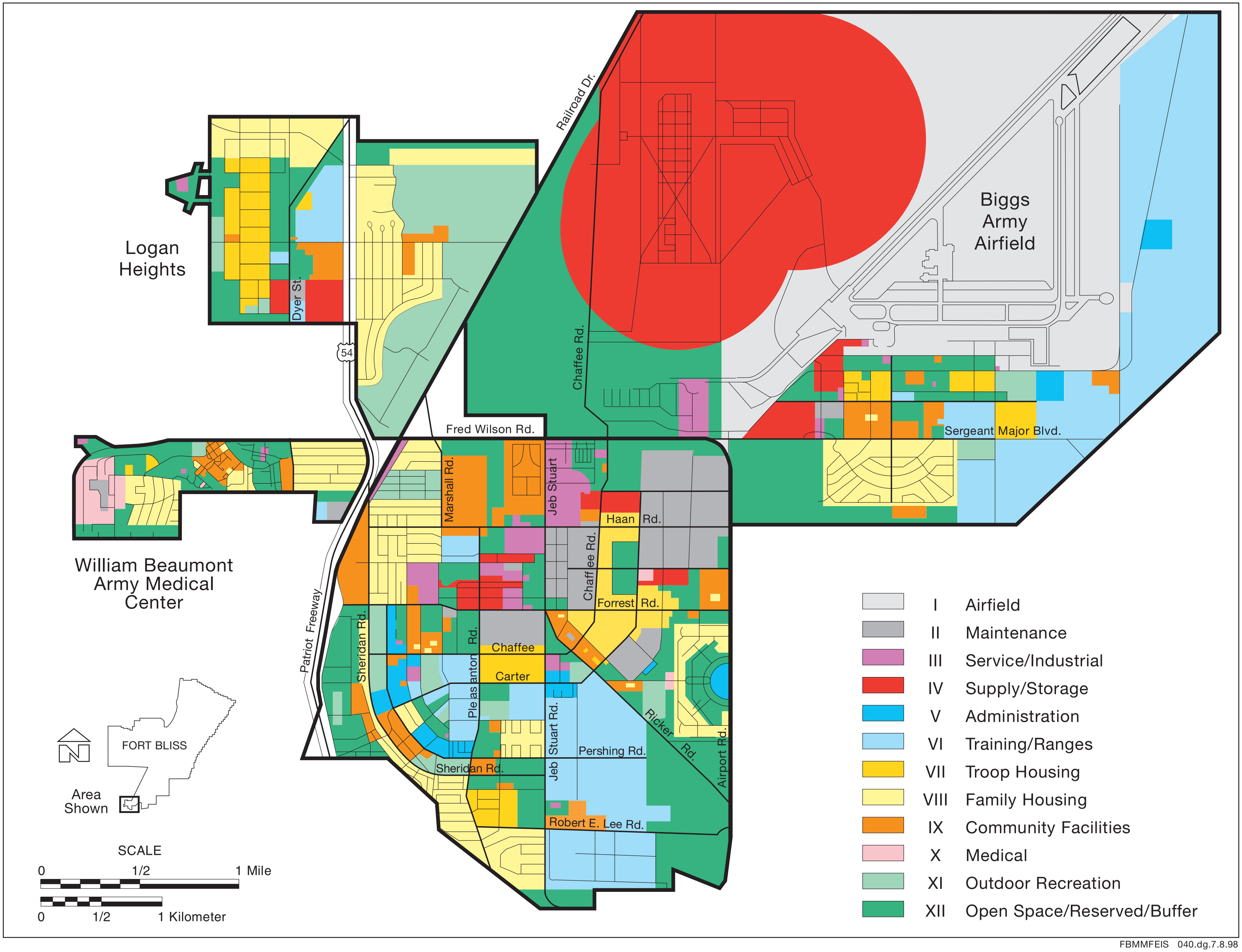

Figure 3.2-1. Main Cantonment Area Existing Land Use.

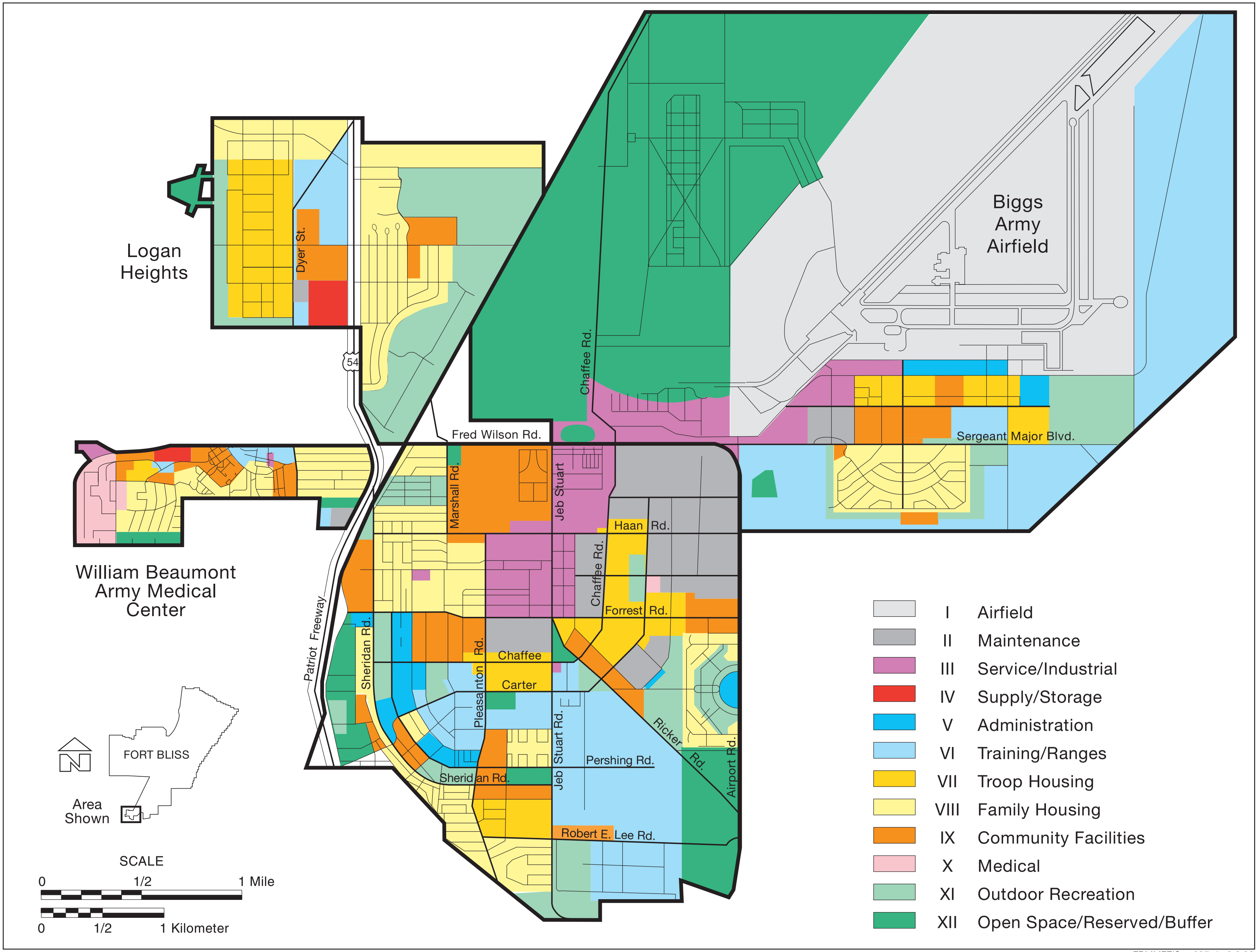

Figure 3.2-2. Land Use Patterns under the Current Land Use Plan.

Table 3.2-4. Routine Ongoing Mission Support Activities

Administrative Support Services • Printing • Furniture Shop • Photographic Labs • Recycling Center • Weapons Repair	*Building Maintenance* • Painting, Roofing, Welding and Sheet metal works • Heating Ventilation and Air Conditioning (HVAC) and Refrigeration Maintenance • Plumbing and Steam Fitting • Electrical Repairs • Asbestos Removal • Radon Testing • Fire Alarm Maintenance • Furnace Maintenance • Glass Repair • Sign Painting	*Utility System Maintenance* • Boiler/Power Plant Operations • Water/Sewer Line and Lift Station Maintenance • Water Treatment and Distribution • Transformer Maintenance and Replacement • Communication System Maintenance • Gas System Maintenance • Street Lighting Maintenance • Fire Hydrant Maintenance
Fire, Medical, and Police Services • Fire Department • Fire Training • Installation and Regional Medical Corps (WBAMC) • Law Enforcement • Training/Traffic Enforcement	*Grounds Maintenance* • Pesticide and Herbicide Application • Landscaping • Lawn Mowing • Fertilizer Application • Grading of Previously Disturbed Training Area Sites • Sprinkler System Maintenance	*Road, Railway, and Airfield Maintenance* • General Repair and Maintenance • Cleaning/Sweeping • Reconstruction
Vehicle Maintenance and Repair • Paint Shop • Wash Racks • Maintenance Shops • Steam Cleaning	*Fuel Storage and Dispensing* • Airfield Operations • Transportation Motor Pool • Army and Air Force Exchange Systems (AAFES) Filling Stations • Tactical Fuel Points	*Range and Training Areas Control* • Scheduling • Safety • Access • Maintenance • Enforcement
Individual Training Activities • Advanced Individual Training • Reserve Component Training • Nuclear, Biological, and Chemical Course • Basic and Advanced NCO Courses • Military Operations Specialty (MOS) Training • ADA Officer Basic Course • ADA Advanced Course • Other ADA School Courses • Sergeant Majors Academy Courses	*Hazardous and Nonhazardous Materials Disposal* • Landfill Operations/Solid Waste Disposal • Sterilization Discharge • Radioactive Material Storage and Use • Medical Waste Handling and Disposal • Pathological Waste Incinerator • Ordnance Disposal	*Special Materials Use* • Polychlorinated biphenyls (PCB) • Asbestos • Radon
Natural and Cultural Resource and Integrated Training Area Management • Natural Resource Management • Cultural Resource Management • ITAM	*Crafts, Shops, and Recreation* • Auto Maintenance • Officer, NCO, and Enlisted Clubs • Gymnasium • Library • Bowling Alley • Woodworking • Photography • Golf Course Maintenance • Swimming Pool Maintenance	*Special Events* • Amigo Air Show • Armed Forces Day • Summerfest Concerts
Community Support • Child Development Center • Youth Activities • Retail Services (Commissary and AAFES)		

3.2.3.1 Main Cantonment Area

Mission activities conducted within the facilities of the Main Cantonment Area include command and control, classroom instruction, doctrine and equipment test design, and medical and logistical support activities.

3.2.3.2 Fort Bliss Training Complex

The Fort Bliss Training Complex is composed of three distinct, mostly undeveloped areas: the South Training Areas in El Paso County, Texas; the Doña Ana Range–North Training Areas in Doña Ana and Otero counties, New Mexico; and the McGregor Range in Otero County, New Mexico. Land use of the South Training Areas includes ground troop (dismounted) training, off-road maneuver using wheeled and tracked vehicles, and drop zone (DZ) activities. Uses of the Doña Ana Range–North Training Areas include artillery, small missile, small arms and other weapons impact areas, drop zone activities, and billeting, administration, and mission support activities at Doña Ana Range Camp and Orogrande Range Camp. Due to the live fire activities, much of Doña Ana Range–North Training Areas are used as surface danger zones (SDZs). McGregor Range uses are distinguished from those of other parts of the training complex through the live firing of high-to-medium-altitude missiles (HIMAD). Other uses of McGregor Range include small missile, small arms, and other weapons impact areas, DZ and landing strip activities, and billeting, administration, and mission support activities at McGregor Range Camp. Much of McGregor Range's surface area is used as SDZs during live fire exercises (FIREX). Only the most southern parts of McGregor Range are used for ORV maneuver training.

The existing LRC generally categorizes all land use in the Fort Bliss Training Complex as Training/Ranges (Category VI). However, for more detailed management of training lands, the area is divided into ranges and 33 training areas (Figure 3.1-1). Current land uses are informally specified by the facilities in each training area and the *Standing Operating Procedures (SOPs) for Weapons Firing and Maneuver Area Use* (U.S. Army, 1996f).

The USAF is expanding GAF operations at HAFB, New Mexico. The action includes construction of a new air-to-ground USAF tactical target complex on McGregor Range. The description of the selected site on McGregor Range is presented in the EIS for *Proposed Expansion of the German Air Force Operations at Holloman AFB* (USAF, 1998) and is included by reference in this document. On May 29, 1998 the USAF selected the Otero Mesa option located in Training Areas (TAs) 17 and 21. This site and the alternate site in TA 31 in the Tularosa Basin are described in Appendix B.

The detailed description of each option for these sites and the associated environmental impact analysis is presented in the USAF EIS (USAF, 1998). This PEIS incorporates the USAF by reference, as part of the cumulative effects of the Army's No Action Alternative. This document was developed concurrently with the USAF EIS.

Land uses on the ranges also include resource-oriented land management areas for archaeological and historical resources, and habitat conservation. In addition, there are other special-use areas for grazing, research, and public recreation which carry with them restrictions on training, access, and public use.

Access to the training areas outside the Main Cantonment Area is controlled by Fort Bliss through the Commander (CDR) USACASB. Military units, government agencies and contractors are required to coordinate access and use with the Range CDR (through the Range Scheduling Office) to ensure safety and to avoid interference with other military missions.

Members of the public must obtain annual access permits from the CDR, USACASB, through the Range Development and Enforcement Section and are also required to check in and out with McGregor Range Control to ensure safety and avoid interference with military missions. Current access procedures allow appropriate military missions such as environmental resource surveys to be conducted concurrently with public use. Public access areas on the training complex are shown on Figure 3.2-3. One thousand to 1,700 permits are issued annually for purposes such as livestock management, hunting, hiking, and guided nature tours. Permit holders are responsible for complying with specific Army procedures for entry, use, and departure from the range. During hunting seasons, for example, access by about 10 persons may be recorded each week. At other times, official access requests for the public is infrequent. The Las Cruces Field Office of the BLM is authorized to issue recreational access permits.

Training activities support the installation's mission to help maintain the operational readiness of active duty, reserve, and National Guard units and other federal agencies. The majority of FTXs are conducted on Fort Bliss training areas. There are presently four ADA Brigades assigned to Fort Bliss, which use FTXs to maintain combat readiness for deployments and air defense operations. Examples of other range users include the Mobilization Army Training Center, U.S. Marine Corps, National Guard units, U.S. Army Reserve units, and engineering units. Many of these units are stationed across the U.S. as shown by Table 3.2-5. 42

In additions to FTXs, missions carried out on Fort Bliss ranges include JTXs, unified command training, unit training, combat support, combat service support, weapons testing, joint training with allied nations, activities conducted by other services, agencies and organizations, range/facility management, and environmental resource management.

Allied nations have utilized Fort Bliss ranges for annual service practice for the past 30 years. These include allied air forces, self defense forces, and air defense schools. Exercises have involved Hercules, Hawk, Roland, and Patriot service practice.

Live fire FTXs are conducted on Fort Bliss training areas by Fort Bliss units and units from other armed forces installations. An example of this type of training is the live FIREX, occurring on McGregor Range, which involves the firing of missiles on McGregor Range following Roving Sands. This FIREX produces a large number of missile firings on McGregor Range, including the Patriot, Hawk, Roland, and Stinger.

Roving Sands is a JTX coordinated by the Chairman, USJCS, scheduled by the U.S. Atlantic Command, and sponsored by FORSCOM. The JTX is the only exercise that actually plans and executes multi-service integrated air defense operations that involve all four services. The exercise includes air-to-air combat scenarios, air-to-ground attacks, and live FIREX. The JTX is conducted annually in spring or early summer for approximately 1 month, and uses most of the Fort Bliss Training Complex for a variety of ground and air training activities. During this period, very little nonmilitary use is permitted. Live-fire activities, as described above, are performed for approximately 1 week and usually result in closure of New Mexico Highway 506 during the exercise. Roving Sands involves units from all U.S. military services and allied armed forces. Roving Sands is the only exercise that carries out multi-service air defense operations involving all four U.S. military services. Recent Roving Sands exercises involved upwards to 24,000 personnel. During the 1997 Roving Sands JTX, of approximately 16,000 personnel involved, 11,300 were stationed at various locations on Fort Bliss. Approximately 4,500 personnel were located at the Fort Bliss Main Cantonment Area including Biggs AAF, a group of approximately 1,700 personnel were stationed near Logan Heights, about 3,300 were located at bivouac sites on Doña Ana Range–North Training Areas, and approximately 1,800 personnel were located at bivouac sites on McGregor Range (U.S. Army, 1997c). In 1998, this exercise was reduced in scale by approximately

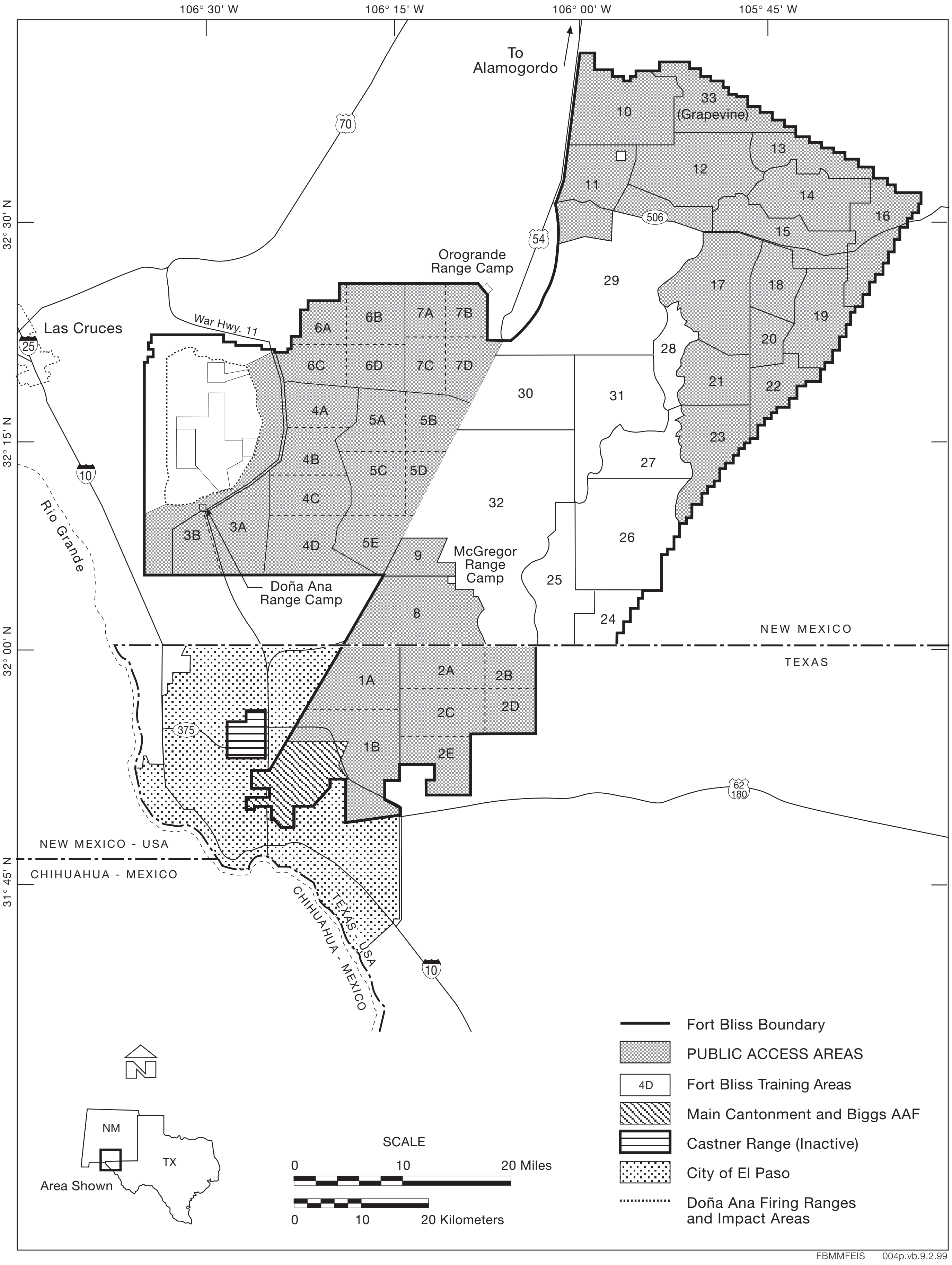

Figure 3.2-3. Public Access Areas on Fort Bliss.

Table 3.2-5. Fort Bliss Range Complex Typical Units Supported

Unit	*Component*	*Home Location*	*Training Area Used*	*Billets*	*Personnel*	*Length of Stay (Days)*
11th ADA	Active	Fort Bliss, TX	Doña Ana Range–North Training Areas - TAs 3A-7D	Doña Ana	400	14
208th Signal	Active	Fort Bliss, TX	Meyer Ranges	None	40	2
3/43 ADA	Active	Fort Bliss, TX	South Training Area 1A	None	100	3
6/52 ADA	Active	Fort Bliss, TX	McGregor - Short-range Air Defense (SHORAD)	None	100	1
70th Ordnance	Active	Fort Bliss, TX	McGregor - TA 8	McGregor	300	15
7/6 Cavalry	Reserve	Conroe, TX	Doña Ana Range–North Training Areas – Firing Ranges 40/48/49 McGregor - Cane Cholla	McGregor	260	14
3/4 ADA	Active	Fort Bragg, NC	McGregor - DZs, SHORAD Range	McGregor	198 150	14 19
18th ABN 3-27 FA	Active	Fort Bragg, NC	Doña Ana Range–North Training Areas – TAs 3A-7D	Doña Ana	35	7
3/1 SFG	Active	Fort Lewis, WA	Doña Ana Range–North Training Areas McGregor - Meyer Ranges	Doña Ana	100	52
1/5 SFG	Active	Ft. Campbell, KY	Doña Ana Range–North Training Areas, McGregor - North Training Areas Meyer Ranges	Doña Ana McGregor	200	36
1-10 Aviation	Active	Fort Drum, NY	Doña Ana Range–North Training Areas – Firing Ranges 40/49	Doña Ana	150	30
Japanese Annual Service Practice	Allied	Japan	McGregor – Tactical Air Command (TAC)	McGregor	100	90
1/82 Aviation	Active	Fort Bragg, NC	McGregor - Hellfire firing	McGregor	N/A	4
GAF Air Defense	Allied	Germany	Doña Ana Range–North Training Areas,	Doña Ana	1,000	60
6/32 FA	Active	Fort Sill, OK	Doña Ana Range–North Training Areas, MLRS Firing	Orogrande	700	34
Combined Federal Officer Tng.	Law Enforcement Agencies	El Paso, TX	Doña Ana Range-–North Training Areas Meyer Ranges	McGregor	35	7
1/3 SFG	Active	Fort Bragg, NC	McGregor - Training Areas Meyer Ranges - DZs	McGregor	95	36
21 FA	Active	Fort Hood, TX	Doña Ana Range–North Training Areas Multiple Launch Rocket System (MLRS) Firing		100	N/A
138 FA	National Guard	Lafayette, IN	McGregor - Forward Area Weapons (FAW) 10	McGregor	4	2

Notes: ABN = Airborne, ADA = Air Defense Artillery, FA = Field Artillery, SFG = Special Forces Group.
Source: 1st CAS, Fort Bliss, TX.

5,000 to 6,000 troops from previous years because of the buildup of U.S. Forces in the Persian Gulf. Additional information regarding the Roving Sands JTX is presented in the *Final Programmatic*

Environmental Impact Statement for the Joint Training Exercise Roving Sands at Fort Bliss, Texas and New Mexico and White Sands Missile Range, New Mexico, February 1994 (U.S. Army, 1994a).

Another major FTX held periodically at Fort Bliss is Rio Bravo, the largest smoke-generation training exercise led in the United States. This exercise includes the use of battlefield obscurant (fog oil) and tasks to improve unit and individual survival skills. The exercise usually is for a 2-week period in June with a 6-day deployment to the Doña Ana Range–North Training Areas. Participants have included approximately 1,350 personnel from five battalions of the 460th Chemical Brigade, headquartered at Camp Pike Armed Forces Reserve Complex, Arkansas.

The WSMR uses Fort Bliss ranges/training areas for limited tests. Operations directed by test and missile commands from WSMR primarily use the SHORAD and Orogrande ranges. The WSMR may also use McGregor Range and Doña Ana Range–North Training Areas as a safety buffer zone for some tests. HAFB uses a Class C bombing range on northern McGregor Range for low-level, inert ordnance delivery.

Other agencies conduct weapons training and testing activities within the Fort Bliss Training Complex. For example, Meyer Range is used for federal law enforcement training.

3.2.4 Facility Construction and Demolition

The facility construction program under the No Action Alternative includes new construction, existing facility renovation or rehabilitation, and related infrastructure improvements. Construction projects were planned for the fiscal years described below; however, implementation in a specific fiscal year is subject to program funding changes. Twenty-six construction projects have been identified under this alternative (Table 3.2-6). Fifteen of these projects involve the replacement or renovation of family housing and are located in areas categorized as Land Use VIII–Family Housing. The *Fort Bliss Long-range Family Housing Plan* (U.S Army, 1997a) consists of a number of sequential projects developed around two concepts. The first concept is to build new family housing units on previously undisturbed sites. The second concept is to demolish older, existing units and replace them with new housing units. As stated previously, this is a sequential process, new units are built before older homes in other areas are demolished. Therefore, an adequate quantity of family housing is available for post personnel. The family housing construction projects occur in the following areas: Logan Heights, WBAMC, Aero Vista, Van Horn Park, Hayes, and the South and North Main Cantonment Areas.

By means of construction projects with fiscal years prior to FY 97, 299 family houses were replaced in the Logan Heights area, 105 family houses were replaced in the WBAMC area. Under the No Action Alternative, between FY 97 and FY 12 there are plans to replace 1,427 family housing units. In addition, renovation of 121 housing units is scheduled to occur in FY 14 (Table 3.2-6).

There are 11 other construction projects included in the No Action Alternative (Table 3.2-6). Five of these construction projects began and/or were completed prior to FY 97. These five projects included construction activities in areas designated as land use categories I–Airfield; II–Maintenance; VI–Troop Housing; and IX–Community Facilities (Figure 3.2-2, *Land Use Patterns under the Current Land Use Plan)*. The remaining six nonhousing construction projects are scheduled to occur during FY 97 and FY 98. Five of these projects are slated to occur in association with Biggs AAF, which is designated Land Use I–Airfield. The sixth project is located at WBAMC, which is categorized as Land Use X–Medical.

The facility demolition program is a part of the Army's Facility Layaway Program begun in 1994 to reduce infrastructure and bring operations and maintenance costs on each installation in line with the facilities

Table 3.2-6. Fort Bliss Family Housing and Other Construction Projects–No Action Alternative

Program FY	*Project*	*Quantity*	*Location*	*Land Use Category*
Family Housing				
Before FY 97	Army Family Housing Construction (AFHC) Family Housing Replacement	189	Logan Heights–West	VIII
		110	Logan Heights–East	
		105	WBAMC	
FY 97	AFHC Family Housing Replacement	64	Hayes	
FY 98	AFHC Family Housing Replacement	66	Hayes	
		25	WBAMC	
FY 00	AFHC Family Housing Replacement	200	Aero Vista–West	
FY 02	AFHC Family Housing Replacement	200	Aero Vista–East	
FY 04	AFHC Family Housing Replacement	130	WBAMC	
FY 06	AFHC Family Housing Replacement	165	North Main Cantonment Area (1400, 1500, 1800 areas)	
FY 08	AFHC Family Housing Replacement	167	Logan Heights	
FY 10	AFHC Family Housing Replacement	300	North Main Cantonment Area (1300, 1800, 1900, 9300 areas)	
FY 12	AFHC Family Housing Replacement	110	Logan Heights	
FY 14	AFHC Family Housing Renovation	121	South Main Cantonment Area (200–500 areas), WBAMC (7000, 7300 areas)	
Other Construction				
Before FY 97	Repair Airfield Runway	1	Biggs AAF	I
	Vehicle Maintenance Shop (THAAD)	1	Main Cantonment Area	II
	Barracks Replacement		Main Cantonment Area	VI
	Dining Facility	1	WBAMC	VI
	Child Development Center	1	Logan Heights	IX
FY 97	Repair Airfield Lighting System	1	Biggs AAF	I
	Repair Asbestos Concrete (AC) Loading Apron East	1	Biggs AAF	
	Repair Airfield Taxiways (Phase I)		Biggs AAF	
	Repair Airfield Taxiways (Phase II)		Biggs AAF	
	Hospital Upgrade	1	WBAMC	X
FY 98	Aircraft Maintenance Hangar repair and renovation	1	Biggs AAF	I

required to meet the assigned mission. The Layaway Program has two purposes: layaway awaiting demolition, and layaway but holding for potential future use. The value of the layaway program comes from lowering operating costs for heating, cooling, custodial services, etc., which equates to an annual savings in operations and maintenance costs. Any facility proposed for demolition must have the appropriate U.S. Department of Housing and Urban Development (HUD) and environmental or cultural effect evaluations (asbestos, lead-based paint, and historic property) before demolition can proceed.

The No Action Alternative includes plans to demolish family housing and other facilities (Table 3.2-7). The current plan has 2,765 facilities scheduled for demolition between FY 97 and FY 14. In addition, 512 family housing units were demolished prior to 1997. Demolition of nonhousing and troop housing facilities was planned to occur beginning FY 97, while demolition of family housing units is scheduled to continue through FY 14. Implementation in a specific fiscal year is subject to program funding changes.

Demolition of facilities will occur in the following areas: the Main Cantonment Area, Logan Heights, WBAMC, Biggs AAF, and McGregor Range. Some of the facilities scheduled for demolition in the Main Cantonment Area (Areas 300, 400, 1300, 1400), and the WBAMC area (Area 7100) are located in National Register-eligible districts as shown in Figure 3.2-4.

The facilities scheduled for demolition that have potentially historic value are building numbers:

- 317 to 351 and 353 to 357; 448 and 452 to 455;
- 1301, 1335, 1372;
- 1400 to 1413; 1442 to 1454; 1457 to 1479; and 1481 to 1488;
- 2100 to 2104; and
- 7183 to 7194.

Of the 2,863 facilities scheduled for demolition between FY 97 and FY 14, 2,770 are family housing units that are located in areas designated as Land Use Category VIII–Family Housing. The leases for 300 family housing units in northeast El Paso are due to expire and there is no plan to renew the leases. The 300 units are included in the table because they will no longer be available for use by Fort Bliss, but demolition of the units will not occur. Many of the family housing units scheduled for demolition will be replaced with new buildings as discussed in the Facility Construction section.

There are 93 nonhousing and troop housing (other) facilities scheduled for demolition in FY 97. The 48 facilities to be demolished include known demolition after 1997 in the North Main Cantonment Area are located in land use categories II–Maintenance; III–Industrial; VII–Troop Housing; VIII–Family Housing; IX–Community Facilities; and XI–Outdoor Recreation and include known demolition after 1997. Thirteen nonhousing facilities in the South Main Cantonment Area are located in areas designated as Land Use XI–Outdoor Recreation and VI–Training/Ranges.

The 11 facilities in Logan Heights that are scheduled for demolition are located in land use categories VII–Troop Housing; VIII–Family Housing; and IX–Community Facilities. The 12 facilities in the WBAMC area are located in land use categories IV–Supply/Storage; VIII–Family Housing; and IX–Community Facilities.

The land use categories at Biggs AAF that contain facilities scheduled for demolition include II–Maintenance; III–Industrial; VI–Training/Ranges; VII–Troop Housing; and IX–Community Facilities.

3.2.5 Environmental Resource Management

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Fort Bliss has an active environmental resource management program that includes integrated training area management as well as natural resources and cultural resources management. These programs include the following actions discussed in the following subsections under the No Action Alternative.

Table 3.2-7. Fort Bliss Facility Demolition Program–No Action Alternative

Program FY	*Project*	*Quantity*	*Location/Building Number(s)*	*Land Use Category*
Family Housing				
Before FY 97	Demolition of Family Housing	278	Hayes	VIII
		110	George Moore Park	
		124	WBAMC	
FY 97	Demolition of Family Housing	170	Aero Vista–West	
FY 98	Demolition of Family Housing	287	Aero Vista–West Aero Vista–East	
FY 00	Demolition of Family Housing	343	Aero Vista–East	
FY 02	Demolition of Family Housing	303	Van Horn Park	
FY 04	Demolition of Family Housing	335	North Main Cantonment Area (1400, 1500, 1800 areas)	
FY 06	Demolition of Family Housing	289	Logan Heights	
FY 08	Demolition of Family Housing	443	North Main Cantonment Area (1800, 1900, 9300 areas), Logan Heights	
FY 10	Demolition of Family Housing	300*	NE El Paso	
FY 12	Demolition of Family Housing	260	South Main Cantonment Area (5100, 5200 areas)	
FY 14	Demolition of Family Housing	40	317–351, 353–357	
Other Facilities				
FY 97	Demolition of Facilities	61	Main Cantonment Area/448, 452, 453, 454, 455, 809, 1170, 1301, 1335, 1372, 2027, 2065, 2066, 2067, 2324, 2325, 2326, 2327, 2328, 2334, 2335, 2336, 2337, 2344, 2345, 2346, 2347, 2354, 2355, 2356, 2357, 2443, 2503, 2504, 2506, 2507, 2508, 2510, 2511, 2512, 2514, 2515, 2516, 2534, 2535, 2546, 2645, 2646, 2647, 2906, 2907, 2908, 2909, 5316, 5331, 5336, 5349, 5350, 5354, 5355, 5363	II III VI VII VIII IX XI
		1	3796	
		11	Logan Heights/4241, 4569, 4622, 4625, 4637, 4659, 4677, 4718, 4725, 4731, 4879	VII VIII IX
		12	WBAMC/7006, 7007, 7008, 7021, 7113, 7134, 7135, 7137, 7142, 7178, 7198, 7265	IV VIII IX
		1	McGregor Range Camp/9900	XII
		7	Biggs AAF/11001, 11178, 11189, 11241, 11264, 11350,11360	II III VI VII IX

* Lease expires, no planned renewal. No actual demolition will occur.

Fort Bliss has an active environmental management program for natural and cultural resource management. The program is founded on and incorporates the requirements and application of federal and state laws, and DoD and Army programs, instructions, and regulations. The program is implemented

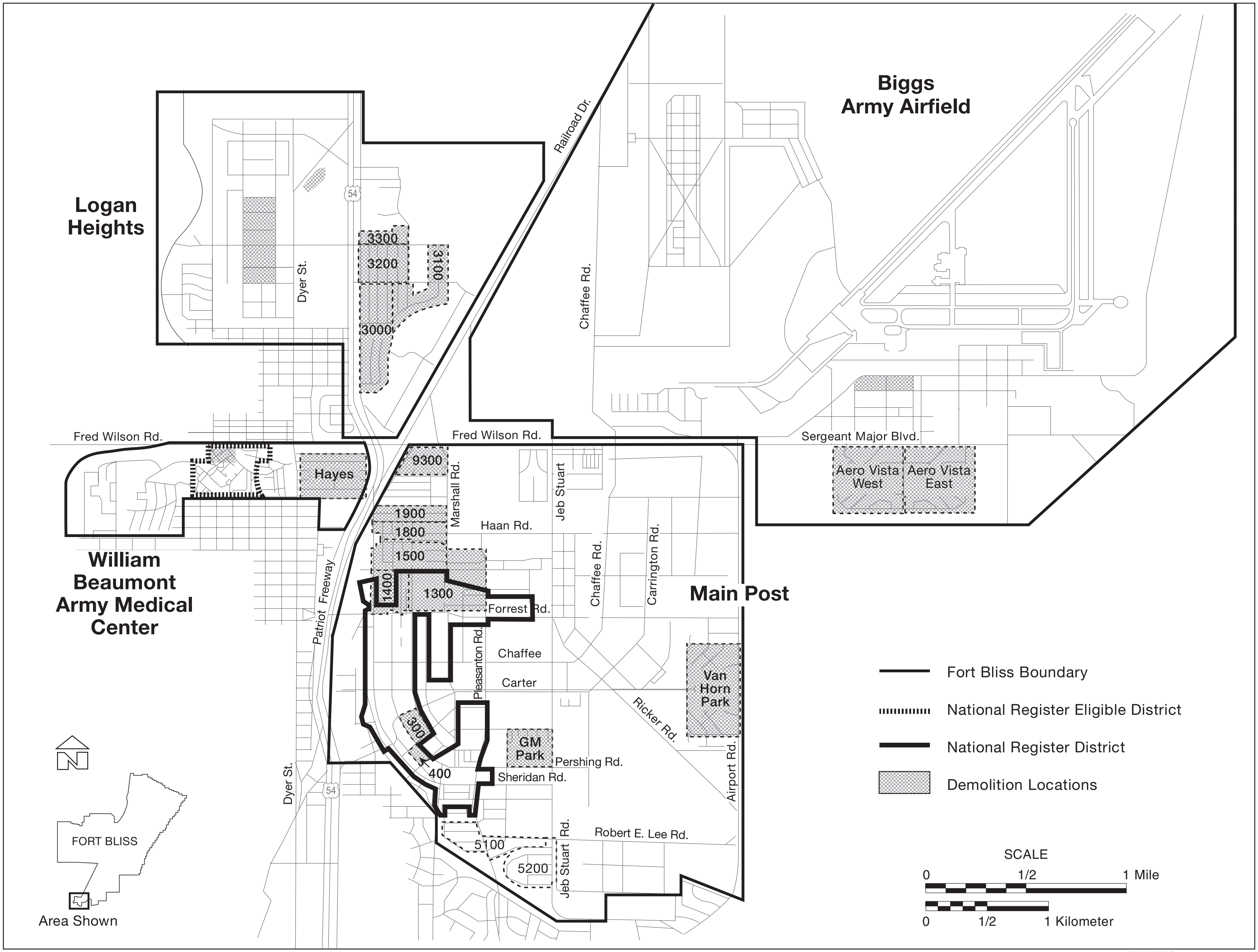

Figure 3.2-4. National Register Use/Eligible Districts and Location of Demolition Activities.

on Fort Bliss by an experienced staff of natural and cultural resource management professionals. The overall objective of the Fort Bliss program is to wisely use, scientifically manage, and systematically restore renewable natural resources and cultural resources on the installation consistent with the military mission, national security, and applicable federal and state laws.

Fort Bliss manages the environmental effects of military training by applying natural and cultural resource conservation and rehabilitation programs while providing public access to these resources as appropriate and consistent with the military mission. The objectives for natural and cultural resource protection at Fort Bliss are to manage installation natural resources to provide the optimum environment which sustains the military mission; develop, initiate, and maintain progressive programs for land management and utilization; and to maintain, protect, and improve environmental quality, aesthetic values, and ecological relationships.

A result of these goals is reduced environmental damage and effective land rehabilitation, reduced costs for land management and environmental compliance, and enhanced land stewardship. Environmental resource management is coordinated with all planning efforts on Fort Bliss such as master planning for real property on the cantonment, range, and training areas; ITAM; natural and cultural resource management plans; and EAs and EISs. All elements facilitate land and cultural resource management decisions on the installation. The Fort Bliss natural and resource conservation and rehabilitation programs include the following major elements that are implemented subject to available funding:

- Inventory and monitoring of natural and cultural resources to document their condition and assess the ability of the land to withstand impacts from training and testing–an example of inventoring and monitoring vegetation is through land condition and trend analysis (LCTA);

- Education of soldiers, civilian employees, and contractors to foster environmental awareness and wise use of the land;

- Land rehabilitation and maintenance (LRAM) restores the land, enhances testing and sustains training realism through revegetation and erosion control.

- Optimization of land use by training requirements integration (TRI) with the carrying capacity of the land and natural resource conservation and rehabilitation programs; and

- Use of technologies such as geographic information systems, global position systems (GPS), and databases, which interact directly with the Range Facility Management Support System (RFMSS).

3.2.5.1 Natural Resource Management

AR 200-3 (*Natural Resources–Land, Forest, and Wildlife Management*) and the *Sikes Act* as amended in 1997 (PL 105-85) requires that Army installations develop and maintain integrated natural resources management plans. Implementation of this requirement is the subject of Alternative 1 of this PEIS. Under the No Action Alternative, natural resource management practices are implemented on a species-by-species basis, without applying ecosystem management or biodiversity principles. Under current practices, resource management is reactive to changes in training requirements, with priorities set on an individual action basis. Actions under this alternative may include:

- Wildlife management;
- Fire management;
- Threatened and endangered species management;

- Soil management;
- Pest management; and
- Wetlands management.

3.2.5.2 Cultural Resource Management

Under the No Action Alternative, cultural resource management is generally done on an individual project basis outside the framework of programmatic agreements and/or without reference to comparative cultural property significance or mission imperative. A significant implication of this is that compliance with Section 106 of the NHPA is done on a project-by-project basis versus through any cultural resources programmatic agreement for routine actions.

3.2.6 Real Estate Actions

Real estate actions that are ongoing at Fort Bliss include the four typical types of real estate outgrants authorized in AR 405-80 (leases, licenses, permits, and easements) and disposition of excess property. Leases authorize the grantee to use the installation land and/or buildings. Licenses grant the licensee authority to do a specific act on installation property for a term that is usually 5 years or less. Permits allow another federal agency to temporarily use installation property for a period normally not to exceed 5 years; however, the permit may be renewed as approved by TRADOC. Easements grant the right to use property generally for linear rights-of-way (ROW) and is usually granted for as long as the land can be made available.

3.2.7 Management Practices that Avoid or Reduce Environmental Impact

The following management practices will be incorporated into Fort Bliss implementation of mission and mission support activities or are currently within various installation SOPs and are consequently incorporated into this programmatic evaluation under the No Action and subsequent alternatives.

- The mission activity, facility, and natural and cultural resource management planning process will continue, including periodic review to update, integrate newly developed components, and evaluate adherence to the plans and planning process as decision-making tools. Actions that limit intensity, frequency, duration, or time of day activities that degrade the suitability of surrounding land uses are considered in the planning process. Adequate “stand-off” buffers for activities are incorporated into the planning process to reduce or prevent incompatible effects on adjacent land uses.

- Construction activity plans and designs, including maintenance, repair, and demolition, will be routed through the Fort Bliss DOE for review. The DOE will ensure that engineering management practices are in compliance with NEPA and other legislation specific to the individual resources within Fort Bliss. These construction activities include but are not limited to ground-disturbing activities (i.e. roads, trenches, reclamation activities, fences, power lines), activities that may cause harm to personnel or wildlife (i.e., harmful radiation from radar or lasers, loud noises), and routine maintenance activities (i.e., painting, fence mending, roofing).

- Fugitive dust emissions will be reduced to the extent possible on the range complex by static positioning of vehicles, equipment, and troops. Heavy vehicles and tracked vehicles travelling from the Main Cantonment Area to the ranges and training areas will use the eastern tank trails to avoid dust impacts to residential and industrial areas near the Fort Bliss boundary. Light and medium trucks will use U.S. Highway 54 or the eastern tank trails. Vehicular speed will be maintained as low as practical, since one of the factors governing fugitive dust emissions is vehicle speed.

Meteorological conditions such as wind speed and direction, and atmospheric stability will be considered to reduce potential air quality impacts from fire during controlled burns for habitat management.

- Environmental engineering and management review will assure that common erosion-control techniques are used in ground-disturbing activities. Project designs incorporate measures that minimize water contamination by overland flow, reduce soil loss by wind and water erosion, reduce the period of recovery in restoration efforts, reduce negative visual and aesthetic impacts, help to minimize the extent and duration of habitat loss, and in other ways assist in environmental management.

- Rainwater and sediment runoff are controlled by construction drainage ditches, energy dissipaters, berms, and sediment fences. Dust from exposed soils and roads is controlled by water or soil binders. Exposed soils are permanently stabilized after construction is complete. Soils at construction sites are analyzed before disturbance to determine engineering properties that could affect stability and erosion. Erosion from training is addressed by incorporating measures to reduce soil erosion by alternating and rotating training sites for Roving Sands and other exercises to minimize potential adverse effects and to allow for the maintenance of a protective vegetative cover. ITAM activities to reduce soil erosion and vegetative loss on McGregor Range include: prohibition of free maneuvering with the exception of TA 8, limiting vehicles to existing roads or training sites, detouring traffic away from problem roads, avoiding maneuvering vehicles on steep slopes and on thin, fragile, and highly erosive soils, and controlling fires from hot missile debris.

- Impacts from controlled burns for habitat management are reduced by achieving a rapidly moving fire. Such a fire removes much of the vegetation but does not destroy the organic matter or increase the water repellency of the soil.

- Measures to reduce impacts on soils from cultural resource investigations include limiting wheeled vehicle access to cultural sites, filling in excavations following site decommissioning, and revegetation of the site for long-term soil stabilization.

- If road shoulders are necessary, they will be kept to a minimum width and diversion structures will be used to reduce erosion where necessary. Road construction, maintenance, and closing plans will be provided to Fort Bliss DOE during the design phases to ensure compliance with environmental standards.

- During facility demolition, wind erosion will be controlled with water or soil binders and stabilization of soils as soon as possible. Runoff and water erosion will be controlled as described above.

- Where safety and security would not be affected exterior lighting will be avoided where possible, particularly where it could significantly affect wildlife or other natural resources. Exterior lighting will be in conformance with the visual and historic qualities of the area in which it is installed while meeting the appropriate safety and security requirements.

- Wildfires and troop originated fires are reported to the appropriate Range Control by the units causing the fires as soon as possible. These units provide on-call personnel to help extinguish the fire.

- Measures in place to eliminate or reduce the impacts of military and other activities on vegetation, sensitive species, resource areas, wildlife, wetlands, and wilderness include:

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- Work with other agencies within existing agreements to assure that optimum training and ecosystem vegetation conditions are maintained on the Fort Bliss Training Complex, including McGregor Range, where the BLM manages nonmilitary activities such as grazing, recreation and mineral exploration;
- Impact assessment of military training on vegetation via ITAM activities and analysis of satellite remote imagery;
- Repair of lands damaged by military operations and prevent further degradation of soil, water, and vegetation;
- Management of black grama grasslands in ACECs and other black grama grasslands on McGregor Range;
- Management of the Culp Canyon WSA on McGregor Range;
- Prohibition of the use of cut or uprooted vegetation as military camouflage;
- Management of other vegetation types such as dense stands of yucca and mesquite that are important to wildlife and the stabilization of soil;
- Flight restrictions such as flights below 2,000 feet above ground level (agl), are prohibited above raptor habitat in the Organ Mountains;
- Earthen water collecting tanks are off-limits to all vehicular traffic. Static military positions are not allowed within approximately 300 feet of an earthen water collection tank;
- U.S. Army Corps of Engineers (USACE) 404 Permit applications are prepared when required to address actions that may affect Waters of the U.S., including wetlands; and
- Surveys for sensitive species are conducted during project planning so impacts to such species, if they occur, can be reduced or eliminated.

- Fort Bliss, in consultation with the appropriate SHPO, determines if an undertaking as defined in the NHPA will have an adverse effect on properties that are eligible for inclusion in the NRHP. Fort Bliss then follows the procedures for review required by 36 CFR 800 and implements the mitigation measures included in any agreement document resulting from that review.

- Hazardous waste and hazardous materials are managed according to federal, state, and local requirements. The *Integrated Pollution Prevention* Plan (IPPP) and the Hazardous Substance Management System addresses pollution prevention and waste minimization issues. The use of hazardous materials and the generation of hazardous waste is expected to decrease as pollution prevention initiatives are implemented.

- Environmental Baseline Surveys (EBS) are prepared to determine the environmental conditions of properties being considered for acquisition, outgrants, and disposals. Easements, licenses, and permits do not require an EBS. The EBS is used to identify the potential environmental contamination liabilities associated with real property transactions.

3.3 ALTERNATIVE 1

Alternative 1 contains all of the actions contained in the No Action Alternative plus implementation of short- and long-range plans, construction and demolition programs, and resource management plans with potential to affect the environment of the installation. These include the four interrelated components of the Fort Bliss RPMP and three contributing plans. This PEIS addresses the implementation of decisions previously made in developing the three contributing plans. The RPMP provides a systematic comparison of existing on-post facilities with projected needs, and a framework for projects or actions necessary to establish future directions for the installation development. The Fort Bliss RPMP consists of four components and three contributing plans described as follows:

1. The first component, the LRC of the Fort Bliss RPMP establishes the basic framework and specific options for developing and managing the installation real property (AR 210-20). The LRC provides a concise overview of the installation and its mission and describes how the master planning process works. It specifies optimum land use for mission accomplishment and expansion. The LRC provides the foundation upon which other RPMP components are based.

2. The second component of the RPMP is the CIS. Several CISs may be prepared to present various capital improvement strategies. The CIS included as an example in this document is the P3 CIS that supports the ASMP designation of Fort Bliss as one of the Army's 15 continental United States P3s. NEPA evaluation of the P3 CIS is included in the *Environmental Assessment for ASMP Program Facilities at Fort Bliss, Texas and New Mexico* (U.S. Army, 1997b).

3. The third component of the RPMP is the SRC, which integrates real property master planning into the Army's operational planning process. The ideas, plans, and policies from the LRC and CIS, to be implemented during the next 6 years, are developed into specific actions.

4. The fourth component of the Fort Bliss RPMP, the MC, assists the Army's mobilization plans and strategies for the installation. It develops the expansion capability analyses of the LRC into specific plans to allocate existing facilities and acquire needed additional facilities to support mobilization missions, functions, and tasks.

5. The first contributing plan of the RPMP is the *Long-range Family Housing Plan* (U.S. Army, 1997a) that addresses construction and demolition of housing facilities within the Logan Heights, Aero Vista, George Moore, Van Horn, and WBAMC areas of Fort Bliss. The program plans for actions occurring between FY 93 to FY 14.

6. The ICRMP is the second contributing plan of the RPMP. When fully implemented, the ICRMP will provide a framework that will allow Fort Bliss to accomplish routine cultural resource management actions following preapproved procedures and coordinate them with federal and state agencies such as the Federal ACHP, interested tribal governments, and the New Mexico and Texas SHPO. The plan also allows for efficient review of certain actions such as necessitated by local emergencies and construction modifications. The ICRMP will also integrate compliance protocols for related federal laws and regulations for management of cultural properties such as NHPA, AIRFA NAGPRA ARPA, and EO 13007.

7. The INRMP is the third contributing plan of the RPMP. The INRMP guides the implementation of the natural resources program on Fort Bliss from 1998 through 2002. The program helps ensure the conservation of natural resources on Fort Bliss as well as compliance with related environmental laws and regulations. The plan helps ensure the maintenance of quality training lands upon which to

conduct the installation's critical military mission. The INRMP meets the requirements of the *Sikes Act* as amended in 1997 (PL 105-85).

3.3.1 Peacetime Strength and Equipment

Peacetime strength and equipment authorized at Fort Bliss remain the same as described in Section 3.2.1 of the No Action Alternative.

3.3.2 Mobilization Strength and Equipment

Mobilization strength and equipment authorized at Fort Bliss remain the same as described in Section 3.2.2 of the No Action Alternative.

3.3.3 Mission Activities

Mission activities as described in the No Action Alternative remain the same for Alternative 1. These missions are discussed in more detail relative to land and airspace use in Alternative 1 to illustrate the rationale for the proposed Fort Bliss Training Complex land use planning process.

3.3.3.1 Main Cantonment Area

Fort Bliss is considering revisions to its land use to meet real property master planning objectives discussed in Section 1.2. Figure 3.3-1 shows the proposed land use plan for Fort Bliss Main Cantonment Areas. The land use patterns and mission intensity on the Fort Bliss Range Complex described in the No Action Alternative remain the same under Alternative 1. The CIS, planning modifications to the MC, and the Program for the Provision of Military Family Housing would be adopted.

3.3.3.2 Fort Bliss Training Complex

Under Alternative 1, the Army proposes to adopt the more specific land use designations for the Fort Bliss Training Complex specified in Chapter 3.0 of the TADC. For informal planning purposes, a variety of mission activities performed at Fort Bliss training areas are grouped into 10 mission- and training-related and environmental management and public access land use categories (Table 3.3-1). The first column in the table is the training category designation, and the second column is a definition of the activities associated with the designation.

In recognition of the overlapping nature of training area land uses, these 10 mission and training use categories and two other use categories (environmental management and public access) presented in Table 3.3-1 were grouped into nine mappable training area land use categories. Each category, while a discrete map unit, carries with it a number of permitted uses that are compatible from a mission standpoint. Certain groups of training areas within the Fort Bliss Training Complex contain designated special uses, such as mission facilities or public access. The entire training complex contains three over-arching activities that occur everywhere: aircraft operations, training complex maintenance, and environmental management and conservation. The training area land use categories, designated A through I, are described in Table 3.3-2. This color-coded table shows the nine mappable land use categories and the permitted uses compatible with each category. For ease of reading the following sections, a foldout of Table 3.3-2 is included at the end of Chapter 3.0. Figure 3.3-2 illustrates this training area land use system as it is currently applied to the entire Fort Bliss Training Complex.

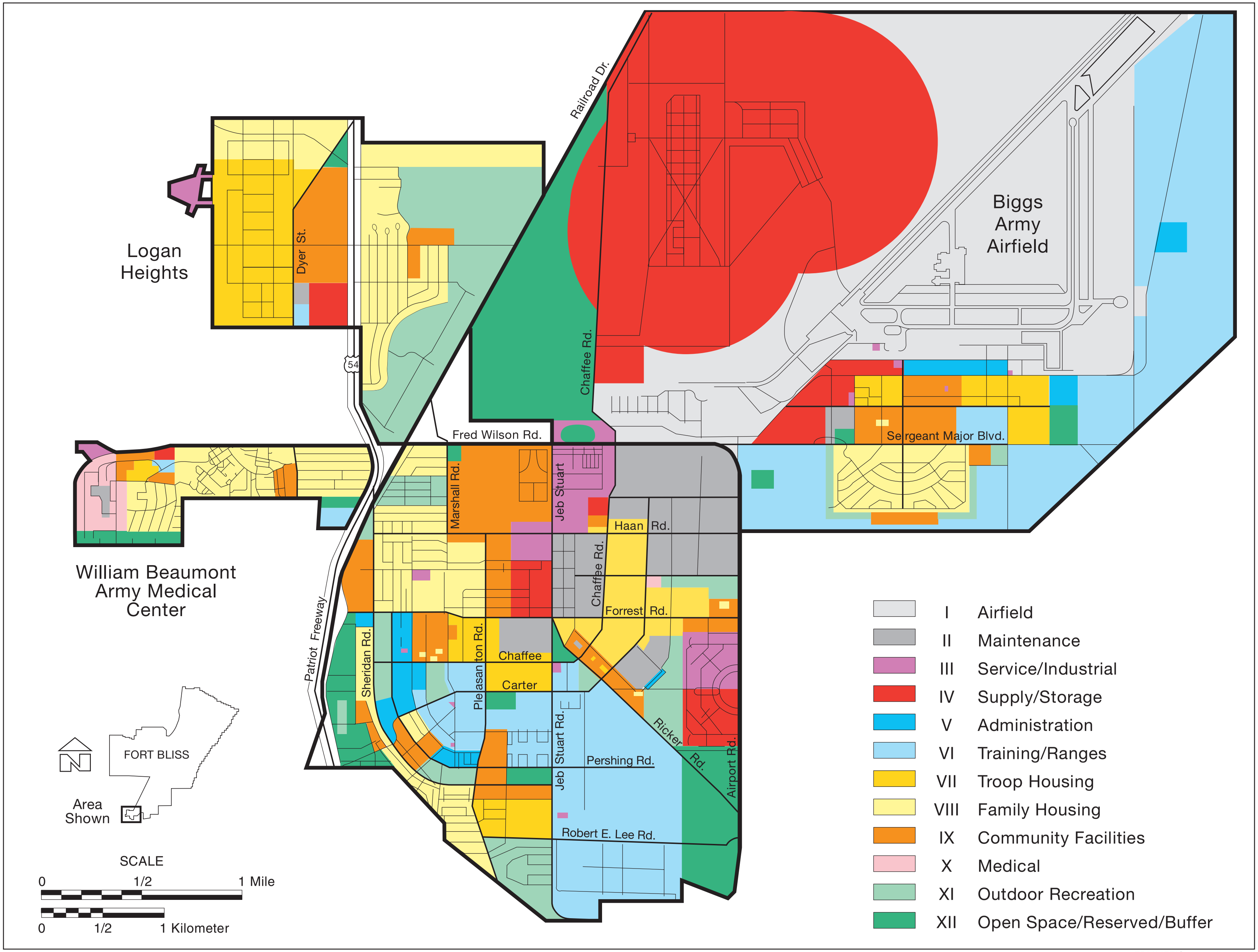

Figure 3.3-1. Main Cantonment Area Proposed Land Use.

Table 3.3-1. Fort Bliss Training Categories

Training Category/Other Uses	*Activities**
1. Mission Support Facility	Test facilities; landing zones/pads; drop zones; radar facilities
2. Weapons Firing	Firing areas for short range and HIMAD, surface-to-surface, surface-to-air, and air-to-surface weapons, launch sites; firing points; laser certified ranges; small arms ranges
3. Surface Impact	Live artillery; live fire surface-to-surface missile impact areas; air-to-surface target areas
4. SDZ/Safety Footprint	Target debris areas and safety footprint for weapons and laser use
5. ORV Maneuver	Use of track or wheeled vehicles that is not confined to roads
6. On-Road Vehicle Maneuver	Use of wheeled or tracked vehicles on existing roads
7. Controlled Access FTX Areas	Air Defense training sites; FTX assembly; training; communication, command, and control
8. Dismounted Training	Dismounted training; pyrotechnics
9. Aircraft Operations	Fixed-wing and rotary-wing overflights and air-to-air training
10. Built-up Areas	Range Camps
ENV. Environmental Management	Environmental management activities; conservation efforts conducted on Fort Bliss i.e., ITAM, INRMP, ICRMP
PA. Public Access	Areas available for public use for grazing and recreation

* Other permitted uses are shown in Table 3.3-2 and may not necessarily be concurrent with listed activities.
Note: ENV = Environmental Management; PA = Public Access

Level of Use (LOU). The level or intensity of use varies among training areas and for the types of training missions performed in each training area. The following sections provide a general current level assessment of use in the South Training Areas; Doña Ana Range–North Training Areas, and McGregor Range Training Areas, based on number of scheduled days in each training area as a percentage of the total days in the year. For current conditions, 1996 was used as the baseline year. Level of use is based on the criteria in Table 3.3-3.

Level of use is provided separately for training operations, environmental operations, and public use. In addition, the assessment estimates how much of each training area's scheduled use falls into each of the 10 training use categories and environmental management and public access described in Table 3.3-1.

South Training Areas. The South Training Areas (104,042 acres) are located in El Paso County, Texas, to the north and east of the main cantonment. They include TAs 1A, 1B, 2A, 2B, 2C, 2D, and 2E. Public access is via U.S. Highways 62/180 and 54. The use of the five paved Loop 375 underpasses through South Training Areas provide military vehicles access to both sides of Loop 375.

The training areas in this area are available for public access within Fort Bliss guidelines. A safety buffer between the training areas and the main cantonment is designated, and no hunting is permitted within the buffer. A city-owned and operated tertiary wastewater treatment plant is located in TA 1A along Railroad Drive.

Paradrop missions are occasionally conducted on the Grange DZ (02) in TA 2A of the South Training Areas. Low altitude aerial tactical navigation by helicopters use Terrain Flying Area 5 over the South Training Areas for low altitude flight training. Terrain flying is the tactic of employing aircraft in such a maneuver as to utilize the terrain, vegetation, and man-made objects to enhance survivability in combat. It includes the tactical application of the following techniques on the South Training Areas:

(1) Low level – route is preselected and conforms generally to a straight line and a constant airspeed and indicated altitude.

Table 3.3-2. Fort Bliss Training Area Land Use Categories.

Training Area Land Use Category	Fort Bliss Training Categories (Table 3.3-1)											
	1	2	3	4	5	6	7	8	9	10	ENV*	PA**
	Mission Support Facility	Weapons Firing	Surface Impact	SDZ/Safety Footprint	Off-Road Vehicle Maneuver	On-Road Vehicle Maneuver	Controlled Access FTX	Dismounted Training	Aircraft Operations	Built-up Areas	Conservation	Public Access
A		●		●	●	●		●	●		●	●
A with Mission Facilities	●	●		●	●	●		●	●		●	●
B					●	●		●	●		●	●
B with Mission Facilities	●				●	●		●	●		●	●
C		●		●		●	●	●	●		●	●
C with Mission Facilities	●	●		●		●	●	●	●		●	●
D		●		●		●		●	●		●	○
D with Mission Facilities	●	●		●		●		●	●		●	
E				●		●	●	●	●		●	●
F				●		●		●	●		●	○
G				●				●	●		●	●
H			●						●			
I	●			●		●			●	●	●	●

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● Training Category Occurs in Land Use - Uses May Not Be Concurrent
○ Public Access on Some Areas
* Environmental Management
** Public Access

Note: A foldout of this table is located at the end of Chapter 3 to assist the reader.

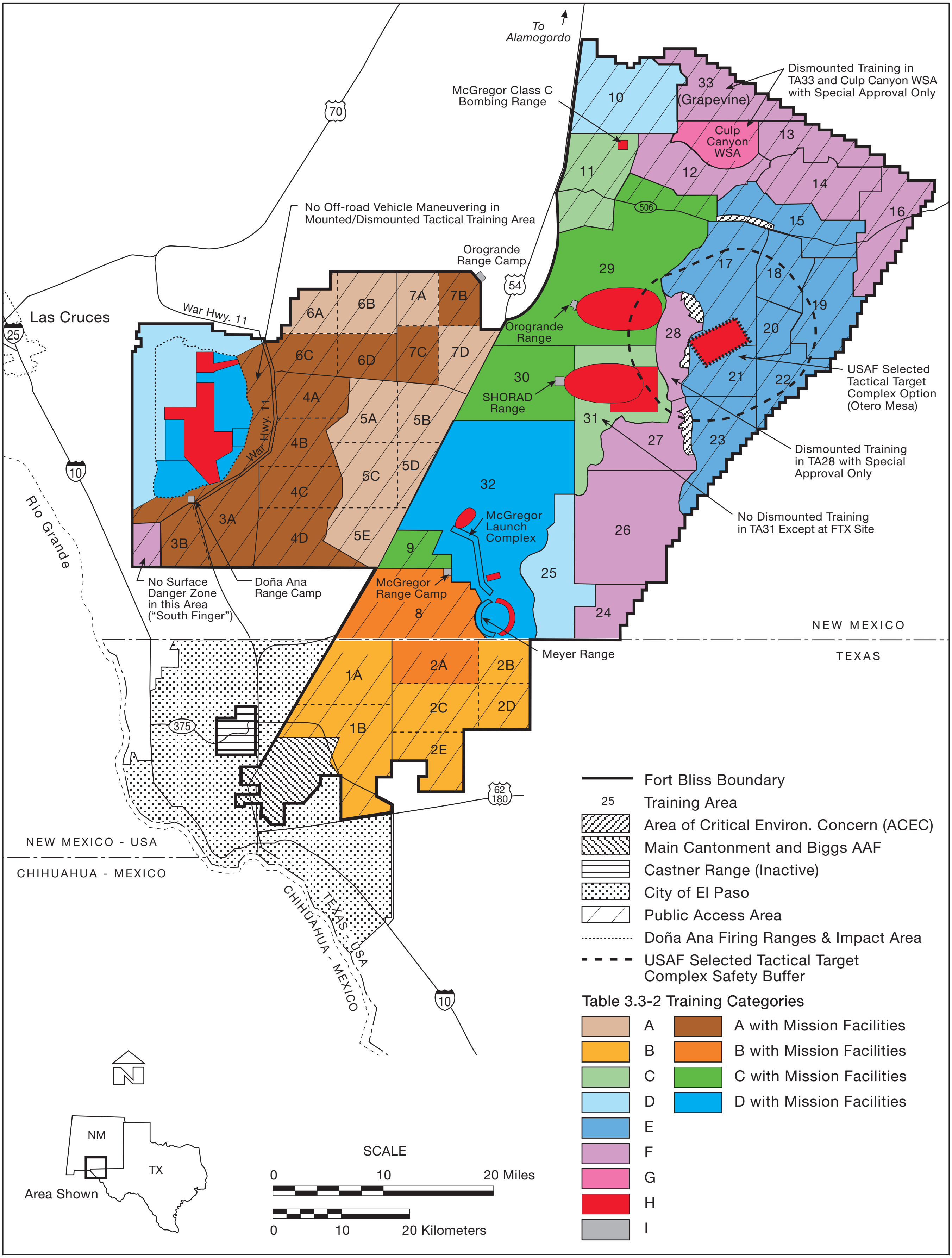

Figure 3.3-2. Current Training Area Land Use for Fort Bliss.

Table 3.3-3. Level of Use Criteria

LOU	*Percent Scheduled Use*
Very Low (VL)	0 through 25 percent
Low (L)	26 through 50 percent
Moderate (M)	51 through 75 percent
High (H)	76 through 100 percent

Note: LOU = Level of Use.

(2) Contour – low altitude flight conforming to the earth's contours. Varying speeds and altitudes are used. Obstacles are overflown.

Terrain Flying Area 5. It is designated for both day and night use. The boundaries of this area are shown in Figure 3.3-3.

Current land use for the South Training Areas is shown in Figure 3.3-4. The entire area with the exception of one training area, TA 2A, is zoned 'B.'

The South Training Areas are primarily used for wheeled and tracked vehicle training/travel and ground troop training operations. TA 2A contains a mission facility, the Grange DZ, and is zoned 'B' with Mission Facilities. Distributed throughout are several areas with environmental restrictions.

Table 3.3-4 presents overall level of use in the South Training Areas, based on 1996 scheduled days for training. The table also indicates the estimated percent of scheduled use within each of the 10 training and 2 other use categories described in Table 3.3-1.

Level of training use in the South Training Areas fluctuates from very low to moderate, with off-road tracked vehicle use being the primary mission activity (Table 3.3-4). Because of its proximity to the Main Cantonment Area, TA 1B is used most frequently for military missions. TAs 2A and 2B, located closer to McGregor Range Camp and Meyer Range, also have moderate use. Facilities in TA 2A support a small number of paradrop missions, which include facilities use, dismounted training, and aircraft operations, together encompassing about 30 percent of the use. Environmental management activities by the Army currently are low to very low in these areas. Public access, primarily for recreation and hunting, is very low in all training areas. TAs 1B and 2B have the highest use (about 90 days annually based on available data), probably due to their proximity to the Main Cantonment Area and McGregor Range, respectively.

<u>Doña Ana Range–North Training Areas.</u> Doña Ana Range–North Training Areas are located in southern Doña Ana and Otero counties in New Mexico. It is comprised of approximately 60,141 acres of fee-owned land and about 236,865 acres of withdrawn lands. The withdrawn land is part of the perpetual withdrawal of two million acres approved by Congress to establish WSMR, HAFB, and Doña Ana Range–North Training Areas of Fort Bliss in the 1950s. Withdrawal of 46,000 acres of land for Doña Ana Range occurred in 1911. Additional withdrawals occurred in 1915 and 1918. War Highway, a public access highway, passes through Doña Ana Range–North Training Areas from U.S. Highway 54 in the south to WSMR in the north. (The portion of the highway passing through Texas is known as the Martin Luther King Highway.) There is no public access through WSMR to this highway. The southern half of the Organ Mountains are located on the west side of Doña Ana Range–North Training Areas. Some of the highest peaks in this range, including Soledad and Organ peaks, are within the Fort Bliss Reservation.

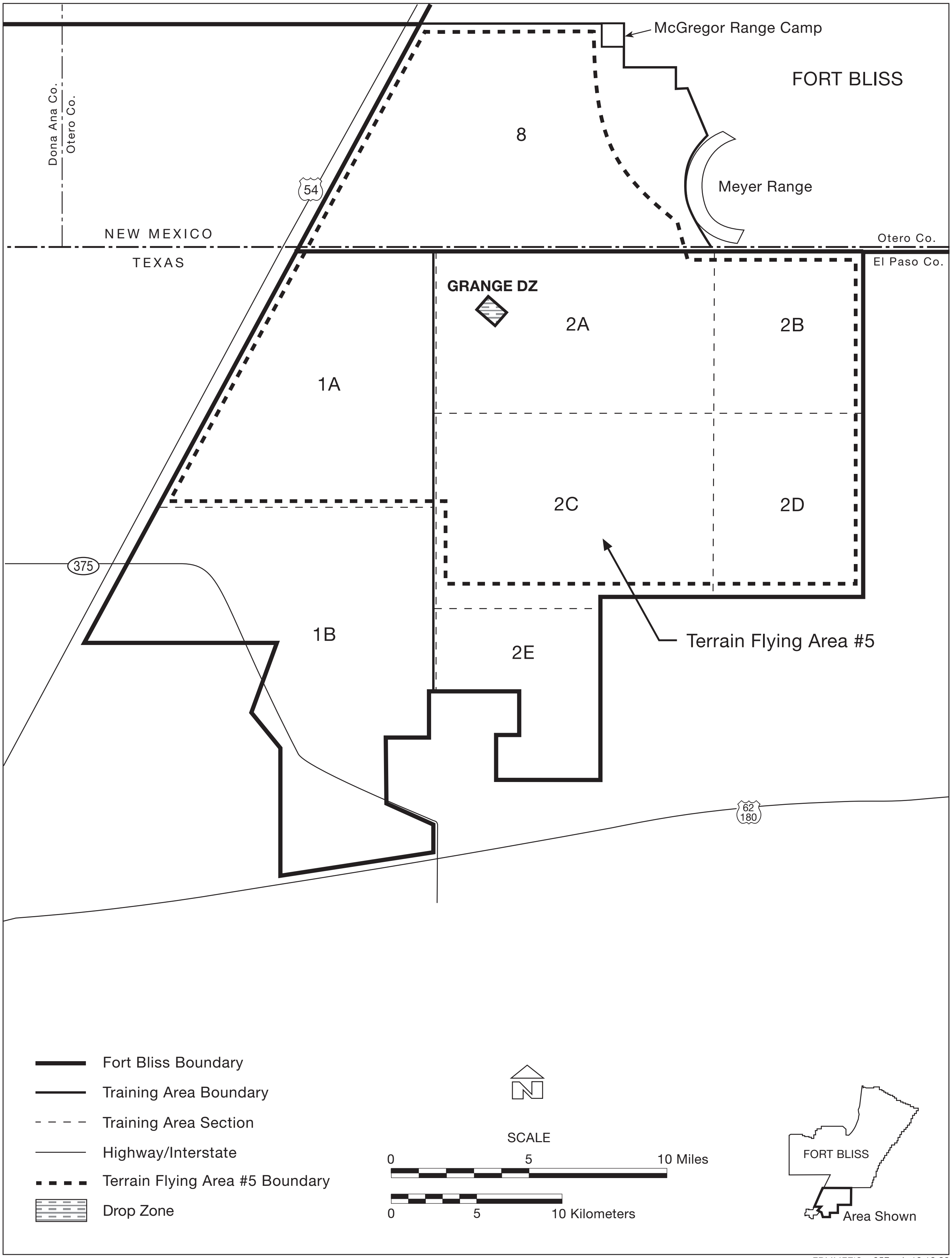

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Figure 3.3-3. Terrain Flying Area #5.

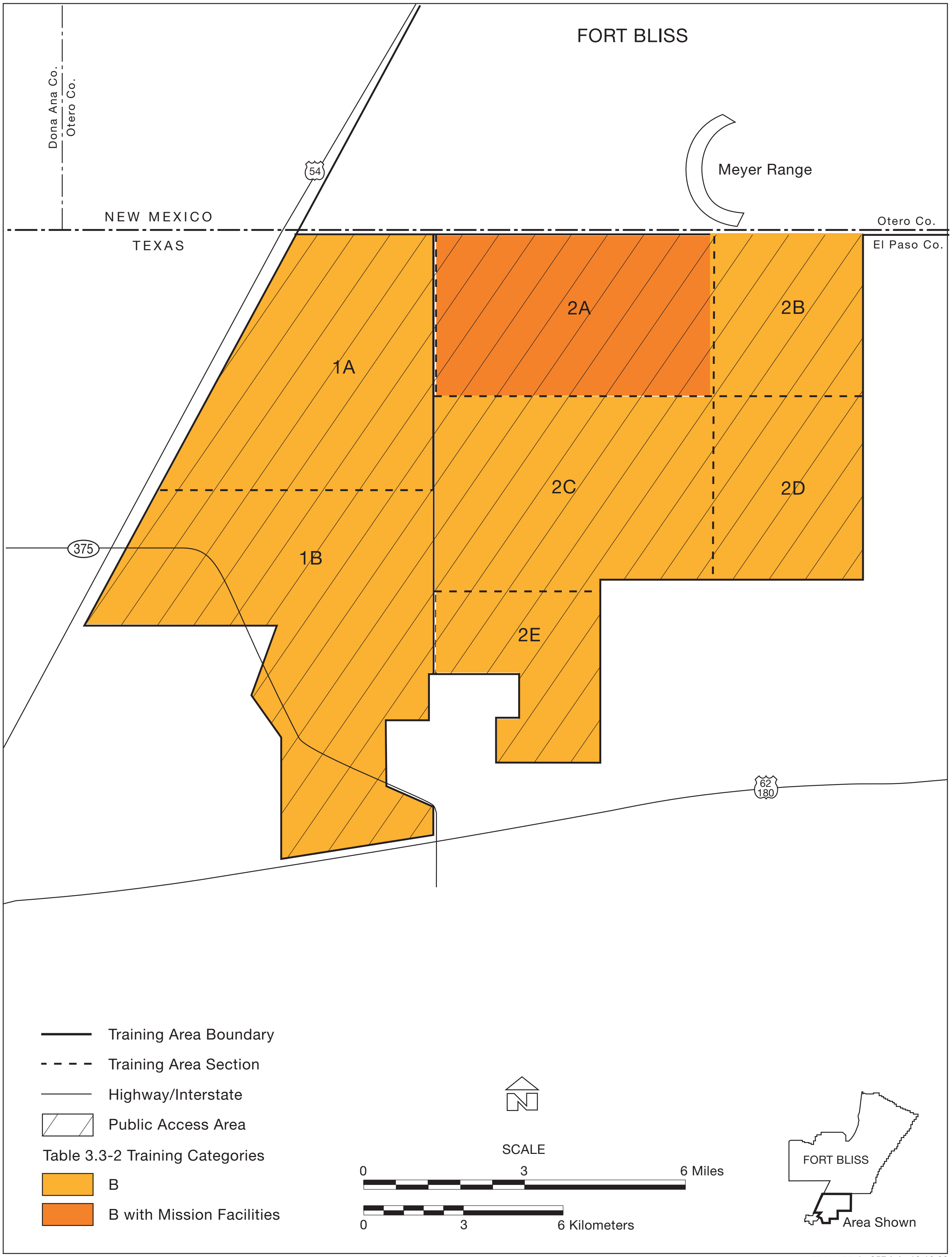

Figure 3.3-4. Current Training Area Land Use for the South Training Areas.

Table 3.3-4. South Training Areas Current Level of Use

	TRNG	*Percent of Use by Training Category* [2]										*Other LOU*	
TA	*LOU* [1]	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*ENV*	*PA*
1A	VL					100						VL	VL
1B	M					100						L	VL
2A	M	10				70			10	10		VL	VL
2B	M					97			3			VL	VL
2C	L					95			5			VL	VL
2D	L					93			7			L	VL
2E	L					100						L	VL

1. Based on military operations in 1996, not including environmental activities and public use (LOU criteria in Table 3.3-3).
2. Percent of total military training use by categories 1 to 10 (see Table 3.3-1). May not sum to 100% due to rounding.

Note: TA = Training Area; TRNG = Training; LOU = Level of Use; ENV = Environmental Management; PA = Public Access Use; VL = Very low; L = Low; M = Moderate; H = High.

Doña Ana Range–North Training Areas include TAs 3A and B, 4A through D, 5A through E, 6A through D, and 7A through D. To the west of War Highway, about 100,000 acres are used as gunnery ranges and impact areas. These ranges support training and testing of conventional and small arms munitions and laser weapons ordnance. Surface impacts from weapons firings occur in the lower elevations of the Organ Mountains. Some portions of these areas contain scrap metal, discharged projectiles, and unexploded munitions that are safety hazards. The majority of the mountain is a SDZ for these activities. The SDZ includes some of the highest peaks of the Organ Mountains. Trespass occurs into these areas due to their accessibility from Dripping Springs Recreation Area and Aguirre National Recreation Area. Unauthorized grazing also occurs within the Organ Mountains, primarily in Soledad and Fillmore canyons. The installation boundary is mostly unfenced, but warning signs are posted at strategic locations on off-limits trails leading into the Doña Ana Range–North Training Areas.

Doña Ana Range Camp, located 30 miles north of the Main Cantonment Area, provides billeting space for up to 1,174 personnel, and may accommodate larger numbers during mobilization. The Orogrande Range Camp, located about 50 miles north of the main cantonment at the far northeast end of Doña Ana Range–North Training Areas, has billeting for 1,036 personnel and may also accommodate a larger number during mobilization.

Paradrop missions are occasionally conducted on the five DZs (Desperation, Monroe, Stewart, Tularosa, Wessly, Weeks) on Doña Ana Range–North Training Areas, as described in the TADC (U.S. Army, 1998a). Low altitude aerial tactical navigation by helicopters use Terrain Flying Area 1 over Doña Ana Range–North Training Areas for low altitude flight training.

This area is designated for both day and night use. The boundary for the area is shown in Figure 3.3-5. A variety of five live-fire ranges lies immediately adjacent on the west side of War Highway 11. There are firing points in Terrain Flying Area 1 that fire to the west into Doña Ana Range–North Training Areas impact areas to the west of War Highway 11. The area is also used frequently by high performance aircraft and target drones.

Roving Sands JTX activities conducted on the Doña Ana Range–North Training Areas include deployment of personnel to field positions that include both Doña Ana and Orogrande Range camps, primarily static positioning of equipment, and establishment of a U.S. Marine Corps Tactical Air Operations Center (TAOC). In addition to target tracking and acquisition training, ground defense participants use live ammunition on the established firing ranges and pyrotechnics (blanks, smoke

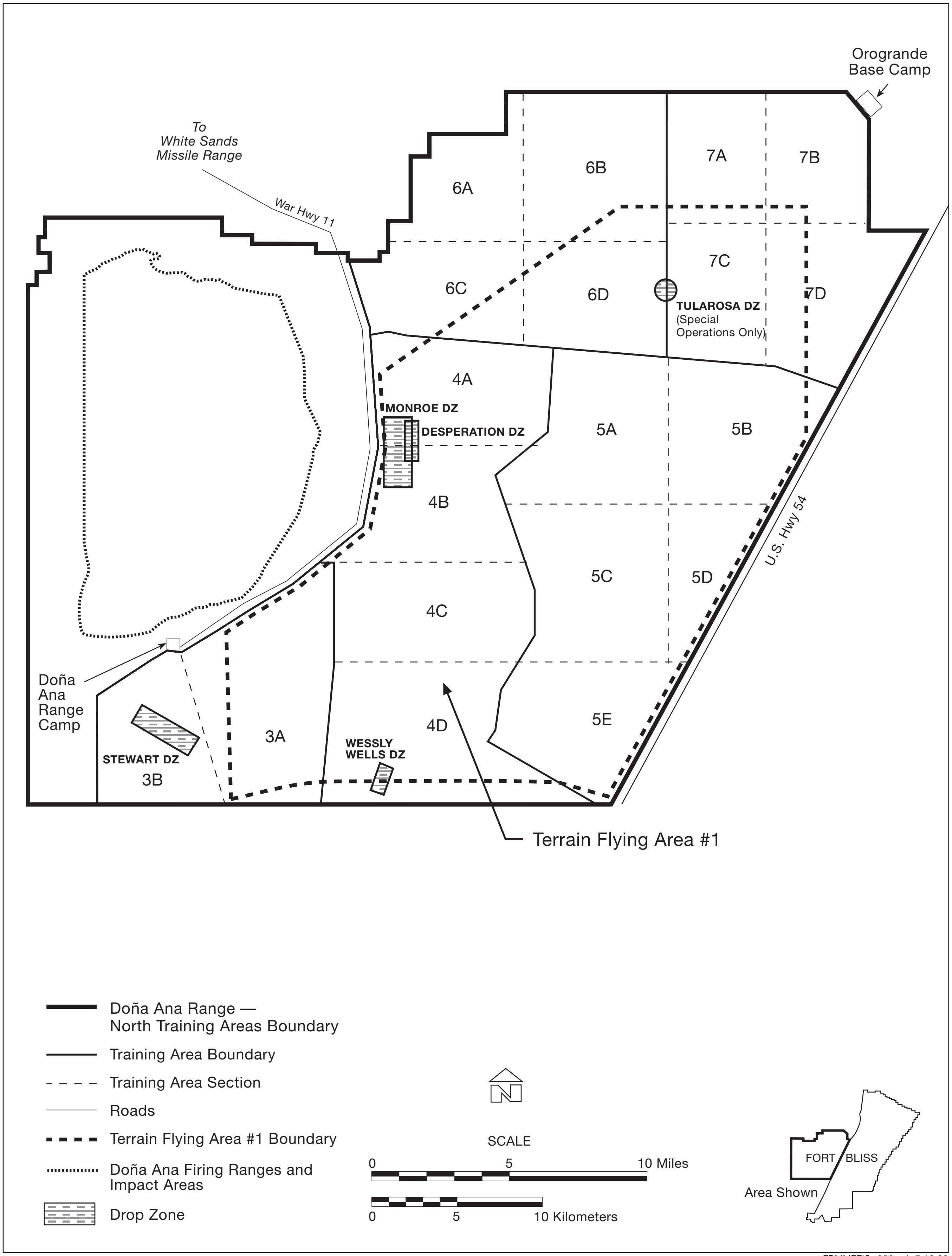

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Figure 3.3-5. Terrain Flying Area #1.

grenades, flares, etc.) throughout the designated exercise areas. Small two-to-three person teams of foot soldiers are deployed periodically in the Organ Mountains to simulate Stinger anti-aircraft missile operations (U.S. Army 1994a).

Current training area land use for Doña Ana Range–North Training Areas is illustrated in Figure 3.3-6. The area west of War Highway 11 (known as the Mounted and Dismounted Tactical Training Area) is zoned as 'A with Mission Facilities.' Weapons firing occurs throughout these training areas, and those zoned for mission facilities contain artillery firing groups and/or parachute drop zones. In addition, these training areas are covered by SDZs resulting from MLRS and Army Tactical Missile System (ATACMS) firings. At the extreme southwest corner of the range is an area zoned 'F,' (South Finger) which is outside any designated training area and beyond the artillery impact areas and SDZs to the north. Permitted uses for this area include on road-vehicle maneuvers, dismounted training, and public access.

A large area west of War Highway 11 zoned 'H,' Surface Impact Area, is associated with the Doña Ana firing ranges 40 through 54 and firing sites throughout the North Training Areas. It includes impact areas from tank and artillery firing and other weapons. The areas surrounding the surface impact area are zoned 'D' and 'D with Mission Facilities.' They include helipads, ammunition holding areas, administrative buildings, and control towers. Built-up areas (zoned 'I') occur in association with Doña Ana Range–North Training Areas and Orogrande range camps. The Doña Ana Range–North Training Areas are publicly accessible in accordance with range guidelines and access requirements. Also publicly accessible is the strip of land between War Highway 11 and the Doña Ana Firing Ranges (Mounted and Dismounted Tactical Training Area), and the extreme southwestern corner of the range. The area west of the firing ranges is closed to public access due to ordnance and explosive hazards.

Table 3.3-5 presents current overall level of use for training areas in the Doña Ana Range–North Training Areas, including quantitative level of use for training activities, and qualitative level of use for environmental management activities, and public access. In addition to the numbered training areas, level of use is provided for the "South Finger" (an unnumbered area west of TA 3B); the eastern edge of the Organ Mountains (the "East Edge" known officially as the Mounted and Dismounted Tactical Training Area) directly west of War Highway, which includes firing groups C, D, E, and F; the surface impact area in the Organ Mountains (which also includes the Doña Ana Ranges, [DAs] 47 and 53); and the area directly north, west, and east of the surface impact area (which includes DAs 40, 43, 44, 45, 47, 48, 49, 50, 51, 52, 53, and 54). Table 3.3-5 also includes the Restricted Area airspace, R-5107A, and Doña Ana and Orogrande range camps. For each of these areas, the table gives the estimated percent of use distributed among the 10 training categories described in Table 3.3-1.

Level of use for training operations is generally high at the Doña Ana Range–North Training Areas. The only exceptions are TAs 3B, 5E, 6D, 7C and 7D, and the eastern edge of the Organ Mountains, which receive a moderate level of training use. The "South Finger" area is used for on-road vehicle maneuvers, dismounted training, aircraft operations, and environmental conservation. The "South Finger" is not scheduled through the range scheduling system, so data were not available on level of use. Environmental management activities in 1996 were low or very low; the only exception being TA 4D, which had moderate level of activity. Public use is very low throughout the Doña Ana Range–North Training Areas.

The predominant type of training activity is ORV maneuvers, which includes some on-road vehicle maneuvers, accounting for between 54 and 98 percent of the use of the numbered training areas. Weapons firing activities, and associated facilities use and SDZs account for a significant percent of the use in the training areas that contain firing points, as well as all the use along the eastern edge of the

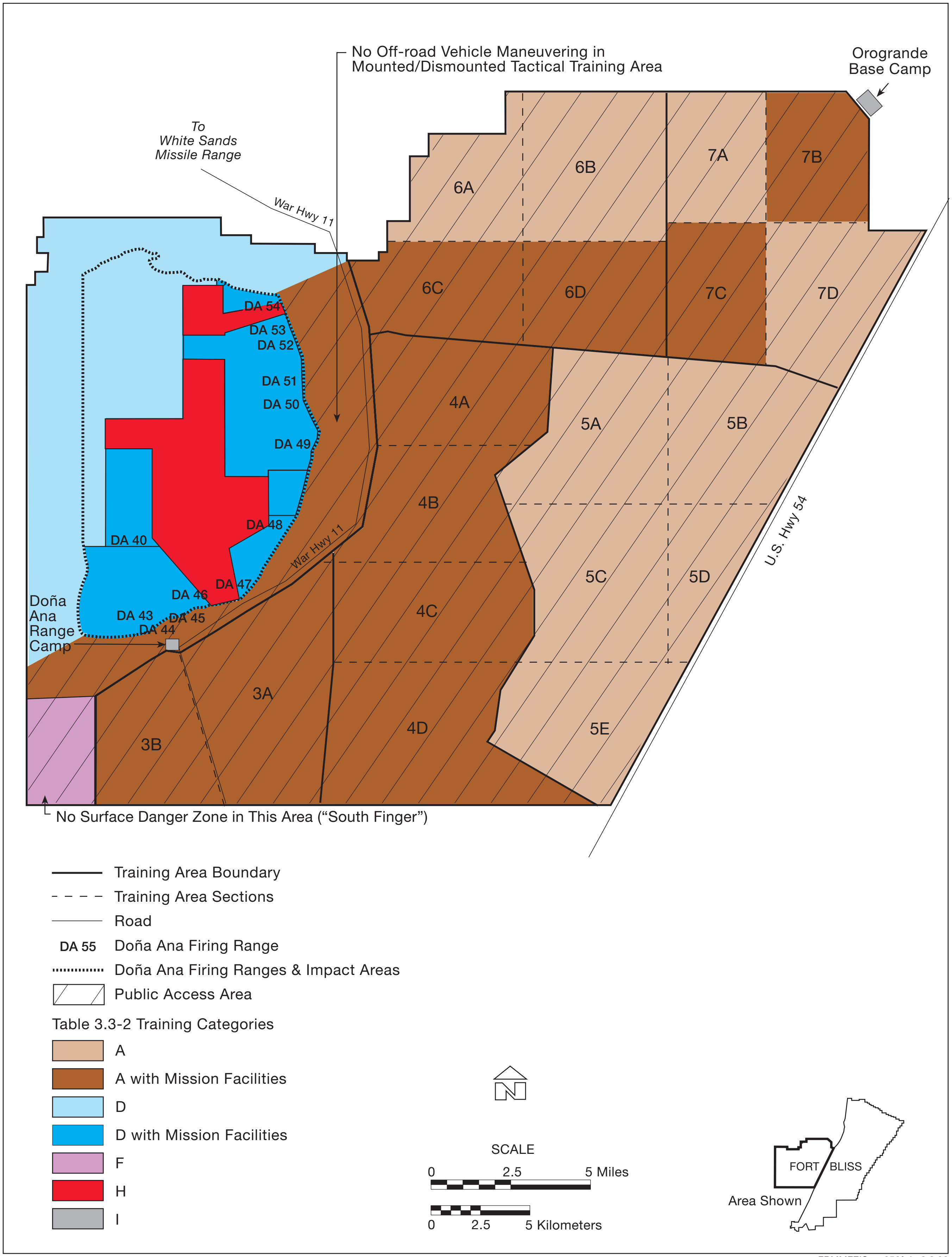

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Figure 3.3-6. Current Training Area Land Use for the Doña Ana Range–North Training Areas.

Table 3.3-5. Doña Ana Range–North Training Areas Current Level of Use

	TRNG	*Percent of Use by Training Category* [2]										*Other LOU*	
TA	*LOU* [1]	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*ENV*	*PA*
3A	H	7	7		26	60						VL	VL
3B	M	2				95			2			L	VL
4A	H	<1			23	76			<1			L	VL
4B	H	10	8		25	54			<1			L	VL
4C	H	14	11		15	57						L	VL
4D	H	6	4		8	79						M	VL
5A	H				2	98						L	VL
5B	H				2	98						L	VL
5C	H				2	98						L	VL
5D	H				2	98						VL	VL
5E	M				3	97						VL	VL
6A	H				2	98						VL	VL
6B	H					98						VL	VL
6C	H	7	7		9	78						VL	VL
6D	M				2	98						VL	VL
7A	H				2	98						VL	VL
7B	H				2	98						VL	VL
7C	M				2	98						VL	VL
7D	M				2	98						VL	VL
SF	Unk											Unk	Unk
EE	M	21	21		58							Unk	VL
IMP	H	10	10	40	40							VL	N/A
OM	H	29	29		42				2			H	N/A
R-5107A[3]	M									100		N/A	N/A
DARC	H										100		
OGRC	Unk										100		

1. Based on military operations, not including environmental activities and public use (LOU criteria in Table3.3-3).
2. Percent of total military training use by categories 1 to 10 (see Table 3.3.1). May not sum to 100% due to rounding.
3. Indicated for aircraft operations only. R-5107A is also activated for safety during some weapons firing.

Notes: TA = Training Area; TRNG = Training; LOU = Level of Use; ENV = Environmental Management; PA = Public Access Use; VL = Very low; L = Low; M = Moderate; H = High; N/A = Not applicable or not allowed; UNK = Unknown; EE = East Edge of Organ Mountains (Mounted and dismounted tactical training area); SF = "South Finger"; IMP = Organ Mountains Surface Impact Area; OM = Organ Mountains (outside Surface Impact Area); DARC = Doña Ana Range Camp; OGRC = Orogrande Range Camp.

Organ Mountains and the surface impact area west of War Highway. Mission support facilities use includes use of DZs in TAs 3B, 4A, 4B, 4D, 6D, and 7C, which also involved dismounted training, and firing groups in TAs 3A, 4A–D, 6C, the eastern edge of the Organ Mountains, and DAs 40 to 54. Aircraft operations occur throughout the Restricted Area (R-5107A) overlying Doña Ana Range–North Training Areas and are at a moderate level of use. Table 3.3-5 includes only aircraft operations for R-5107A. The airspace is also activated for safety purposes during some weapons firing.

McGregor Range. McGregor Range is part of the Fort Bliss Military Reservation, located in Otero County, New Mexico. Geographically, this range is comprised of areas within the Tularosa Basin to the south and west, Otero Mesa and its escarpment to the east and north, the Sacramento Mountains foothills in the far north, and the Hueco Mountains in the southeast. McGregor Range is comprised of 697,472 acres, of which 71,083 acres at various locations throughout withdrawn and USFS lands are owned in-fee by the DA. Through a cooperative agreement with the USFS, Fort Bliss uses 18,004 acres of USFS land on McGregor Range (TA 33) as a safety buffer and for ground troop training. Fort Bliss uses another 608,385 acres of land (TAs 8-32) on McGregor Range withdrawn for military use under

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PL 99-606 and PL 106-65. This is used for mission support facilities, weapons firing surface impact, safety buffers, off- and on-road vehicle maneuvers, FTX sites, dismounted training, aircraft operations, and range camps. McGregor Range is publicly accessible via U.S. Highway 54 and New Mexico Highway 506.

McGregor Range is subdivided into TAs 8 through 33. TA 8 is a permanent dismounted and tracked/wheeled vehicle travel area. The remaining training areas support on-road vehicle maneuvers, dismounted training (except TA 31), and a variety of weapons live fire training and testing missions.

McGregor Range Camp, located 27 miles north of the main cantonment, is used for a variety of administrative, troop housing, and training functions. It can provide billeting for approximately 1,154 personnel during training and approximately 1,220 personnel during mobilization. Range Control functions are located at Davis Dome, located near the range camp.

A series of firing locations for HIMAD missiles are located in the south part of the range on the McGregor Launch Complex. These are used for a variety of large and small air defense missile systems and may also be used for MLRS firings. Target impacts and resulting debris are generally concentrated over training areas in the Tularosa Basin portion of the range and that portion of Otero Mesa within McGregor Range. The direction of firings is usually from south to north-northeast. ATACMS firings are conducted about six times annually and impact in WSMR. ATACMS firings require closure of U.S. Highway 54.

Missiles are fired from SHORAD and Orogrande ranges and FAW Site 10, all located on the west side of McGregor Range in TAs 30, 29, and 32, respectively. Typical missiles include Stinger, Advanced Medium-range Air-to-Air Missile (AMRAAM), Hellfire, tube-launched, optically-tracked, wire- guided (TOW), and Chaparral. SDZs for these are contained within the Tularosa Basin.

Aerial gunnery missions are conducted by helicopters at Cane Cholla Aerial Gunnery Range and at the Hellfire special firing point in TA 32 and by fixed-wing aircraft at the Class C Bombing Range north of New Mexico Highway 506 in TA 11. Class C targets are located in the Class C Bombing Ranges only. The area immediately around the Class C targets (about 20 acres) is fenced to exclude livestock. Public access to areas north of New Mexico Highway 506 within the vicinity of the Class C Bombing Range is not permitted when this area is in use. An average of four to five sorties have used this target daily when the Class C bombing range is in use.

Paradrop missions are occasionally conducted on the Range DZ in TA 8 and the Wilde Benton landing strip in TA 29. Low-altitude (less than 300 feet above the ground) aerial tactical navigation by helicopters use Terrain Flying Areas 2 through 4 and a portion of 5 over McGregor Range for low-altitude flight training.

Terrain Flying Area 2. This area is designated for both day and night use. The boundaries of this area are shown in Figure 3.3-7.

Terrain Flying Area 3. This area is designated for both day and night use. The boundaries of this area are shown in Figure 3.3-7.

Terrain Flying Area 4. This area is designated for both day and night use. The boundaries of this area are shown in Figure 3.3-7. There are two nap-of-the-earth (NOE) courses that coincide with canyons located in the northern portion of airspace R-5103B for very low altitude terrain following helicopter training. The southern route follows Culp Canyon east to El Paso Canyon, turning northeast, then southeast. The northern route follows canyons just north of Culp Canyon. All lanes/courses run in a west to east direction.

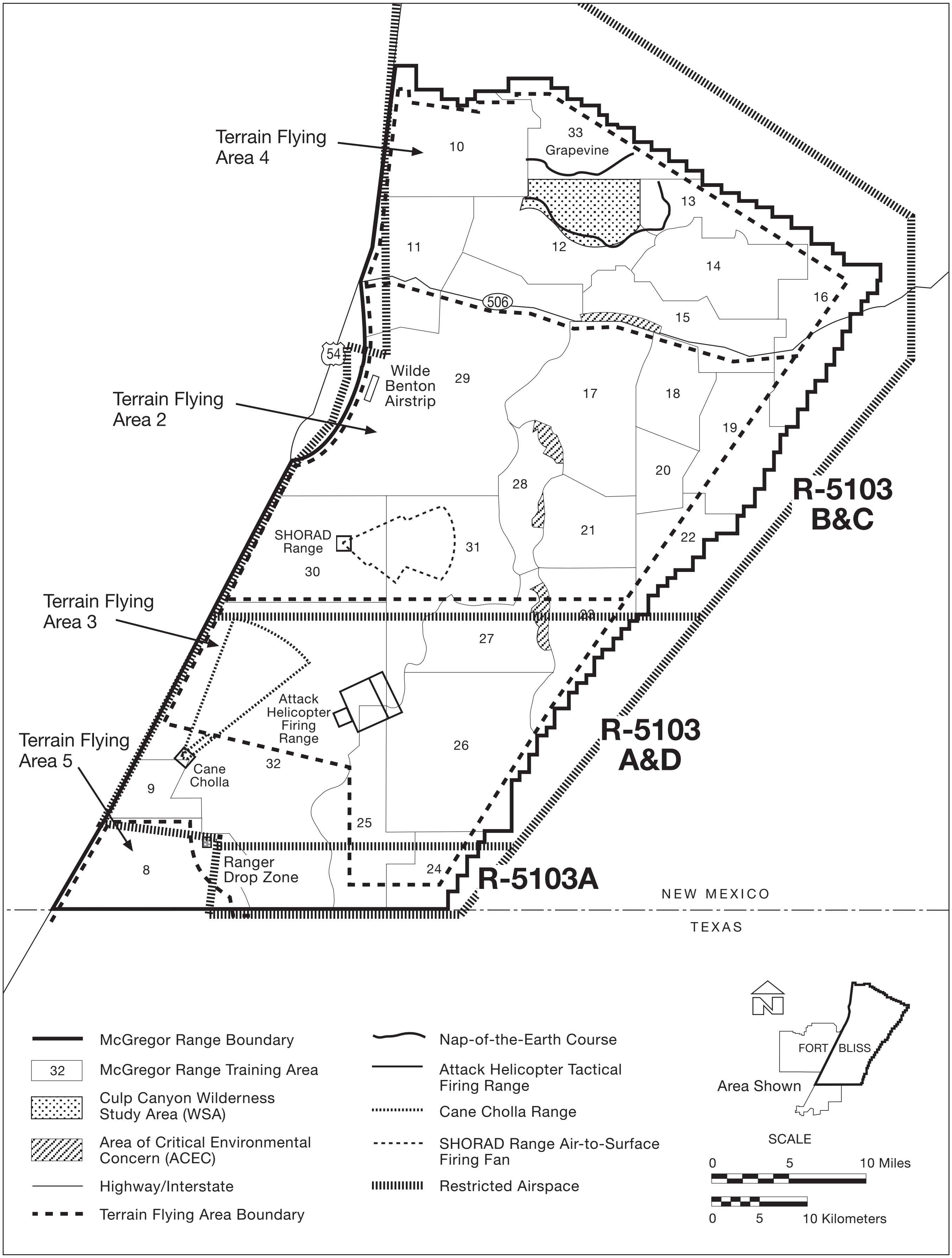

Figure 3.3-7. Terrain Flying Areas over McGregor Range.

Terrain Flying Area 5. This area is designated for both day and night use. The boundaries of this area over TA 8 on McGregor Range are shown in Figure 3.3-3.

The Roving Sands JTX activities conducted on the southern portion of McGregor Range include activities similar to those on the Doña Ana Range–North Training Areas. Personnel are deployed to field positions, including McGregor Range Camp and trained through static positioning of equipment. A USAF Control and Reporting Center is established to control the entrance and exit of aircraft in the exercise airspace in coordination with the U.S. Marine TAOC on the Doña Ana Range–North Training Areas. Units are also deployed on and around Otero Mesa in the northern region of McGregor Range (U.S. Army, 1994a). The existing controlled access FTX sites are used to position small units at or below the battery, platoon size. These units are stationed within a fixed radius of a position or asset to be defended and then moved periodically (U.S. Army, 1994a).

Small arms (including pistols, machine guns, and grenades), demolition, and other similar individual training is conducted at Meyer Range in the south part of the McGregor Range (TA 32). Meyer Range activities can occur simultaneously with most other military operations.

Current training area land use for McGregor Range is illustrated in Figure 3.3-8. TA 8 at the southwestern corner of the range is the only areas zoned for off-road wheeled vehicle maneuvers ('B with Mission Facilities'). TA 32 contains the McGregor Missile Launch complex and Meyer Range and associated surface impacts areas ('H'). Also zoned for surface impact is the Class C Bombing Range in TA 11, the areas east of SHORAD and the Orogrande complex, and TA 31 that contains the MLRS target impact area. TAs 9, 11, 29, and 30 are zoned 'C,' with TAs 29 and 30 containing mission facilities. TA 10 at the northwest corner of the range is zoned 'D.'

The training areas on Otero Mesa and the Sacramento Mountains foothills are zoned 'E' or 'F,' depending on whether the training area contains controlled access FTX sites. TAs 12, 13, 14, 16, and the Grapevine Area are zoned 'F,' and designated for on-road vehicle maneuvers and dismounted training (training of soldiers on foot without motor vehicles), SDZ, aircraft operations, and environmental conservation. This same zoning has been applied to TAs 24, 26, 27, and 28 in the Hueco Mountains. Dismounted training may be conducted with special approval only in TA 28, 33, and the Culp Canyon WSA. There is no dismounted training in TA 31 except at the FTX site. TAs 15 through 23 on Otero Mesa are zoned 'E,' and contain controlled access training exercise sites, primarily for communications and target engagement training involving the Patriot and Hawk missiles. The Culp Canyon WSA in TA 12 is zoned 'G,' and may be used for dismounted training. Built-up areas, zoned 'I,' are associated with McGregor Range Camp, and the SHORAD and Orogrande complexes. TAs 8 through 23 are publicly accessible in accordance with range guidelines and access requirements, as are four elongated parcels of land collectively designated as an ACEC by the BLM.

Table 3.3-6 depicts overall current level of use for training areas at McGregor Range. The table also includes Culp Canyon WSA and R-5103, the restricted airspace overlying the range. The level of use in training areas at McGregor Range varies from very low to high. The areas that receive the highest concentration of training use are primarily centered around the facilities in TAs 29, 30, and 32, and associated impact areas in TA 31, and SDZs in TAs 27, 28, and 31 within the Tularosa Basin portion of the range.

McGregor Range TA 32 contains the McGregor Launch Complex, Meyer Range, the Cane Cholla Helicopter Gunnery Range, and the Hellfire missile special firing point, which makes it the most highly used training area in the Fort Bliss Training Complex. The highest percent of training use in the training area is facilities use. Use of TAs 29 and 30, where the Orogrande and SHORAD ranges are located,

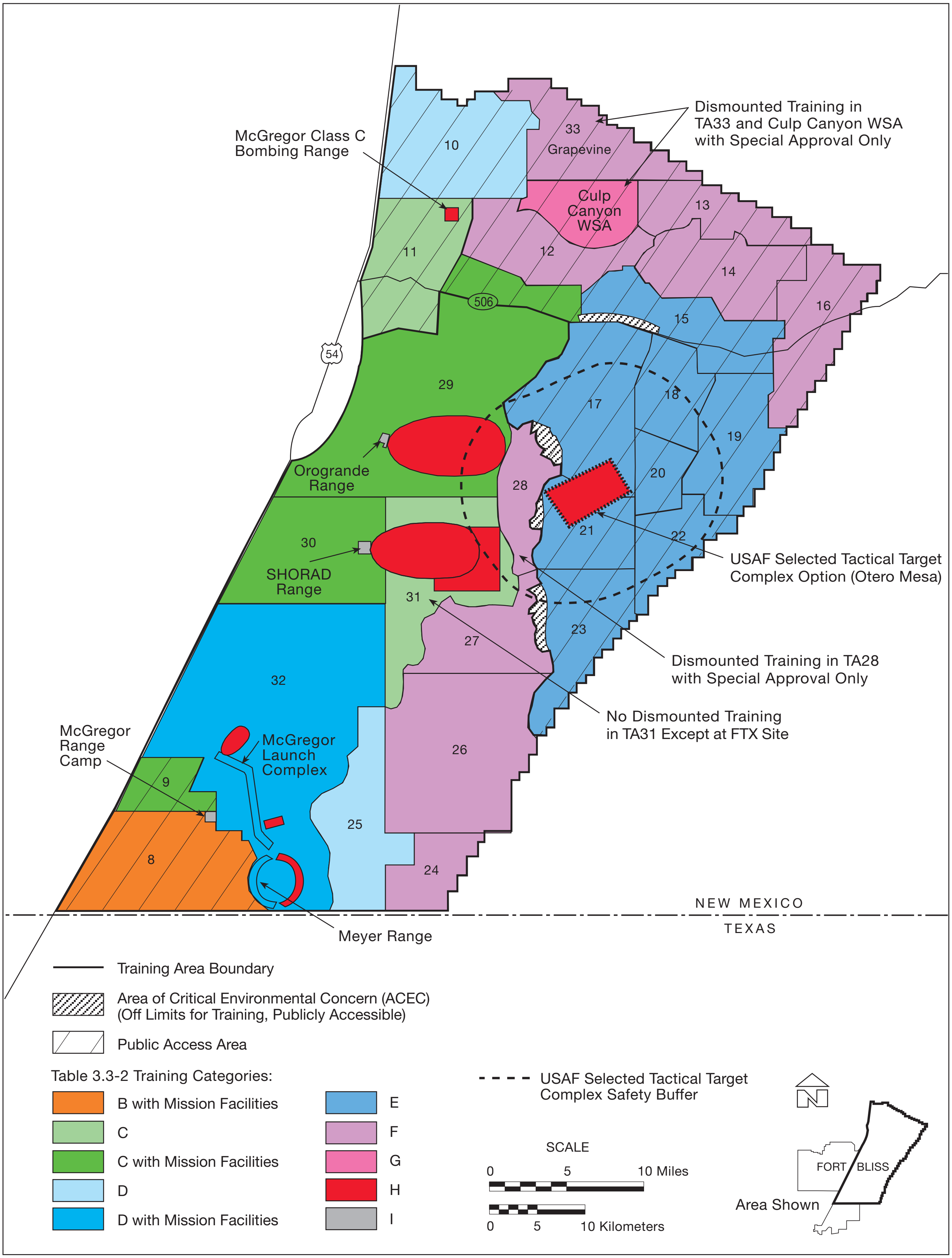

Figure 3.3-8. Current Training Area Land Use for McGregor Range.

Table 3.3-6. McGregor Range Current Level of Use

	TRNG	*Percent of Use by Training Category*[2]										*Other LOU*	
TA	*LOU*[1]	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*ENV*	*PA*
8	L					99[3]			1			L	VL
9	VL				27		73					L	VL
10	L				67		19		14			H	VL
11	L	9	9	9	48		15		12			H	VL
12	L				59		19		22			H	VL
13	L				61		22		16			H	VL
14	L				61		22		16			H	VL
15	L				54		25	6	14			H	VL
16	L				61		22		16			H	VL
17	H	22	22	22	33							H	VL
18	H				95		3	2				H	VL
19	H				94		4	2				H	VL
20	H				93		4	3				H	VL
21	H	22	22	22	32			1				H	VL
22	H				95		2	3				H	VL
23	H				95		2					H	VL
24	L				96		2		2			M	N/A
25	L				100							M	N/A
26	L				99		1					M	N/A
27	H				100							M	N/A
28	H			5	95							M	N/A
29	H	19	16	16	45		3		1			M	N/A
30	H	28	25	14	33							M	N/A
31	H			23	76		1					M	N/A
32	H	31	11	8	17		17				16	H	VL
33 (Grapevine)	VL				78				22			L	UNK
WSA	VL				72				28			H	VL
R5103	H									100		N/A	N/A

1. Based on military operations, not including environmental activities and public use (LOU criteria in Table 3.3-3).
2. Percent of total military training use by categories 1 to 10 (see Table 3.3-1). May not sum to 100% due to rounding.
3. Includes on-road vehicle maneuvers.

Notes: TA = Training Area; TRNG = Training; LOU = Level of Use; ENV = Environmental Management; PA = Public Access Use; VL = Very low; L = Low; M = Moderate; H = High; N/A = Not applicable or not allowed; UNK = Unknown (not included in total); WSA = Culp Canyon WSA.

respectively, is roughly equivalent, and generally higher than other training areas in the Fort Bliss Training Complex. Level of training use on TAs 28 and 31, although high, is primarily confined to surface impact area and SDZs.

The principal type of training and testing at McGregor Range is SHORAD and HIMAD missile firing. Most of the use in the training areas is as SDZs for weapons firing. Training areas within SDZs of SHORAD missions, including TAs 17 and 21, show a slightly higher level of use than areas within SDZs of HIMAD missiles, although use in these areas is still low. TAs 24, 25, and 26 in the Hueco Mountains portion of McGregor Range are also within SDZs for weapons firings from TA 32. Training use in these training areas remains low.

Some training areas also support on-road vehicle maneuvers, primarily involving use of existing controlled-access sites for the Roving Sands JTX (Figure 3.3-9). Activities on these sites include target

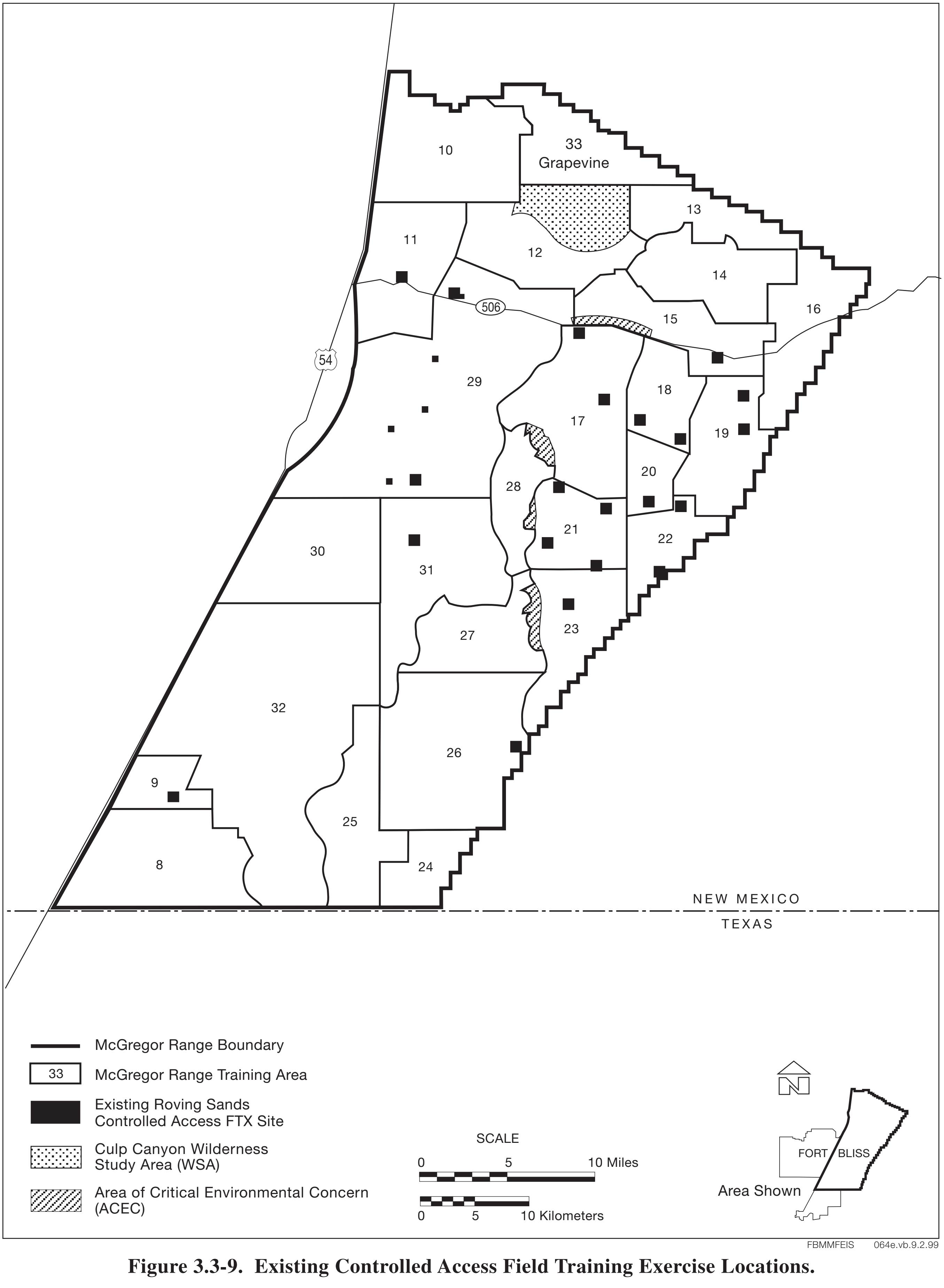

Figure 3.3-9. Existing Controlled Access Field Training Exercise Locations.

acquisition and communication training. These activities require no improvements, no clearing, no digging and involve roll-in/roll-out of wheeled vehicles only. Because use of those sites can be rotated from year to year, some training areas experience higher use than others in any given year, especially in the Otero Mesa portions of the McGregor Range.

In 1996, the majority of use on TA 8 was for off-road and on-road wheeled vehicle maneuvers. TA 8 is the only training area at McGregor Range where off-road wheeled vehicle maneuvers are permitted. However, since the relocation of the 3rd ACR, ORV use has declined, and more of the vehicle activity involves on-road travel by ADA units. Several training areas, as well as Culp Canyon WSA, are used for dismounted training, but that use is typically very low overall.

McGregor Range is overlain by Restricted Area R-5103 (Figure 3.3-10). Use of that airspace for air operations is high, and significantly higher than at R-5107A overlying Doña Ana Range–North Training Areas. Restricted Area R-5103 must be activated during missile firings to ensure safety.

The future USAF tactical target complex will increase training use substantially in TAs 17, 18, 19, 20, 21, 22, and 23 from very low or low to high. With the exception of TAs 17 and 21, all of the increase would be in Category 4, SDZ. This action will introduce mission facilities and surface impact area as new uses in TAs 17 and 21. When the target complex is constructed, it is expected to replace much of the use of the existing Class C Bombing Range in TA 11, which would consequently experience a decrease in training use.

McGregor Range has been subject to a significantly higher level of environmental study than the other ranges/training areas, as shown by the generally moderate to high levels of environmental management use noted in Table 3.3-6. This is due to three factors. First, McGregor Range is, and has been, used for FTX, Roving Sands, and other troop training exercises which required environmental compliance. Second, the proposal to develop a USAF Tactical Target Complex on McGregor Range required environmental studies. Third, several studies are ongoing in support of this programmatic EIS and the McGregor Range Withdrawal Renewal application. Public access use is very low and generally comparable to or slightly lower than Doña Ana Range–North Training Areas. Public access use on McGregor is for hunting, hiking, wildlife-watching, and similar activities. Permits for public access are issued by the Army and by the Las Cruces Field Office of the BLM. Additionally, the McGregor grazing units are contracted to the public through a bid system administered by the BLM. In either case, public use is substantially less than at the South Training Areas, where public use, although still low, is two to three times higher than at McGregor Range or Doña Ana Range–North Training Areas. 48

3.3.4 Facility Construction and Demolition

Alternative 1 incorporates requirements specified in the ongoing Fort Bliss *Long-range Family Housing Plan* (U.S. Army, 1997a) to continue the sequential projects developed as described in the No Action Alternative. As with the No Action Alternative, the fiscal year schedule for the Family Housing Program is subject to change dependent upon program funding. For example, the following changes to the Family Housing Program (Table 3.3-7) are not reflected by the Proposed Land Use presented in the LRC (Figure 3.3-1). A summary of programmed actions included in this plan through FY 14 is shown in Table 3.3-7. Although the housing construction projects and schedules under Alternative 1 are similar to those in the No Action Alternative, there are some differences. Alternative 1 differs from the No Action Alternative in that:

- A total of 450 additional replacement family housing units will be constructed in the Logan Heights West area in FYs 99 through 01.

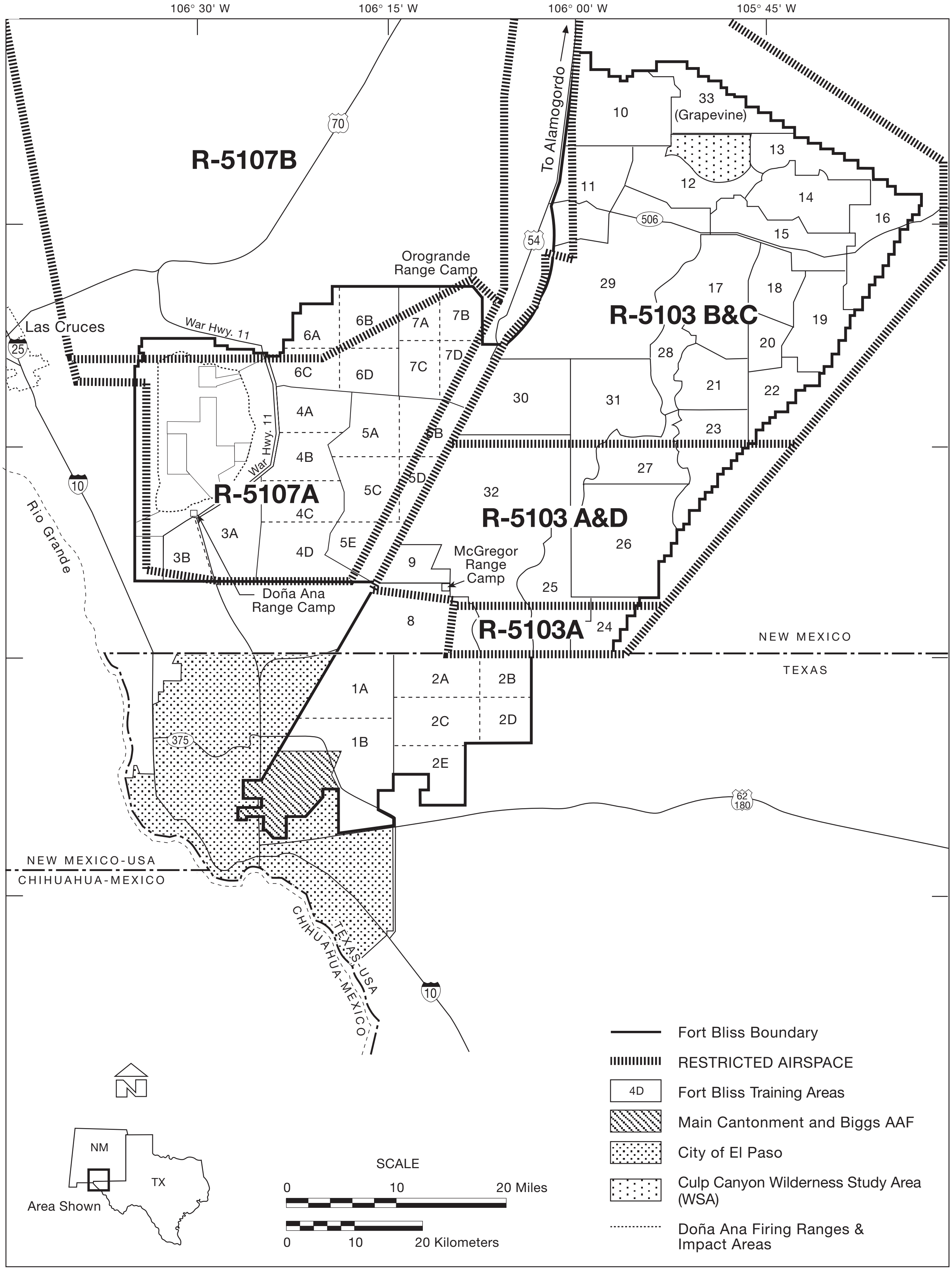

Figure 3.3-10. Restricted Airspace on Fort Bliss.

Table 3.3-7. Fort Bliss Housing and Other Construction Projects–Alternative 1

Program FY	*Project*	*Quantity*	*Location*	*Land Use Category*
		Family Housing		
Before FY 97	AFHC Family Housing Replacement	189	Logan Heights–West	VIII
		110	Logan Heights–East	VIII
		105	WBAMC	VIII
		333	Van Horn Park	VIII
FY 97	AFHC Family Housing Replacement	64	Hayes	VIII
FY 98	AFHC Family Housing Replacement	66	Hayes	VIII
		25	WBAMC	VIII
FY 99	AFHC Family Housing Replacement	150	Logan Heights–West	VIII
FY 00	AFHC Family Housing Replacement	125	Aero Vista–West	VIII
		150	Logan Heights–West	VIII
FY 01	AFHC Family Housing Replacement	138	Aero Vista–West/East	VIII
		150	Logan Heights–West	VIII
FY 02	AFHC Family Housing Replacement	137	Aero Vista–East	VIII
FY 04	AFHC Family Housing Replacement	130	WBAMC	VIII
FY 06	AFHC Family Housing Replacement	165	North Main Cantonment Area (1400, 1500, 1800 areas)	VIII
FY 08	AFHC Family Housing Replacement	167	Logan Heights	VIII
FY 10	AFHC Family Housing Replacement	250	North Main Cantonment Area (1300, 1800, 1900, 9300 areas)	VIII
FY 12	AFHC Family Housing Replacement	110	Logan Heights	VIII
FY 14	AFHC Family Housing Renewal	121	South Main Cantonment Area (200–500), WBAMC (7000, 7300 areas)	VIII
		Other Construction		
FY 98	Upgrade Patriot Tactical Launch Site	6	Training Ranges	VI
	Upgrade FAW Site	3	Training Ranges	
	Multi-purpose Small Arms Range and Combat Pistol Qualification Course	1	Meyer Range	
	ASMP Repair Taxiway/Lighting-Phase II	1	Biggs AAF	I
	ASMP Repair Airfield Lighting-Phase II	1	Biggs AAF	I
FY 99	ASMP Repair Apron/Taxiway Lighting	1	Biggs AAF	I
FY 00	Tactical Equipment Shop	7		I
	ASMP Air Deployment Facility Complex	1	Biggs AAF	
FY 01	Sanitary Landfill—233 Acres	1	0.5 miles Northeast of Existing Landfill	III
FY 01	Street Realignment and Widen	1	North Main Cantonment Area	IX
	ASMP Aircraft Loading Apron	1	Biggs AAF	I
	ASMP Aircraft Ammunition Hot Load Area	1	Biggs AAF	
	ASMP Rail Deployment Facility Complex	1	Biggs AAF	III
	ASMP Tactical Vehicle Overpass	1	Main Cantonment Area	III
	Ammunition Storage Facilities	17	McGregor Range	IV
FY 02	Tactical Equipment Shop Expand/Upgrade	7		II
	Ammunition Supply Point (ASP)_Expansion—Phase II	17	McGregor Range	IV

- The schedule for family housing unit replacement in the Aero Vista Area has been revised. Rather than replacing 200 units in FY 00 and 200 in FY 02, 125 units will be replaced in FY 00, 138 units will be replaced in FY 01, and 137 units will be replaced in FY 02.

- During FY 10, 50 fewer units will be replaced in the north Main Cantonment Area.

- The following changes in land use categories occur:

  – the old George Moore Park area (Figure 3.2-3) changes from family housing to training/ranges;
  – the Van Horn Park area (Figure 3.2-3) changes from family housing, outdoor recreation, and administration to service/industrial and supply/storage;
  – the area at Forrest/Pleasanton/Chaffee and Marshall changes from community facilities to troop housing; and
  – an area in the WBAMC area changes from community facilities and training/ranges to family housing.

As an example of a CIS component of the RPMP relating to Alternative 1 is the P3 CIS. This investment strategy document supports the ASMP designation of Fort Bliss as one of the Army's 15 continental United States P3s. The *Environmental Assessment for Army Strategic Mobility Program Facilities at Fort Bliss, Texas and New Mexico* (U.S. Army, 1997b), describes five primary ASMP projects and three secondary projects at or near Biggs AAF. The primary ASMP projects include construction and repair of an aircraft loading apron, an air deployment facility complex, an ammunition hot-load facility, a tactical vehicle overpass, and a rail deployment facility. The secondary projects include demolition, relocation, and construction of a fire fighting area, as well as demolition and relocation of a contractor storage area. Nonhousing and troop housing (other facilities) construction projects shown on Table 3.3-1 are identified in the RPMP or included in the minor construction program.

There are 17 nonhousing construction projects included in Alternative 1 (Table 3.3-7). These projects are scheduled to occur between FY 98 and FY 02. Nine of these projects are part of the ASMP. The nonhousing construction projects are located in areas designated as land use categories I–Airfield; II–Maintenance; III–Industrial; IV–Supply/Storage; VI–Training/Ranges; and IX–Community Facilities.

Facility Demolition under Alternative 1 continues the previous facility reduction program and the Army Family Housing Program described under the No Action Alternative. Alternative 1 includes plans to demolish family housing and other facilities (Table 3.3-8). The current plan has 3,098 facilities scheduled for demolition between FY 97 and FY 14.

In addition, 512 housing units were demolished prior to 1997. Demolition of nonhousing and troop housing facilities is scheduled to occur through FY 01, while demolition of family housing units continues through FY 14. There are 328 nonhousing and troop housing facilities scheduled for demolition between FY 97 and FY 01. Demolition of facilities will occur in the following areas: the North Cantonment Area, the South Cantonment Area, Logan Heights, WBAMC, Biggs AAF, and McGregor Range (Figure 3.3-11).

Of the 3,098 facilities scheduled for demolition between FY 97 and FY 14, 2,770 are family housing units. Under Alternative 1, as under the No Action Alternative, many of these family housing units are scheduled to be replaced with new buildings as discussed in Section 3.3.4, *Facility Construction and Demolition*. Demolition of family housing units under Alternative 1 differs from the No Action Alternative in that:

Table 3.3-8. Fort Bliss Demolition Projects–Alternative 1

Program FY	*Project*	*Quantity*	*Location/Building Number(s)*	*Land Use Category*
Family Housing				
Before FY 97	Demolition of Family Housing	278	Hayes	VIII
		10	George Moore Park	
		124	WBAMC	
FY 97	Demolition of Family Housing	70	Aero Vista–West	
FY 98	Demolition of Family Housing	87	Aero Vista–West Aero Vista–East	
FY 99	Demolition of Family Housing	5	Van Horn Park	
FY 00	Demolition of Family Housing	72	Aero Vista–East	
		5	Van Horn Park	
FY 01	Demolition of Family Housing	71	Aero Vista–East	
		5	Van Horn Park	
FY 02	Demolition of Family Housing	8	Van Horn Park	
FY 04	Demolition of Family Housing	35	North Main Cantonment Area (1400, 1500, 1800 Areas)	
FY 06	Demolition of Family Housing	89	Logan Heights	
FY 08	Demolition of Family Housing	43	North Main Cantonment Area (1800, 1900, 9300 Areas), Logan Heights	
FY 10	Demolition of Family Housing	00*	Northeast El Paso	
FY 12	Demolition of Family Housing	60	South Main Cantonment Area (5100, 5200 Areas)	
FY 14	Demolition of Family Housing	40	317–351, 353–357	
Other Facilities				
FY 97	Demolition of Facilities	36	Main Cantonment Area / 453, 454, 455, 809, 1165, 1343, 1355, 2027, 2065, 2066, 2067, 2443, 2503, 2504, 2506, 2507, 2508, 2510, 2511, 2512, 2514, 2515, 2516, 2535, 2546, 2645, 2646, 2647, 2906, 2907, 2908, 2909, 5331, 5336, 5349, 5354	II III IV VI VII VIII IX XI
		11	Logan Heights / 4241, 4569, 4622, 4625, 4637, 4659, 4677, 4718, 4725, 4731, 4879	VII VIII IX
		5	Biggs AAF / 11178, 1350, 11351, 11352, 11360	VII XI
		1	South Main Cantonment Area 675	IX XI
FY 98	Demolition of Facilities	36	North Main Cantonment Area / 897, 1020, 1170, 1208, 1250, 1328, 1332, 1600, 1601, 1602, 1603, 2040, 2318, 2323, 2324, 2325, 2326, 2327, 2328, 2333, 2334, 2335, 2336, 2337, 2344, 2345, 2346, 2347, 2354, 2355, 2356, 2357, 2513, 2519, 2534, 2582, 5350, 5355, 5363	II I IV VI VII VIII IX

Table 3.3-8. Fort Bliss Demolition Projects–Alternative 1 (Continued)

Program FY	*Project*	*Quantity*	*Location/Building Number(s)*	*Land Use Category*
Other Facilities (continued)				
FY 98 (continued)	Demolition of Facilities (continued)	104	Logan Heights / 4204, 4205, 4240, 4252, 4253, 4254, 4255, 4258, 4321, 4546, 4547, 4548, 4562, 4563, 4564, 4565, 4566, 4570, 4571, 4572, 4574, 4575, 4591, 4618, 4619, 4620, 4626, 4627, 4628, 4634, 4635, 4636, 4641, 4642, 4643, 4644, 4652, 4656, 4657, 4662, 4663, 4664, 4665, 4672, 4674, 4676, 4682, 4714, 4715, 4716, 4722, 4726, 4727, 4728, 4729, 4732, 4733, 4734, 4735, 4737, 4741, 4742, 4743, 4744, 4756, 4757, 4762, 4763, 4764, 4765, 4776, 4798, 4799, 4814, 4815, 4826, 4827, 4832, 4833, 4834, 4835, 4867, 4880, 4881, 4882, 4884, 4885, 4886, 4887, 4888, 4889, 4890, 4918, 4919, 4920, 4926, 4927, 4928, 4929, 4930, 4931, 4973, 4974, 4975	VII VIII IX
		2	McGregor Range Camp / 9900, 9496	XII
		48	Biggs AAF / 3664, 3680, 3681, 3682, 3683, 3684, 3685, 3686, 3687, 3694, 10001, 10002, 11001, 11030, 11046, 11110, 11111, 11122, 11125, 11129, 11130, 11177, 11189, 11203, 11216, 11219, 11220, 11221, 11222, 11223, 11225, 11226, 11228, 11237, 11238, 11239, 11241, 11264, 11283, 11312, 11316, 11515, 11516, 11517, 11518, 11519, 11520, 11521	II IV V VII IX
		6	South Main Cantonment Area / 440, 448, 452, 690, 5000, 5363	VII IX
FY 99 to 01	Demolition of Facilities	36	North Main Cantonment Area / 48, 49, 50, 801, 888, 889, 890, 898, 1177, 1178, 1179, 1180, 1181, 1249, 1270, 1271, 1272, 1273, 1274, 1275, 1276, 1277, 1278, 1279, 1288, 1301, 2009, 2010, 2011, 2014, 2444, 2445, 2518, 2637, 2910, 2911	III V VII IX
		18	Biggs AAF / 3651, 3656, 3657, 3665, 3666, 3667, 3668, 3669, 3670, 11121, 11126, 11131, 11162, 11213, 11216, 11240, 11273, 11275	

Table 3.3-8. Fort Bliss Demolition Projects–Alternative 1 (Continued)

Program FY	*Project*	*Quantity*	*Location/Building Number(s)*	*Land Use Category*
FY 99 to 01 (continued)	Demolition of Facilities (continued)	36	WBAMC / 7000, 7005, 7006, 7007, 7008, 7075, 7113, 7121, 7124, 7125, 7133, 7134, 7136, 7137, 7139, 7142, 7145, 7146, 7147, 7151, 7152, 7153, 7154, 7155, 7157, 7158, 7159, 7161, 7162, 7166, 7167, 7175, 7177, 7178, 7181, 7265	IV VIII
		4	McGregor Range Camp / 9470, 9472, 9592, 9593	III

* Lease expires, no planned renewal. No actual demolition will occur.

- The 171 units in the Aero Vista area that were scheduled for demolition during FY 00 have been rescheduled for demolition in FY 01.

- The demolition of 225 units in the Van Horn Park area that were scheduled for demolition in FY 02 has been rescheduled. Seventy-five units will be demolished in FY 99, FY 00, and FY 01.

Demolition of nonhousing and troop housing facilities under Alternative 1 differs from that of the No Action Alternative. The more obvious differences are that:

- An additional 235 nonhousing and troop housing facilities will be demolished.

- The schedule for demolition of the facilities has been extended through FY 01.

The less obvious differences are that:

- Land use categories for some areas in which the facilities will be located have changed in the revised LRC planning from that of the existing LRC land use plans. Compare Figures 3.2-2 (No Action Alternative) and 3.3-1 (Alternative 1) for the location of proposed land use category changes throughout the Fort Bliss Main Cantonment Area.

- Some facilities scheduled for demolition under the No Action Alternative will not be demolished under Alternative 1.

- Some facilities not scheduled for demolition under the No Action Alternative will be demolished under Alternative 1.

3.3.5 Environmental Resource Management

Installation programs and plans that integrate environmental resource management with mission requirements include ITAM practices that are ongoing under this alternative in the same fashion as the No Action Alternative. However, ITAM also interfaces with the proposed implementation of the RPMP, INRMP, and ICRMP that are the focus of this alternative.

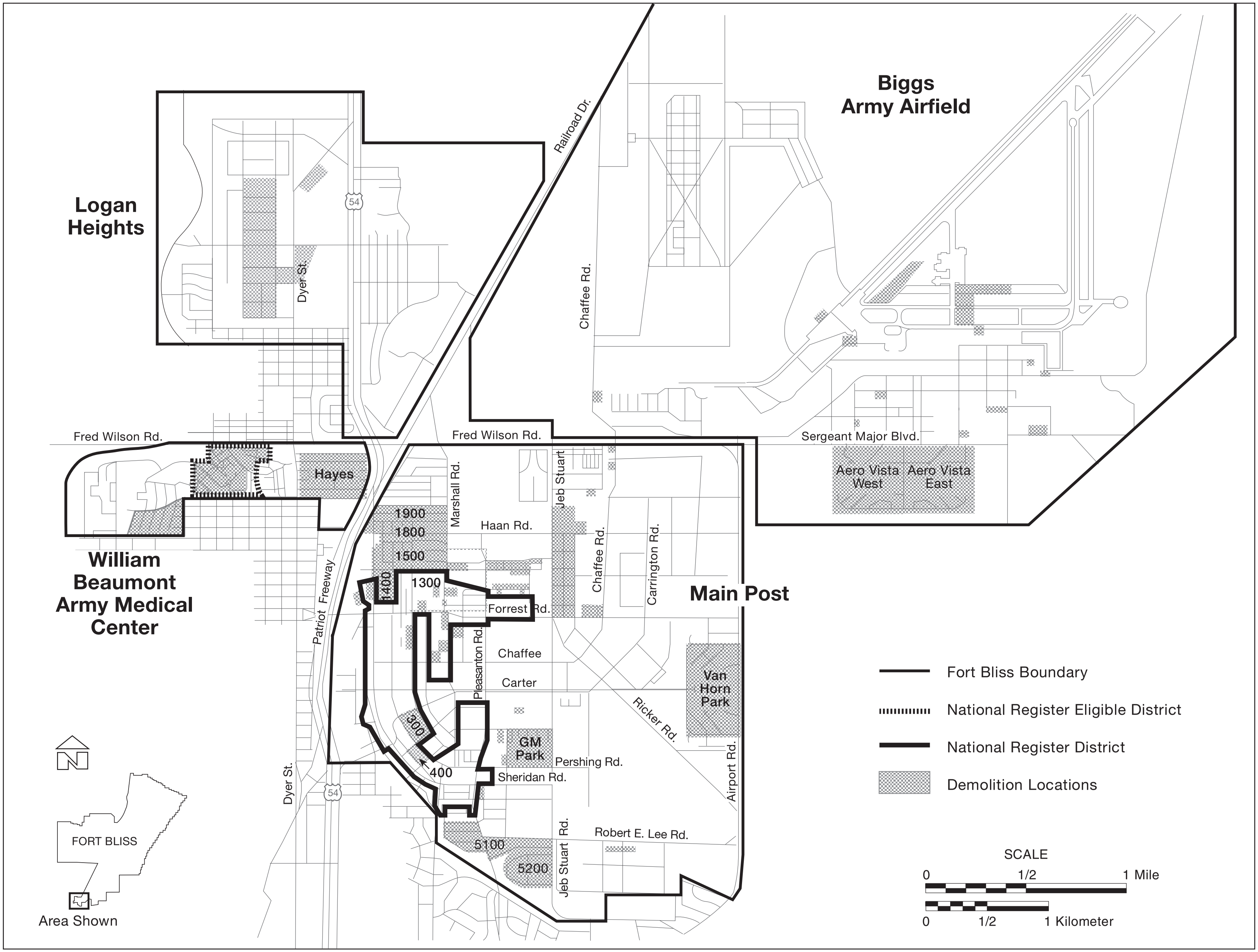

Figure 3.3-11. National Register Use/Eligible Districts and Location of Demolition Activities under Alternative 1.

3.3.5.1 Integrated Natural Resource Management

The INRMP meets the congressionally mandated requirements of the *Sikes Act* (PL 105-85), guides the implementation of the natural resources program on Fort Bliss from 1998 through 2002, and provides the management philosophy throughout the master planning horizon to 2016. The objective of this program is to ensure the conservation of Fort Bliss natural resources as well as compliance with related environmental laws and regulations while maintaining quality training lands upon which to accomplish the training and testing missions. This plan is an integral part of the Fort Bliss mission and master planning activities to maximize both environmental conservation efforts and range use. The INRMP emphasizes an ecosystem management approach to natural resources management. Many of the Fort Bliss resource management objectives are broad in scope; others pertain to discrete ecosystem units. This change is consistent with recent changes in laws and Army policy. Comprehensive goals are:

- Support sustainable training while maintaining ecosystem integrity.
- Conduct threatened and endangered species surveys where necessary, and ensure proper implementation of threatened and endangered species management plans.
- Prevent deterioration of highly erodible soil resources.
- Protect wetland resources and other special aquatic sites from degradation, enhance existing wetlands, and ensure no net loss of wetland resources.
- Identify and protect unique and sensitive areas.
- Prevent expansion of and actively control exotic, noxious organisms.
- Consider prescribed burning as a management tool; consider wildfire suppression where necessary.

Ecosystem management will continue to allow the use of natural resources along with Fort Bliss training areas for both military and other human-related values and purposes. However, ecosystem management has an over-riding goal of protecting the properties and functions of natural ecosystems. Since these ecosystems go beyond installation boundaries, management of natural resources on Fort Bliss will include more emphasis on partnerships with its neighbors. On McGregor Range, the INRMP applies to Army fee-owned land and managing impacts of military missions on withdrawn public land as specified in the McGregor Resource Management Plan Amendment (RMPA) and Memorandum of Understanding (MOU) (BLM, 1990b). The BLM retains management for public access uses on withdrawn and Army fee-owned land. The INRMP incorporates activities of the installation's ITAM Site Rehabilitation Prioritization System as a means to identify and prioritize degraded training sites or areas for potential rehabilitation based upon the requirements of the training mission, environmental influences, and resources available. Actions that may be undertaken following integrated reviews to ensure consideration of the objectives of the three resource management activities – ITAM, the INRMP, and the ICRMP include:

- Control burns for habitat management;
- Fire suppression – chemicals, blading, backfires, and firebreaks;
- Brush cuttings (mowing, brush hog, other vegetation maintenance);
- Tree harvesting (pinyon juniper areas) – firewood sales;

- Plowing, disking, chemical treatment (herbicides, fertilizers) in preparation for planting of vegetation for wildlife food or cover (including disking or other soil management to prepare the seed bed), erosion control, or land rehabilitation;
- Construct nesting areas or structures;
- Disking, raking, burning, seeding, as a part of moist soil management;
- Weed and noxious plant control (burning, mowing, chemical treatments);
- Animal control (predator control, diseased animals);
- Construct water control management device (earthen dam or structure to control or modify water run-off, terracing, check dams, drainage catchments, water diversion);
- Construct water units (above-ground, below-ground collection units and drinkers);
- Application of erosion blankets to disturbed areas;
- Auguring, trenching, soil and rock removal;
- Introduction/reintroduction of locally native plants and animals;
- Provisions to allow hunting, hiking, and camping;
- Construction of interpretative trails and signs;
- Construction of fences for security or to protect natural resources;
- Grounds maintenance mostly on post or range camps (planting, fertilizing, weed control);
- Training area road construction and maintenance (water bars and turnouts);
- Training area road closures; and

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- Grazing activities on areas of Fort Bliss other than McGregor Range (grazing on McGregor Range is managed by the BLM).

Implementation of the INRMP would replace the current species-specific strategy. The context of these measures would be expanded from the single species or single resource perspective to an ecosystem management approach where ecosystem processes and the maintenance of biodiversity are stressed. Integration into Fort Bliss operations includes the following management measures to be developed and/or implemented as appropriate:

- Ecosystem management units delineation and description of attributes and primary objectives for these ecosystem management units.
- A fire management plan to (1) provide greater protection to vegetation units deemed important for the maintenance of biodiversity, (2) potentially reduce the frequency and duration of fires, and (3) potentially use prescribed burns for habitat management that is consistent with ecosystem management.

- An Organ Mountains management plan to improve management of locations that contain plant communities and wildlife species that are unique to Fort Bliss and which are important for the maintenance of biodiversity.

- Improved plant community and unique wildlife species management in the Hueco Mountains.

- Improved management of the scattered areas of shinnery oak (*Quercus havardi*), which may be indicative of relic sand dunes.

- Improved management of playas and springs. A survey of springs on Fort Bliss is being conducted to identify springs.

- Improved management of desert arroyo/riparian areas.

- Establish nongame management plans that identify important nongame species and habitats so they can be protected.

- Improved management of prairie dog towns.

- Improved management of caves that are important for wildlife.

- Improved management of bat concentration areas and hibernaculums.

3.3.5.2 Integrated Cultural Resource Management

The *Integrated Cultural Resources Management Plan for Fort Bliss through Fiscal Year 2000*, (U.S. Army, 1998b), is a proposed revision to the *Historic Preservation Plan (HPP)* (U.S. Army, 1982b). The HPP implements a 1981 MOA with the ACHP and the Texas and New Mexico SHPOs. Programmatic compliance through the development and implementation of ICRMPs is encouraged by the ACHP and the SHPOs. Fort Bliss will submit this ICRMP to the ACHP and the Texas and New Mexico SHPOs for review as a modification that will replace the existing HPP. This ICRMP, when implemented, would allow Fort Bliss to accomplish routine cultural resource actions following preapproved procedures and report the results to the ACHP and the New Mexico and Texas SHPOs. During FY 01, the ICRMP would be reviewed by Fort Bliss, the ACHP, and the Texas and New Mexico SHPOs to determine if revisions are required.

The primary goal of the plan is to sustain complete compliance with federal cultural resource management statutes with the least possible degradation of the military training mission. Ensuring military readiness requires continued use, changes, and ground disturbance in open spaces required for military training, changes in land use, testing, construction, and conservation in support of military use. Maintenance, repair, and renovation of historic buildings and structures can threaten properties if preservation planning and technology are not integrated into all aspects of the work. For these reasons, the bulk of archaeological funding and management efforts are focused upon identifying, evaluating, and managing archaeological properties in training areas while reducing or eliminating as many of the current constraints on training as possible. The installation would set priorities for work in various portions of the training complex based upon military training, testing, and other mission and mission support requirements. Fort Bliss would submit a 12-month work plan (January through December) that delineates priority areas for projects as a part of each ICRMP annual report. These projects would then become a part of the ICRMP. Table 3.3-9 illustrates the actions included in the ICRMP that would affect mission

Table 3.3-9. Fort Bliss Cultural Resources Management Plan Programs Affecting Mission and Master Planning

FY 95	*FY 96*	*FY 97*	*FY 98*	*FY 99*	*FY 00*
Discipline—Historic Archaeology					
Sensitivity Area Mapping for Historic Sites in the Cantonment (BLIS94H003)		Cantonment Testing Using Sensitivity Map, Phase II (BLIS94H003)	Apache/Spanish/ Protohistoric Site Survey and Evaluation in Maneuver Areas and Doña Ana Range (BLIS97CH01)	Military Site Testing in Maneuver Areas and Doña Ana Range, Phase II (BLIS95C004)	Military Site Testing and Mitigation in Maneuver Areas and Doña Ana Range, Phase I (BLIS95004)
		Survey and Evaluation of Sites Associated with the Spanish Salt Trail and the Butterfield Trail, Phase I (BLIS97CH02)	Military Site Survey and Evaluation in Maneuver Areas and Doña Ana Range, Phase I (BLIS95C004)	Apache/Spanish/Proto-historic Site Survey and Evaluation in Maneuver Areas and Doña Ana Range (BLIS97CH01)	Apache/Spanish/Proto-historic Site Survey and Evaluation in Maneuver Areas and Doña Ana Range (BLIS97CH01)
			Cantonment Testing Using Sensitivity Map, Phase II (BLIS94H003)	Cantonment Testing Using Sensitivity Map, Phase II (BLIS 94H003)	
			Nominations of Eligible Pre-Army Acquisition Sites (BLIS95C005)		
Discipline—Prehistoric Archaeology					
Preliminary Testing of 25 Sites in the Hueco Hills (BLI-89-S27)	Cultural Resources Survey, McGregor Range (BLIS95C040)	Cultural Resources Survey, McGregor Range (BLIS95C040)	Site Testing and Nomination in High Density Zones In Maneuver Areas, Phase II (BLIS97C001)	Small Sites Mitigation in Selected Areas across Post (BLIS94H002)	Small Sites Mitigation in Selected Areas across Post (BLIS94H002)
McGregor Range EIS Predictive Model		Red Zone Redefinition and Nomination for NRHP Eligibility (BLIS94H005)	Site Mitigation in the Hueco Mountain Project Area, Phase III (BLIS97C004)	Site Mitigation and Nomination in High Density Zones in Maneuver Areas, Phase II (BLIS97CH02)	Site Mitigation and Nomination in High Density Zones in Maneuver Areas, Phase II (BLIS97CH02)
Site Evaluation in a 10-Square Kilometer Area in Maneuver Area 3 (BLIS94H004)		Small Sites Mitigation in Selected Areas across Post (BLIS94H002)	Site Mitigation and Nomination in High Density Zones in Maneuver Areas (BLIS97CH02)	Site Mitigation in Hueco Mountain Project Area, Phase III (BLIS97C004)	Site Mitigation in Hueco Mountain Project Area, Phase III (BLIS97C004)
Red Zone Redefinition and Nomination for NRHP Eligibility (BLIS94H005)		Site Evaluation in a 10-Square Kilometer Area in Maneuver Area 3 (BLIS94H004)	Small Sites Mitigation in Selected Areas across Post (BLIS94H002)	Red Zone Redefinition and Nomination for NRHP Eligibility (BLIS94H005)	NAGPRA On-Going Compliance (BLIS98C002)

Table 3.3-9. Fort Bliss Cultural Resources Management Plan Programs Affecting Mission and Master Planning (Continued)

FY 95	*FY 96*	*FY 97*	*FY 98*	*FY 99*	*FY 00*
Discipline—Prehistoric Archaeology (Continued)					
Project Reports Editing and Publication (BLIF91C005)		Unrepatriated Native American Burials Identification and Stabilization (BLIS97C005)	Site Evaluation in a 10-Square Kilometer Area in Maneuver Area 3 (BLIS94H004)	NAGPRA On-Going Compliance (BLIS98C002)	
		Site Survey of 35-Square Kilometers for McGregor Range ADA Positions (BLIS97C006)	Red Zone Redefinition and Nomination for NRHP Eligibility (BLIS94H005)		
			Most Significant Sites on Post Evaluation and Nomination (BLIS95C008)		
			Site Survey of 35-Square Kilometers for McGregor Range ADA Positions		
			NAGPRA On-going Compliance (BLIS97C006)		
			Eligible McGregor Range Site Nominations (BLIS98C005)		
Discipline—Architecture and Landscape Architecture					
WWII Buildings Inventory and Evaluation (BLIS95CNEW)	Cantonment Historic Landscape Initial Inventory (BLIS95CNEW)	Landscape Treatment and Maintenance Plan for the Main Cantonment Historic District	Fort Bliss Cold War and Air Defense Artillery Development Overview and Exceptional Significance Study, Phase I (BLIS97HP02)	Fort Bliss Cold War and Air Defense Artillery Development Overview and Exceptional Significance Study, Phase II (BLIS97HP02)	Cold War and Other Properties Inventory and Evaluation through 2004, Phase II (BLIS95C029); NRHP Nomination (BLIS95C028)

Table 3.3-9. Fort Bliss Cultural Resources Management Plan Programs Affecting Mission and Master Planning (Continued)

FY 95	*FY 96*	*FY 97*	*FY 98*	*FY 99*	*FY 00*
Discipline—Architecture and Landscape Architecture (Continued)					
Early Rocketry Development Study (BLIS95CNEW)	Historic Facilities Treatment and Maintenance Plan (Phase I)	Initial Range Inventory and Evaluation, Phase I (BLIS95C015)	Historic Buildings and Structures Materials Treatment Plan, Phase II (BLIS97HP05)	Military Historic Period Multiple Property Documentation, Phase III (BLIS95C014)	Consolidated Inventory and Evaluation (BLIS95C027)
Pre-1950 Cantonment Buildings Inventory and Evaluation Architectural Baseline Study Phase I (BLIS95CNEW)		Military Historic Period Multiple Property Documentation, Phase I (BLIS95C014)	Military Historic Period Multiple Property Documentation, Phase II (BLIS95C014)	Initial Range Inventory and Evaluation, Phase II (BLIS95C015)	Preservation Maintenance Plan, Phase II (BLIS95CO21)
		Historic Interiors Inventory and Treatment Plan for Pre-1950 Buildings in Cantonment Architectural Baseline Study, Phase II (BLIS95CNEW)	Initial Range Inventory and Evaluation, Phase II (BLIS95C015)	NRHP Nominations (BLIS95C028)	Air Defense Object Inventory and Evaluation (BLIS97HP03)
		Historic Paper Records Inventory (BLIS97HP07)	Historic Interiors Inventory and Treatment Plan for Pre-1950 Buildings in Cantonment Architectural Baseline Study, Phase III (BLIS95CNEW)	Cold War and Other Properties Inventory and Evaluation through 2004, Phase I (BLIS95C029)	
			Preservation Maintenance Plan, Phase I (BLIS 95C021)	Modern Materials Treatment Plan (BLIS95C030)	
			Historic Building Plans and Photographs Archiving, Phase I (BLIS95HP02)	Historic Buildings and Structures Materials Treatment Plan, Phase III (BLIS 97HP05)	
				Historic Interiors Inventory and Treatment Plan for Pre-1950 Buildings in Cantonment Architectural Baseline Study, Phase III (BLIS95CNEW)	

Table 3.3-9. Fort Bliss Cultural Resources Management Plan Programs Affecting Mission and Master Planning (Continued)

FY 95	*FY 96*	*FY 97*	*FY 98*	*FY 99*	*FY 00*
Discipline—Architecture and Landscape Architecture (Continued)					
				Historic Building Plans and Photographs Archiving, Phase II (BLIS95HP02)	
				Historic Paper Documents Copying and Archiving (BLIS95C039)	
Discipline—Preservation Planning					
					Fort Bliss ICRMP Evaluation. Revision, and Update

Source: U.S. Army, 1998b.

and master planning. Projects are planned for the fiscal years shown in the table; however, implementation during a specific fiscal year is subject to program funding changes.

Government-to-government consultation with Native American nations and tribes is also addressed in the ICRMP. The ICRMP includes plans for compliance with the NAGPRA. Consultation with Native Americans with ties to Fort Bliss lands would be conducted and provisions for compliance with the AIRFA and with EO 13007, *Indian Sacred Sites*, would be determined, if appropriate.

Another priority is the integration of routine treatment of historic properties into the current system(s) used for the operation, maintenance, and repair of mission support facilities. This plan includes a 5-year program to inventory and evaluate all of the buildings and designated landscapes on Fort Bliss that pre-date 1950 and examine the significance of facilities associated with the Cold War. This would allow Fort Bliss to exclude properties found not eligible from further review and treatment, and focus on the development of treatment plans appropriate to the significance of the properties, allowing for Army funding constraints.

Integration into Fort Bliss operations will be accomplished through development and implementation of "rule books" over the 5-year program. When the "rule books" are completed, the set would become the heart of the *Historic Buildings and Structures Material Treatment Plan (HMTP)*. The HMTP allows the initial decision makers who approve and budget work throughout Fort Bliss to ensure compliance of routine work and to record their decisions in a format that can be easily compiled for inclusion in the ICRMP annual report. The Installation Historic Architect will monitor the process for the Fort Bliss Historic Preservation Officer. Examples of activities that the HMTP would be integrated into include engineering functions such as work management, budgeting and estimating, design, real property management, space allocation, site selection, master planning, construction supervision, contract management, construction, maintenance, repair, and self-help maintenance. Also included are partner organization and nonappropriated fund facility maintenance, repair, and construction. As each "rule book" is completed and reviewed by Fort Bliss, TRADOC, the ACHP, and the appropriate SHPO(s), its use would be implemented and its requirements and procedures would be agreed upon and become a part of this plan.

A second focus of the archaeological management program will be the development of maps identifying areas within the cantonment area of Fort Bliss most likely to include archaeological properties. Information gained from this work will allow for more effective management and planning of ground disturbing activities in the cantonment and will help avoid the cost and delay associated with late discoveries. A plan for the management of ground disturbing activities will be developed. When reviewed by the ACHP and the appropriate SHPO(s) it will become a part of this plan. Selected archaeological surveys of Fort Bliss property would continue. These include Phase I, II, and III archaeological surveys comprised of the following activities.

- Phase I, Planning Level Survey. Planning Level Surveys include a literature review, site and map file searches to determine the range and types of resources that may be or are known to be present, development of archaeological sensitivity assessments or predictive models, and historic contexts (Army Pamphlet 200-4, 1998).

- Phase II, Reconnaissance Survey. Reconnaissance surveys are employed to gather data in a historic context such as checking on the presence or absence of expected property types, to define specific property types or to estimate the distribution of historic properties in an area.
- Phase III, Intensive Survey. Intensive survey is most useful when it is necessary to know precisely what historic properties exist in a given area or when information sufficient for later evaluation and treatment decisions is needed on specific individual historic properties.

A "Historic Property" is any prehistoric or historic district, site, structure, or object included in or eligible for inclusion in the NRHP and artifacts, records, or remains related to or located within such properties.

The SOP for ground disturbance would be incorporated into the ICRMP. In addition, the ICRMP includes SOPs establishing a structure within which Fort Bliss will operate on a day-to-day basis relative to cultural resource management. These SOPs include:

- Archaeological Site, Landscape, Native American, Cultural Properties Clearance for Large Scale Operations and/or Exercises;
- Archaeological Site/Landscape Clearance for Areas Located in Training, Firing Impact, or Training Areas;
- Archaeological Site/Landscape Clearance for Areas NOT Located in Training, Firing Impact, or Training Areas;
- NHPA Section 106 Compliance for Historic Structures, Landscapes, and other Above-Ground Properties (for organizations WITH an implemented *Historic Facilities Treatment and Management Plan);*
- NHPA Section 106 Compliance for Historic Structures, Landscapes, and other Above-Ground Properties (for organizations WITHOUT an implemented *Historic Facilities Treatment and Management Plan);*
- Archaeological Survey Standards;
- Identification of Historic Structures, Landscapes, and Other Above-Ground Properties that Meet the Criteria of Eligibility for Inclusion in the NRHP;
- Reporting Damage to Historic Properties (Buildings, Sites, Landscapes, Districts, Objects, etc.);
- Unanticipated Discovery of Archaeological Properties;
- NHPA Section 106 Compliance for Construction Modifications;
- Mobilization and/or Military Training in Anticipation of Immediate Deployment;
- Public Involvement in the Fort Bliss Cultural Resources Management Program; and
- Annual Report on the Status of those portions of this ICRMP to which the NHPA applies.

The ICRMP also complements BLM management of cultural resources on McGregor Range as specified in the RMP and MOU. 49

3.3.5.3 Integrated Training Area Management

Continue installation ITAM practices coordinated with implementation of the revised RPMP, INRMP, and ICRMP.

3.3.6 Real Estate Actions

Real estate actions remain as discussed under the No Action Alternative.

3.3.7 Management Practices Incorporated into Alternative 1

Management practices specified in the RPMP, INRMP, and ICRMP will be added to those described in Section 3.2.7. In addition, the use of this document as it affects management practices also will be added. Project proponents will use the *Fort Bliss Mission and Master Plan PEIS* at the earliest point in the planning stage to assist in identifying the appropriate level of NEPA documentation, to plan projects so as to minimize environmental impacts, and to identify any additional mitigation measures (see Appendix A).

3.4 ALTERNATIVE 2

This alternative contains all of the actions contained in the No Action Alternative and Alternative 1. Alternative 2 also includes mission requirements to develop additional controlled access FTX sites on the installation. The land use designations on McGregor Range as would exist under No Action and Alternative 1 would not change, however an additional 13.5 square miles of McGregor Range could be used for controlled access FTX. These would be located on suitable terrain within specific training areas in the Tularosa Basin and on the Otera Mesa portions of McGregor Range. Additional site-specific NEPA 19
documentation would be required prior to specific site designation and use.

3.4.1 Peacetime Strength and Equipment

There would be no change in peacetime strength and equipment from that specified in the No Action Alternative and Alternative 1.

3.4.2 Mobilization Strength and Equipment

There would be no change in mobilization strength and equipment from that specified in the No Action Alternative and Alternative 1.

3.4.3 Mission Activities

3.4.3.1 Main Cantonment Area

Activities in the Main Cantonment Area remain the same as the No Action Alternative and Alternative 1.

3.4.3.2 Fort Bliss Training Complex

The DA force structure realignment co-located all ADA Brigades in the continental United States at Fort Bliss. This realignment was to establish Fort Bliss as the Army's ADA Center of Excellence. At present, there is not an adequate number of established air defense training sites on the Fort Bliss Training Complex to allow for the dispersal necessary for doctrinally correct ADA training. All training areas outside of McGregor Range have unlimited maneuver, allowing placement of sites throughout those areas within the 289
limits of current SOPs. Training and proper ADA development requires additional sites to meet future training requirements. Current sites to not meet the full range of tactical scenarios required for ADA training.

Actions being considered to improve the capabilities to support FTXs include identification of up to 13.5 square miles that are conducive to siting additional controlled access FTX locations. The additional controlled access FTX areas would be used for training small contingents in command and control, communications, and target engagement activities. Normal use would be headquarters elements/units, communication sections, maintenance units, and/or Battery-size units. The 8,640 acres (13.5 square miles) 54
would also be available to support JTXs in the future, to include Roving Sands. Up to 1,235 acres of the existing approved Roving Sands sites have been found to be environmentally and militarily unsuitable. These existing sites will be removed from the inventory of controlled access FTX sites. The additional sites will provide greater latitude for air defense training in a tactical environment. These areas would not be cleared of vegetation, would have no improvements, and would be used for roll-in/roll-out wheeled vehicle traffic only. As with the existing sites used for Roving Sands, sites selected within these areas could be rotated for use from year to year, but would be available for use throughout the year. However, when the controlled access FTX sites are in use, the training area in which the action site is located would be closed to public access. The areas investigated programmatically in this alternative would be located mostly on Otero

Mesa south of New Mexico Highway 506, while the remaining areas would be immediately east of U.S. Highway 54 in the Tularosa Basin portion of McGregor Range. These areas were selected based on the following location characteristics (specific sites may or may not meet all criteria):

- Located on convex terrain (to avoid adverse soil types);
- Located within 0.6 mile of a currently established road;
- At least 80 percent of the area has a slope of less than 10 percent; and
- Has communications capability with at least one or more of three primary tactical communication sites on Otero Mesa.

Figure 3.4-1 illustrates the areas on McGregor Range where these training criteria are met. These would be in the Tularosa Basin and the southern Otero Mesa. The initial screening indicates probable site locations.

53 The frequency of use of TAs 11, 15, 17, 18, 19, 22, 23, 26, 27, and 29 could increase in these training areas if the initial screening sites or suitable areas in the vicinity were selected. Additional site-specific NEPA documentation would be required prior to specific site designation and use. Table 3.4-1 depicts the overall level of use for training areas at McGregor Range projected under Alternative 2.

3.4.4 Facility Construction and Demolition

No facility construction or demolition is associated with this alternative.

3.4.5 Environmental Resource Management

Under this alternative, environmental resource management would be the same as specified in Alternative 1.

3.4.6 Real Estate Actions

No additional real estate actions beyond those in the No Action Alternative are included in Alternative 2.

3.4.7 Management Practices Incorporated into Alternative 2

Fort Bliss will avoid or minimize damage to sensitive areas such as the 13.5 square miles of controlled access training sites and areas adjacent to the sites using ITAM techniques such as RFMSS, satellite imagery, transect monitoring, boundary marking, Seibert stakes, site rotation and rehabilitation, and in-field inspection of training. Maps and center point grids will be available to the units through RFMSS. Units will use center point grids and GPS units for navigation to the sites. Satellite imagery will be compared annually to determine if there are any significant reductions in vegetation on the training site. Monitoring and photo transects will be used as needed to detect problems and/or monitor recovery of the site. Portions of a site demonstrating a significant reduction in vegetation will be rested and marked off-limits using Siebert stakes. Corner boundaries of each site will be marked with a t-post and a stamped identification tag. The identification tag will state the training site name, what corner the post represents, and a Universal Transverse Mercator (UTM) grid for the corner. Occupations in off-limit areas, including out of boundary areas, will be addressed immediately by removal of the unit. ITAM procedures require site investigation in the affected area to determine if any damage has occurred. Rehabilitation of damaged sites will be in accordance with the National Resource Conservation Service (NRCS) field office technical guide.

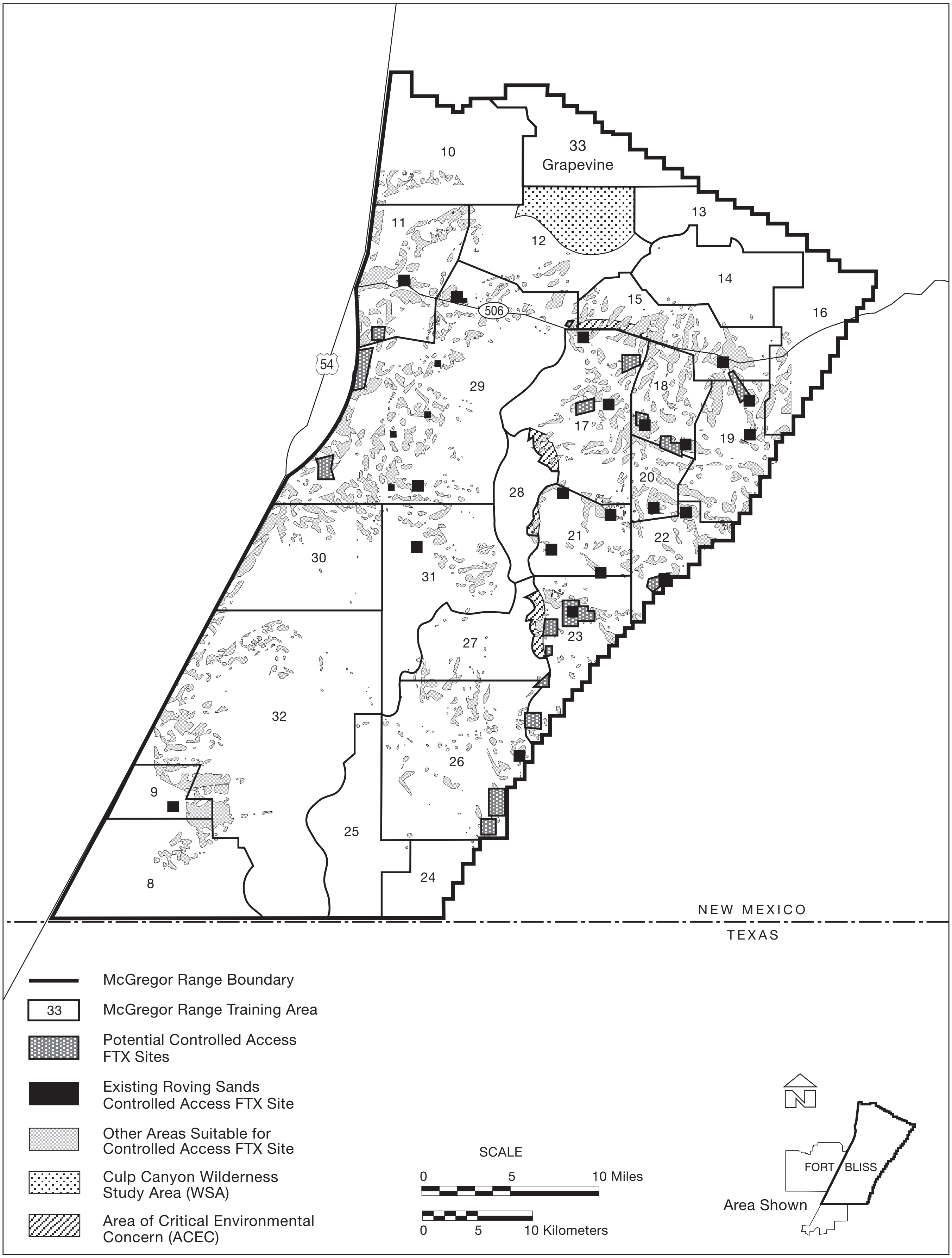

Figure 3.4-1. Existing , Potential, and Areas Suitable for Controlled Access Field Training Exercise Sites on McGregor Range.

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Table 3.4-1. McGregor Range Alternative 2 Level of Use

	TRNG	*Percent of Use by Training Category* [2]										*Other LOU*	
TA	*LOU* [1]	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*ENV*	*PA*
8	L					99[3]			1			UNK	VL
UNK	VL				27		73					UNK	VL
10	L				67		19		14			UNK	VL
11	H	21	21	21	30		3	1	3			UNK	VL
12	L				55		21		25			UNK	VL
13	L				61		22		16			UNK	VL
14	L			0.0	61		22		16			UNK	VL
15	L				52		25	9	14			UNK	VL
16	L	22	22		55		20	10	15			UNK	VL
17	H				32			1				UNK	VL
18	H				94		3	3				UNK	VL
19	H				93		4	3				UNK	VL
20	H				92		4	5				UNK	VL
21	H	22	22	22	32		1	2				UNK	VL
22	H				93		2	5				UNK	VL
23	H				94		2	3				UNK	VL
24	L				96		2		2			UNK	N/A
25	L				100							UNK	N/A
26	L				99		1					UNK	N/A
27	H				100							UNK	N/A
28	H			5	95							UNK	N/A
29	H	19	16	16	45		3		1			UNK	N/A
30	H	28	25	14	33							UNK	N/A
31	H			23	76		1					UNK	N/A
32	H	31	11	8	17		17				16	UNK	N/A
33 Grapevine	VL				78				22			UNK	UNK
WSA	VL				72				28			UNK	VL
R 5103	H									100		UNK	NA

1. Based on military operations, not including environmental activities and public use (LOU criteria in Table 3.3-3).
2. Percent of total military training use by categories 1 to 10 (see Table 3.3-1). May not sum to 100% due to rounding.
3. Includes on-road vehicle maneuvers.

Notes: TA = Training Area; TRNG = Training; LOU = Level of Use; ENV = Environmental Management; PA = Public Access Use; VL = Very low; L = Low; M = Moderate; H = High; N/A = Not applicable or not allowed; UNK = Unknown (not included in total); WSA = Culp Canyon WSA.

3.5 ALTERNATIVE 3

This alternative contains all of the actions contained in the No Action Alternative and Alternatives 1 and 2. Additionally, it contains the following mission support and training capabilities contained in Chapter 4.0 of the TADC and other installation initiatives. Alternative 3 is the Army's preferred alternative.

3.5.1 Peacetime Strength and Equipment

Personnel and equipment levels during peacetime conditions under this alternative are not expected to vary from those anticipated under the No Action Alternative and from Alternatives 1 and 2 discussed previously. However, under Alternative 3, there would be additional training capabilities developed above those levels associated with other alternatives. The most noticeable change would be the addition of a training exercise involving two brigades. Such an exercise could involve a total of up to 10,000 personnel and have a duration of 2 weeks (or an equivalent of 383 full-time equivalent [FTE] personnel).

3.5.2 Mobilization Strength and Equipment

Mobilization Strength and Equipment remain as discussed under the No Action and other alternatives.

3.5.3 Mission Activities

Table 3.5-1 presents the planning stage and likelihood of possible future activities both in the Main Cantonment Area and on the Fort Bliss Training Complex.

3.5.3.1 Main Cantonment Area

Joint use for Biggs AAF with EPIA is being discussed with the City of El Paso and has not progressed past the conceptual stage. The discussions have included possible construction of a taxiway that would connect the EPIA taxiway north to the existing Biggs AAF taxiways. The current and future mission of Fort Bliss at Biggs AAF would take precedence over commercial civilian use by EPIA.

3.5.3.2 Fort Bliss Training Complex

The items listed in Table 3.5-1 that relate to the training complex are installation capabilities and potential mission support improvements that could be considered under the proposed land use planning criteria for more intensive mission activities. Regardless of the actions actually implemented, land use sensitivities on the Fort Bliss ranges would be fully considered. The scope of the mission's intensity and its proposed location would be dependant on a number of land use factors including avoidances to ACECs, the Culp Canyon WSA, and distance to roads, and compatibility with soils, topography, vegetation, and related resources. Future installation-wide training area land use is illustrated in Figure 3.5-1, and shows the changes that would occur if the mission support requirements summarized above were implemented.

Table 3.5-2 summarizes the training area land use changes that would occur if potential construction activities, training capabilities, and other installation initiatives contained in Alternative 3 and the TADC were implemented.

Mission and mission support activities envisioned for the South Training Areas, Doña Ana Range–North Training Areas, and McGregor Range are discussed in the following sections.

Table 3.5-1. Likelihood of Possible Future Activities

In Process NEPA Documentation Ongoing or Completed	• Construction of a new air-to-ground tactical target complex located on Otero Mesa, McGregor Range (USAF, 1998). • Additional Controlled Access FTX sites, each approximately one to several square miles in size, located in nonmountainous terrain on McGregor Range. • Geothermal sources in southern McGregor Range are being explored, but continued exploration could involve other locations. * * • Road and communication system improvements are ongoing. • Utility improvements.
Under Consideration	• Support testing of extended range of Block IB ATACMS. Launches may originate from Fort Wingate in northern New Mexico to impact on McGregor Range. Safety and environmental clearances and analysis would be required. * • Construction of a Military Operations Urbanized Terrain (MOUT) Training Complex on either McGregor Range, Doña Ana Range–North Training Areas, or Biggs AAF. * • Installation of a geothermal binary generation and desalination plant. * * • Additional support facilities for 500 to 800 persons would be constructed near McGregor Range Camp. • Post mobilization National Guard heavy brigade validation may occur. * • Construction of a rail spur from the Union Pacific/Southern Pacific (UP/SP) rail line (along U.S. Highway 54) to McGregor Range Camp. * * • Construction of additional classrooms at Meyer Range, unit chapels at Doña Ana, Orogrande, and McGregor Range camps, addition of a physical fitness center at McGregor Range Camp. * * • Construction of a Law Enforcement Training Complex at Meyer Range. • Construction of additional facilities at McGregor Range Camp and linking of the domestic water distribution system on Doña Ana Range–North Training Areas to McGregor Range. • Phase III expansion of a new ASP in south McGregor Range, located between U.S. Highway 54 and McGregor Range Camp. * * • Development of a capability to use a tactical ballistic missile (TBM) target from a new facility in the northwest part of McGregor Range. * • Establishment of a National Guard Training Center on Doña Ana Range–North Training Areas and South Training Areas. * • Joint use of Biggs AAF and EPIA. * *
Additional Installation Capability	• Heavy Division Training Center that supports additional brigade-size training exercises. These activities would be at the scale of the Roving Sands exercise, involving about 10,000 troops for a duration of about 2 weeks each year. McGregor Range aviation gunnery and NOE flight training capabilities would be used. * • Development of the existing Cane Cholla and Hellfire Training Area into a state-of-the-art Helicopter Training Complex in southern McGregor Range. The training area would be about 13-by-14 miles and include a 1,000-acre surface impact area.* • Combat aviation unit training would utilize this gunnery facility and 62-by-124 miles of associated restricted airspace over Fort Bliss and WSMR.*

* TADC Chapter 4.0.
* * Other installation initiatives.

Post-mobilization Unit Validation. Fort Bliss has the ranges and training area capacity to support post-mobilization unit validation training for Heavy Brigades from the Army National Guard. After validation, the unit could then be deployed to the theater of operations from the P3 facilities being developed at Biggs AAF. This National Guard Heavy Brigade would consist of approximately the same assigned strength and number of tracked and wheeled vehicles as assigned to the 3rd ACR (previously

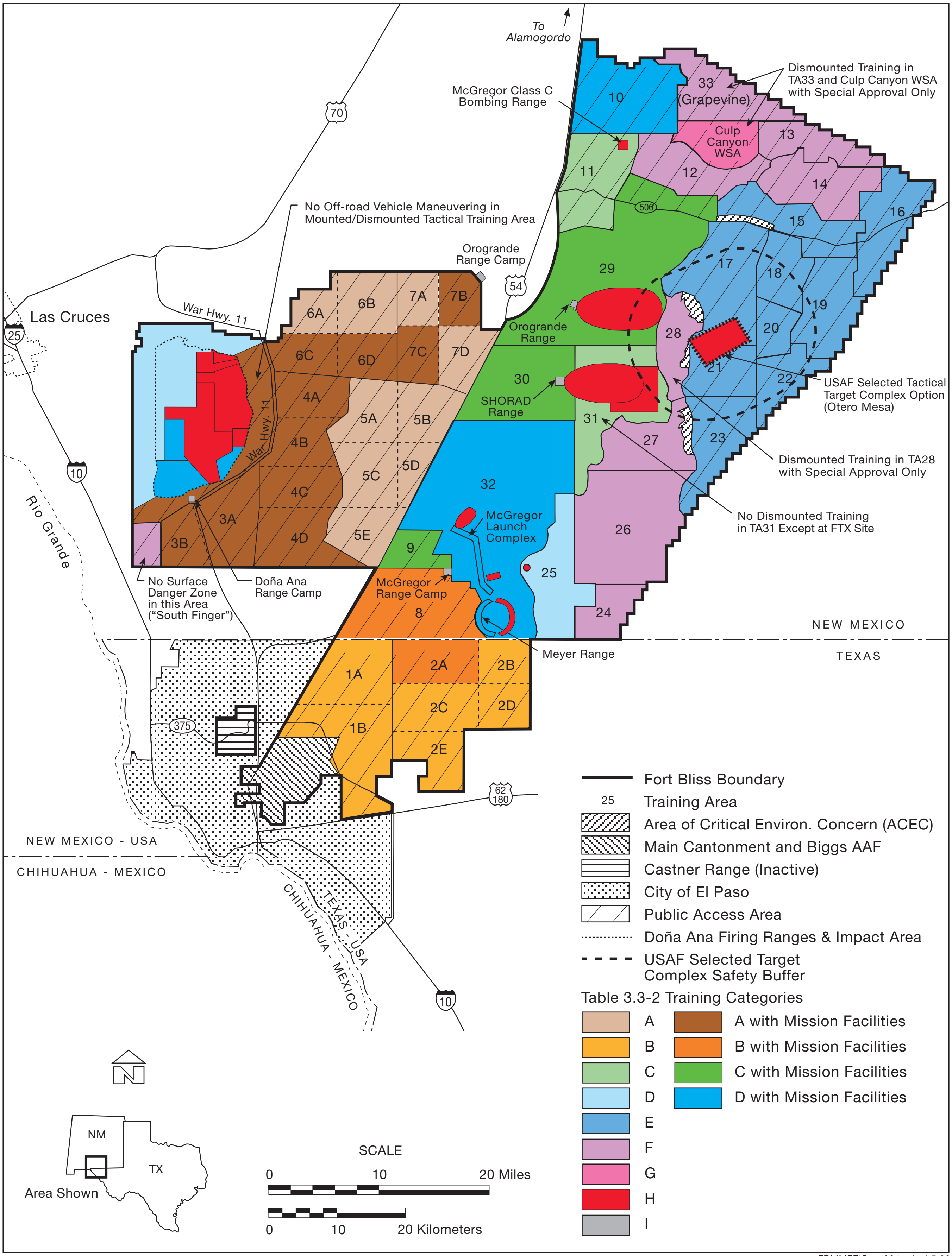

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Figure 3.5-1. Projected Training Area Land Use for Fort Bliss.

Table 3.5-2. Summary of Land Use Changes under the Future Development Concept

Fort Bliss Areas	*Location*	*Land Use Change*	*Cause*
South Training Areas	No training areas affected	None	—
Doña Ana Range–North Training Areas	Surface impact area on east slopes of Organ Mountains	From: 'D, with Mission Facilities' To: 'H,' Surface Impact	Expansion of impact area due to Heavy Division Training activities.
McGregor Range Training Area	TA 10	From: 'D' To: 'D+'	Potential location for TBM target launch facilities.
	TA 16	From: 'F' To: 'E'	Potential locations for controlled access FTX.
	TA 25 (small portion)	From: 'D' To: 'H,' Surface Impact	Small portion of TA 25 would become a surface impact area for ATACMS IB.

assigned to Fort Bliss during the 1980s and early 1990s). The numbers and types of training areas required are not expected to exceed those used by the 3rd ACR. The ranges that would be used are Doña Ana 40, 47, 48, 49, 50, 52, and 53, and Meyer 8, 9, 12, 18, and 23.

South Training Areas. The following future mission support activity projects are envisioned for the South Training Areas. There are no land use changes envisioned in the South Training Areas under Alternative 3 and they would be as depicted in Figure 3.2-3.

The projected level of use in the South Training Areas, including training operations use is presented in Table 3.5-3. As in Table 3.3-4, this use is distributed among the 10 training categories described in Table 3.3-1. It is not possible to predict what percentage of total use would be for environmental management activities. Therefore, this category is omitted from the percentage distribution. Environmental management activities are expected to continue throughout the Fort Bliss Training Complex and will be scheduled, as they are currently, around training activities. For planning purposes, the overall level of environmental management activity is projected to be low throughout the training areas.

Table 3.5-3. South Training Areas Projected Level of Use

	TRNG	*Percent of Use by Training Category*[2]										*Other LOU*	
TA	*LOU*[1]	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*ENV*	*PA*
1A	L				4	96						Unk	VL
1B	H				1	99						Unk	VL
2A	H	6			1	81			6	6		Unk	VL
2B	H				1	97			2			Unk	VL
2C	H				2	95			2			Unk	VL
2D	M		4	4	6	81			4			Unk	VL
2E	H				2	98						Unk	VL

1. Based on military operations, not including environmental activities and public use (LOU criteria in Table 3.3-3).
2. Percent of total military training use by categories 1 to 10 (see Table 3.3-1). May not sum to 100% due to rounding.

Note: TA = Training Area; TRNG = Training; LOU = Level of Use; ENV = Environmental Management; PA = Public Access Use; VL = Very low; L = Low; M = Moderate; H = High; UNK = Unknown (not included in percentage total).

A doubling of track vehicle use is projected over 1996 level of use for the South Training Areas, resulting in high levels of use for most training areas. If a new program to fire ATACMS IB missiles into

McGregor Range is implemented, portions of the South Training Areas could be exposed to SDZs during a small number of firings each year (4 to 6). Public use of these areas may increase slightly over time in proportion to population growth of the El Paso area, however this use is expected to remain very low.

Doña Ana Range–North Training Areas. The following projects are envisioned for the Doña Ana Range–North Training Areas. Specific missions, level of use, and the type of use at Doña Ana Range–North Training Areas could change. The only change that would occur would be an expansion of surface impact area through a consolidation of impact areas within the current outer boundary encompassing impact areas in the Doña Ana Range–North Training Areas due to deployment of the Heavy Division Training Center. This would result in increased weapons firings occurring in association with tank, Bradley gunnery, field artillery, and aviation gunnery. The projected training area use for the Doña Ana Range–North Training Areas is shown in Figure 3.5-2, taking into account the changes occurring if the mission support requirements discussed above were implemented.

Heavy Division Training Center. Fort Bliss has the training areas, ranges, and airspace, to support a mechanized/armor division. Extensive training areas and airspace exist to support brigade-on-brigade training. The Doña Ana Range–North Training Areas has adequate ranges to support tank and Bradley gunnery as well as field artillery and aviation gunnery training. While the types of training would not change from those that currently exist, the intensity of use of Fort Bliss ranges and training areas could increase during the annual training cycle. For example, an additional major training exercise could be conducted for a limited period. An increase in intensity could include another training exercise with two brigades of personnel and associated equipment (a brigade is composed of 3,000 to 5,300 personnel) for a training period of approximately 2 weeks. Supporting equipment for the two hypothetical heavy brigades could include approximately 960 wheeled vehicles, 490 tracked vehicles, 30 helicopters, and 6 fixed-wing aircraft. This hypothetical brigade equipment configuration is similar to the 3rd ACR equipment previously assigned to Fort Bliss (approximately 540 tracked vehicles, 1,200 wheeled vehicles, and 73 helicopters).

National Guard Training Center. The Doña Ana Range–North Training Areas with its range camp, training areas, and tank gunnery ranges provides an ideal setting for a National Guard Training Center. A company or larger set of equipment could be permanently stationed at the Doña Ana Range Camp and maintained by the USACASB. Alternatively, a Heavy Equipment Transport (HET) company could be formed at Fort Bliss to transport equipment from a railhead to the Fort Bliss Training Complex. National Guard units from throughout the United States could be scheduled for annual training at Fort Bliss using the Multi-Purpose Range Complex-Heavy (MPRC-H), the training areas and other ranges as necessary to maintain training proficiency.

Table 3.5-4 presents projected level of use in the Doña Ana Range–North Training Areas. The level of use at Doña Ana Range–North Training Areas is currently high for most training areas. Future missions at the range are expected to increase about 50 percent in ORV maneuvers, 60 percent in surface-to-surface weapons training from firing groups west and east of War Highway, and 60 percent in activity in the built-up areas of the range camps. Training increases in areas that already support a high level of use would not necessarily increase the number of scheduled days but would increase the level of activity conducted on any given day.

Level of use is projected to increase from moderate to high in TAs 3B, 5E, 6D, 7C, 7D, and in the east edge of the Organ Mountains. As shown in Table 3.5-4, this would result in a high level of training use through the entire complex (with the exception of air operations in R-5107, which are projected to remain moderate). Environmental management is expected to continue to be an ongoing activity throughout the Fort Bliss Complex, generally scheduled around training activities. For planning purposes, a uniform low level of use is indicated. Public use is projected to remain at very low levels.

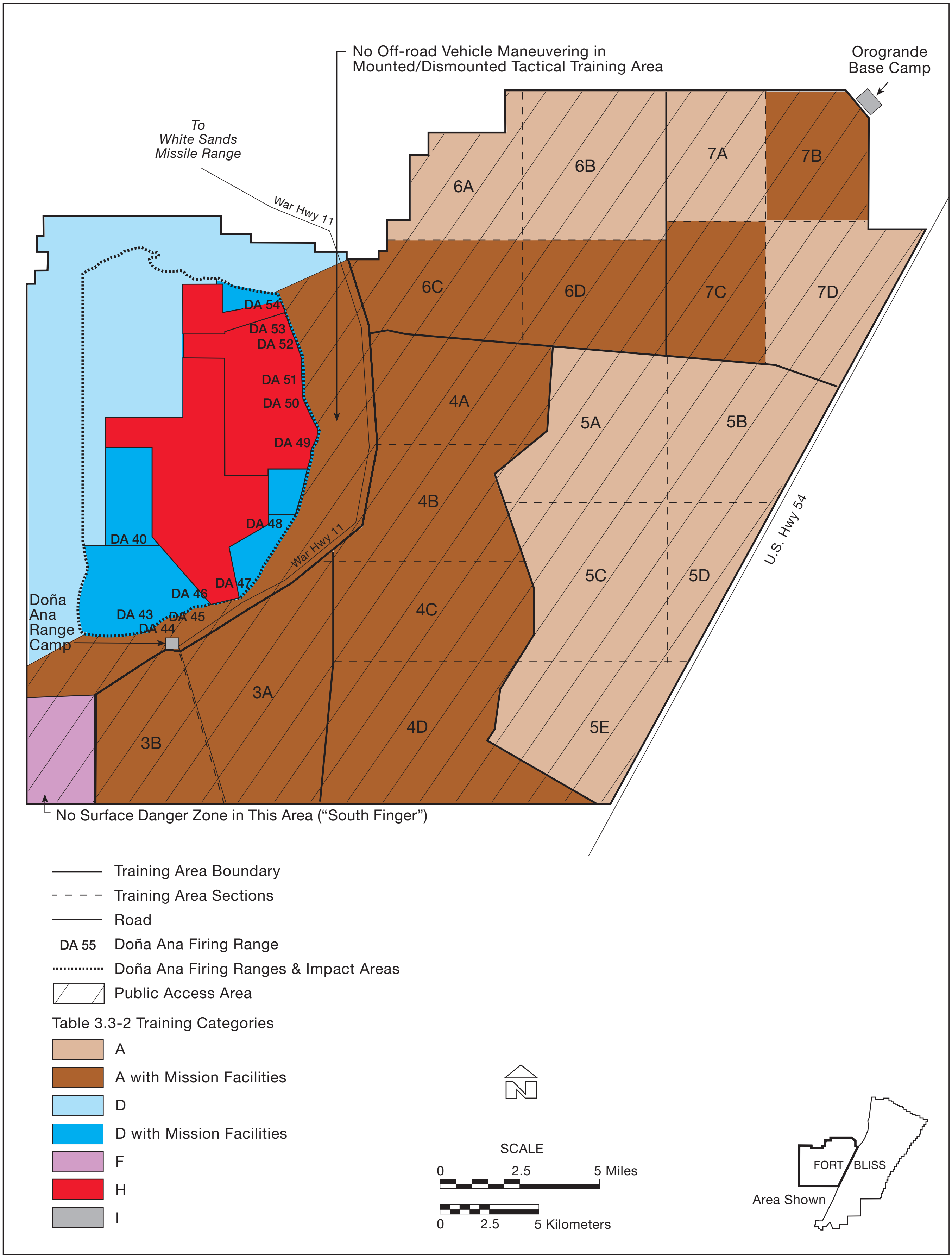

Figure 3.5-2. Projected Training Area Land Use for the Doña Ana Range–North Training Areas.

Table 3.5-4. Doña Ana Range–North Training Areas Projected Level of Use

	TRNG	*Percent of Use by Training Category* [2]										*Other LOU*	
TA	*LOU* [1]	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*ENV*	*PA*
3A	H	7	7		27	58						Unk	VL
3B	H	1				97			1			Unk	VL
4A	H				8	81						Unk	VL
4B	H	11	10		6	53						Unk	VL
4C	H	14	14		7	54						Unk	VL
4D	H	7	7		10	76						Unk	VL
5A	H				3	97						Unk	VL
5B	H				3	97						Unk	VL
5C	H				3	97						Unk	VL
5D	H				3	97						Unk	VL
5E	H				3	97						Unk	VL
6A	H				3	97						Unk	VL
6B	H				3	97						Unk	VL
6C	H	7	7		11	75						Unk	VL
6D	H				3	97						Unk	VL
7A	H				3	97						Unk	VL
7B	H				3	97						Unk	VL
7C	H				3	97						Unk	VL
7D	H				3	97						Unk	VL
SF	UNK											Unk	VL
EE	H	21	21		58							Unk	VL
IMP	H	8	8	31	42							Unk	N/A
OM	H	27	27	23	47				3			Unk	VL
DARC	H										100	Unk	N/A
OGRC	H										100	Unk	N/A
R-5107A[3]	M									100		N/A	N/A

1. Based on military operations, not including environmental activities and public use (LOU criteria in Table 3.3-3).
2. Percent of total military training use in categories 1 to 10 (see Table 3.3-1). May not sum to 100% due to rounding.
3. Indicated for aircraft operations only. R-5107 is also activated for safety during some weapons firing.

Note: TA = Training Area; TRNG = Training; LOU = Level of Use; ENV = Environmental Management; PA = Public Access Use; VL = Very low; L = Low; M = Moderate; H = High; N/A = Not applicable or not allowed; UNK = Unknown (not included in total); EE = East Edge of Organ Mountains; SF = "South Finger"; IMP = Organ Mountains Surface Impact Area; OM = Organ Mountains (outside Surface Impact Area); DARC = Doña Ana Range Camp; OGRC = Orogrande Range Camp.

The projected mission changes can be expected to change the distribution of activities among the ten training and two other use categories in some training areas, compared to 1996 conditions. ORV maneuvers (which includes on-road maneuvers in these areas) are expected to increase as a percentage of use in most of the numbered training areas, largely due to the potential for a Heavy Division Training Center and a National Guard Training Center, as described in the beginning of this section. If public use remains similar to current levels, its percent of overall use will decrease as training use increases. Because the percentage of time devoted to environmental management activities cannot be predicted, this category has been omitted from the percent distribution.

McGregor Range. The following projects are envisioned for McGregor Range:

Helicopter Training Complex. McGregor Range does not have an automated, computer-scored range designed for helicopter operations. The Cane Cholla Helicopter Gunnery Range and the existing Hellfire

Training Area could be developed into a state-of-the-art Helicopter Training Complex. This complex would provide aviation units the full spectrum of helicopter training from gunnery to training in a realistic training environment. An attack helicopter gunnery range of dimensions approximately 13 by 14 miles (extent of safety fans) could be located in the southern part of McGregor Range. This range is currently in the concept development stage but would consist of some moving targets and pop-up targets still to be determined. The firing would be from a firing box within the area that would constrain firing azimuth and location to ensure safety fans are respected.

Combat Aviation Training. Since 1991, the Army has been exploring the feasibility of relocating aviation training to a site better suited for the Kiowa Warrior, Longbow (Apache), Comanche and potential future, unit-level aviation training requirements. Installation capability to support this activity requires:

- A 62.1-by-124.2-mile training area that could be met by using a combination of existing Fort Bliss and WSMR airspace and Army land;
- A 12.4-by-12.4-mile gunnery range that could be met if the helicopter training complex described above were developed;
- An airfield such as Biggs AAF;
- The ability to meet night time (2200 to 0400 hours) training demands; and
- The ability to train without producing excess or unacceptable levels of noise.

TBM Target. At present, Fort Bliss does not have the capability to use a TBM target for live fire exercises. Since all Patriot Battalions based in the continental United States are located at Fort Bliss, capability to employ a TBM target into the live fire exercises is being investigated. This type of target requires a SDZ extending from TA 10 south to TA 25 approximately opposing the flight corridor of the Patriot, in addition to the SDZ required for Patriot firing. The TBM target would overfly TAs 10, 11, 12, 25, 26, 27, 29, 30, and 31.

122 **Test Support, ATACMS.** The Block IB ATACMS has extended range that may require launches from Fort Wingate, Arizona, into McGregor Range. If this occurs, this would be the first launch of ATACMS into McGregor Range. WSMR currently conducts such launches that terminate in impact areas on WSMR. The safety implications of these activities were assessed in the *Theater Missile Defense Extended Test Range EIS*. Appropriate safety and environmental clearances will be obtained before this test can be conducted. Flights of the Block IB ATACMS are currently envisioned for FY 02. IB ATACMS would impact in the Tularosa Basin in TA 25 east of FAW Site 10. The missile would carry inert munitions and would self-destruct on impact with all fuel expended.

The projected level of use in the McGregor Range Training Areas is shown in Table 3.5-5. As with the South Training Areas and Doña Ana Range–North Training Areas, environmental management activities have not been projected but are assumed to be at a moderate level and higher than the other two ranges due to the greater number of sensitive resources at McGregor Range. These activities would continue to be scheduled around training activities.

The main projected initiatives that could affect level of use at McGregor Range TAs include development of additional controlled access FTX (ADA) training sites, development of a Helicopter Training Complex, and launching of a small number at ATACMS into McGregor Range (4 to 6 per year).

Table 3.5-5. McGregor Range Projected Level of Use

	TRNG	*Percent of Use by Training Category*[2]										*Other LOU*	
TA	*LOU*[1]	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*ENV*	*PA*[3]
8	H	37			1	25[4]			37			UNK	VL
9	VL				43		57					UNK	VL
10	L				67		19		14			UNK	VL
11	L	8	8	8	45		14	7	11			UNK	VL
12	L				55		21		25			UNK	VL
13	L				61		22		16			UNK	VL
14	L				61		22		16			UNK	VL
15	L				52		25	9	14			UNK	VL
16	L				50		28	9	13			UNK	VL
17	H	22	22	22	32			1				UNK	VL
18	H				92		5	3				UNK	VL
19	H				92		5	3				UNK	VL
20	H				90		5	4				UNK	VL
21	H	22	22	22	32		1	2				UNK	VL
22	H				93		2	5				UNK	VL
23	H				94		2	3	1			UNK	VL
24	L				97		2		2			UNK	N/A
25	L			3	97							UNK	N/A
26	L				99		1					UNK	N/A
27	H				100							UNK	N/A
28	H			5	95							UNK	N/A
29	H	19	16	16	46		3		1			UNK	N/A
30	H	28	25	14	33							UNK	N/A
31	H			24	76		1					UNK	N/A
32	H	28	11	9	16		14			1	22	UNK	N/A
33 (Grapevine)	VL				78				22			UNK	VL
WSA	VL				72				28			UNK	VL
R5103[5]	H									100		UNK	N/A

1. Based on military operations, not including environmental activities and public use (LOU criteria in Table 3.3-3).
2. Percent of total military training use in categories 1 to 10 (see Table 3.3-1). May not sum to 100% due to rounding.
3. Assume same as current levels.
4. Includes on-road vehicle maneuvers.
5. Indicated for aircraft operations only. R-5103 is also activated for safety during some weapons firing.

Note: TA = Training Area; TRNG = Training; LOU = Level of Use; ENV = Environmental Management; PA = Public Access Use; VL = Very low; L = Low; M = Moderate; H = High; N/A = Not applicable or not allowed; UNK = Unknown (not included in total); WSA = Culp Canyon WSA.

If a new program to fire ATACMS into McGregor Range is implemented, portions of McGregor Range could be exposed to SDZs during a small number of firings each year (4 to 6). The exact location of the potential impact area is not yet known but has been assumed to be in the south part of the range. It has been tentatively assigned to TA 25 in the calculations for Table 3.5-5.

TA 11 is the only area projected to experience a decrease in level of use because operations on the Class C Bombing Range would be reduced when the new USAF tactical target complex is developed. If the new target complex is not constructed, level of use in that area would remain similar to current conditions.

With the potential for facilities development in TA 8, the distribution of use would change over current conditions, with more activity in facility use and dismounted training activities that may involve pyrotechnics. Use of TAs 27, 28, 29, 30, and 31 for SDZs would increase with the 60 percent projected increase in SHORAD missions indicated in the TADC. TA 31 would also experience an increase in the percent of use for SDZs associated with helicopter gunnery missions.

While the USAF tactical target complex is incorporated into the No Action Alternative, changes in intensity resulting from this potential future use are presented in this analysis of other future activities. The USAF selected site for a the tactical target complex is in TAs 17 and 21. Operations at this site were assumed to project a cumulative level of use for Table 3.5-5. If the target complex is constructed, it is expected to replace much of the use of the existing Class C Bombing Range in TA 11, which would consequently experience a decrease in training use.

The USAF tactical target complex would increase training use substantially in TAs 17, 18, 19, 20, 21, 22, and 23 from very low or low to high. With the exception of TAs 17 and 21, all of the increase would be in Category 4, SDZ. This proposal would also introduce mission facilities and surface impact areas as new uses in TAs 17 and 21. If the proposal is not adopted, level of use in all the affected TAs would be expected to remain at the low levels as presented in Alternative 1 (Table 3.3-6).

Other than the training areas potentially affected by the new USAF tactical target complex in TAs 17/21, as described above, the training areas that would experience the largest increase in level of use would be TAs 8 and 32. As noted above, the increase in TA 8 (about 130 percent) would be primarily from 50 percent increase in ORV maneuvers projected in the TADC, facilities use, and dismounted training, if a MOUT Training Complex is developed in this training area. Increased use of TA 32 would be concentrated at McGregor Range Camp.

Figure 3.5-3 illustrates future training area land use for McGregor Range, taking into account the change that would occur if the mission support requirements described above were implemented. As it shows, the only areas that would experience a change in the types of uses conducted are TA 10, which could become the location for a new TBM launch site, a small portion of TA 25, which would become a surface impact area for Block IB ATACMS, and TA 16 for the potential FTX locations.

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3.5.4 Facility Construction and Demolition

The only construction and demolition initiative affecting the Main Cantonment Area is the possible joint use of Biggs AAF and EPIA. Envisioned construction activities associated with installation initiatives and potential mission support improvements for the South Training Areas, Doña Ana Range–North Training Areas and McGregor Range are discussed in the following section.

3.5.4.1 South Training Areas

MOUT Complex. Development of a new, permanent, fire resistant, standard MOUT Training Complex, consisting of a 32-building Collective Training Facility (CTF) and a 7-building MOUT Assault Course (MAC). Siting could be east of Biggs AAF, between the prison camp and the JTF-6 complex. Two other sites near the Doña Ana and McGregor range camps are also being considered.

3.5.4.2 Doña Ana Range–North Training Areas

MOUT Complex. If sited on Doña Ana Range–North Training Areas, the MOUT Complex would be located near Doña Ana Range Camp.

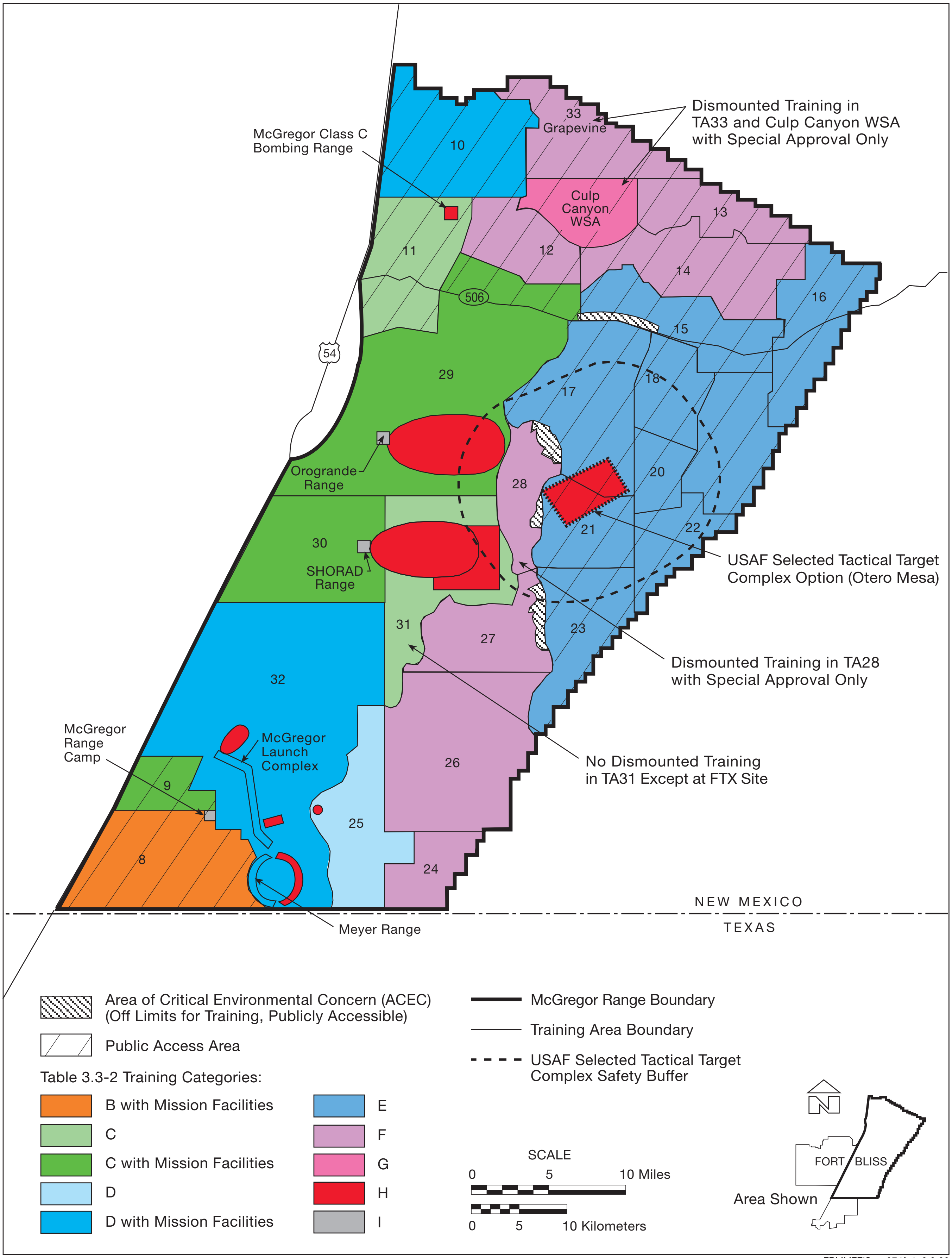

Figure 3.5-3. Projected Training Area Land Use for McGregor Range.

Water Well. This project involves construction of one water well at Doña Ana Range Camp, with a permanent, fire resistant pump house and a permanent, fire resistant booster pump station with two pumps. The well would be linked with the distribution system and a new pipeline would be required to provide water to McGregor Range.

Potential Rail Spur to Range Camp. This potential project includes construction of a rail spur from the UP/SP rail line to a point west of Doña Ana Range Camp. The connecting point would be off existing track paralleling U.S. Highway 54. The spur would run westward along the southern boundary of Doña Ana Range–North Training Areas, then turn north and run along the western boundary of TA 3B, to a terminal point near Doña Ana Range Camp.

3.5.4.3 McGregor Range

Potential Rail Spur to Range Camp. This project includes construction of a rail spur from UP/SP rail line to McGregor Range Camp. The connecting point would be off existing track paralleling U.S. Highway 54. The spur would run eastward toward McGregor Range Camp. An additional spur would split south off the east spur into the interior of TA 8, southwest of the range camp.

ASP, Phase III. This project is the extension of ASP on McGregor Range, to be located in the vicinity of the current ASP facilities immediately south of the road from U.S. Highway 54 to McGregor Range Camp. The location is 1.5 miles east of U.S. Highway 54 and 1 mile south of the main access road from U.S. Highway 54 to McGregor Range.

MOUT Complex. If sited on McGregor Range, the MOUT Complex would be located in TA 8, immediately west of Meyer Range.

Utility Improvement. Exploration under the ongoing Geothermal Program could lead to the design and installation of a geothermal binary generation and desalination plant. Future prospects for continued exploration efforts to discover new geothermal systems are currently focused on McGregor Range, but could include other unexplored regions of Fort Bliss.

3.5.5 Environmental Resource Management

Environmental resource management would take place as described under Alternatives 1 and 2.

3.5.6 Real Estate Actions

Joint use of Biggs AAF and EPIA may require leases or ROW agreements regarding this potential use of the Main Cantonment Area. Initiatives for future construction of water pipelines and rail lines on the training complex may require ROWs for areas crossing public transportation corridors or nonwithdrawn land.

3.5.7 Additional Management Practices to Avoid or Reduce Environmental Impact

Management practices discussed under Alternatives 1 and 2 would continue under Alternative 3. Additional project and site-specific NEPA documentation would be required for initiatives described programmatically under Alternative 3.

3.6 ALTERNATIVES CONSIDERED BUT NOT CARRIED FORWARD FOR FULL ANALYSIS

The following alternatives were considered but not carried forward. On detailed examination, it was determined that these alternatives could not meet a significant underlying need of the proposed action, namely, requirements to execute the current mission at Fort Bliss.

3.6.1 Reconfiguration of McGregor Range

During scoping, representatives from the BLM and others requested that the *Mission and Master Plan PEIS* include a proposal that would return the "Otero Mesa and Sacramento Mountains foothills" portion of the McGregor Range to nonwithdrawn public land status. Additionally the BLM proposal would retain the "Tularosa Basin" portion of the McGregor Range in withdrawal status for military use. The New Mexico Wilderness Coalition also requested that the wilderness status of the Culp Canyon WSA be considered in the Army's scoping and planning process. In the *New Mexico Statewide Wilderness Study* (BLM, 1988a*)*, a "No Wilderness" status was proposed for the Culp Canyon WSA, based upon the low quality of wilderness value and the potential for conflict with military use. The area is currently managed in accordance with the *Interim Management Policy and Guidelines for Lands under Wilderness Review* (BLM, 1979), whereby no impairing activities can occur that may permanently alter wilderness value. Unless Congress acts to change the status of the Culp Canyon WSA, public access and use of Culp Canyon WSA would remain in accordance with the Interim Management Policy. The establishment of a Wilderness Area by Congress is outside the jurisdiction of the DoD.

The following section provides details about firing, impact, and surface danger areas associated with the Hawk and Patriot missiles on McGregor Range. Most of Otero Mesa and much of the Sacramento Mountains foothills (north of New Mexico Highway 506) lie within the Patriot firing corridor, secondary SDZ, or impact areas. Therefore, this alternative is not carried forward.

McGregor Range provides several different environments for units to conduct training and maintain operational readiness. The majority of the McGregor Range is located in the Tularosa Basin, Otero Mesa, and the Sacramento Mountains foothills. The only area at Fort Bliss that can provide a forested environment for training is north of New Mexico Highway 506. This area is limited to 40 personnel or 6 vehicles at one time to conduct specialized training. Additionally, the area north of New Mexico Highway 506 (Otero Mesa and Sacramento Mountains foothills) includes areas of the SDZ for various missile systems. The SDZ for any firing range is generally composed of a firing area, impact area, and danger areas surrounding these locations. The shape and size varies with the type of missile or rocket being fired. For the Hawk missile, the safety area extends from the firing points north of Davis Dome to slightly south of New Mexico Highway 506.

Concerning HIMAD missile training activities, the current SDZ for Patriot firings fits within the boundaries of McGregor Range, with a buffer zone between the maximum extent of impact debris and the range boundary. Figure 3.6-1 is a depiction of the configuration of McGregor Range under the BLM proposal and SDZ for the Patriot using three common firing scenarios against two of its aerial targets The Patriot SDZ occupies varying amounts of terrain on McGregor Range depending on these general firing scenarios: short-range, medium-range, and long-range. The position of the Patriot's east-west buffer zone on McGregor Range is dependent on the launch site used and the launch dispersion angle. Launches from southern sites with an easterly launch dispersion angle shift the safety zones toward the northeast, overfly, and impact on Otero Mesa. Those launched from northern sites with a westerly launch dispersion angle shift the safety zones toward the northwest and would tend to overfly and impact on north-central McGregor Range.

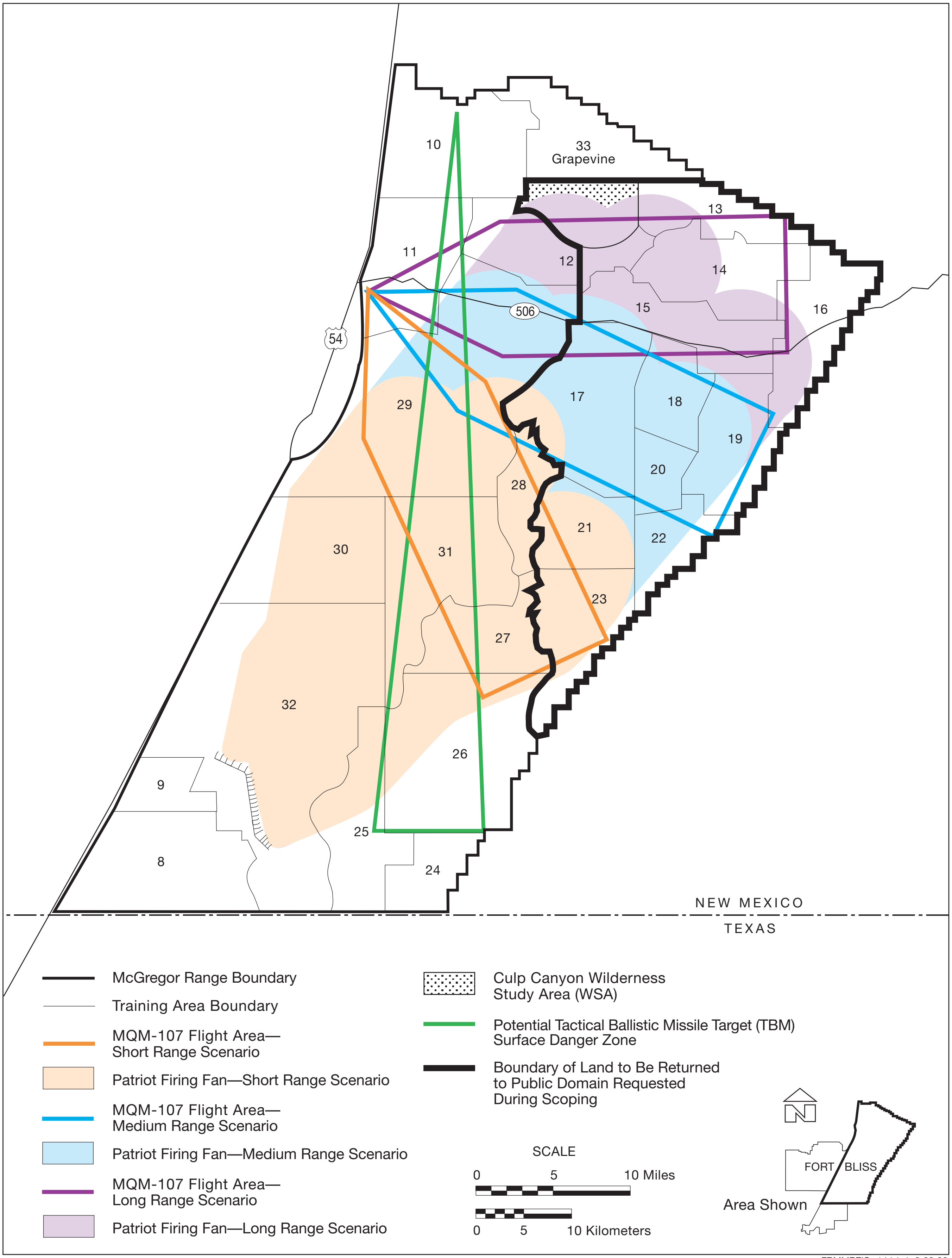

Figure 3.6-1. Target Flight Areas and Surface Danger Zones Associated with Patriot Missile Firings within McGregor Range.

Currently, the McGregor Range and WSMR are the only land-based ranges in the world where Patriot missiles are fired for training and testing. The Patriot is the primary weapons system deployed with ADA units throughout the U.S. Army at this time. Relocation of the Patriot firing points sufficient to result in the SDZ being below Otero Mesa places the firing points well within the approach control zone of the EPIA. Reconfiguration of McGregor Range to a withdrawal without Otero Mesa and the Sacramento Mountains foothills would not support the capability of Fort Bliss to meet training and test missions involving the Patriot missile and adequate SDZ.

Currently, the Patriot is launched from the McGregor Guided Missile Range, approximately 5 miles east of McGregor Range Camp. The missile is fired from one of six launch sites located along South and North Launcher Roads. These launchers are designated, from north to south: Patriot TAC, TAC 0, TAC 1, TAC 7, TAC 12, TAC 18, and TAC 24 (U.S. Army, 1996f). The TAC sites are separated by more than 1 mile, and the distance between the northernmost and southernmost launchers is approximately 7.5 miles.

For example, under the long-range scenario, the missile is launched toward the northeast, travels downrange for 35.2 miles within a 2.9-mile wide flight corridor, and reaches an apogee of 12 miles during flight. Fort Bliss Range Safety has developed SDZ maps for the Patriot that predict impact debris zones for a flight scenario based on target intercept 35.2 miles from the launch site at an altitude of 5.1 miles. In this scenario, missiles are launched from the TAC 24, TAC 18, and TAC 1 firing points. TAC 24 is the northernmost, TAC 18 the middle, and TAC 1 the southernmost of these launchers.

After launch, the missiles overfly a portion of Otero Mesa and debris can fall both north and south of New Mexico Highway 506. The exact arrangement of the SDZ, its size and shape, and missile impact point will vary depending on the launch site used, launch dispersion angle, and other factors.

3.6.2 Reconfiguration of the Doña Ana Range

During scoping, BLM representatives requested 40,000 acres of land on the western portion of the Organ Mountains be returned (Figure 3.6-2) to public land management status and be analyzed in the *Mission and Master Plan PEIS.* In addition, the BLM and the New Mexico Wilderness Coalition requested that the proposed wilderness areas on military land in the Organ Mountains be managed as wilderness areas and included as a part of the scoping and planning process.

Much of the Doña Ana Range–North Training Areas in the Organ Mountains contains surface impact areas, SDZs, and areas with ordnance and explosive hazards. Since approximately 1911, the Army has used the Organ Mountains complex as an impact area. It has been extensively used since the early 1940s. Live ordnance currently fired on the range includes 20 millimeter (mm), 25mm, 40mm, 120mm, and 155mm shells; AT4 rockets; and TOW missiles. Duds and unexploded projectiles are difficult to detect in rough terrain. Such terrain also precludes a thorough surface clearing of the area. Therefore, to ensure public safety, Army policy continues to prohibit entry into firing ranges and historic impact areas except in the performance of official military business.

The MLRS is another weapon system used on Doña Ana Range–North Training Areas that requires accommodation of safety factors and engagement distances within the confines of the range. As with the Patriot, Fort Bliss Range Safety has developed surface danger and SDZs for this weapon. Figure 3.6-2 depicts examples of the SDZs for MLRS using three possible firing scenarios and examples of SDZs from weapon firing on Doña Ana Range–North Training Areas. However, the MLRS can be positioned to fire toward the Organ Mountains from almost anywhere on Doña Ana Range–North Training Areas,

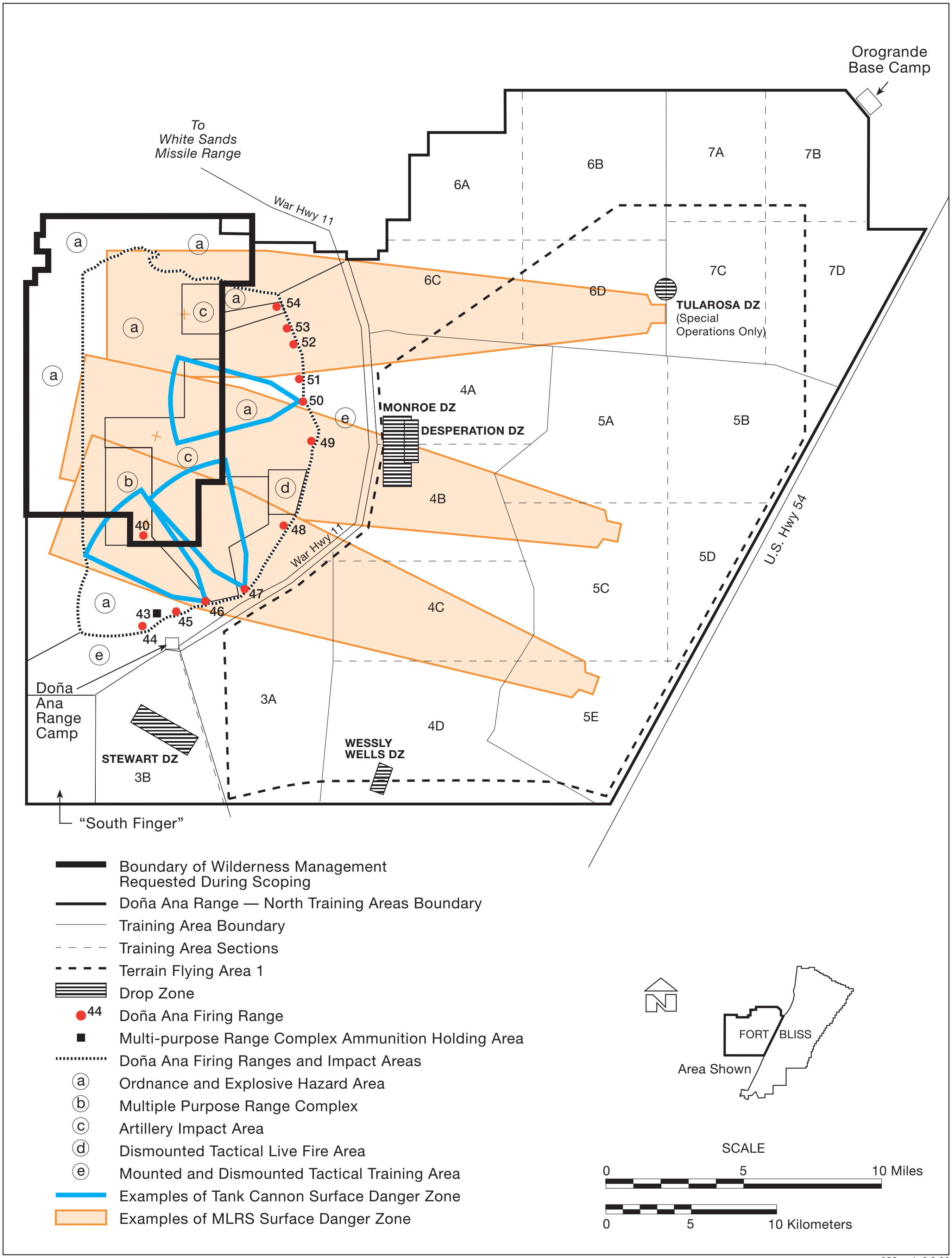

Figure 3.6-2. Examples of Surface Danger Zones on Doña Ana Range—North Training Areas.

producing SDZs covering almost the entire range. The distance from firing point to target is approximately 75,500 feet (14.3 miles). As shown in the examples on Figure 3.6-2, the width of the MLRS SDZ varies with distance from the firing point, ranging from approximately 6,700 feet wide at 16,000 feet from the firing point to approximately 25,000 feet wide at 14.3 miles from launch. Reconfiguration of Doña Ana Range–North Training Areas, particularly involving the Organ Mountains, would restrict or eliminate the capability of Fort Bliss to train and test using MLRS with adequate margins of safety.

Also shown on Figure 3.6-2 are examples of tank cannon SDZs from various firing points on the Doña Ana firing range. These SDZs are approximately 5miles long and overlap those from MLRS, occupying substantial portions of the slopes of the Organ Mountains.

Weapons systems with greater firing distances have evolved over the years; SDZs associated with some weapons have increased. The firing points have been located closer to U.S. Highway 54 than they had been historically to accommodate the safety factors within the current range boundaries. For example, the maximum engagement distances for firing of the target practice, cone-stabilized, discarding sabot tracer (TPCSDS-T) round has been extended from 9,186 to 13,120 feet. The length of the SDZ for this round on Doña Ana Range–North Training Areas is now 24,600 feet.

During scoping, various groups requested that 40,000 acres of the Organ Mountains be returned to public land management status as a part of the buffer safety zones necessary to protect the public safety relative to the adjacent military firing and training ranges. Although these areas will not be returned to the public domain, Fort Bliss will manage these areas to the maximum extent possible to maintain public safety and the environmental, biological, and cultural resource values of the land. Military environmental management activities continue in areas of the Organ Mountains such as Soledad, Fillmore, Long, Rucker, and Findley canyons and in the area known as Bishops Cap within these buffer safety zones. Therefore, this alternative is not carried forward.

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Fort Bliss Training Area Land Use Color Coding Matrix

Training Area Land Use Category	Fort Bliss Training Categories (Table 3.3-1)											
	1	2	3	4	5	6	7	8	9	10	ENV*	PA**
	Mission Support Facility	Weapons Firing	Surface Impact	SDZ/Safety Footprint	Off-Road Vehicle Maneuver	On-Road Vehicle Maneuver	Controlled Access FTX	Dismounted Training	Aircraft Operations	Built-up Areas	Conservation	Public Access
A		●		●	●	●		●	●		●	●
A with Mission Facilities	●	●		●	●	●		●	●		●	●
B					●	●		●	●		●	●
B with Mission Facilities	●				●	●		●	●		●	●
C		●		●		●	●	●	●		●	●
C with Mission Facilities	●	●		●		●	●	●	●		●	●
D		●		●		●		●	●		●	○
D with Mission Facilities	●	●		●		●		●	●		●	
E				●		●	●	●	●		●	●
F				●		●		●	●		●	○
G				●				●	●		●	●
H			●						●			
I	●			●		●			●	●	●	●

FBMMFEIS 110a.dg.10.22.98

● Training Category Occurs in Land Use - Uses May Not Be Concurrent
○ Public Access on Some Areas
* Environmental Management
** Public Access

Affected Environment

4.0

4.0 AFFECTED ENVIRONMENT

This chapter contains the description of the existing environmental conditions for the Fort Bliss Main Cantonment Area and the training complex. The baseline year for the information presented in this section is 1996. During PEIS preparation, the most up-to-date and accurate information available was used to describe existing environments, facilities, activities, and projects. The information serves as a baseline from which to identify and evaluate environmental changes resulting from the proposed alternatives. The ROIs vary, as dictated by the resources under consideration. The environmental resources discussed in this chapter include land use, aesthetics and visual resources, infrastructure, airspace use, earth resources, air quality, water resources, biological resources, cultural resources, noise, safety, hazardous materials and waste management/pollution prevention, socioeconomics, and environmental justice.

Geographic Setting

Fort Bliss encompasses approximately 1.12 million acres within portions of two states and three counties in the westernmost part of Texas and in south central New Mexico, as shown in Figure 1.0-1 in Chapter 1. At its greatest extent, it is approximately 70 miles from north to south (trending north-northeast) and approximately 50 miles from east to west. The installation is predominately located in portions of El Paso County, Texas, and Doña Ana and Otero counties in New Mexico. The primary population centers in the area include El Paso, Texas; Alamogordo and Las Cruces, New Mexico; and Ciudad Juarez, Republic of Mexico. The main cantonment of Fort Bliss, where most mission support, logistic, administrative, and community functions are concentrated, is surrounded by the City of El Paso, Texas, and falls within the El Paso Standard Metropolitan Statistical Area.

Outlying training areas of the installation are located north of the main cantonment. These include the South Training Areas in El Paso County, Texas, and the McGregor Range and Doña Ana Range–North Training Areas within Otero and Doña Ana counties, New Mexico. Areas surrounding the training areas include privately owned lands, public domain lands managed by the BLM, state-owned land, Lincoln National Forest, and WSMR.

Fort Bliss is located in the northern Chihuahua Desert in south central New Mexico and southwest Texas, and major vegetation types are Chihuahuan desert scrub and desert grassland (Dick-Peddie, 1993). Elevations range from approximately 3,900 feet in the cantonment area to 8,600 feet in the Organ Mountains of the Doña Ana Range–North Training Areas. The terrain of Fort Bliss is spread across four mountain ranges and two major structural basins. Figure 4.0-1 portrays the physiographic features of the area surrounding Fort Bliss. The Tularosa Basin is in the center with the Sacramento Mountains to the northeast and the Franklin and Organ mountains to the west. The mountain ranges and Tularosa Basin have a north-south orientation. The Rio Grande is located to the south and west of Fort Bliss.

Climate

Fort Bliss is located in the northern Chihuahua Desert and has a semi-arid to arid, subtropical desert climate characterized by low rainfall, relatively low humidity, hot summers, moderate winters, wide temperature variations, and an abundance of sunshine throughout the year.

Records of the weather in the area that have been kept since 1904 indicate that the area has an average annual precipitation of 8.8 inches, (El Paso Water Utilities (EPWU), 1995) with extremes of 2.22 inches and 18.29 inches. More than one-half of the total average annual precipitation occurs during the months

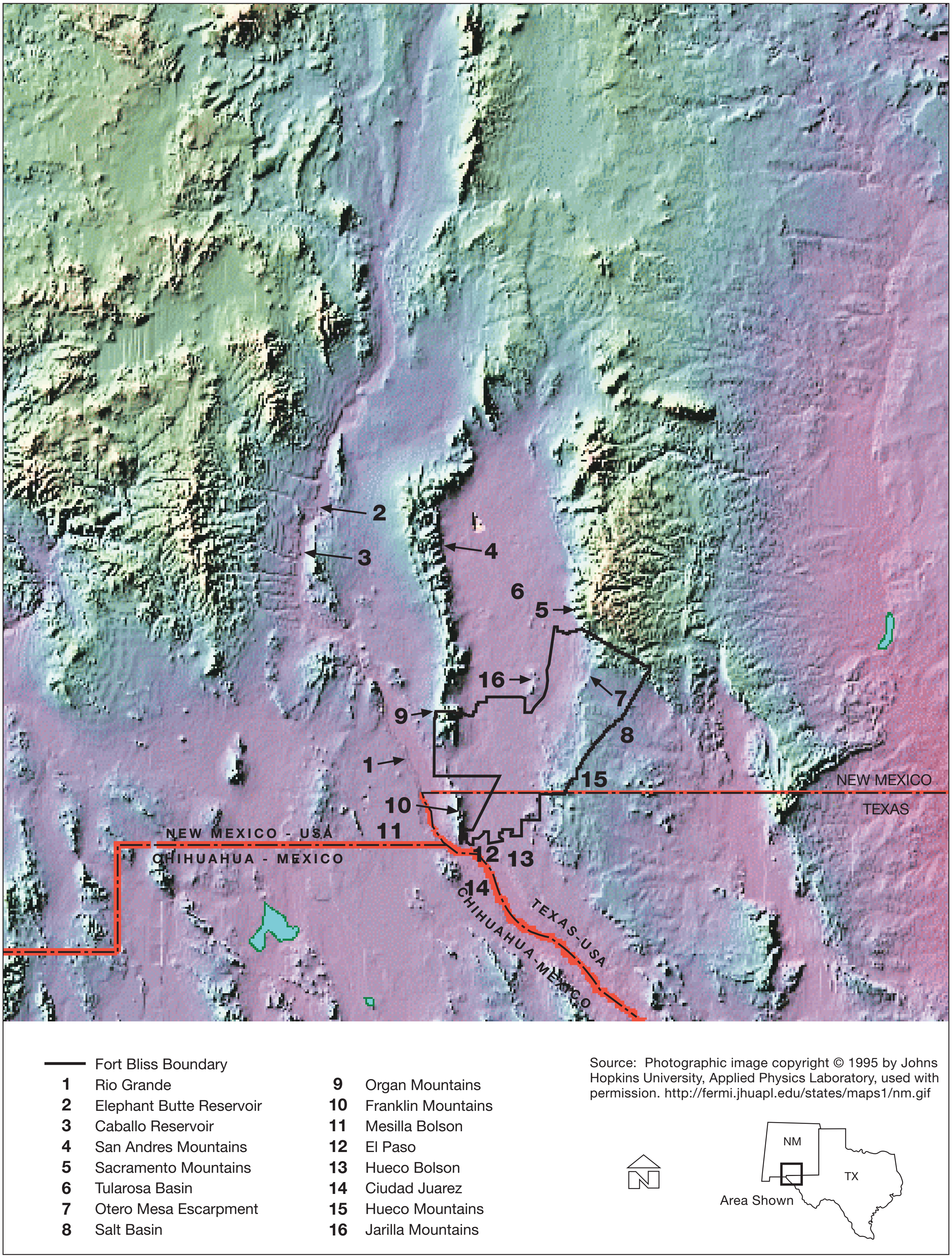

Figure 4.0-1. Physiographic Features of the Area Surrounding Fort Bliss.

of July, August, and September. During these months, brief but heavy rainstorms frequently cause localized flooding. A small percentage of annual precipitation falls in the form of snow. Periods of extreme dryness lasting up to several months are not unusual.

The Main Cantonment Area has a frost-free season that averages 248 days a year. Temperatures are generally warm, ranging from highs in the mid-50 degrees Fahrenheit (°F) during the winter months to highs well above 90°F during the summer. The annual average temperature is 63.3°F, with a record low of -8°F and a record high of 114°F. Daytime humidity is generally low, ranging from 10 to 14 percent. Because of the mountainous terrain and the Rio Grande Valley, there are significant diurnal and locational fluctuations in humidity. Typical of desert climates, rapid cooling from nighttime re-radiation causes increases in relative humidity. Average daily relative humidity increases to about 40 percent at midnight and to 51 percent by 6:00 a.m.

Wind speeds in the El Paso area are relatively moderate, with an annual average of 9.0 miles per hour (mph). From October through February, average windspeeds range from 8.2 to 9.0 mph and are predominantly from the north. The highest average wind speeds (11.3 mph) occur during the months of March and April, decreasing slightly in May to an average of 10.5 mph. The combination of moderately strong sustained winds and the low average precipitation contribute considerably to the occurrence of dust and sand storms in the area. During the summer months, average wind speeds drop to their lowest levels of the year (less than 8.0 mph). The predominant wind direction during the summer months is from the south-southwest.

A combination of abundant sunshine, high temperatures, low relative humidity, and continuous winds results in an evaporative rate that is more than 10 times the amount of annual precipitation. The annual evaporation rate for shallow water bodies (known as “pans”) is about 105 inches per year, and the average annual evaporation rate from small lakes in the region ranges from 72 to 80 inches.

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Land Use

4.1

4.1 LAND USE

This section summarizes the existing configuration, land use categories, and management of Fort Bliss lands. It also discusses compatibility of these uses with other installation lands and with surrounding land uses. The TADC (U.S. Army, 1998a) describes the size, location, and use of Fort Bliss cantonment, ranges, and training areas during 1990 and 1996 to the extent data are available.

The ROI for land use includes areas adjacent to Fort Bliss boundaries in El Paso County, Texas, and Doña Ana and Otero counties, New Mexico.

Fort Bliss is comprised of a Main Cantonment Area in El Paso County, Texas, and extensive training areas and ranges to the north of the cantonment extending into Doña Ana and Otero counties, New Mexico. The Main Cantonment Area has the heaviest concentration of facilities and mission support activities. The training areas have widely dispersed specialized equipment and instrumentation to support a variety of test and training activities. The primary active training areas are Doña Ana Range–North Training Areas and McGregor Range located in south-central New Mexico, and the South Training Areas in El Paso County, Texas, immediately surrounding the main cantonment. Castner Range, also in El Paso County, is no longer in use. Table 4.1-1 summarizes the relative area of the major components of the installation.

Table 4.1-1. Fort Bliss Installation Components

Area	*Acres*
Main Cantonment Area including Biggs AAF	10,965
Doña Ana Range–North Training Areas	297,006
McGregor Range[1.]	697,472
South Training Areas	104,042
Castner Range	7,040
Castner Recreation Area	70
Actual Installation Total	*1,116,595*

1. Includes 18,004 acres in Lincoln National Forest used through cooperative agreement.

Installation activities and uses affect areas surrounding Fort Bliss. These areas include: (1) the City of El Paso and El Paso County in Texas, adjacent to the main cantonment and South Training Areas; (2) areas to the south and west of Doña Ana Range–North Training Areas in Otero and Doña Ana counties, New Mexico; and (3) areas to the west, north, and east of McGregor Range in Otero County, New Mexico.

AR 210-20, *Master Planning for Army Installations*, directs land-use planning for Army installations. The RPMP is a tool for defining construction projects and other actions for physical development of the installation. These requirements are identified through systematic comparison of current facilities and resources inventory against future needs. Objectives for land use planning are listed in the LRC of the RPMP and include:

- functional efficiency of operations;
- minimization of conflicts between incompatible functions;
- adaptability of land use areas to accommodate changing mission requirements;
- separation of functions with incompatible visual attributes;

- harmony of on-site uses with surrounding community; and
- efficient circulation of traffic through improved functional organization.

4.1.1 Main Cantonment Area

The Main Cantonment Area is comprised of the Main Post Area (about 3,150 acres), Logan Heights (1,208 acres), WBAMC (264 acres), and Biggs AAF (6,343 acres). Figure 4.1-1 shows these general divisions of the Main Cantonment Area. These areas are all owned in-fee by the Army. The Army no longer holds any leases for real property comprising the Fort Bliss installation (Tipton, 1997). Within this area are several real property out-leases and easements, primarily for utility lines and fixtures. Areas within the main cantonment are often referred to by a descriptive name or by a block of building numbers within the same range–such as "the 1500 Area"–shown in Figure 3.2-3.

4.1.1.1 Existing Land Use

Fort Bliss is a microcosm of urban land uses ranging from heavy industrial to community and residential uses. The current arrangement of land uses within the main cantonment is shown in Figure 3.2-1. The primary roadways are shown in Figure 3.2-3. Many areas defined as one land use contain a mixture of facilities used for other functions. To avoid excessive segregation, land uses show the dominant or characteristic use of an area. Descriptions of the land use categories used to characterize the built-up areas of the main cantonment are provided in Table 2.5-1. The following paragraphs generally describe existing uses, special districts and constraints, and conditions of compatibility between on-post uses.

<u>Main Post.</u> The Main Post is bounded on the north and northeast by Biggs AAF, on the east by EPIA, to the south and west by mixed residential, commercial, and industrial uses in the City of El Paso as shown in Figure 4.1-1. Except for the south boundary, the edges of the Main Post are clearly defined by Patriot Freeway to the west, Fred Wilson Boulevard to the north, and Airport Road to the east. These roadways are city-maintained transportation corridors. The Main Post is divided into four quadrants by Jeb Stuart Road, oriented north to south, and by Forrest Road, oriented east to west. A railroad spur enters the Main Post at the southeast corner and cuts diagonally across the east half of the Main Post and fans out into a series of warehouses in the northwest quadrant.

The Main Post includes a broad range of land use activities. Overall, uses directly supporting mission activities occur in the east half (east of Jeb Stuart Road), with generally smaller-scaled community support, residential, and administrative functions on the west half. The following paragraphs describe the land uses on the Main Post using the categories in the LRC.

Airfield (Category I). There are no airfield uses on the Main Post.

Maintenance (Category II). Maintenance areas are concentrated in the northeast quadrant east of Jeb Stuart Road and north of Forrest Road. Additional motor vehicle maintenance is located between the railroad and Chaffee Road, west of Jeb Stuart Road.

Industrial (Category III). Industrial activities are scattered throughout the post. Two larger industrial areas are located along Jeb Stuart Road in the north portion of the post. Other areas are focused on the railroad spur in the northwest quadrant. Several water towers on post are designated as industrial use.

Supply and Storage (Category IV). Most of the supply and storage areas are located with the maintenance areas between the railroad and Chaffee Road, west of Jeb Stuart Road. Additional supply and storage areas are located in the northeast quadrant along Carrington and Forrest roads.

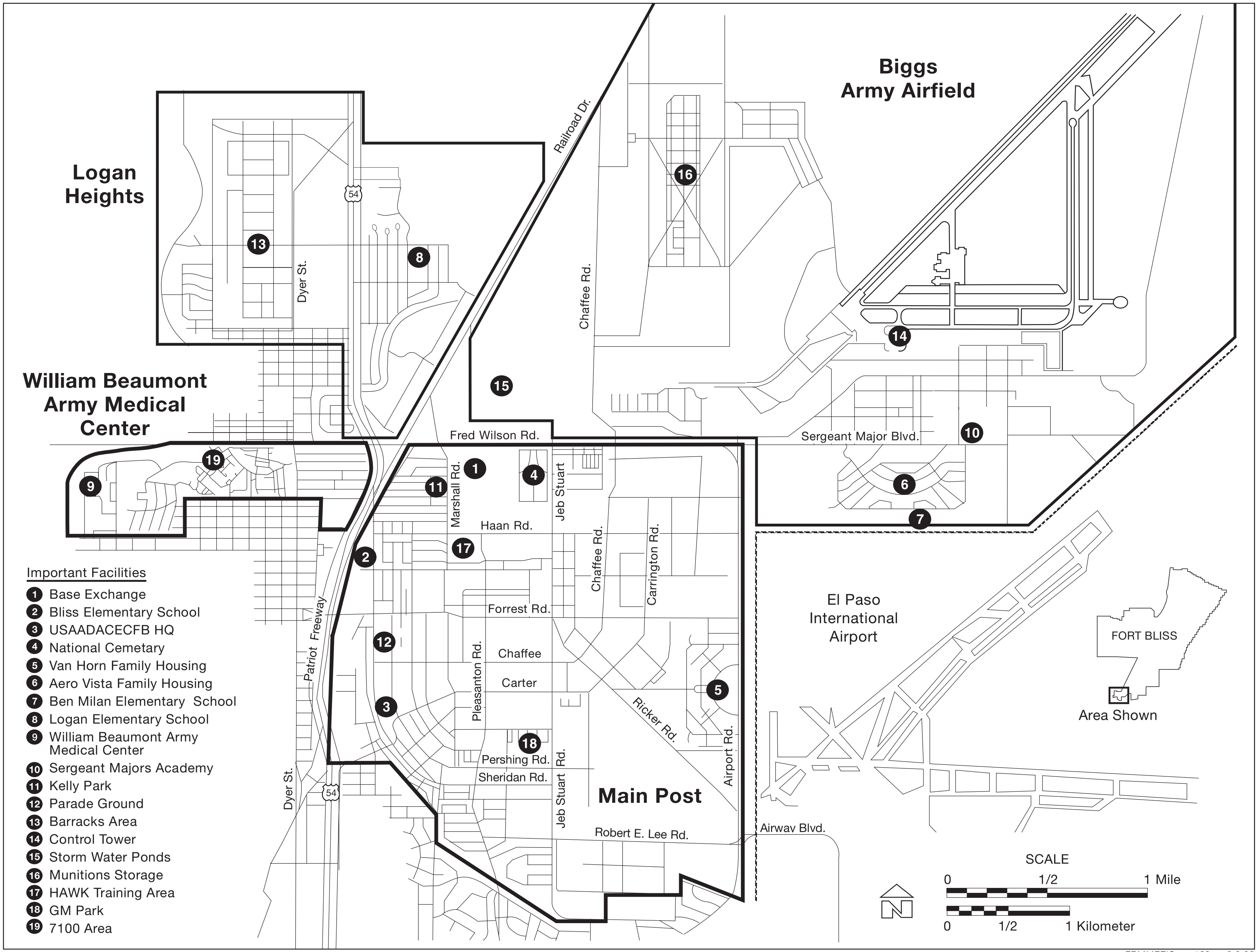

Figure 4.1-1. Divisions and Important Facilities within Fort Bliss Main Cantonment.

Administration (Category V). Administration facilities are concentrated on the west side of the Main Cantonment Area, along Pershing Road and the Parade Field. These facilities are among the oldest on the installation and are eligible for inclusion in an historic district. An administrative area is also located within a family housing area on the east side of the Main Cantonment Area along Airport Road.

Training/Range (Category VI). South of the railroad and east of Jeb Stuart Road is classified as open training/range areas extending south to the installation boundary. The area contains dispersed classrooms, laboratory, and radar facilities supporting a variety of training activities. Most of these areas are surfaced in a rock blanket to minimize blowing dust, and to allow for permeable surfaces that can support vehicle maneuvering.

Troop Housing (Category VII). Troop housing is located in several pockets along a central core from the southwest to the northeast of the Main Cantonment Area. Troop housing has generally developed adjacent to maintenance and storage areas.

Family Housing (Category VIII). Family housing is concentrated in a north-south belt along the west side of the Main Cantonment Area. Homes for NCOs and dependents are located between Fred Wilson and Pike roads. Two large clusters of old red-brick homes in the 1400 and 300 Areas have historic value. The larger officer homes along Sheridan Drive adjacent to the Parade Field have historic value and provide an attractive feature on the Main Post (100, 200, 300, 400, and 500 areas). The Van Horn housing area (6000 through 6500 areas), located along Airport Road, is exposed to aircraft noise and higher risk of accidents associated with aircraft operations at EPIA.

Community Facilities (Category IX). These facilities are used for commercial uses (shops, malls, gas stations, banks, theaters), cultural centers (libraries, museums, and educational facilities), and physical safety (police and fire stations). The large community center, post exchange (PX) and commissary complex is located near Marshall and Haan roads. Many smaller clusters of community facilities are scattered throughout the post, convenient to training, administrative, and family and troop housing areas. The Fort Bliss railroad station and Bliss Elementary School are located in the northwest quadrant, west of Sheridan Street. The National Cemetery is located in the northwest quadrant along Fred Wilson Road. This parcel, designated as community facility land use, is owned by the Veterans Administration. Plans to expand the cemetery to the west are reflected in the RPMP.

Medical (Category X). Medical uses are dispersed in facilities throughout the Main Post.

Outdoor Recreation (Category XI). These areas are predominantly located in the west half of the Main Cantonment Area in proximity to housing areas. A sports complex is located close to troop housing at Carter and Ricker roads. Kelly Park is located near the community center complex.

Open Space (Category XII). These areas are primarily located on the periphery of the Main Cantonment Area, providing a buffer between post activities and off-post areas. These areas are potential future development areas, and in some cases, designated for storm-water collection and drainage, such as the open area between Patriot Freeway and officers' housing along Sheridan Road.

Logan Heights. Logan Heights is located to the northwest of the Main Cantonment Area (see Figure 4.1-1). It is bordered by an active railroad corridor on the east, and bisected by two major north/south roadway corridors; Patriot Freeway and Dyer Street. These arteries divide the area into two distinct sections.

The primary uses in the east part of Logan Heights in the triangular parcel between the railroad corridor and Patriot Freeway include a recreational area with two golf courses (Category XI), family housing

(Category VIII), and a small pocket of community facilities (Category IX). Logan Elementary School is located within the housing area on a parcel leased to El Paso Independent School District (ISD). These uses are compatible with one another.

The area to the west of Patriot Freeway, is used primarily for troop housing (Category VII), with functionally related training/range areas (Category VI) used for exercising and troop activities, supply and storage areas (Category IV), and maintenance areas (Category II). The troop housing area is concentrated in a series of barracks located west of Dyer Street. Training/range areas that include a parade ground, fitness/exercising structures, and community facilities (including shops, fitness center, and theater) are connected to troop housing on the east side of Dyer Street by two pedestrian overpasses. Maintenance, and supply and storage functions are located between Patriot Freeway and Chapman Street. Coe Avenue family housing is located at the north end of this portion of Logan Heights adjacent to off-post residential areas. A parcel of this area is leased to the El Paso ISD for a new high school.

WBAMC. The WBAMC is easily accessible from the Main Cantonment Area using Fred Wilson Road (see Figure 4.1-1). The main medical complex (Category X) and helipad are located at the west end of this parcel. The WBAMC is comprised of medical facilities, administrative offices, and parking areas. Current roadways provide easy access to the complex. Two water tanks located north of the hospital, on the north side of Alabama Road, are considered an industrial land use.

Immediately east of the hospital is a family housing area (Category VIII) and two pockets of troop housing (Category VII). These housing areas are mostly surrounded by open space and are compatible with current land uses. The troop housing provides easy access for medical support personnel. An area of mixed community facilities and family housing in the central portion of WBAMC area, in the vicinity of Beaumont Drive and Miller has historic value and is functionally well situated for continued residential use. New family housing has been constructed between these community facilities and Dyer Street. The area between Dyer Street and Patriot Freeway has recently been cleared and new family housing is being constructed.

The Naval Reserve Center is located south of this new housing area along Patriot Freeway on property leased to the U.S. Navy. This area is designated for training/range uses, and is separated from family housing to the north by open space.

Biggs AAF. Biggs AAF is located to the north and east of the Main Cantonment Area (see Figure 4.1-1). It is served by one entry gate at the corner convergence of Airport Road, Sergeant Major Boulevard, and Fred Wilson Avenue. Sergeant Major Boulevard is the primary east/west access roadway into the Biggs AAF cantonment area. Biggs AAF is dominated by airfield (Category I) land use oriented around one 13,572-foot long runway and its associated taxiways, and aircraft parking aprons that can support large C-5A and 747 aircraft.

The primary concentration of facilities and activities on Biggs AAF is between the runway and EPIA to the south. Immediately adjacent to the flightline are maintenance hangars, motor repair shops, warehouses, control tower, and administrative offices supporting airfield functions that are served by a railroad spur that links to the major railroad corridor on the west side of Biggs AAF. Aviation fuel storage tanks and supply/storage areas are located east of the railroad spur and north of Sergeant Major Boulevard. Additional fuel storage is located at the east end of the Biggs AAF cantonment.

Other functions located on the north side of Sergeant Major Boulevard include troop housing (Category VII), motor vehicle storage and maintenance areas (Category II), administrative functions (Category V), open space (Category XII), and outdoor recreation areas (Category XI). The Sergeants Major Academy facility, designated as training/range land use (Category VI), is also located in this area.

To the east of the airfield is a Federal Prison compound designated as administrative use. The site is used by permit, renewable every 5 years. Beyond the airfield to the east and north are extensive open training/range areas.

South of Sergeant Major Boulevard are open-space areas, the Aero Vista family housing area, and the Ben Milam Elementary School. These residential and community uses are adequately separated from airfield and mission-related activities to the north.

To the north and west of the runway is the ASP, which is designated for supply/storage. The area is served by a rail spur line and includes required open, undeveloped safety areas where other land uses and activities are excluded. Most munitions for use on the training ranges are currently stored in this location. To the south of the ASP, between Fred Wilson Road and the railroad corridor is mostly open space. This area also has a small industrial area linked to the airfield by a taxiway. The southwest corner of Biggs AAF has a large storm-water ponding area adjacent to city-owned property.

Fort Bliss has retained a perpetual easement from the City of El Paso for a strip of land along the southeast boundary line between Biggs AAF and EPIA. An unpaved roadway in this easement provides access to the north end of the airfield and training areas to the north.

4.1.1.2 Areas Surrounding the Main Cantonment

The City of El Paso surrounds the main cantonment on the west, east, and south. The major jurisdictional boundaries and special land use areas in the area are shown in Figure 4.1-2. Adjacent areas to the north and northeast are training ranges within the installation. The area directly west of the main cantonment contains a substantial amount of urban development, primarily within the city limits of El Paso. The area consists principally of single- and multi-family housing units, with neighborhood commercial businesses catering to local residents. This pattern of land use extends northward, bounded by the UP/SP railroad in the east, and Castner Range and Franklin Mountains State Park to the west. The U.S. Highway 54 corridor and other major roadways have attracted strip commercial and light industrial development. The land lying immediately to the south of the Main Cantonment Area is primarily residential. Between this residential area and the Mexican border to the south, land use undergoes a progressive transition from residential to a mixture of residential and commercial, and then becomes heavily commercial and industrial near the river that forms the international boundary.

The EPIA is located to the east of the Main Cantonment Area and south of Biggs AAF. The airport provides commercial passenger service, general aviation, air cargo, overnight air package, and freight service. The EPIA has an associated industrial park adjacent to the airport along Montana Avenue and Airport Road. Hotels, restaurants, packaging, and freight businesses largely support activity associated with EPIA. The airport plans to expand industrial park and air-related industry in the future in existing areas (Butterfield Park and along Montana Avenue). In the long term, additional industrial park and airfreight services may be developed on the east side of the airfield with a new innerloop highway linking Montana Avenue to Airport Road through the airport, and a possible connection to Loop 375.

Zoning surrounding the installation largely corresponds to current land use. The *Plan for El Paso* (El Paso, 1988) indicates that land uses will tend to follow the current pattern, with new industrial and commercial development focused on the major arterial. Generalized zoning surrounding the main cantonment is shown in Figure 4.1-3.

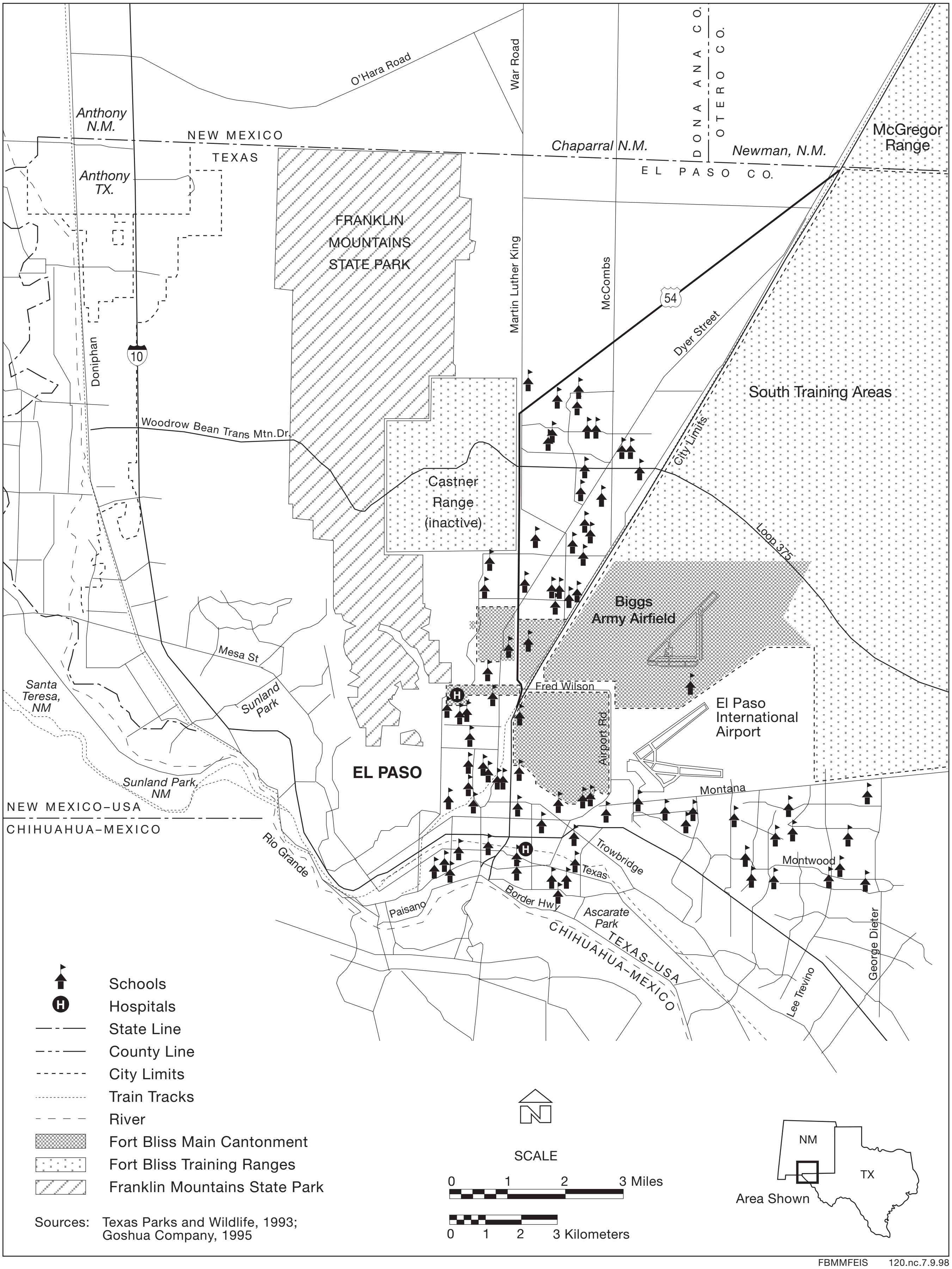

Figure 4.1-2. General Land Uses in the Vicinity of the Main Cantonment.

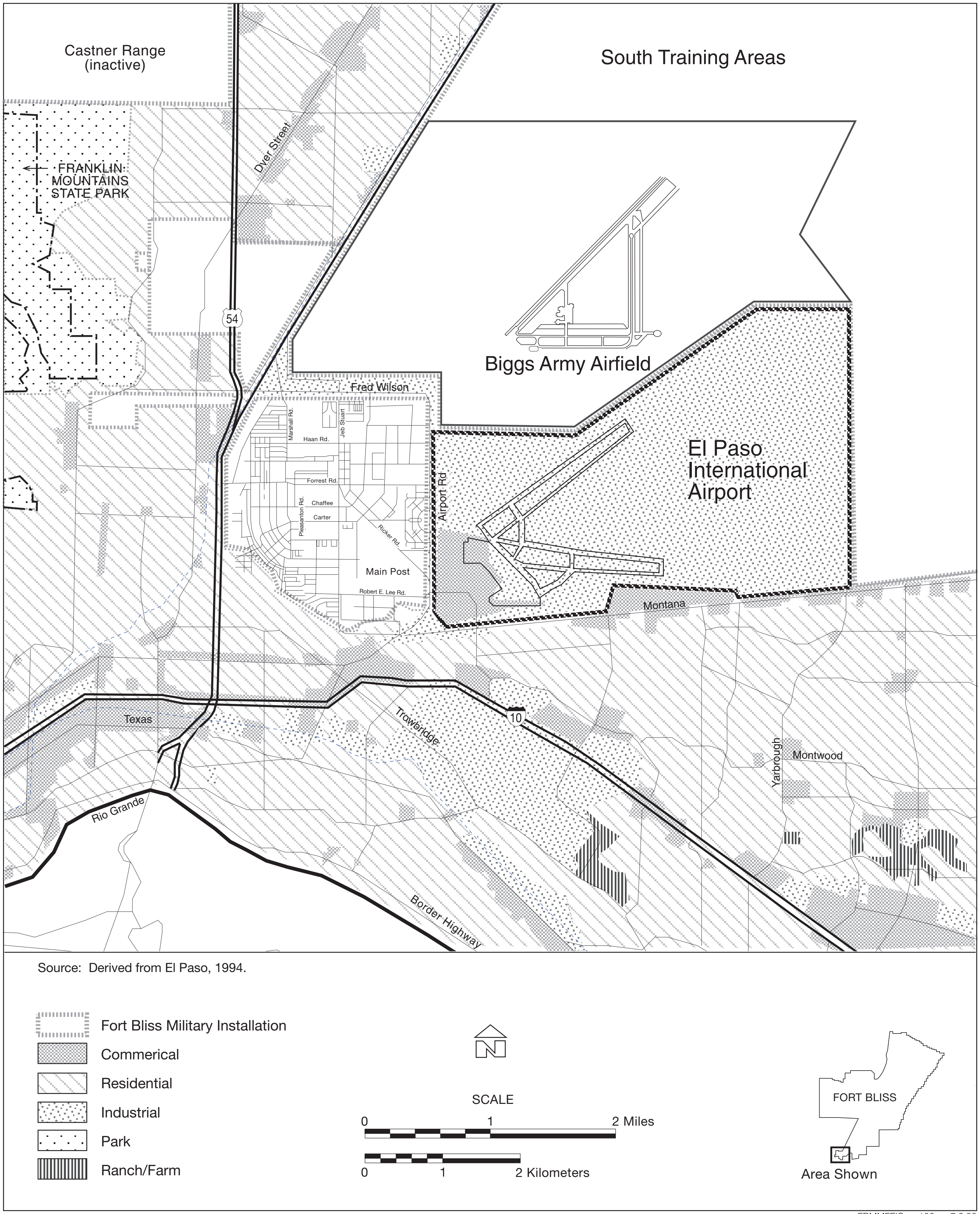

Figure 4.1-3. City of El Paso Generalized Zoning in the Vicinity of the Main Cantonment.

4.1.1.3 Land Use Compatibility

Main Post. Several uses on the Main Post are marginally compatible with adjacent activities. The following list summarizes the primary areas and issues of concern that are identified in the LRC for the RPMP (U.S. Army, 1997a).

- Troop housing is unbuffered from training/range and maintenance areas in several locations;
- Industrial uses along the railway line are incompatible with adjacent family housing (9300 area), and industrial uses on Marshall and Forrest roads are incompatible with family housing in the 1400 and 1500 areas;
- Extensive training areas are inconsistent with smaller scale adjacent residential use in the 1500, 5200, and 5700 areas, and with off-post neighborhoods and schools to the south;
- Administrative use and residential use (Van Horn family housing) along Airport Road are isolated from other similar functions, and exposed to aircraft noise and accident risks from operations at EPIA; and
- Proximity of family housing areas to heavily used roadways both on- and off-post contributes to higher noise levels and degraded air quality in residential areas.

Logan Heights. Family housing along Patriot Freeway and troop housing close to Dyer Street are affected by increasing urbanization, and noise and air pollution caused by vehicular traffic. Separation of troop and family housing from supporting community facilities by major thoroughfares reduces accessibility and use of support functions.

WBAMC. Generally, current development on WBAMC is compatible both internally and with surrounding uses. The large hospital complex is sited on a hillside. Open space and family housing areas buffer hospital functions from adjacent residential areas. Steep terrain on the north side of Alabama Road near the water tanks has limited residential development at this time. Fred Wilson Road separates this area from residential uses to the north. The scale and functions of residential areas to the south is compatible with existing family housing and community facilities.

Biggs AAF. Most activities on Biggs AAF are compatible with surrounding off-post industrial and airport activities. Vehicular traffic and large-scale industrial buildings associated with new industrial and commercial development in the city-owned Butterfield Trail industrial park within EPIA is marginally compatible with residential use in the Aero Vista family housing area.

The Army uses the Installation Compatible Use Zone (ICUZ) program to recommend land use compatibility guidelines for areas exposed to increased safety risks and noise in the vicinity of airfields, and to maintain a safe environment for aviation. Three areas are delineated at both ends of the runway where the probability of aircraft accidents is highest: the Clear Zone (CZ), Accident Potential Zone I (APZ), and APZ II. The CZ for a Class B runway is 3,000 feet wide (centered on the extended runway centerline), and starts at the end of the runway and extends for 3,000 feet. It has the highest accident potential of the three zones and above-ground construction, except for airfield equipment, is generally prohibited in this zone. Similarly, APZ I is 3,000 feet wide, and extends an additional 5,000 feet beyond the end of the CZ. Accident potential in this zone is also significant, and recommended civilian land uses are usually limited to light industrial, manufacturing, transportation, communication, utilities, wholesale trade, open space, and agricultural uses (U.S. Army, 1997a). APZ II, where accident potential is still measurable, extends 7,000 feet beyond APZ I. Recommended civilian land uses in this zone include those compatible with APZ I as well as low-density residential, service, and retail trade.

Figure 4.1-4 illustrates the CZs and APZs for Biggs AAF. The CZ and APZs to the northeast extends over airfield and open training areas used for dispersed military activities and are therefore not shown. These areas have no structures within them. To the southwest, some facilities used for supply and storage are within the CZ. APZ I and II extend across the Main Post incorporating many facilities and activities. Both troop housing and mission support facilities are high-density uses occurring within APZ II on the Main Post.

The CZs for runways on EPIA, as defined by the Federal Aviation Administration (FAA), are within the airport's boundary. Using the ICUZ definition, part of the CZ for Runway 4/32 extends over training/range areas in the southeast corner of the Main Post, but there are no structures in this area. The Van Horn family housing area is within APZ I for Runway 8/26. Community facilities, troop housing and family housing are within the APZ II zones for EPIA runways. The APZs for EPIA also encompass surrounding (off-post) residential areas and two schools that are not recommended uses in this higher accident risk area.

Under the ICUZ program, recommendations of land use compatibility based on noise exposure have also been developed. Guidelines are based on the Federal Interagency Committee on Urban Noise (FICUN) Report of 1980. A summarized version of these guidelines has been adopted by several federal agencies, including the FAA, HUD, and U.S. Environmental Protection Agency (EPA), and are shown in Table 4.1-2. Under these guidelines, most urban uses are compatible with noise levels below the Day-Night Average Sound Level (L_{dn}) of 65 decibels (dB)[1]. Additional information regarding noise from airfield operations may be found in Section 4.10.1.2. The areas exposed to noise levels of L_{dn} 65 dB and above are shown in Figure 4.1-5. Aircraft operations at Biggs AAF do not expose any civilian (off-post) residential areas, schools, hospitals, or other sensitive uses to incompatible noise levels of L_{dn} 65 dB or greater. However, in combination with operations from EPIA, most of the south half of the Main Post, including the Van Horn, and 5100 and 5200 family housing areas, and troop housing areas, and Aero Vista family housing south of Biggs AAF, is affected by noise levels above L_{dn} 65 dB. Under mobilization conditions, aircraft operations could increase temporarily at Biggs AAF, expanding the area exposed to L_{dn} 65 and greater. Residents in Aero Vista family housing may experience increases of 1 to 3 dB during deployment periods.

Operations from EPIA also expose off-post areas with mixed uses to incompatible noise levels. Several schools and residential areas to the southwest and east of the airport (south of Montana Avenue near Yarborough Drive) are exposed to levels between L_{dn} 65 to 70 dB including subdivisions in including Foster Heights, Del Mesa, Terry Allen, Mesa Terrace, Loretto, Hillside, Chula Vista, El Valle, Tobins, Brentwood, Cielo Vista, and Eastside. Some residences south of Montana Boulevard are exposed to levels between L_{dn} 70 to 75 dB. Several motels and hotels for transient lodging near the airport are also exposed to similar incompatible noise levels. Increased noise from operations at Biggs AAF during mobilization periods is not expected to increase average noise levels in off-post areas.

4.1.2 Fort Bliss Training Complex

The majority of the Fort Bliss installation (about 99 percent) is comprised of training and impact areas as well as firing ranges used for military training activities. These training areas are comprised of

[1]. A description of noise metrics and methodology for calculating noise exposure is provided in Section 4.10 and Appendix G (*Noise*).

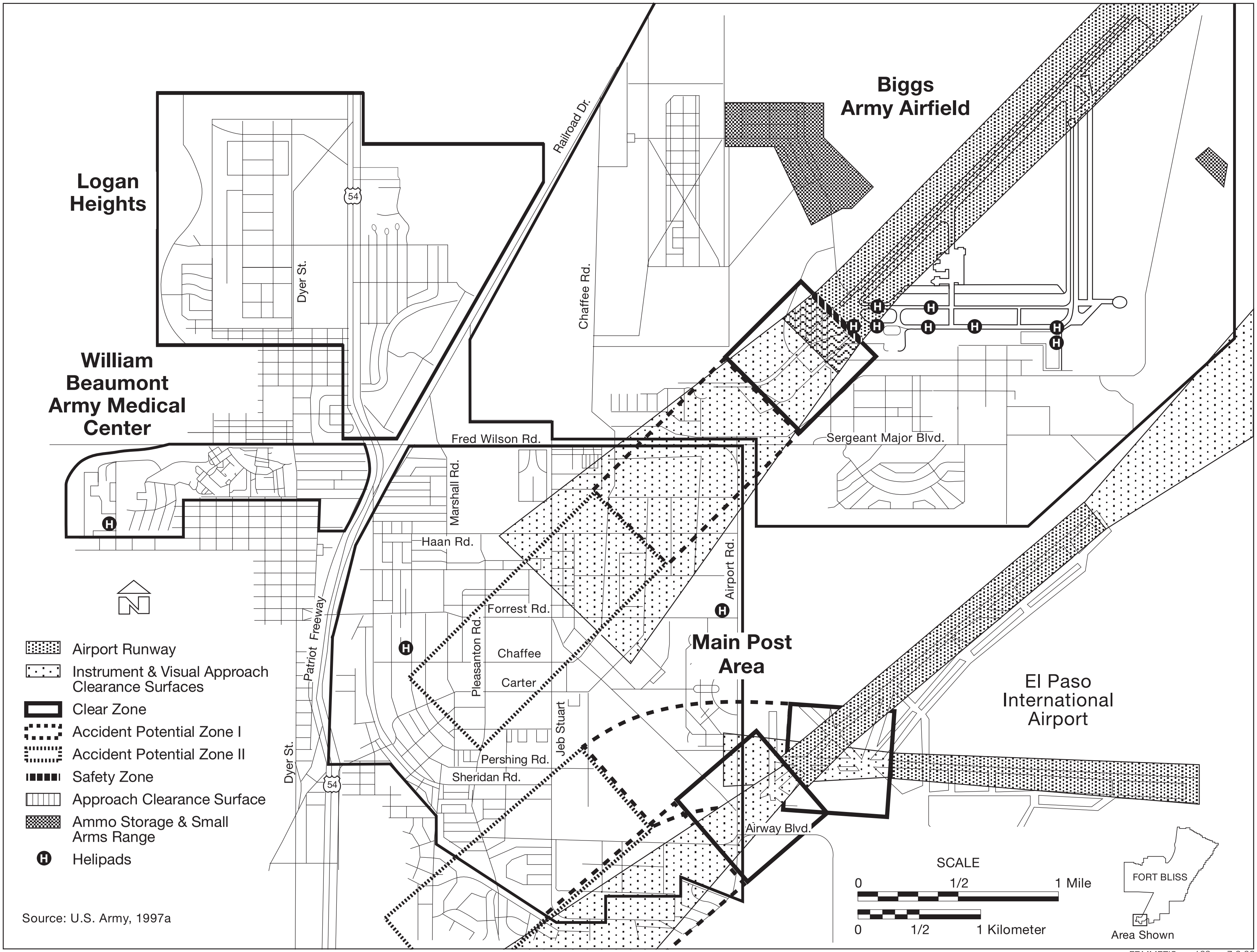

Figure 4.1-4. Biggs Army Airfield and El Paso International Airport Clear Zones and Accident Potential Zones.

Table 4.1-2. Land Use Compatibility with Yearly Day-Night Average Sound Levels

Land Use	*Yearly L_{dn} in dB*					
	Below 65	*65–70*	*70–75*	*75–80*	*80–85*	*Over 85*
Residential, other than mobile homes and transient lodgings	Y	N[1]	N[1]	N	N	N
Mobile home parks	Y	N	N	N	N	N
Transient lodgings	Y	N[1]	N[1]	N[1]	N	N
Schools	Y	N[1]	N[1]	N	N	N
Hospitals and nursing homes	Y	25	30	N	N	N
Churches, auditoria, and concert halls	Y	25	30	N	N	N
Governmental services	Y	Y	25	30	N	N
Transportation	Y	Y	Y[2]	Y[3]	Y[4]	Y[4]
Parking	Y	Y	Y[2]	Y[3]	Y[4]	N
Offices, business and professional	Y	Y	25	30	N	N
Wholesale and retail—building materials, hardware, and farm equipment	Y	Y	Y[2]	Y[3]	Y[4]	N
Retail trade—general	Y	Y	25	30	N	N
Utilities	Y	Y	Y[2]	Y[3]	Y[4]	N
Communication	Y	Y	25	30	N	N
Manufacturing, general	Y	Y	Y[2]	Y[3]	Y[4]	N
Photographic and optical	Y	Y	25	30	N	N
Agriculture (except livestock) and forestry	Y	Y[6]	Y[7]	Y[8]	Y[8]	Y[8]
Livestock farming and breeding	Y	Y[6]	Y[7]	N	N	N
Mining and fishing, resource production and extraction	Y	Y	Y	Y	Y	Y
Outdoor sports arenas and spectator sports	Y	Y[5]	Y[5]	N	N	N
Outdoor music shells, amphitheaters	Y	N	N	N	N	N
Nature exhibits and zoos	Y	Y	N	N	N	N
Amusements, parks, resorts, and camps	Y	Y	Y	N	N	N
Golf courses, riding stables, and water recreation	Y	Y	25	30	N	N

The designations contained in this table do not constitute a federal determination that any use of land covered by the program is acceptable or unacceptable under federal, state, or local law. The responsibility for determining the acceptable and permissible land uses and the relationship between specific properties and specific noise contours rests with the local authorities. FAA determinations under Part 150 are not intended to substitute federally determined land uses for those determined to be appropriate by local authorities in response to locally determined needs and values in achieving noise-compatible land uses.

1. Where the community determines that residential or school uses must be allowed, measures to achieve outdoor-to-indoor Noise Level Reduction (NLR) of at least 25 dB and 30 dB should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide an NLR of 20 dB; thus the reduction requirements are often stated as 5, 10, or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year-round. However, the use of NLR criteria will not eliminate outdoor noise problems.
2. Measures to achieve NLR 25 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where normal noise level is low.
3. Measures to achieve NLR of 30 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where normal noise level is low.
4. Measures to achieve NLR 35 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where normal noise level is low.
5. Land-use compatible provided special sound reinforcement systems are installed.
6. Residential buildings require an NLR of 25 dB.
7. Residential buildings require an NLR of 30 dB.
8. Residential buildings not permitted.

Notes:
Y (Yes) = Land use and related structures compatible without restrictions.
N (No) = Land use and related structures are not compatible and should be prohibited.
NLR = To be achieved (outdoor to indoor) through incorporation of noise attenuation into the design and construction of the structure. 25, 30, or 35 = Land use and related structures generally compatible; measures to achieve NLR of 25, 30, or 35 dB must be incorporated into design and construction of structures.
Source: Derived from Federal Aviation Regulation (FAR) *Part 150 Airport Noise Compatibility Planning* (FAA, 1989); FICUN, 1980.

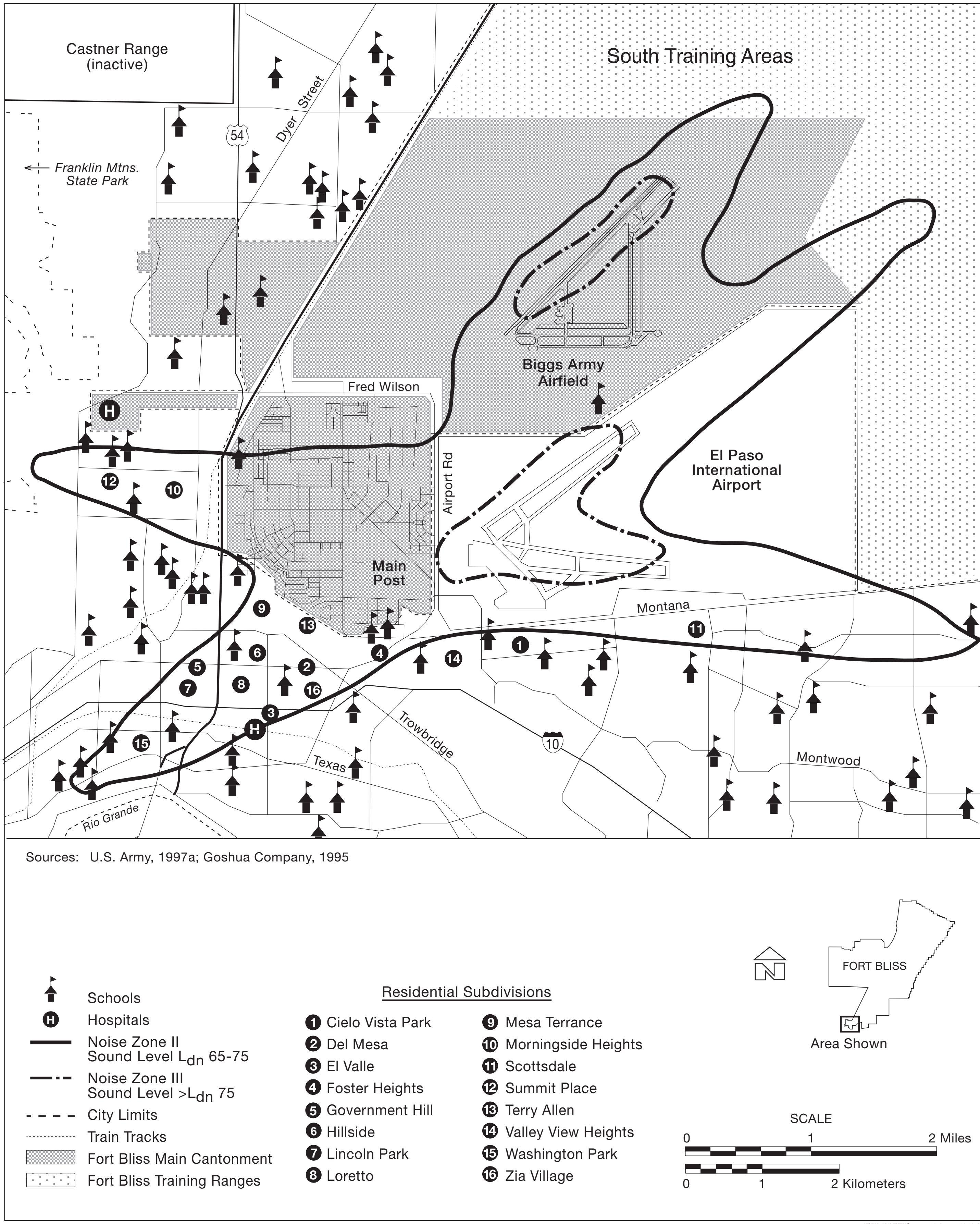

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Figure 4.1-5. Noise Zones for Biggs Army Airfield and El Paso International Airport.

38 McGregor Range and Doña Ana Range–North Training Areas in New Mexico, and the South Training Areas in Texas (see Figure 3.1-1 in Section 3.1). The Doña Ana Range–North Training Areas and the McGregor Range are both withdrawn public land. The Doña Ana Range–Training Areas are withdrawn in perpetuity; McGregor Range is withdrawn until 2001. Castner Range, located in El Paso County, Texas, is no longer an active training range. Some locations within the range complex are equipped with facilities and infrastructure for specific military activities. Other areas are used for a variety of overlapping military and nonmilitary uses (including ground maneuvers, safety zones, recreation and hunting, grazing and natural resource field surveys). With the exception of the impact area on the Doña Ana Range–North Training Areas, all areas used for training activities are divided into training areas. These are designated numerically (e.g., TA 2A, TA 13) for the purpose of specifying geographical locations for mission activities.

Land use on the South Training Areas, Doña Ana Range–North Training Areas, and McGregor Range is categorized within the RPMP as Category VI–Training/Ranges. No further delineation of land use has been specified for these areas. The public has limited access to some areas for recreation, hunting, and cattle grazing, to the extent that it does not conflict with military uses. The following sections present additional information on current uses, land status, special use areas, and land use compatibility with adjacent areas.

All activities and access on McGregor Range are controlled by the Army in accordance with the *SOPs for Weapons Firing and Maneuver Area Use* (U.S. Army 1996f). The SOP prescribes the general safety requirements and procedures for users of the training areas and ranges. All persons are required to coordinate access and use with the Range CDR (through the Range Development and Enforcement Office) to ensure safety and to avoid interference with military missions. This procedure applies to government employees, contractors, and the public at large. Some portions of the training complex are available for public recreation. Members of the public must obtain annual recreation access permits from either the Army or BLM. Between 1,000 and 1,700 recreation permits have been issued annually for purposes such as livestock management, hunting, hiking, and guided nature tours. Permit holders are responsible for complying with specific Army and BLM procedures for entry, use, and exiting of the range (Bankston, 1997). During hunting seasons, access by about 10 persons may be recorded each week. At other times, official access to the ranges for public recreation is infrequent (Grossenheim, 1997). Current access procedures allow concurrent use of some areas for a military mission or Army and BLM maintenance and resource survey activities, with public recreational use. Compatible military activities such as range maintenance and resource survey activities can occur along with recreational use. When military activities are incompatible with public use, the entire training area is closed to public access.

Fort Bliss currently uses ITAM as a tool for monitoring vegetative cover impacts from different mission activities. Various elements of this program provide information about land condition trends, land rehabilitation characteristics, and training requirements using digital GIS, allowing selection of training locations that will require the minimum of cost for land restoration and environmental compliance. On McGregor Range, the INRMP applies to managing impact of military missions on withdrawn public land and Army fee-owned land as specified in the BLM/Army MOU (BLM, 1990b). The BLM retains management for public access uses on withdrawn and Army fee-owned land as enumerated in the FLPMA (PL 99-606 and the McGregor Range RMPA (BLM, 1990a).

4.1.2.1 Existing Land Use

South Training Areas. The South Training Areas (104,042 acres) are located in El Paso County, to the north and east of the main cantonment as shown in Figure 3.1-1 in Section 3.1. In a recent real estate action, Fort Bliss acquired about 15,040 acres in TA 2 that were previously leased from the State of Texas. In exchange for this land, Fort Bliss gave a perpetual easement (227 acres) to the state, which was transferred to the City of El Paso for construction of the Loop 375 highway that connects eastern El Paso at Montana Drive to northeastern El Paso at Patriot Freeway. The ROW is fenced to preclude access onto Fort Bliss property. No commercial development is permitted in the ROW. Fort Bliss also transferred about 1,212 acres along Montana Avenue that are now City of El Paso lands.

Figure 4.1-6 shows the general military uses of the South Training Areas. The areas are mostly used for tracked vehicle training operations. Tracked vehicle operations are primarily confined to established corridors. TA 2D is used for some weapons firing and the DZ in TA 2A supports paradrop missions of troops and equipment. There are five freeway underpasses for tracked vehicles that are paved in concrete to reduce dust generation near the roadway.

These training areas are available for limited public recreational access when the areas are not used for military activities. Based on available data for an 8-month consecutive period from mid-December 1996 to mid-August 1997, the South Training Areas were used for recreational purposes on about 224 occasions. TA 1B was used the most frequently, probably due to its proximity to the El Paso metropolitan area. The primary attraction for recreationists is bird hunting. (No hunting is permitted within a narrow safety buffer between the training areas and Biggs AAF on either side of Loop 375, or around the wastewater treatment plant). City-owned and operated oxidation ponds for treatment of wastewater are located within TA 1A along U.S. Highway 54. Hunting is not allowed within 328 feet of this facility (Roach, 1997). Figure 4.1-7 depicts hunting areas on the South Training Areas. 234

Several archaeological sites and areas are protected, and designated as off-limits for all training uses. Additional information on cultural resources is provided in Section 4.9.

Doña Ana Range–North Training Areas. Doña Ana Range–North Training Areas, previously known as the Doña Ana Hueco and Orogrande Complex is located in southern Doña Ana and Otero counties in New Mexico. It is comprised of about 60,141 acres of Army-owned land and about 236,865 acres of withdrawn lands (Tipton, 1997). Most of the Army-owned land was purchased from ranchers during the 1940s and 1950s. In some cases, land was acquired following condemnation. The withdrawn land is part of the perpetual withdrawal of 2 million acres approved by Congress in the 1950s to establish WSMR, HAFB, and Doña Ana Range–North Training Areas of Fort Bliss (Public Land Order [PLO] 833). War Highway, a public access highway, passes through Doña Ana Range–North Training Areas from U.S. Highway 54 in the south to WSMR and the Main Cantonment Area in the north. Most of Doña Ana Range–North Training Areas is Chihuahuan Desert mesquite dune vegetation. The southern half of the Organ Mountains are located on the west side of Doña Ana Range–North Training Areas. Some of the highest peaks in this range, including Soledad and Organ peaks, are within the Fort Bliss Military Reservation.

There are seven utility easements crossing portions of Doña Ana Range–North Training Areas, including six to the El Paso Electric Company (EPEC), and one for an underground pipeline of El Paso Energy Company (previously El Paso Natural Gas). The electricity ROW are mostly on the periphery of the range. However, the gas pipeline runs north/south between War Highway and the Organ Mountains Impact Area. To avoid damaging pipelines, tracked vehicles must traverse the pipeline at designated crossings.

Figure 4.1-8 illustrates the primary military uses on Doña Ana Range–North Training Areas. Section 3.1.3.2 describes the military uses and activities throughout the 297,006-acre area. About 200,000 acres of Doña Ana Range–North Training Areas on the east side of War Highway are used for off-road tracked vehicle maneuvering and weapons firing. This area is divided into TAs 3 to 7, primarily located on the east side of War Highway, where tracked vehicles can operate freely. To the west of War

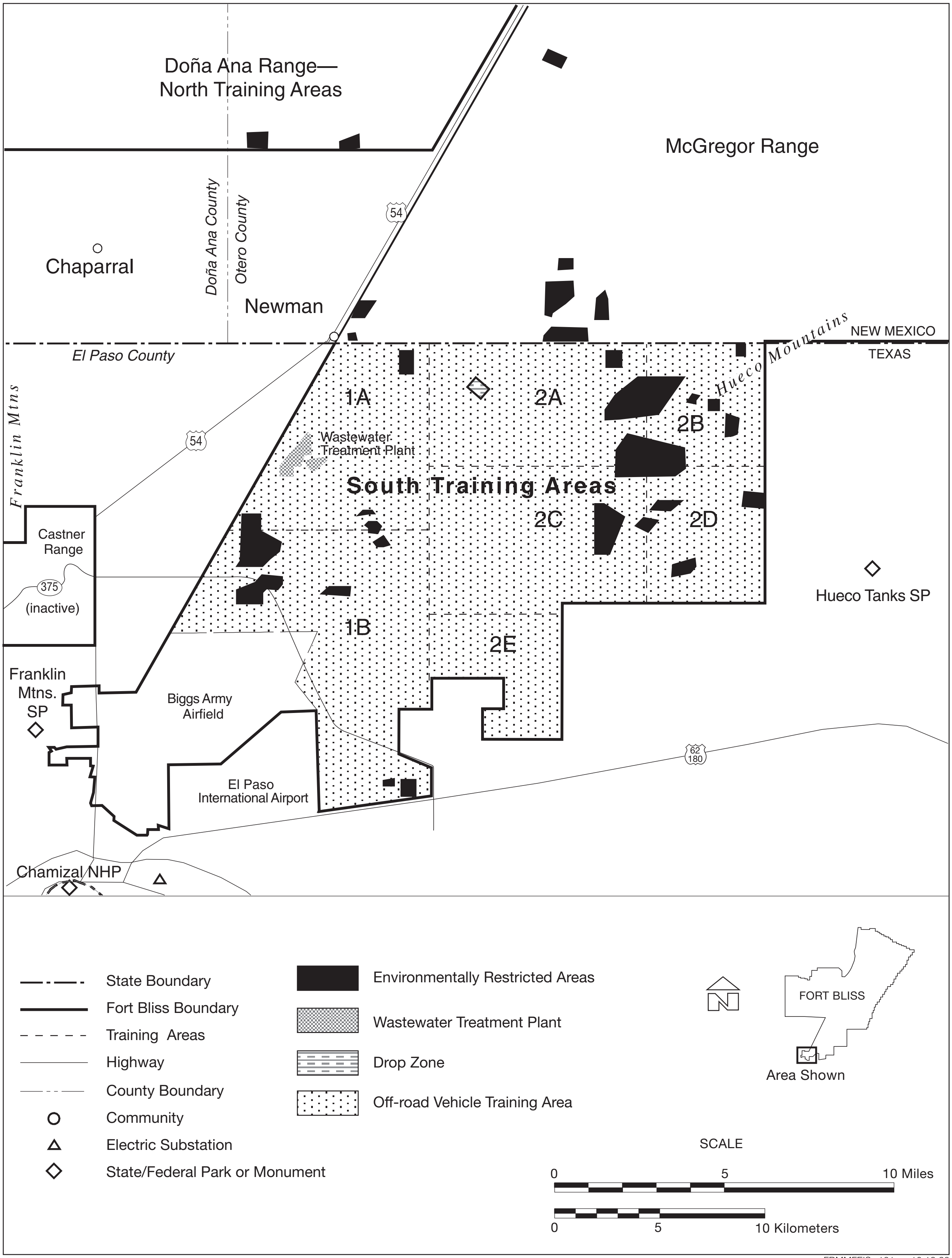

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Figure 4.1-6. Land Use and Mission Facilities in the South Training Areas.

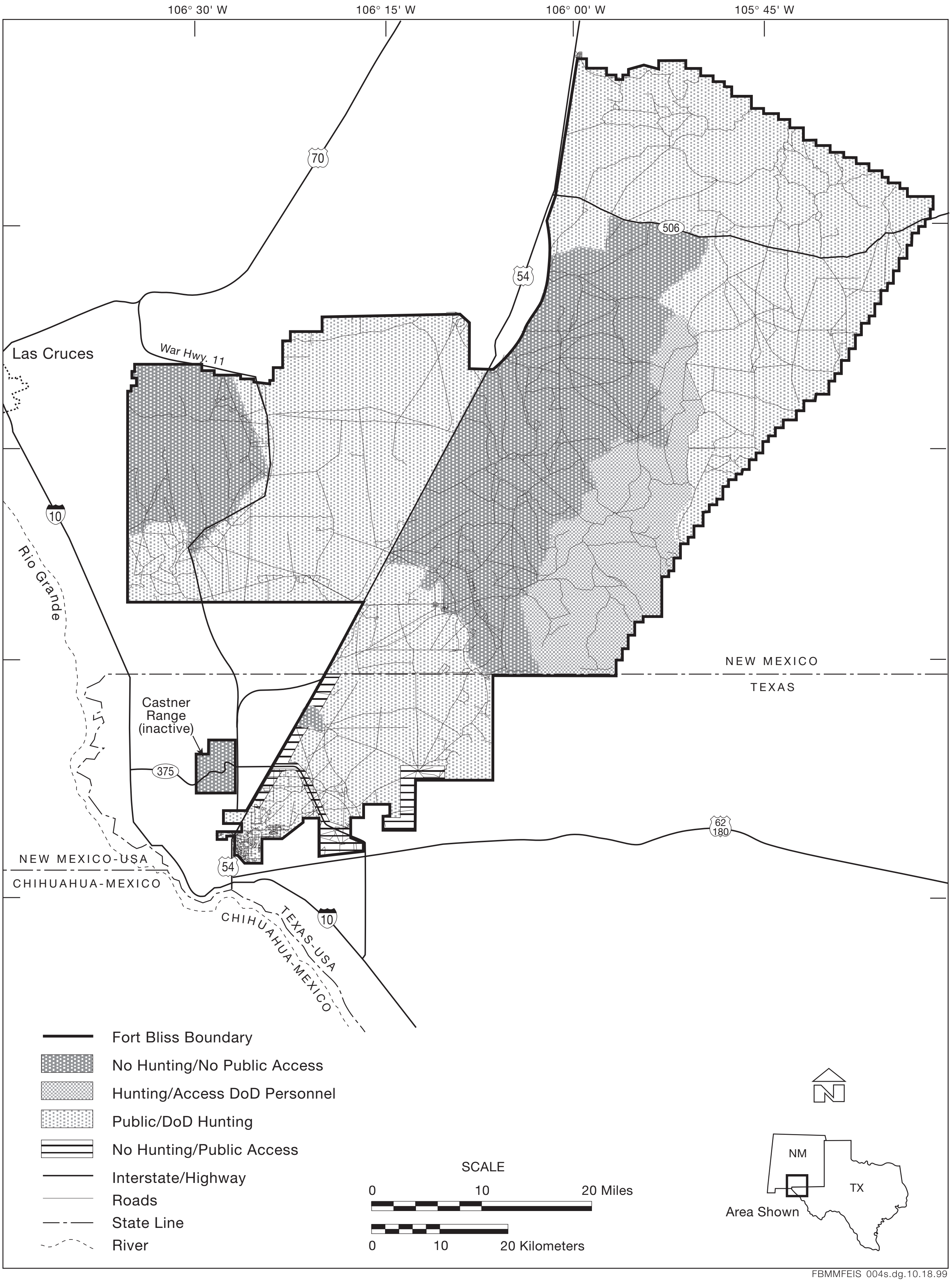

Figure 4.1-7. Hunting Areas on Fort Bliss.

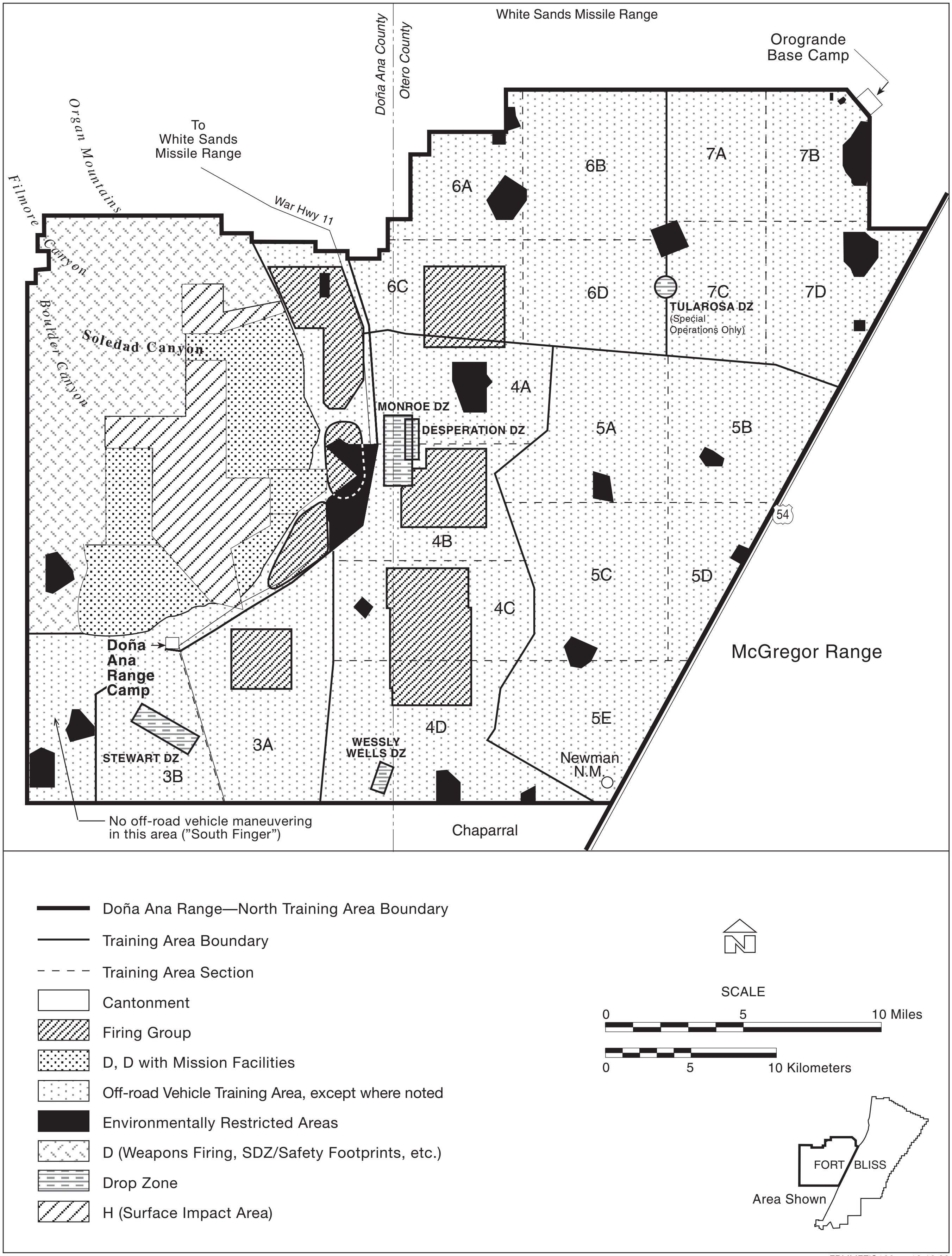

Figure 4.1-8. Land Use and Mission Facilites on Doña Ana Range—North Training Areas.

Highway, about 100,000 acres are used as gunnery ranges, firing locations for MLRS, and impact areas. These ranges support training with and testing of conventional and small arms munitions, and laser weapons. Impacts occur in the lower elevations and the flat areas at the base of the east side of the Organ Mountains. Most of the mountainous area is a safety buffer for these activities.

Doña Ana Range Camp, located 30 miles north of the Main Cantonment Area, provides billeting space for up to 1,174 personnel during training, 1,174 during mobilization. The Orogrande Range Camp is located about 50 miles north of the main cantonment at the far northeast end of the Doña Ana Range–North Training Areas complex. This range camp provides troop housing for about 1,036 personnel with associated maintenance, dining, and storage for units conducting tests or training in the northern part of McGregor Range, primarily at SHORAD and the Orogrande ranges.

Low flying helicopter missions are conducted in the southeast part of Doña Ana Range–North Training Areas. Boulder Canyon on the south end of the Organ Mountains is used as a multipurpose automated range complex for air and ground weapons systems. Five DZs are located in Doña Ana Range–North Training Areas. Desperation and Monroe DZs are located near Old Coe Lake on the east side of War Highway. Tularosa DZ is on the boundary of TA 6D and TA 7C. Wessly and Stewart DZs are in the south part of the range, the latter being within 0.5 miles of the reservation boundary.

When not scheduled for military activities, the Doña Ana Range–North Training Areas are available for public recreational access. Based on available data for an 8-month consecutive period in 1996 and 1997, Doña Ana Range–North Training Areas is used for recreational access on about 270 occasions per year. The most popular activity is game bird hunting. Figure 4.1-7 depicted hunting areas Doña Ana Range–North Training Areas. The Organ Mountains are not allowed for hunting due to the presence of explosive hazards. 234

The impact area SDZ includes some of the highest peaks of the Organ Mountains. Some recreationists trespass into these areas from trails on the west and north side of the mountains from Dripping Springs Recreation Area and Aguirre National Recreation Area (see Section 4.1.2.2). Unauthorized grazing also occurs within the Organ Mountains, primarily in Fillmore and Soledad canyons. Most of the installation boundary is not fenced, but warning signs are posted at strategic locations on trails leading into Fort Bliss (see Section 4.1.2.3).

Within the Doña Ana Range–North Training Areas there are several sensitive archaeological resource areas that are designated as off-limits for all training activity (see Figure 4.1-8). Section 4.9 provides additional information on areas that are used and managed to preserve cultural resources.

McGregor Range. McGregor Range is part of the Fort Bliss Military Reservation, located in Otero County, New Mexico. Geographically, this range is comprised of areas within the Tularosa Basin to the south and west, Otero Mesa and its escarpment to the east and north, the Sacramento Mountains foothills in the far north part of the range, and the Hueco Mountains in the southeast. McGregor Range is comprised of approximately 697,472 acres, of which 71,083 acres scattered among the withdrawn and USFS lands are owned in fee by the DA. Under the MLWA of 1986 (PL 99-606) 608,385 acres of public land were withdrawn for military use. McGregor Range was withdrawn from the public domain by PL 106-65, October 1999, for a period of 25 years following the expiration of PL 99-606 in November 2001. In addition, 18,004 acres of USFS-managed land are used through cooperative agreement as a safety buffer during some missile firings and for dismounted training. Figure 4.1-9 shows the general land status of McGregor Range.

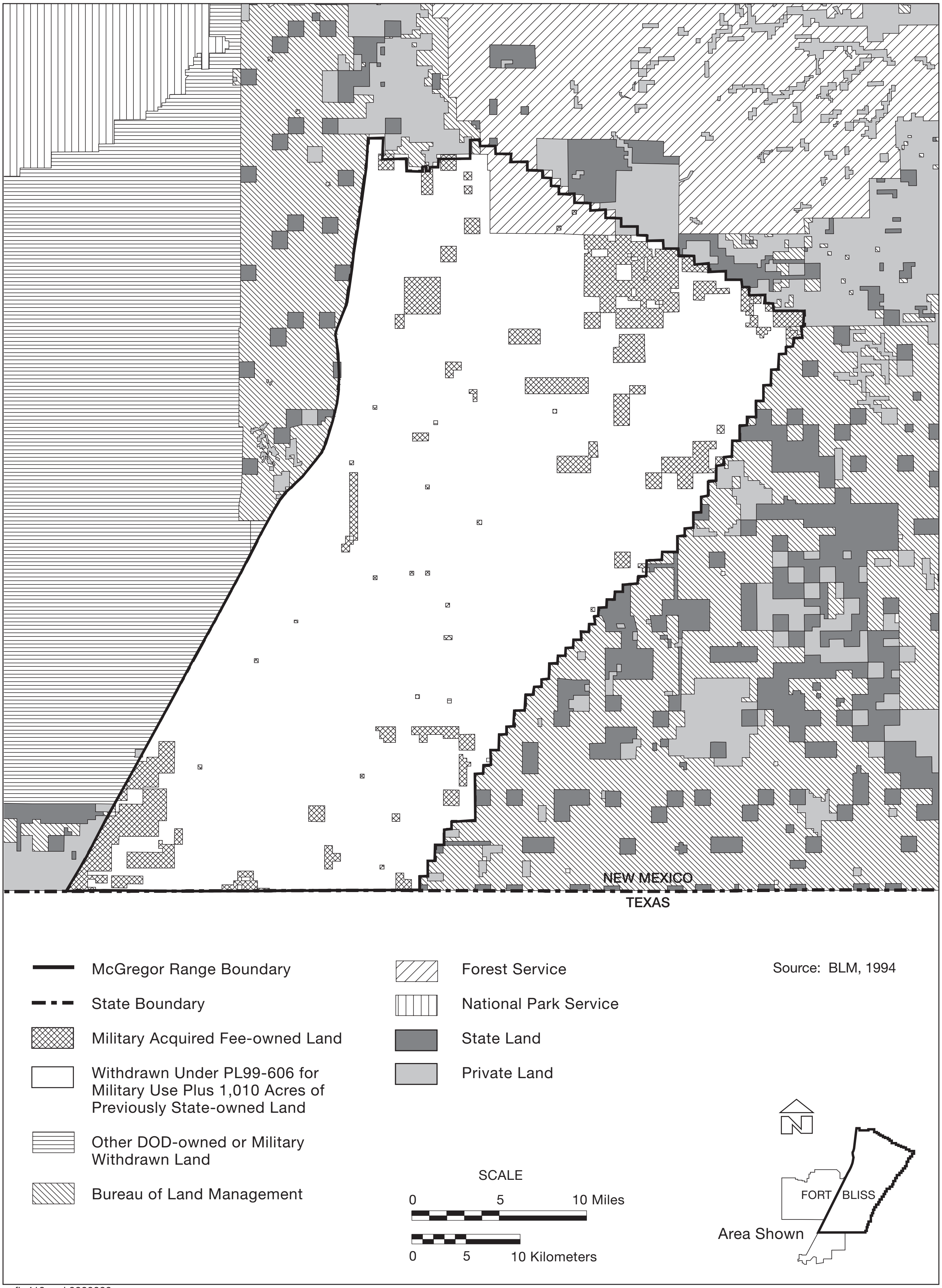

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Figure 4.1-9. General Land Status of McGregor Range and Surrounding Area.

Under MLWA (PL 99-606) and PL 106-65, the Secretary of the Interior manages nonmilitary uses of the withdrawn lands, including hunting and recreation, wildlife habitat management, and grazing, with approval from the Army. However, the Secretary of the Army has the authority to limit nonmilitary uses and public access to the range for the purpose of military operations, public safety, or national security. The BLM (Las Cruces Field Office) manages daily nonmilitary uses of McGregor Range within the parameters defined by a 1990 MOU. **62**

In accordance with the MLWA and Section 202 of the FLPMA of 1976, BLM prepared an amended Resource Management Plan (RMP) for McGregor Range. The BLM also entered into a MOU as specified by PL 99-606, between the Secretary of the Interior and the Secretary of the Army in 1990 to implement the amended plan. Management objectives for lands, realty, and access; mineral resources; soil, water, and air; livestock grazing; wildlife and habitat management; recreation; visual resources; wilderness; cultural resources; and fire management.

The Army has annual rights to about 110,000 gallons per day (gpd) of water from the Sacramento River and Carrisa Springs. All mineral rights on withdrawn public land and Army fee-owned land are held and managed by the BLM. However, under PL 99-606 use of these resources requires Army concurrence regarding consistency with military missions.

The USFS manages portions of Lincoln National Forest within McGregor Range under the *Lincoln Forest Plan* (USFS, 1986). These lands fall within Management Area 2C, known as the “Grapevine” area. All resources in this area are managed at a low level, with an emphasis on preserving soil productivity.

The State of New Mexico owns a ROW for New Mexico Highway 506, but Otero County maintains the highway. The public ROW was grandfathered in when FLPMA was passed in l976, because it adopted the authority granting public access under the older mineral law, RS2477 (Creager, 1996). In addition, an easement for a 345 kilovolt (kV) electric power line, held by El Paso Power Company until the year 2036, traverses the McGregor Range north of New Mexico Highway 506. El Paso Energy Company holds a natural gas pipeline ROW until the year 2009. The U.S. Border Patrol holds an easement along U.S. Highway 54 at the intersection with New Mexico Highway 506.

Military Use. Figure 3.3-8 illustrates current training area use on McGregor Range, using the categories defined in Table 3.3-2. Figure 4.1-10 illustrates the locations of key facilities and special areas on McGregor Range. Current military activities and training area use is described in Section 3.2.3.2. The primary distinguishing military mission on McGregor Range is air defense missile firing and system testing, made possible by the extensive land area. The Tularosa Basin portions of McGregor Range are used extensively for small missiles, and the entire range is used for HIMAD missiles. These missile types impact their targets in mid-air and consequently do not have designated impact areas on the ground. Instead, they have SDZs that are used during firings within which access is temporarily restricted, and debris is deposited. Most of the major support facilities for these activities are located in the south part of the range near McGregor Range Camp in TA 32, at the SHORAD Range in TA 30, and at the Orogrande Complex in TA 29.

McGregor Range Camp is a built-up area used for a variety of mission support functions including administrative, troop housing, training, and storage of equipment. Billeting can be provided for up to 1,154 enlisted personnel during training and exercises. During mobilization, this capability could expand to accommodate up to 1,154 enlisted personnel and 66 officers (1,220 total). Range Control functions are located at Davis Dome, about 1 mile east of the range camp. A series of firing locations for HIMAD and short range air-to-ground missiles are located about 1 to 2 miles north and east of McGregor Range Camp.

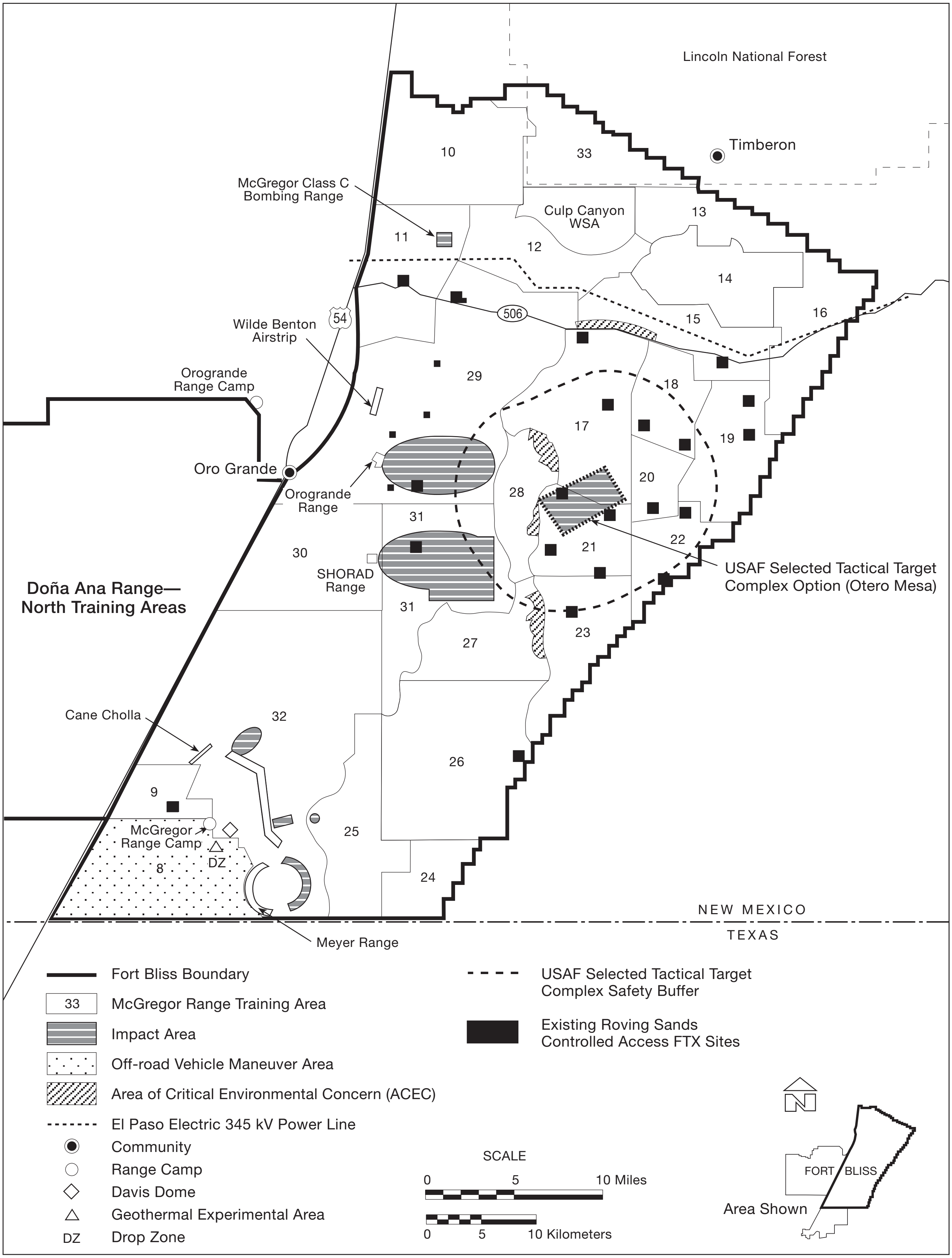

Figure 4.1-10. Location of Existing Army and Proposed United States Air Force Facilities on McGregor Range.

Aerial gunnery missions are conducted by helicopters at Cane Cholla Aerial Gunnery Range in TA 32 (about 3 miles northwest of the range camp) and by fixed-wing aircraft at a Class C Bombing Range north of New Mexico Highway 506 in TA 11. Other air missions include paradrops at DZs and at Wilde Benton landing strip and low-altitude tactical navigation by helicopters in specified areas.

Small-arms training is concentrated at Meyer Range in the southernmost part of McGregor Range. Activities at this complex can occur simultaneously with most other uses.

Dismounted training is conducted throughout the range, except in TAs 28, 33 and Culp Canyon WSA, which require special approval, and TA 31 where it is prohibited except at the existing FTX site. The varied terrain of the Sacramento Mountains foothills, including Culp Canyon and co-use areas within the Lincoln National Forest offer good training environments for dismounted training.

McGregor Range also supports joint FTX for the air defense mission. Each year, Roving Sands exercises are conducted during spring or early summer for about 2 weeks, using most of the range for a variety of air and ground activities. Twenty-five (approximately 0.4 square miles) controlled access sites for Patriot units and 10 smaller sites for Hawk units are located throughout the range. These are used during exercises by mobile air defense units. These areas have undergone environmental evaluation and clearance. Not all sites are used every year, thus allowing recovery of disturbed areas.

A new tactical target complex will be constructed on 5,120 acres on Otero Mesa. It will support training
by units at HAFB, particularly the GAF. Use is expected to commence around FY 00. It will be used on 16
a daily basis from Monday through Friday morning for air-to-ground training. When in use, no public 26
access would be allowed within 12-mile by 15-mile safety area (180 square miles) surrounding the target
complex (USAF, 1998). The MOU between BLM and the USAF provides that real-time public access to 96
the USAF complex will be from 1:00 p.m. Friday through 9:00 p.m. Sunday. Scheduling for the target
complex will be controlled by Fort Bliss. This includes most of the area surrounding the target complex
on Otero Mesa, south of New Mexico Highway 506 (see Figure 3.3-8).

Overall, the highest level of military use is concentrated in the Tularosa Basin portions of McGregor
Range, mostly south of New Mexico Highway 506 (see Table 3.1-8). Currently, operations at the Class C 16
Bombing Range, and most military use of Otero Mesa and areas north of New Mexico Highway 506
(TAs 10 through 23) have been intermittent, during periodic HIMAD missile firing programs, and Roving 26
Sands. The new target complex will increase the level of use of several training areas on Otero Mesa
including TAs 17, 18, 19, 20, 21, 22, and 23 from low and very low levels to high use. It is expected that 96
use of the existing bombing target in TA 11 will decline as a result, allowing more availability for
recreation and grazing. This same area (south of the highway) is heavily scheduled by the Army for
training area maintenance including road repairs and environmental management activities such as habitat
conservation and rehabilitation, and biological and archaeological studies and surveys. Until recently,
these activities accounted for over half of the scheduled use of Otero Mesa and the Sacramento Mountains
foothills, and although not hazardous in nature, precluded concurrent use for other military and
nonmilitary use. Exceptions to this allowed a BLM range management team to operate when military 16
activities were not hazardous. Also, compatible military activities could use the same training area when 26
agreed to by the military users. Range control also coordinates specific requests for access by members
of the public on a "real time" basis. A new Army policy allows environmental management activities and
compatible public recreation to occur in the same areas.

Nonmilitary Use. In addition to military use of McGregor Range, the withdrawal action (PL 99-606)
gave the DOI responsibility for management of the withdrawn lands in accordance with FLPMA. It also 65
permitted the continuation of grazing, protection of wildlife and wildlife habitat, control of predatory

animals, and recreation, to the extent that they do not conflict with the military mission, and prevention and suppression of nonmilitary-caused fires. The following paragraphs summarize nonmilitary users and uses of resources on McGregor Range.

Access and ROWs. New Mexico Highway 506 crosses the north end of the range, providing access from U.S. Highway 54 to small communities and ranches on the north and east side of the range. Permits are not required to use this roadway. However, the Army restricts access along the route when military operations may cause unsafe conditions. At these times, three access gates are manned by "Range Riders"[1] and/or Military Police for the duration of the closure. Currently, the highway is usually closed for portions of 2 or 3 days each week during missile firings from September through November, and for portions of each day during a 2-week period following Roving Sands. A closure schedule is distributed to local ranchers and the Fire Department in the community of Timberon every week. Road closure details for 1996 may be found in Appendix B.

EPEC has a ROW for a high voltage (345 kV) electric transmission line across the north end of McGregor Range. ROWs are not required for infrastructure constructed by the Army within McGregor Range, such as telephone or utility distribution lines. However, ROWs are needed for new telephone or utility lines originating off-range that enter onto the range. ROW applications on withdrawn land are generally processed and granted by BLM with Army concurrence (Creager, 1996).

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U.S. Border Patrol holds two ROW permits (NM 90666 for a check station and NM 90665 for drag roads) where New Mexico Highway 506 intersects U.S. Highway 54. The EA for the *Construction of Drag Roads near the U.S. Highway 54 Border Patrol Checkpoint, Otero County New Mexico* resulted in a FONSI. The FONSI was issued by the U.S. Border Patrol and JTF-6 in 1993. The EA analyzed the impacts of a network of drag roads to be installed around the intersection of New Mexico Highway 506. The FONSI states that the planned action would result in only minor or temporary impacts on vegetation, air quality, and noise levels. Based on the results of the analyses presented in the EA, the action would not have significant effects on the human environment (U.S. Army, 1993a). A network of drag roads totalling 28 miles in length was constructed in 1994 around the intersection of U.S. Highway 54 and New Mexico Highway 506. Existing roads and ROWs, approximately 13 miles, were regraded for use as drag roads. Where existing roads did not exist, approximately 15 miles of 15-foot wide dirt roads were constructed. These roads are maintained by the Border Patrol. Any additional specific proposals or uses in the future, that could affect roadway access, would need to be reviewed and approved by the BLM. The BLM would need Army concurrence before approving new uses that might affect military activities on withdrawn land.

Energy and Minerals. Under PL 99-606, the withdrawn lands of McGregor Range were withdrawn from use under the mining laws, mineral leasing, and geothermal leasing laws. As such, under the RMPA, McGregor Range is closed for locatable minerals but re-evaluated periodically to see if any areas can be opened. About 100,000 acres are open for oil and gas, and geothermal leasing, and 287,360 acres are open for salable materials. Any application to BLM for exploration, extraction, or production of locatable minerals (such as gold, zinc, copper), salable minerals (such as sand and gravel), and leasable minerals (such as oil, gas, and geothermal resources) on withdrawn land, would have to be approved by the Army prior to BLM's processing and granting the application.

A recent gas discovery to the east of McGregor Range has prompted oil companies to express interest to the BLM regarding future exploration on McGregor Range (Sanders, 1998). However, there has been no

[1.] Range Riders are civilian employees whose diverse functions include: Enforcement of Army, federal, state, and local regulations on Fort Bliss; safety of persons on the range; and range conservation activities and firefighting services.

formal request for exploration on McGregor Range. Any future use for oil and gas exploration on withdrawn land would need to be approved by the Army.

A recent assessment of mineral and energy resources on McGregor Range was conducted jointly by staff of the New Mexico Bureau of Mines, New Mexico State University (NMSU), and TRC Mariah Associates, Inc. (U.S. Army, 1998e). Currently the Army is exploring opportunities to use geothermal resources in the south part of McGregor Range. Additional information on mineral and energy resources and potential is provided in Section 3.5.4.3.

Water Use. Water used on McGregor Range to support military activities is primarily supplied from a public purveyor to McGregor Range Camp. Some groundwater sources are used periodically during construction projects for dust control. The Army holds a water right that entitles them to use up to 110,000 gpd from surface water sources. The beneficial use of this water right is for fish and wildlife. However, the tanks filled from this supply are also used by livestock. Water is also collected in earthen tanks for use by wildlife and livestock. **67**

Grazing. A long history of grazing throughout the area is closely tied to early settlement of the southwest. Originally, settlers generally established a formal claim for land around a spring where a homestead would be built, and cattle would graze on surrounding unclaimed public domain areas, as was the practice in Mexico. Several presidents supported colonization and liberal sales and grants of settled areas to the land users. By the end of the nineteenth century, speculative land practices and depletion of timber and other resources prompted Congress to repeal this policy, and to set aside "national forest lands." Subsequently, in 1934, under the *Taylor Grazing Act*, the remaining unclaimed federal lands were put under the management of the DOI. During this time, livestock grazing continued on federal lands, and regulations evolved allowing these practices to continue. A permit system evolved that recognized priority in occupancy and use of rangeland; grazing permits for specific parcels of land remained with individuals (Otero County, n.d.).

The original land acquired for McGregor Range in the 1940s and 1950s was mostly comprised of public domain areas. Several ranchers in the areas owned small properties in-fee, and held grazing permits for extensive portions of public land. Through negotiations with ranchers it was decided that the Army would use the public lands for 4 days each week. Most ranchers considered 3 days as inadequate to work a ranch and favored selling their grazing permits to the Army. A few ranchers were strongly opposed to losing use of public lands and their homesteads, and condemnation of these properties ensued. In addition to acquiring fee-owned lands, a portion of the current McGregor Range within the Tularosa Basin was officially withdrawn for military use in 1957 under PLOs 1470 and 1547 (U.S. Army, 1997d). **67**

From this time until the mid-1960s, grazing was suspended on McGregor Range, but trespass grazing continued because there were no fences, and it was impossible for the Army to patrol the large area. The 1966 MOU between the Army and BLM co-use area, in which grazing could be permitted under supervision of the BLM and a 1976 MOU was incorporated into the 1990 MOU that resulted from PL 99-606 (see Appendix D). The co-use area contained 515,000 acres. The BLM divides the co-use area of McGregor Range into six distinctive natural units (BLM, 1980):

1. The Mountain Foothills unit (23.4 square miles) occurs at the north end of the range and is an upland area with a characteristic pinyon-juniper woodland.

2. The Canyonlands unit (59.4 square miles) is the rugged, rocky lands, which separate the Mountain Foothills from the lower country to the south and west.

3. The Mesa (171.1 square miles) is a gently, rolling grassland in the southeastern portion of the range.

4. The Rimlands unit (100.0 square miles) is the rugged, rocky area, which separates the Mesa from the lower country to the west.

5. The Alluvial Fans unit (296.9 square miles) is sloping shrublands at the foot of the Canyonlands and Rimland units.

6. The Bolson, or Basin (153.1 square miles), is the lowland area on the west side of the range, characterized by the presence of stabilized sand dunes.

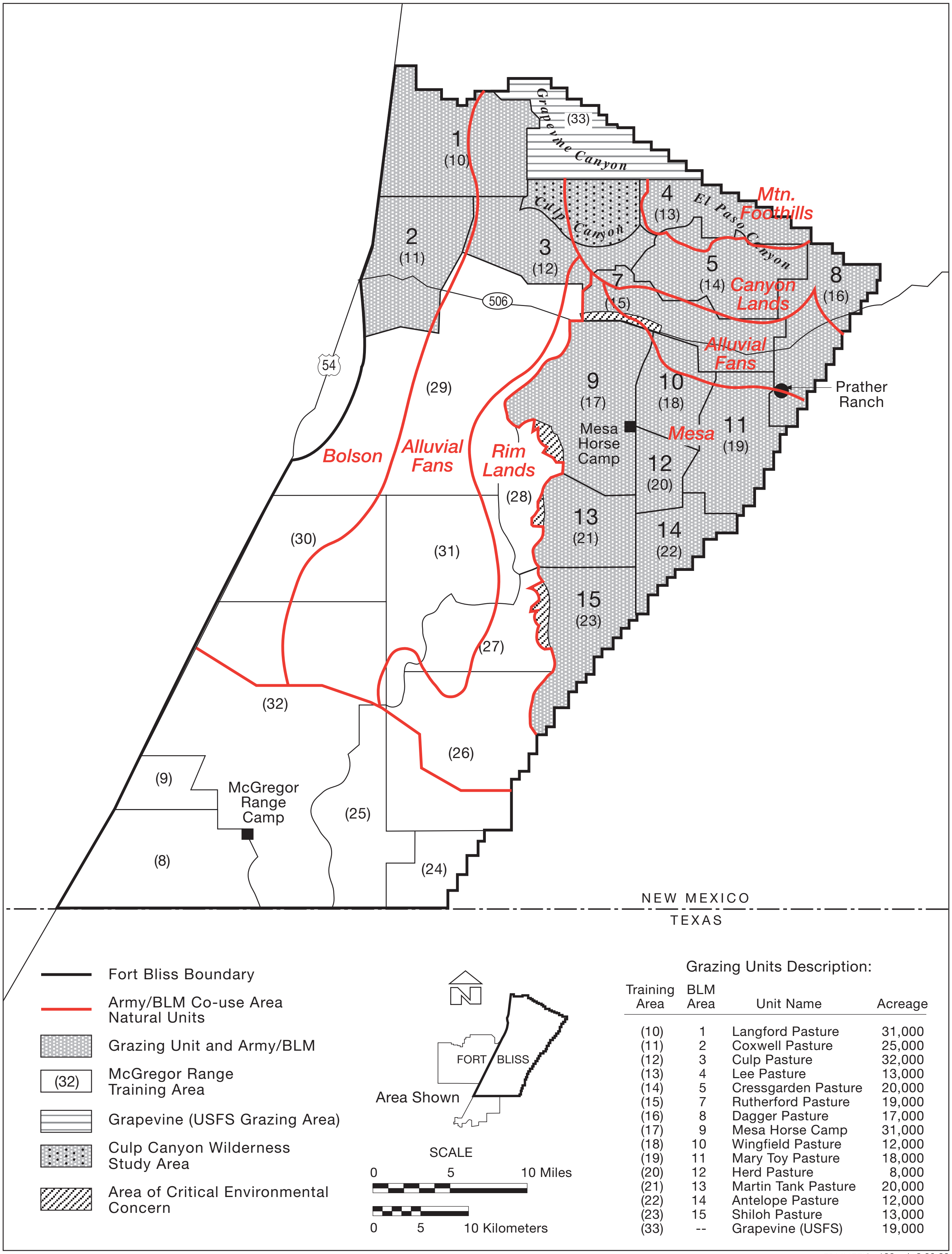
Grazing is allowed in fourteen pastures, containing 271,000 acres. Thirteen of the pastures were developed in the 1960s; another became available for grazing in 1981 (BLM, 1980).

In 1966, BLM established an auction system for grazing units on McGregor Range, unlike the priority system that prevails for most public lands under the *Taylor Grazing Act*. Grazing was initiated in 1967. Pastures were defined by historical utilization. By 1970, BLM had developed the present management program, which allowed approximately 9 months of grazing each year, usually from October 1 to June 30. In the event that one pasture is damaged by fire, a rested pasture may be put into service. In a typical year prior to 1970, 4,500 cattle utilized the range and there had been about 40,000 animal units per month (AUMs) of livestock grazing. Income from the bidding is retained by BLM for maintenance of, and improvements to, the grazing lands of McGregor Range (BLM, 1980). Money collected from grazing fees is placed in a fund to directly pay for the costs of running the program.

After expiration of the original withdrawal of 1957, the DoD and the DOI entered into an MOU in 1977 that allowed the Army to continue to use the land as they had since 1957. Subsequently, Congress formally withdrew about 608,385 acres of public land for military use in 1986 under the MLWA. Under terms of the withdrawal, grazing has continued to be permitted on a noninterference basis with military missions. The areas that have been opened up to grazing have relatively low safety risk from prior military operations (e.g., ordnance and explosive hazards and debris) that have been opened up to grazing. This area corresponds generally with TAs 10 through 23.

As agreed to in the 1990 MOU (Appendix D), BLM continues to manage the grazing program and determines livestock grazing levels. Grazing units are put up for public auction to the highest bidder every year. There are 14 grazing units, shown in Figure 4.1-11, which currently support about 2,400 cattle. In 1996, about 28,900 AUMs were auctioned on 13 active units (of which 22,350 AUMs applied to the 1996/1997 grazing season). Most grazing contracts run for 9 months, from October through June of the following year. Sometimes contracts will run for 18 months or up to 42 months, depending on rangeland conditions, allowing summer grazing. Table 4.1-3 summarizes the acreage and AUMs currently under contract on McGregor Range.

Recently, auctioned AUMs have been valued from $11 up to $16.75 compared to the standard AUM fee of $1.35 currently set for BLM lands administered under the *Taylor Grazing Act* (43 USC Section 315a-r; 43 CFR 4130.8-1) (Aguirre, 1997). The average grazing cost per AUM varies on public and private land. The total cost per AUM includes nonfee costs that a rancher must invest in cattle operations, and other fees. Other fees include lease rates (for private contracts), grazing fees, and permit costs (for BLM contracts). A study conducted by NMSU on competitive pricing for McGregor Range indicates that nonfee costs such as maintenance, improvements, water, lost animals, etc., are less for ranchers on McGregor Range because some of these services are provided by BLM (for example, water). Table 4.1-4 shows total nonfee costs on private and public leased rangeland, compared to McGregor Range. Table 4.1-4 also shows that prices bid for AUMs on McGregor Range in the early 1990s were comparable to fee costs on other lands. However, recently, auctioned AUMs have been



Grazing Units Description:

Training Area	BLM Area	Unit Name	Acreage
(10)	1	Langford Pasture	31,000
(11)	2	Coxwell Pasture	25,000
(12)	3	Culp Pasture	32,000
(13)	4	Lee Pasture	13,000
(14)	5	Cressgarden Pasture	20,000
(15)	7	Rutherford Pasture	19,000
(16)	8	Dagger Pasture	17,000
(17)	9	Mesa Horse Camp	31,000
(18)	10	Wingfield Pasture	12,000
(19)	11	Mary Toy Pasture	18,000
(20)	12	Herd Pasture	8,000
(21)	13	Martin Tank Pasture	20,000
(22)	14	Antelope Pasture	12,000
(23)	15	Shiloh Pasture	13,000
(33)	--	Grapevine (USFS)	19,000

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Figure 4.1-11. Grazing Areas and Special Management Areas on McGregor Range.

Table 4.1-3. Animal Unit Months for Grazing Units on McGregor Range, October 1996

Grazing Unit No.	*AUMs*	*Bid Price per AUM*	*Contract Period*	*No. of Cattle*	*Acres per Head (cattle)*
1	1,802	$11.00	Oct 8, 1996 through July 8, 1997	200 C or 286 Y	155
2	1,802	$12.75	Oct 8, 1996 through July 8, 1997	200 C or 286 Y	125
3	-	Not bid	-	-	-
4	4,480	$16.00	Nov 15,1995 through May 15, 1997	250 C or 358 Y	132
5					
7	10,496	$12.20	Oct 1, 1994 through March 31, 1998	250 C or 358 Y	76
8	3,597	$12.00	Oct 1, 1995 through March 31, 1997	200 C or 286 Y	85
9	2,702	$11.50	Oct 10, 1996 through July 10, 1997	300 C or 429 Y	103
10	2,252	$14.00	Oct 6, 1996 through July 6, 1997	250 C or 358 Y	48
11	3,603	$15.25	Oct 2, 1996 through April 2, 1998	200 C or 286 Y	90
12	901	$13.25	Oct 4, 1996 through July 4, 1997	100 C or 143 Y	80
13	3,590	$14.10	Oct 4, 1995 through April 2, 1997	200 C or 286 Y	100
14	2,702	$14.75	Oct 3, 1996 through April 3, 1998	150 C or 214 Y	80
15	1,802	$16.75	Oct 1, 1996 through April 1, 1998	100 C or 143 Y	130

C = cattle; Y = yearlings.
Source: BLM, 1996.

Table 4.1-4. Average Grazing Costs ($/Animal Unit Months) on Public and Private Leased Land in New Mexico and McGregor Range

	Native Rangeland		*McGregor Range*	
Cost	*Private*	*BLM*	*1990*	*1992*
Non-fee Costs[1]	12.80	16.16	11.22	11.90
Fee Costs[2]	6.88	4.90	5.21[3]	4.88[3]
Total Cost	*19.68*	*21.06*	*16.43*	*16.78*

1. Includes ranching operation and maintenance costs.
2. Includes leases rates, grazing fees, permit costs.
3. Market driven at public auction: variable cost.

Source: Fowler, et al., 1994.

valued from $11 up to $16.75, compared to the standard AUM fee of $1.35 and permit cost $4.90 currently set for BLM lands administered under the *Taylor Grazing Act* (43 USC Section 315a-r; 43 CFR 4130.8-1) (Aguirre, 1997). Fluctuations in bid prices over time indicate that the value of AUMs (lease rates) on McGregor Range varies in an open market. External conditions, particularly low rainfall, have been correlated to dramatic increases in what ranchers have been willing to pay for good grazing conditions (Fowler et al., 1994). These increased prices have provided additional operating revenue for BLM's services in recent years. The Army provides assistance in fire suppression under the terms of the 1990 MOU (BLM, 1990b), but does not financially support grazing activities on McGregor Range.

Money collected from grazing fees on McGregor Range continues to go into a fund to directly pay for the costs of running the program. Eight of 14 units were bid with a total bid value of $186,077.83. Payments for 4 units on 18-month contracts and 1 unit on a 42-month contract contributed an additional $111,0440.40 for total FY 97 collection of $297,122.23 (Aguirre, 1996).

Grazing units on McGregor Range are valuable due to extensive range improvements, high-quality forage, services provided to ranchers by BLM, and availability and delivery of Army-owned water through an extensive pipeline system that was constructed and maintained by ranchers and BLM over several generations. There are about $4.6 million of improvements in the form of water pipelines, holding

tanks and troughs, corrals, wells, fences, and windmills (Christensen, 1996). The Army has annual rights to about 110,000 gpd of water from the Sacramento River and Carrisa Springs that is used for preservation of fish and wildlife. Currently, both wildlife and cattle benefit from this water, delivered via 69
pipeline to watering tanks on McGregor Range. Additional information on the water distribution and supply system on McGregor Range is provided in Section 4.7.

Tasks performed by BLM include repairs to water pipelines, corral and fence maintenance, evaluation of rangeland condition, and assistance with moving cattle onto and off the range. Currently, a three-man Range Management team performs these functions, spending about 80 percent of their time on Otero Mesa and the Sacramento Mountains foothills grazing units. About 50 to 75 percent of this time is used to check and repair water pipelines. A phased program to replace old pipeline has been intermittent and dependent on funding. Congressional appropriation in the early 1990s allowed about half the links to be replaced, resulting in reduced upkeep for new portions. Most of the waterlines on Otero Mesa have not yet been replaced and still require considerable maintenance. These lines are checked for leaks and damage about twice each week (usually Mondays and Fridays). The minimum amount of time needed to check waterlines south of New Mexico Highway 506 is 6 to 8 hours. Two persons working simultaneously can reduce the window needed to 3 to 4 hours. Additional time is required for repairs (Christensen, 1997).

In addition to day-to-day maintenance, BLM assists ranchers with bringing cattle onto the range in October, and taking them off in March or July (depending on the period of specific grazing contracts). It takes between 1 and 7 days to move cattle onto or off of different grazing units (depending on size and location of the unit and condition of the cattle). Cattle cannot be moved to and from all the grazing units at the same time; therefore, it can take several days during these months to move cattle. Military operations are generally coordinated between the Army and BLM to allow ranchers to bring cattle onto the range or take them off. Ranchers can usually perform these tasks without conflicting with current military activities (Christensen, 1996). Several corrals are used for staging cattle during round-up times, and for housing sick cattle. Under current management, many grazing contractors perform intermittent caretaking of their cattle during most of their contract period. However, the amount of time individual ranchers spend in tending cattle varies widely.

Under the bid/auction system, grazing units do not necessarily stay with the same rancher, as they do with most BLM grazing allotments. In the last 5 years, most units had two or three different grazing contractors, and three units had up to four different grazing contractors. Two units (units 4 and 5) were used under contract by the same rancher, and these units were only available for 2 years, while unit 15 has been held by the same rancher for 4 years. Also, because BLM provides water and maintenance services that are not usually included in grazing contracts, grazing units on McGregor Range are operable for out-of-state ranchers as well as local ranchers. Over 50 percent of the contracts were with ranchers in New Mexico, about 25 percent with ranchers out of Texas, about 17 percent from Arizona, and the remainder from Colorado and California. Currently, 10 grazing units are held by out-of-state grazing contractors, mostly from west Texas. Three units are held by in-state grazing contractors, of which one is categorized by the BLM as an Otero County ranch operator (Christensen, 1997).

Construction of the new tactical target complex on Otero Mesa will remove about 5,000 acres from grazing in grazing units 9 and 13 (TAs 17 and 21). This area is less than 2 percent of the grazing land on McGregor Range. Use of the target complex will restrict access to most of the area on Otero Mesa south of New Mexico Highway 506 (within the safety buffer) for about 60 hours each week. In an MOU recently signed by the USAF and BLM, several measures were identified that would reduce the potential 70
for disruption to grazing. The ACC agreed to move existing pipelines and stock tanks to outside the safety buffer where necessary, coordinate range closing for range cleanup and cattle work, restrict operations to meet BLM's maintenance requirements, provide 40 man-hours per week to support routine

grazing management tasks, and to reimburse, replace, and repair BLM range improvements damaged as a result of USAF activities on the range.

Livestock grazing in the 18,004 acres of Lincoln National Forest used by Fort Bliss is managed by the USFS. Approximately 150 to 200 head of cattle graze in the co-use area. Military activities have not affected grazing operations (Goodwin, 1998).

Wildlife and Habitat Management. BLM has responsibility for wildlife and habitat resources on public lands. The primary objective is to ensure optimum populations and the natural abundance and diversity of wildlife. This is accomplished through management plans and coordination with other agencies, including Fort Bliss, U.S. Fish and Wildlife Service (USFWS), and New Mexico Department of Game and Fish (NMDGF). Plans and actions must also protect federal and state-listed and candidate threatened and endangered species. Management plans consider the interactive effect of multiple-use resource objectives to meet a balance in deciding management priorities. They also provide standard procedures that protect wildlife. NMDGF has responsibility for game species and also manages hunting on McGregor Range. Scheduled hunts are coordinated with Fort Bliss to minimize conflicts with military missions and to ensure safety of hunters (see *Recreation*, below).

Recreation. McGregor Range offers a variety of settings that are suitable for an assortment of recreational activities. Of interest are: (1) its relative remote and isolated quality, (2) special scenic and habitat features in desert, grassland, and foothills vegetative regimes, (3) opportunities for hunting, and (4) wilderness value.

The allocation of training land and ranges to recreational use (for example hunting) on Fort Bliss is through ITAM in coordination with all applicable federal, state, host nation or other local laws and regulations.

AR 210-21, *Army Ranges and Training Land Program* (1 May 97), prohibits the conduct of uncontrolled or unscheduled outdoor recreation activities within the training complex. Further, outdoor recreational activities in impact areas with ordnance and explosive hazards are prohibited.

Recreational use on McGregor Range is co-managed by BLM and the Army, and is allowed by the Army on a noninterference basis with the military mission. Public access and use is controlled by the Army. Members of the public must obtain annual access permits issued by the Army. These are available from both the Army and the BLM. Between 1,000 and 1,700 permits are applied for and issued annually (Bankston, 1997). Current permit holders include members of the Audubon Society, NMSU , Sierra Club, ranchers, and members of the general public (Bankston, 1997).

Permit holders are responsible for complying with specific Army and BLM procedures for entry, use, and exiting the range. When permits are issued, recipients are required to read these procedures, and to sign an agreement of compliance. All recreational passes are issued by the USACASB Range Development and Enforcement Office. To ensure safety and to avoid interference with military missions, the McGregor Range Control must be contacted each time access is requested.

Public access is only permitted in areas that are considered safe and compatible with current and past military activity (Figure 3.2-3). On a weekly basis, the Range Scheduling Office issues a roster of areas that are available for nonmilitary use. Public access to TAs 29, 30, 31, and 32 is never permitted due to potential hazards from ordnance and explosives and debris in active impact areas.

Recreational opportunities on McGregor Range are mostly classified as semiprimitive, motorized (SPM) by BLM, indicating the range’s potential for isolation and opportunities for interacting with the natural environment. Areas close to New Mexico Highway 506 are classified as roaded-natural (RN). Both SPM and RN opportunities exist in abundance, with similar ecological settings on BLM and USFS lands surrounding the range. An area of 6,812 acres within Culp Canyon WSA is classified as semiprimitive, nonmotorized (SPNM) offering opportunities for isolation from the sights and sounds of human activities.

The primary recreational uses of McGregor Range are hunting, hiking, and observing nature. For the 12-month period from January 1 through December 31, 1997, logs indicate that 330 persons requested access for recreational use on McGregor Range. Visitors often requested access into more than one training area on McGregor Range during the same visit. Based on areas requested, the average recreational use of any training area was 14 occasions in 1997. The most frequently requested area was TA 8 (30 occasions). The two small depressions near McGregor Range Camp were used 20 times. These locations in the south part of the range are easily accessible from El Paso and have good opportunities for game-bird hunting. Requests for use of training areas north of New Mexico Highway 506, including TA 33 within Lincoln National Forest, and Culp Canyon WSA in TA 12, ranged from 20 to 28 times in 1997. Less accessible areas on Otero Mesa tended to have fewer requests (about 9 to 10 occurrences), probably due to lack of game-bird hunting opportunities and because they are not as accessible due to longer driving times from population centers.

Both licensed antelope and deer hunts are conducted annually on McGregor Range. These hunts are managed by NMDGF consistent with federal laws and Army regulations. Hunting schedules are coordinated with the Army well in advance to ensure that they can occur without conflict with military missions. Since this coordination has occurred, no hunts have been canceled due to military uses. Scheduled hunts occur from late September through early November.

Otero Mesa has antelope herds of trophy quality, and antelope hunts are restricted to muzzle-loading guns. A portion of McGregor Range corresponding to BLM's grazing areas on Otero Mesa, south of New Mexico Highway 506, is part of Antelope Management Unit 29 of NMDGF. Unit 29 extends to the east of McGregor Range and is comprised of about 536,000 acres, of which the McGregor portion is about 111,000 acres.

The number of licenses issued for both antelope and deer hunts is based on herd size. Currently, 95 licenses are being issued annually for the Unit 29 antelope hunt in September, of which 20 are assigned to the McGregor Range portion of the unit. Current numbers of licenses are typical of recent years, although prior to the drought that has persisted through the mid-1990s, antelope herds were larger and about 195 licenses were typical (Madsen, 1997).

Similarly, deer hunting on McGregor Range is part of Big Game Management Unit 28. In 1997, 50 licenses were issued for public deer hunting in Unit 28 north of New Mexico Highway 506 (including portions of the range within Lincoln National Forest), and 20 licenses were issued for DoD personnel only, to use in areas along the Otero Mesa escarpment south of New Mexico Highway 506. The number of entry permits/licenses available to the public and military users varies annually and is based on herd size and are issued through a drawing of names of all permit applicants. Deer hunts are usually held in early November. Camping occurs during some scheduled hunts. At other times, requests to camp are approved by Range Control and the Security and Safety officer for McGregor Range similar to all other recreational access requests. Camping is restricted to a few sites north of New Mexico Highway 506 and on Otero Mesa.

During hunting seasons, access by about 10 persons may be recorded each week. At other times, official access to the range for public recreation is infrequent (Grossenheim, 1997). Occasionally, individuals or groups with a particular interest in observing nature or hiking will recreate on Otero Mesa or in the foothill areas. Vehicular use is restricted to roadways and established trails on McGregor Range.

Figure 4.1-7 depicts hunting areas on McGregor Range. There is no public hunting in the Tularosa Basin area because of ordnance and explosive hazards. TAs 24-28 are open to hunting by DoD personnel only, due to safety concerns about possible explosive hazards.

234 ***Special Management Areas.*** The McGregor Black Grama Grassland ACEC is comprised of four separate stands of black grama grasses located along the Otero Mesa escarpment and New Mexico Highway 506. ACECs are areas where special management attention is needed to protect, and prevent irreparable damage to important cultural or natural resources, or to protect human life from natural hazards. The McGregor Black Grama Grassland ACEC is managed to protect valuable biological resources and to study the ecology of undisturbed grassland. The location of these areas is shown in Figure 3.1-1. The ACEC is within SDZs for missile firings and underlies restricted airspace used for aircraft operations. These areas are fenced to prevent cattle from grazing in the ACEC. The public are allowed access to the ACEC under the same restrictions and regulations as other publicly accessible parts of McGregor Range. Military training is not allowed in the ACEC. The ACEC is maintained and managed jointly through cooperative agreements between the Army, BLM, and NMSU .

Culp Canyon WSA, comprised of 10,937 acres, is located north of New Mexico Highway 506 within the
72 McGregor Range, and south of the Lincoln National Forest boundary. The area is valued for its outstanding opportunities for solitude and primitive, unconfined recreation such as hiking, hunting, horseback riding, and backpacking. Due to a high deer population, the area provides good hunting. The area has several cultural resource sites and habitat for state-listed plant species, state-listed animal species, and one federally listed endangered animal species (see Section 4.8).

The WSA is managed under the BLM's *Interim Management Policy and Guidelines for Lands Under Wilderness Review* (BLM, 1979) to prevent impairment of wilderness value. In the *New Mexico Wilderness Study Report* (BLM, 1988a), BLM did not recommend Culp Canyon WSA for wilderness status. Occasionally, low-impact ground troop training and low-level helicopter training missions use NOE routes over the east part of Culp Canyon (BLM, 1988a). The area is also used as a SDZ for several types of missile firings.

Cultural Resources. BLM is responsible for managing cultural resources throughout the range in a manner that protects and provides for proper use of these resources. The public has access to a wide variety of cultural resources throughout the co-use portions of McGregor Range. However, low public
73 use of the range has provided a beneficial level of protection to potentially sensitive resources. The Escondido Pueblo was proposed to be fenced in the McGregor RMPA to exclude livestock and other surface-disturbing activities. Also, by limiting use of motorized vehicles to established roads and trails, potential damage to cultural resources is reduced.

Castner Range. Castner Range is a former firing range, comprised of 7,040 acres of mostly mountainous terrain. It is located in El Paso County about 4 miles northwest of the main cantonment as shown in Figure 3.1-1. Castner Range is surrounded by the Franklin Mountain State Park on the west, northwest, and southwest, and incorporated land in the City of El Paso to the southeast, east and north. U.S. Highway 54 (Patriot Freeway) borders Castner Range on the east. Trans Mountain Road, an important link between east and west El Paso, passes through Castner Range. The range has not been used for military training since 1966. In 1971, Castner Range was declared excess to Army needs, but due to ordnance and explosive hazards, Fort Bliss has not disposed of the property.

Currently, the range is heavily trespassed for recreational use by the public. The boundaries are well posted with warning signs in both English and Spanish warning of the dangers of ordnance and explosive hazards. In addition, the boundaries are patrolled by the military. Trespassing is a result of the attractiveness for hiking and exploring for nearby residents in El Paso, and access is provided to canyon trails from unofficial pulloffs on Trans Mountain Road. Early funding was used to clear the ordnance and explosive hazards from the most heavily used and accessible areas; however, the entire range has since been characterized hazardous and additional money has been authorized by Congress to further the study of the amount of cleanup required. Fort Bliss is in the process of designing a cleanup plan. This study is expected to be complete by summer 1998. No money for cleanup is presently available. The degree of cleanup (and resulting cost) is based on projected land use. For example, surface cleanup is sufficient for uses requiring no earth disturbing activity from construction, such as dispersed outdoor recreation. However, subsurface cleanup is required when construction would result. A current Master Plan for Franklin Mountains State Park conceptually incorporates Castner Range into the Park for recreational use. However, no decision has been made on possible future uses and disposal scenarios (Blough, 1997).

Castner Recreation Area, a noncontiguous 70-acre parcel located between Castner Range and Milagro Hills subdivision, is an inactive Army recreation area, 14 acres of which are leased to the Girl Scouts. Although originally part of Castner Range, it has no ordnance and explosive hazards, and could be used for a variety of uses. It is unauthorized for military use because of its proximity to residential areas.

4.1.2.2 Surrounding Areas

Jurisdiction and Management. Lands surrounding Fort Bliss comprise a mosaic of private, city, state, and federal ownership, and are used to meet a variety of purposes. The federal agencies administering adjacent lands include the BLM, DoD, and USFS. Both Texas and New Mexico own adjacent lands managed by their respective State Land Offices.

Figure 4.1-12 shows that within the surrounding region are a number of areas that are designated and managed for their special resource value. The National Park Service (NPS) manages White Sands National Monument located 25 miles north of Fort Bliss. The park is surrounded by WSMR on three sides, and coordinates with the Army regarding a variety of military activities. Guadalupe National Park is located in Texas along the border with New Mexico, about 75 miles from Fort Bliss. The Capitan and White Mountain Wilderness Areas lie 90 and 55 miles, respectively, to the north of McGregor Range, and are administered by the USFS. The Jornada Experimental Range of the Department of Agriculture and San Andres National Wildlife Refuge of the USFWS are adjacent to WSMR, about 15 miles northwest of Doña Ana Range–North Training Areas. The Solar Observatory Experimental Area and Apache Point Observatory are located about 10 miles north of McGregor Range, in the Sacramento Mountains.

Figure 4.1-12 shows the location of these special areas. These areas are generally managed to restrict incompatible uses, and therefore influence existing and potential land use.

The following paragraphs provide a brief description of federal, state, and local entities with responsibility or jurisdiction over land areas adjacent to Fort Bliss Federal agencies administering surrounding lands and working cooperatively with Fort Bliss include the DoD, BLM, and USFS.

DoD facilities include HAFB and WSMR. WSMR adjoins the northern boundary of Doña Ana Range–North Training Areas and consists of 1.8 million acres of perpetually withdrawn land under PLO 833. Its primary mission is to support a range of test and evaluation programs by the U.S. Government, as well as allied governments and private industry. Fort Bliss and WSMR cooperatively share land area to expand their capabilities to support specific missions. HAFB is located further north, near Alamogordo, in Otero County, New Mexico.

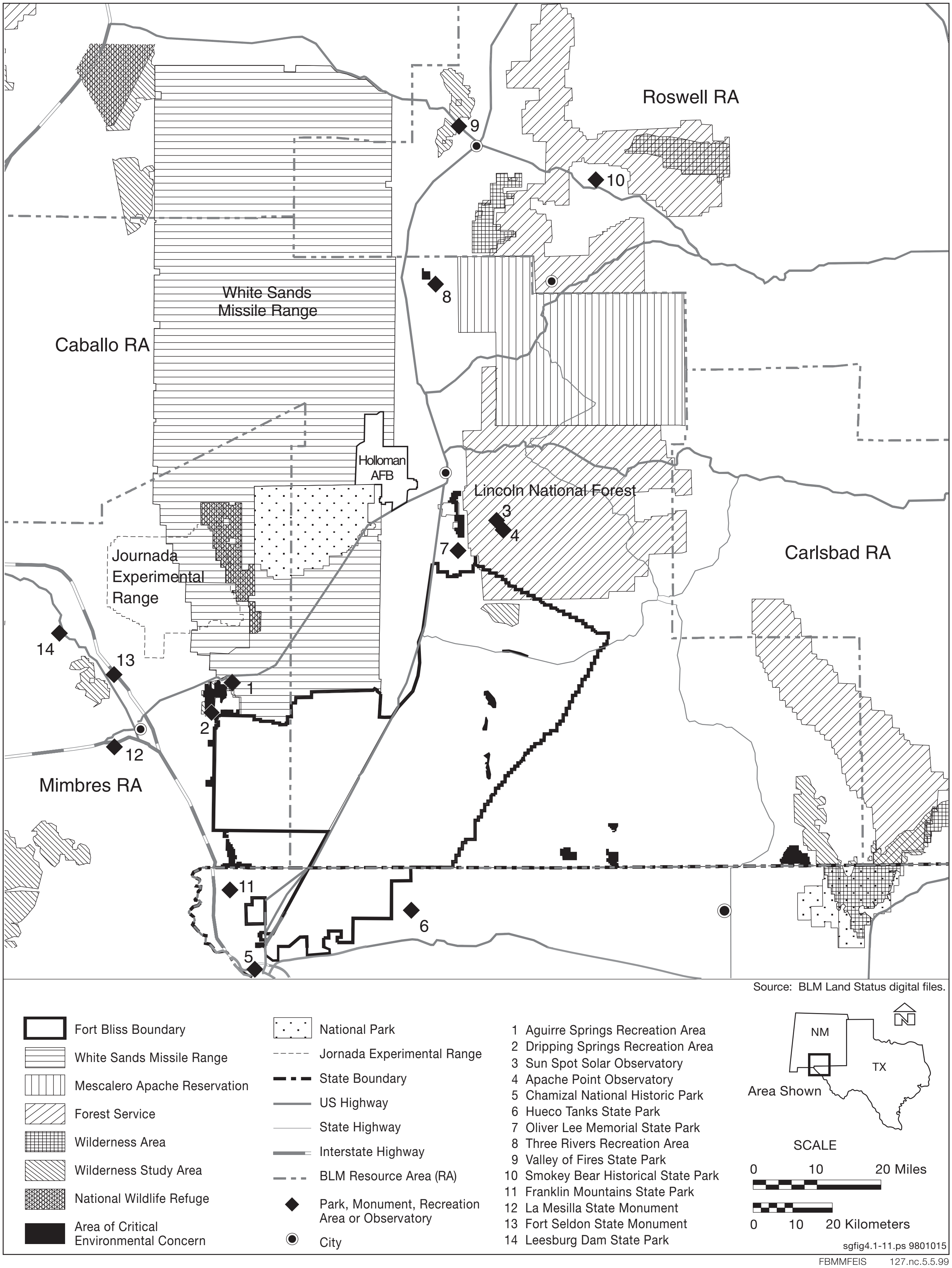

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Figure 4.1-12. Specially Designated Areas in Region Surrounding Fort Bliss.

The BLM public domain lands surrounding Fort Bliss are administered by the BLM Las Cruces Field
Office. BLM public lands are managed for multiple use and sustained yield under FLPMA. RMPs are 74
the framework for management actions.

USFS properties are administered by the Lincoln National Forest, an administrative unit of the Southwestern Region of the Forest Service. These federal administrative units are also guided by long-range land use plans, encompassing a variety of complex land use issues. The Sacramento District is immediately located north of (and partially within) McGregor Range. Dominant land use on federal lands immediately surrounding Fort Bliss includes grazing, developed and dispersed recreation, protection of sensitive resources, mineral development, tree harvesting, and fuel wood gathering.

State Lands. Currently, neither New Mexico nor Texas has a statewide land use plan or policy. However, numerous policies, laws, and regulations of each state influence activities on both state lands and Fort Bliss in a variety of ways. These include but are not limited to, compliance with laws associated with natural resources, environmental documentation, wetlands, threatened and endangered species, air and water quality, wildlife management, transportation, social, and economic issues.

Several state agencies influence how land may be managed, developed or used, either directly, through regulations and management plans, or indirectly, through policy and strategic plans and advisory committees. These agencies include:

- the New Mexico and Texas State Land Offices;
- the New Mexico State Game and Fish Commission;
- the New Mexico Economic Development District;
- the West Texas Council of Governments, New Mexico Environmental Department;
- the New Mexico Water Quality Control Commission (NMWQCC);
- the New Mexico Department of Game and Fish;
- the New Mexico Department of Energy, Minerals and Natural Resources (NMDEMNR);
- the New Mexico Economic Development District;
- the Texas Water Commission;
- the Texas Natural Resources Conservation Committee (TNRCC);
- the Texas Parks and Wildlife Department (TPWD); and
- the West Texas Council of Governments.

Most of the surrounding State Trust lands are leased for grazing. There are some mineral, and oil and gas leases for exploration and production in the region. Revenues from leases of State Trust lands support education in both states, and generally the land is leased for its highest and best use. The Texas State Land Office manages the Loop 375 ROW through the training areas.

County Governments. Local governments within the region also influence and control land use and development to varying degrees. El Paso County borders the south and east boundaries of the South Training Areas. El Paso County currently has no comprehensive land use plan. Development is controlled through a building permit review process to ensure that lot sizes can accommodate required on-site wastewater storage and treatment for the structure(s) proposed.

The County Plans of Doña Ana and Otero counties are primarily goal statements and policy documents used to guide the future growth and development in a manner consistent with the respective communities' goals; including the physical, social, and economic environment. Major categories considered in the *Doña Ana County Plan* (Doña Ana County, 1994) include overall land use and zoning, agriculture, parks, recreation and open space, water resources, population and housing, and transportation. Specific plans for these major categories are called for in the future, consistent with the general framework of the county plans. Coordination with city, state, and federal agencies is emphasized, recognizing the strong interrelationship each county has with these entities. Plans consider the character of the county and the suitability of areas within the county for particular uses and are expected to promote the health, safety, and welfare of county residents.

Doña Ana County has experienced rapid growth (about 40 percent population increase between 1980 and 1990) particularly near Las Cruces and the border areas of Santa Teresa and Sunland Park. Future growth issues include water availability and wastewater treatment.

Over 65 percent of the land in Otero County is owned by the federal government and an additional 10 percent is in the Mescalero Apache Reservation (Bureau of Business and Economic Research [BBER], 1994). In 1993, Otero County adopted an *Interim Land Use Policy Plan* (Otero County, n.d.), and is now developing a *Comprehensive Land Use Plan*. The primary goal of the plan is to guide the use of public (federal) lands and resources in the county and to protect the rights of private land-owners. Several reports and draft portions of the comprehensive plan identify areas of historic and customary use of value to county residents. These include use of water, agriculture, livestock grazing, timber and wood production, mineral production, cultural resources, recreation, hunting, federal and military activities, transportation and access, wilderness, wildlife, and threatened and endangered species. Specific to McGregor Range, the county supports multiple use of federal lands, maximizing livestock production, maintaining access along New Mexico Highway 506, and recreational use for hunting, hiking, and observing nature. Mineral and geothermal resources are available for public exploration or extraction under the RMPA at the discretion of the Army (PL 99-606). No timber resources except fuel wood are present on McGregor Range. The county has also adopted Ordinance 93-04, based on NEPA, regarding desired county involvement in the federal NEPA process.

Otero County is updating its 1974 comprehensive land use plan for nonfederal lands. It is anticipated that this plan could include elements of performance zoning. It will also adopt the procedural elements of the revised State subdivision regulations, and include an appendix with specific subdivision standards based on water and terrain.

Each county controls development through review of individual building permit applications and through subdivision regulations. Permits are approved if soil conditions and lot size accommodate septic system requirements for the proposed structure and use. Subdivision regulations generally require new areas of development to provide access and integration of new roadways with the existing network. They also regulate lot size, density, and utility infrastructure to ensure development meets minimum standards for public health and safety.

Municipalities. The City of El Paso shares a boundary with the main cantonment and South Training Areas. The city has jurisdiction for planning and zoning of incorporated areas. A comprehensive plan, *The Plan for El Paso*, was developed in 1988 (El Paso, 1988). The current zoning ordinance implements this plan. No incorporated municipalities border the Doña Ana Range–North Training Areas or McGregor Range in New Mexico.

Other cities within the region that are indirectly influenced by Fort Bliss activities include Las Cruces in Doña Ana County and Alamogordo in Otero County. Both these cities use a zoning process to control land use and development.

Private Land. Several private ranches and residents are located adjacent to Fort Bliss. Pockets of private land, particularly west of Fort Bliss, are being developed for residential use. Private lands surrounding Fort Bliss are generally used for ranching, land investment, or residential development. Key areas for future development are the unincorporated community of Chaparral south of Doña Ana Range–North Training Areas and west of McGregor Range, subdivisions on the west side of Doña Ana Range–North Training Areas, and areas south and east of the South Training Areas.

<u>Existing Land Uses in Surrounding Areas.</u> The following sections summarize existing land use and zoning (where applicable), land use plans and controls, special management areas, and land use compatibility for areas surrounding the range complex of Fort Bliss. Figure 4.1-13 illustrates special use areas closer to Fort Bliss than those shown by Figure 4.1-12.

Areas Surrounding South Training Areas. The South Training Areas are bounded by Fort Bliss to the north (McGregor Range) and southwest (Biggs AAF), and by El Paso County to the east, west and southeast (Figures 4.1-12 and 4.1-13). The City of El Paso borders a small portion along the south.

Areas within El Paso County are largely undeveloped, but new residential subdivisions are starting to be built near the El Paso city limits. The area south of Montana Avenue eastward to the county boundary is projected to experience residential expansion and infill development in the future. This area is also likely to experience commercial and industrial development along the major arteries. The area of land that the city recently acquired from the Army around the intersection of Loop 375 and Montana Avenue will provide opportunities for future development.

Hueco Tanks State Park is located in El Paso County just south of TAs 24 and 25. The park is notable for its extensive pictographs and is popular for hiking and rock climbing. About 75,000 visitors come to the park annually.

Areas Surrounding Doña Ana Range–North Training Areas. Generalized land ownership and important special use areas surrounding Doña Ana Range–North Training Areas are shown on Figure 4.1-14. The adjacent land is within the Mimbres Resource Area (RA), managed by BLM, Las Cruces Field Office. Pockets of adjacent land are also in state and private ownership. The Organ Mountains, located immediately west of Doña Ana Range–North Training Areas, contain two BLM-developed recreation sites: Aguirre Spring Campground (with 57 campsites) and Dripping Springs 75
Natural Area. The Dripping Springs Natural Area, formerly the operations center for a working cattle ranch, is described as a unique attraction for visitors. A visitor center has been developed in the old ranch house. Several developed hiking trails originate at the visitor center and include Baylor Pass Trail (6 miles), Pine Tree Trail (4 miles), Dripping Springs Natural Area Trail (1.5 miles), La Cueva Trail (1 mile), and Crawford Trail (2 miles). An estimate of total annual visitor days for the Organ Mountains is over 200,000 visits.

The proposed Organ Mountains National Conservation Area (NCA) would border the west boundary of Doña Ana Range–North Training Areas. Within the proposed NCA are the Organ Mountain, Organ 231
Needles, and Pena Blanca WSAs being managed under the *Interim Management Policy and Guidelines for Lands Under Wilderness Review* (BLM, 1979) until Congress determines its wilderness status. Overlapping the Organ Mountain WSA and extending to the southeast is the Organ Mountains Scenic ACEC. This ACEC borders the northwest boundary of Doña Ana Range–North Training Areas. However, this ACEC is visually separated from the firing ranges and off-road training areas of Fort Bliss, by the intervening Organ Peaks, many of which are on the installation. Several areas have been administratively grouped into the Organ/Franklin mountains ACEC for their biological, scenic, cultural, special status species, and riparian resource value.

The BLM is pursuing increased vehicular access to the Organ Mountains to the south of Soledad
Canyon, allowing for increased public recreational use. A proposed trail linking the NCA to the Franklin 76

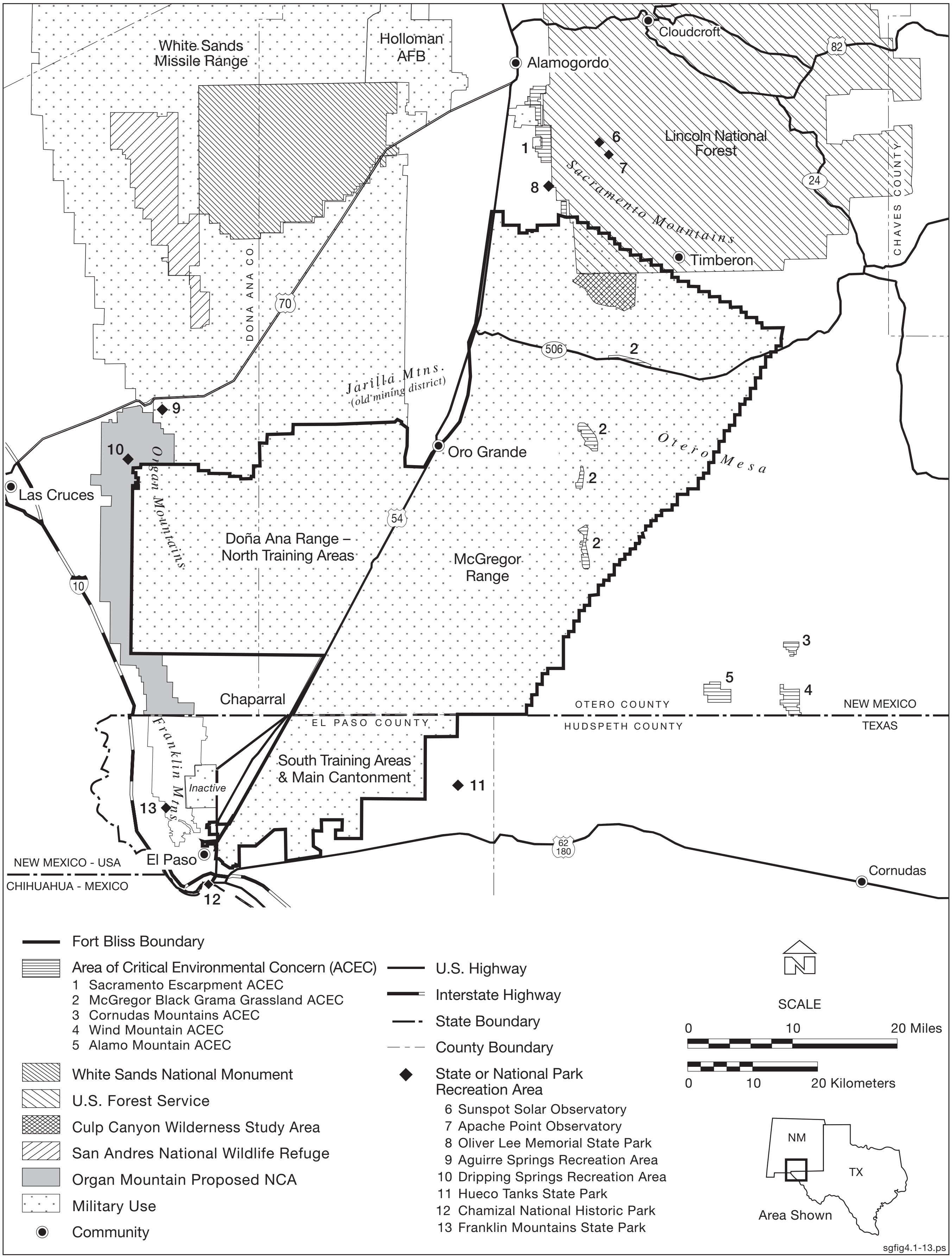

Figure 4.1-13. Special Use Areas Surrounding Fort Bliss.

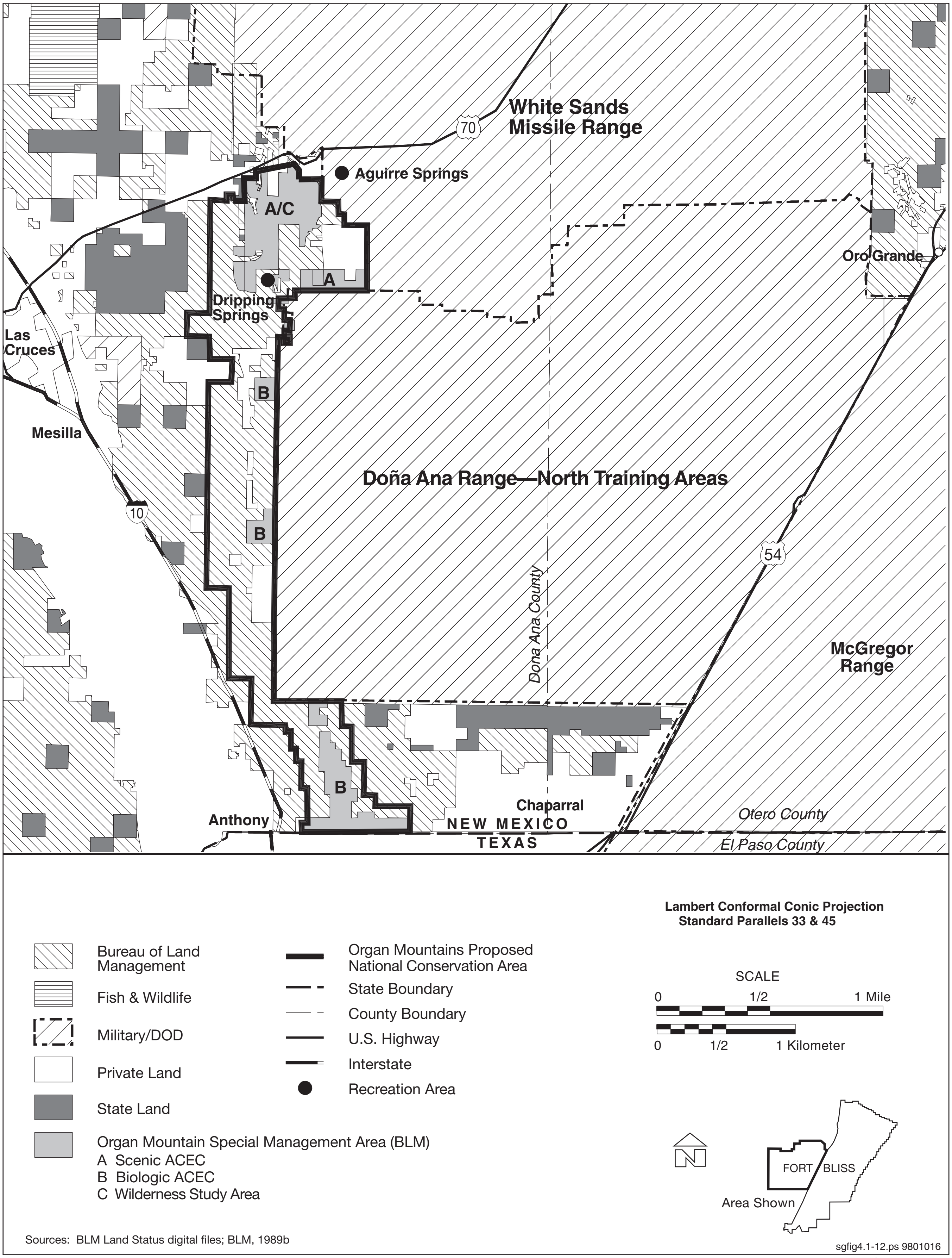

Figure 4.1-14. General Land Status and Special Use Areas Surrounding Doña Ana Range–North Training Areas.

Mountains State Park would pass outside the southwest corner of Doña Ana Range–North Training Areas. Overall planning for BLM land in the Organ Mountains was developed in a BLM coordinated RMP in 1989.

The BLM has been consolidating land through disposal and acquisition, primarily through exchanges.
231 Land is also made available for municipal uses under the *Recreation and Public Purposes Act.* About 9,000 acres of state and private land within the proposed Organ Mountains NCA have been acquired through exchanges. Large blocks of land within the proposed Organ Mountains NCA, and to the south of Doña Ana Range–North Training Areas have been identified for disposal. It is likely that growth of surrounding communities will generate demand and requests for disposal action.

Table 4.1-5 summarizes grazing allocations in areas surrounding Fort Bliss training areas. There are six grazing allotments held by five different ranchers bordering Doña Ana Range–North Training Areas. Currently, there are 669 head of cattle permitted on the combined acreage of 107,450 (which includes state and private holdings) in these allotments. Trespass of cattle onto Doña Ana Range–North Training Areas, primarily in Fillmore and Soledad canyons, is an ongoing concern. It is difficult to prevent cattle from straying onto the range, particularly where grazing conditions are good. Even though the boundary is fenced in Soledad Canyon, cattle find their way around the fence or through openings. Removing cattle has been the task of Fort Bliss personnel, who are exposed to potential safety hazards from past Army activities in this area.

Table 4.1-5. Summary of Grazing Permitted on Federal and State Lands Surrounding Fort Bliss

Location	*Annual Permitted Cattle numbers*[1]
Mimbres RA	52,215
Doña Ana County–Federal land	10,943
Doña Ana County–State land	1,795[2]
Caballo RA	24,100[3]
Otero County–Federal land	9,560
Otero County–State land	2,650[2]
Lincoln National Forest	
Sacramento District, Otero County	3,950
Guadalupe District, Otero County	1,500
McGregor Range, withdrawn land	2,400

1. Actual numbers can vary from year-to-year depending on grazing conditions
2. Based on estimated 5 head per acre for Doña Ana and Otero counties, compared to state average of 11 head per acre. Also, assume grazing on all State Trust lands.
3. Includes total permitted cattle for Sierra and Otero counties.
4. Assume cattle on part of Sacramento Allotment within McGregor Range is proportionate to total number permitted in Sacramento allotment.

Source: BLM, 1996; Thornhill, 1998; Newman, 1998.

Adjacent and nearby, privately owned land within the proposed NCA includes three mines in the Organ Mountains (which are not currently active), Talavera and Z-Ranch subdivisions in the Soledad Canyon area, and Lords Ranch subdivision. The Soledad Canyon area has large residential lots and development is steady. The area has about 200 homes. Lords Ranch has experienced rapid growth and now has about 50 homes. Future development will depend on acquisition of additional water rights by developers (Price, 1997).

To the south of Doña Ana Range–North Training Areas, the community of Chaparral straddles Doña Ana and Otero counties (Vallejos, 1997). Because the land in this area is relatively inexpensive, steady growth (at about 3 to 4 percent per year) is projected for the future. It is likely that growth will result in demands for additional services, and that independent wastewater treatment services will become economical. At that point, residential lot sizes could decrease and infill development could increase intensity of residential development bordering Doña Ana Range–North Training Areas to the south (Price, 1997). BLM lands to the west of Chaparral could also become available for development through disposal transactions (Hargrove, 1997), potentially expanding residential development.

Development in Doña Ana County is controlled through a review process, which includes public notifications and hearings. The county is in the process of preparing a comprehensive land use plan that will implement a performance zoning system, setting standards for lot size, wastewater treatment, and adequate water supply. Areas within the extra territorial zone (within 5 miles of the city limits of Las Cruces) are zoned, designating criteria such as permitted use, lot size, set-backs, and density.

Areas Surrounding McGregor Range. Figure 4.1-12 and 4.1-13 also illustrated the generalized land status and important special use areas in the vicinity of McGregor Range. The BLM and USFS manage most of the lands surrounding McGregor Range. This part of Fort Bliss falls within the BLM Caballo (formerly White Sands) RA. The lands are predominantly used for livestock grazing along with mining, forestry, and recreation. These uses are generally compatible with military uses.

Areas to the west of U.S. Highway 54 are popular for ORV and motorcycle use. The Jarilla Mountains contain an historic mining area that is valued for its cultural attributes and recreational use for sightseeing, hiking, prospecting and rock hounding. To the east of McGregor Range, the land is predominantly used for grazing.

Grazing is the dominant land use throughout the area. Ranches generally consist of combinations of private, state, and federal lands. BLM and USFS set grazing levels in accordance with management plans to meet multiple-resource sustainable yield objectives. BLM manages most of the grazing lands in Otero County. Grazing costs are currently set at the base fee of $1.35 per AUM under the *Taylor Grazing Act* (43 CFR Part 4130.8).

Table 4.1-5 summarizes permitted numbers of cattle on federal and state lands. In 1996/1997, a total of about 20,060 head of cattle grazed on 2,112,000 acres in Otero County, of which 9,560 head were permitted on about 930,600 acres of BLM-administered land. An additional 5,450 cattle on 573,000 acres were on USFS land in Otero County. An estimated 2,650 head grazed on State Trust land. Additional cattle graze on private land throughout the county. Private property accounted for less than 20 percent of the county land area. Assuming the same proportion of private land is used for grazing as federal land and at equivalent grazing levels, there would be an additional 4,000 head of cattle on private land in Otero County.

Recent decisions on *Amendments to Forest Plans for Arizona and New Mexico* have changed standards and guidelines for threatened and endangered species. These have resulted in changes in grazing levels in some areas. The USFS is in the process of evaluating the effects of these changes on grazing in Lincoln National Forest (Hannon, 1997). Since the mid-1990s, below average rainfall has resulted in many areas being grazed at lower than permitted levels.

In recent years, financial viability of livestock operations in the region has been affected by a series of impacts including drought, reductions in beef prices, reduced availability of public lands for grazing due to environmental concerns, increased administrative and regulatory requirements of land managers, and grazing allotment reductions. Cumulatively, this has had the greatest impact on ranches with large debt loads. In addition, the Farm Services Administration is considering a reduction in its guarantee to lending institutions from 90 to 60 percent, further affecting the ability of ranchers to renew loans or to find new lenders (Thal, 1997a, 1997b).

An analysis of grazing data for Otero County indicated that a large proportion of small ranching operations (generally less than 100 head of cattle) operate at below break-even point than larger ranching operations, indicating the marginality of small-scale operations (Thal, 1997a, 1997b).

Some oil and gas potential exists in Otero County. These reserves may become more economically viable for production, depending on market conditions. Other mineral activity, such as precious metals, particularly in the Jarilla Mountain area, also has low production potential at this time. Some oil and gas leases for exploration on State Trust lands between McGregor Range and the Guadalupe Mountains have been let in recent years. Recent discovery of commercial quantities of gas from a well to the east of McGregor Range has initiated interest in exploration. As much as 30,000 acres of public land have recently been nominated for exploration in this area (Sanders, 1998).

The Caballo RA identifies large blocks of land for disposal or exchange. Areas to the north, close to Alamogordo would be suitable for future municipal expansion (BLM, 1986a). Other areas to the northeast and east of McGregor Range have also been identified for disposal or exchange.

Both dispersed and developed recreation opportunities are available on BLM and USFS lands adjacent to Fort Bliss. Dispersed recreation occurring over large areas and independent of developed facilities include hunting, hiking, off-highway driving, sightseeing, camping, picnicking, nature study, viewing of historic and prehistoric artifacts, and a variety of other recreational activities. Hunters come to the region from the states of New Mexico, Texas, as well as other states (BLM, 1993; BLM, 1986a; and USFS, 1986). State lands that are suitable for recreation are often designated as parks. Oliver Lee State Park, located about 2 to 3 miles to the north of McGregor Range, on the west edge of the Sacramento Mountains, is a popular recreation site with camping, hiking, and interesting historic features. This park is easily accessible by residents of Alamogordo, New Mexico. Areas to the west of U.S. Highway 54 are popular for ORV and motorcycle use. The Jarilla Mountains contain a historic mining area that is valued for its cultural attributes and recreational use such as sightseeing, hiking, prospecting, and rock hounding. Surrounding State Trust lands have similar uses as federal lands, with less access for recreation.

The BLM has recently designated several ACECs in Otero County. To the north, the Three Rivers Petroglyphs site has unique cultural resources and the Sacramento Escarpment ACEC has exceptional scenic value. To the east, Cornudas Mountain, Wind Mountain, and Alamo Mountain ACECs all have cultural, scenic, and recreational value and Alkali Lakes has value for particular species of flora.

About 50 to 70 miles to the east of McGregor Range is a clustering of special management areas with recreational value due to their scenery, naturalness, or unique geologic features. This area includes Brokeoff WSA, which is not recommended for wilderness designation (BLM, 1988a), Guadalupe Escarpment WSA, Lonesome Ridge WSA, Mudgetts WSA, Carlsbad Caverns National Park and Wilderness Area, and Guadalupe National Park and Wilderness Area.

Adjacent and nearby unincorporated areas include Timberon and Oro Grande in Otero County, and Chaparral in Doña Ana County. The community of Timberon partially underlies restricted airspace R-5103B. There are about 5,200 property owners in this area, with about 350 permanent residents, and an additional 200 summer residents. Located in the Sacramento Mountains foothills, it is a growing vacation and retirement destination (Roberts, 1996).

Several ranchers have homesteads on small private holdings to the east and west of McGregor Range. These parcels are generally located at a water source. Ranchers primarily use leased federal and state lands for cattle grazing.

Areas Surrounding Castner Range. Castner Range is surrounded to the north, west, and southwest by Franklin Mountains State Park, managed by TPWD. A Master Plan for the park focuses on goals to protect its outstanding ecological, geological, scenic and cultural features, and to promote recreational and educational uses. Trans-Mountain Highway traverses the park, providing scenic overlooks, and recreational access. Several developed recreational sites are planned for the park. The legislation under which the park was designated provided for inclusion of any portions of Castner Range that DoD might convey, contingent upon appropriate levels of cleanup prior to conveyance.

To the south of Castner Range, the land is primarily undeveloped (near the mountains) or residential (see Figure 4.1-2). Sunrise Acres subdivision is adjacent to Castner Range. U.S. Highway 54 borders the range to the east with some commercial and light industrial use along the frontage roadway. East of U.S. Highway 54 and south of Loop 375 is primarily residential with light commercial use, and a community college. To the north of Loop 375 is new residential developments with interspersed community commercial uses. North Hills subdivision borders Castner Range to the northeast. Little other residential development has begun north of U.S. Highway 54, but some low density development is projected in the future.

An area of approximately 5 acres located on land owned by the EPWU Public Service Board has been identified as a Formerly Used Defense Site (FUDS). This site known as the North Hills Reservoir FUDS is an area containing fragments of exploded ordnance on property not under the care of the military. The site investigation and cleanup began in the Spring of 1998.

4.1.2.3 Land Use Compatibility

South Training Areas. Dust generation from tracked vehicle operations has been a concern for residents in adjacent areas in El Paso County. Because of the potential for dust to obscure visibility of drivers on Loop 375, tracked vehicle underpasses were paved. This problem is likely to be most acute during dry, windy periods and when maneuvering is conducted close to housing.

Doña Ana Range–North Training Areas. War Highway 11 is closed for MLRS from firing groups in TAs 3, 4, 5, 6, and 7 that impact in designated impact areas due to safety hazards. This occurs about 20 times each year for a few hours. Previously, Range 41 was used for training in demolition of ordnance and explosive hazards. This function has been moved to Range 23 of Meyer Range on McGregor Range due to noise complaints from residents located off-post about 1 mile to the west. Trespassing by recreationists into the Organ Mountains is an ongoing concern for Fort Bliss and incompatible with hazardous conditions and activities in impact areas and SDZs. The safety risks from ordnance and explosive hazards within safety buffers of active and historic impact areas are relatively low at high elevations, but nonetheless exist. Greater risks are possible if trespassers descend into more hazardous impact areas at lower elevations on the east side of the mountains. Although the most likely access points in Soledad Canyon are fenced or posted, persons and cattle can pass onto the installation at unfenced locations, or pass through broken portions of fence. Retrieving cattle out of hazardous areas poses risks for Fort Bliss personnel.

McGregor Range. PL 99-606 and PL 106-65 allow the Army to exclude nonmilitary uses that may be incompatible with its mission. The Army has not permitted nonmilitary activities in current and historic impact areas in the Tularosa Basin due to safety concerns. The area identified for grazing in the McGregor Range RMPA and MOU (BLM, 1990a,b) is not used as a ground impact area (with the exception of a small area around the Class C Bombing Range in TA 11). Its periodic use as a SDZ during missile firings, for ground troop maneuvers and for FTX missions, does not generate hazardous debris. Consequently, public access for recreation and ranching has been compatible when these areas are not being used for military operations.

Current activities on McGregor Range are generally compatible with surrounding land uses, which are predominantly grazing. Use of R-5103, primarily by aircraft using the Class C Bombing Range, contributes to average noise levels between about L_{dn} 54 and 57 dB. These levels are compatible with dispersed residential areas on the south side of Timberon in the Sacramento Mountains. Isolated
181 structures are avoided by a minimum of 500 feet, and community areas by a minimum vertical distance of 1,000 feet within a 2,000-foot radius or more from the aircraft, (in accordance with Air Force Instruction 11-202). Rural residents in the area have not identified noise from explosive sources as an issue. Culp Canyon WSA also underlies R-5103 and is exposed to overflights.

Safety risks occasionally preclude use of New Mexico Highway 506 (and occasionally U.S. Highway 54) during HIMAD missile firings. Closure interrupts access to residential communities in the Sacramento Mountains and to ranches on the east side of McGregor Range. All locations have alternative access, but they may not be the most direct routes. While this may be inconvenient, current uses have continued, and in some areas developed, under these constraints. Because all locations have alternative access routes, many residents in the area rely on different routes even if they are not the most direct (Roberts, 1996). Emergency services to these areas are provided from Cloudcroft, or by airlift, and therefore do not rely on New Mexico Highway 506.

4.1.3 Aesthetics and Visual Resources

Aesthetics and visual resources include the natural and man-made physical features that give a particular landscape its character and value. Features that contribute to the overall impression a viewer receives of an area include landform, vegetation, water, color, adjacent scenery, scarcity, and man-made (cultural) modifications (BLM, 1986b).

Fort Bliss is located in arid high plains of western Texas and southern New Mexico. The visual ROI of Fort Bliss is divided into two major settings. The first is the main cantonment within urban/suburban areas of the City of El Paso and its newly developing peripheral communities. The second is the extensive open training areas that are visible from Fort Bliss property or locations that have unobstructed views of Fort Bliss. The training complex is surrounded by mostly undeveloped areas in western Texas and south central New Mexico. The following section describes the visual environment for these two areas, including overall appearance and elements, management goals and guidelines, and visual resource value.

4.1.3.1 Main Cantonment and Surrounding Areas

Fort Bliss developed over time, in response to evolving mission requirements and on-post population. As a result, it is a composite of open areas that are undeveloped or used for training, and developed areas with differing visual characteristics and qualities.

Fort Bliss developed an *Installation Design Guide* (IDG) (Army, n.d.(a)) for the cantonment area as part of the master planning process (AR 210-20). Recognizing the importance of appearance and functioning of the built environment, the IDG is a guide to physical development of the cantonment area. The IDG guidance provides that design of new buildings or renovation to existing buildings in or adjacent to historically significant areas should be completed in compliance with the NHPA, Section 106. It provides standards for both site development and architectural treatment of buildings. The IDG classifies areas in the main cantonment into six visual districts; Administrative and Community Support (ACS); Residential (RES); Troop Housing (TRH); Training, Operations and Maintenance (TOM); Biggs Community Support (BCS) and WBAMC.

Figure 4.1-15 illustrates the primary visual districts within the main cantonment during the 1980s. Districts are divided into subtypes that have functional and visual similarities that require specific thematic treatment. Three themes have been used to define the visual character of the post: mission, history, and regional context. Visual images have been defined for each district (and subdistrict) considering the relevant importance of the visual themes. Design emphasis is on visual appearance of the exterior, to promote attractive, organized surroundings that contribute to good morale and efficiency. Design guidelines describe and illustrate appropriate building context and architectural character. Building context addresses site layout, relationship between buildings, orientation, outdoor spaces (such as plazas and courtyards), access and walkways, and landscaping. Architectural character focuses on building form, materials and color, fenestration, entrances, details for material connections, signage, and treatment of renovations and additions.

Currently, the majority of the Main Post is visually dominated by large open training areas covered with rock blankets, with peripheral clusters of functional one- and two-story buildings. These areas are industrial and utilitarian in function, appearance, and character. The built-up areas have a variety of uses, reflected in a range of visual character. Some of the most visually interesting areas are found in the older "historic" parts of the post. The historic district in the south part of the Main Post, includes the Parade Ground and old homes on either side of Sheridan and Pershing Roads; and old classrooms, barracks and stables (now used mostly for administrative functions) between Sheridan and Taylor roads, to the west of Pleasanton Road. This area still houses senior officers and is the center of administrative activity on post. The curve of the streets, brickwork, and shaded arcades are contributing elements to the gracious character of this part of the Main Post. Other areas of the main cantonment have historic value and distinguishing character, such as the red brick housing on Main Post (1400 Area) to the north of the Parade Ground, industrial facilities along the railroad (1300 Area), and the old Warehouses (700 and 800 Areas) along the railroad tracks between Forrest and Baldwin roads. Many of the original Army facilities to the east of the new WBAMC (with building numbers in the 7000 and 7100 series between Sternberg and Beaumont streets) have historic value and are eligible for inclusion on the NRHP. The appearance and visual quality of this area is unique due to the small scale of the street pattern and well-established landscape, providing a strong sense of community. The scale, materials, and context of these special areas provide interpretive opportunities, settings and design typologies that relate to the region, history, and mission of Fort Bliss. Much of the development on Fort Bliss conforms to recommended architectural treatment for the different visual districts. Landscaping and ornamental detail (of building form and materials) is most obvious in the ACS and RES districts where community functions and pedestrian activities are concentrated. The TOM and TRH districts have a utilitarian image, reflecting the mission activities in these areas. Special architectural treatment has been developed for the new Sergeant Majors Academy on Biggs AAF, providing a modern image for the BCS district. Similarly, the WBAMC district is dominated by the hospital facilities and its striking setting on the Franklin Mountains foothills.

Urban areas surrounding the Main Cantonment Area are a mixture of residential, commercial and industrial uses. To the south and west, one and two-story homes on small lots (between about four and eight per acre) are interspersed with neighborhood commercial shops along arterial roadways. Many of the homes, built of frame-and-stucco construction, have simple forms with flat roofs. Incremental growth is reflected in additions to the main structure and out-buildings on many lots. Red-tiled roofs are common on larger buildings in the middle and distant viewing areas, providing interest and individuality to the cityscape. U.S. Highway 54 forms a major visual barrier between the Main Post and adjacent neighborhoods because of its elevated grade. Commercial strip development to the east is dominated by signage and parking lots, and airport-associated industrial parks. The latter are usually fairly new with cohesive building types.

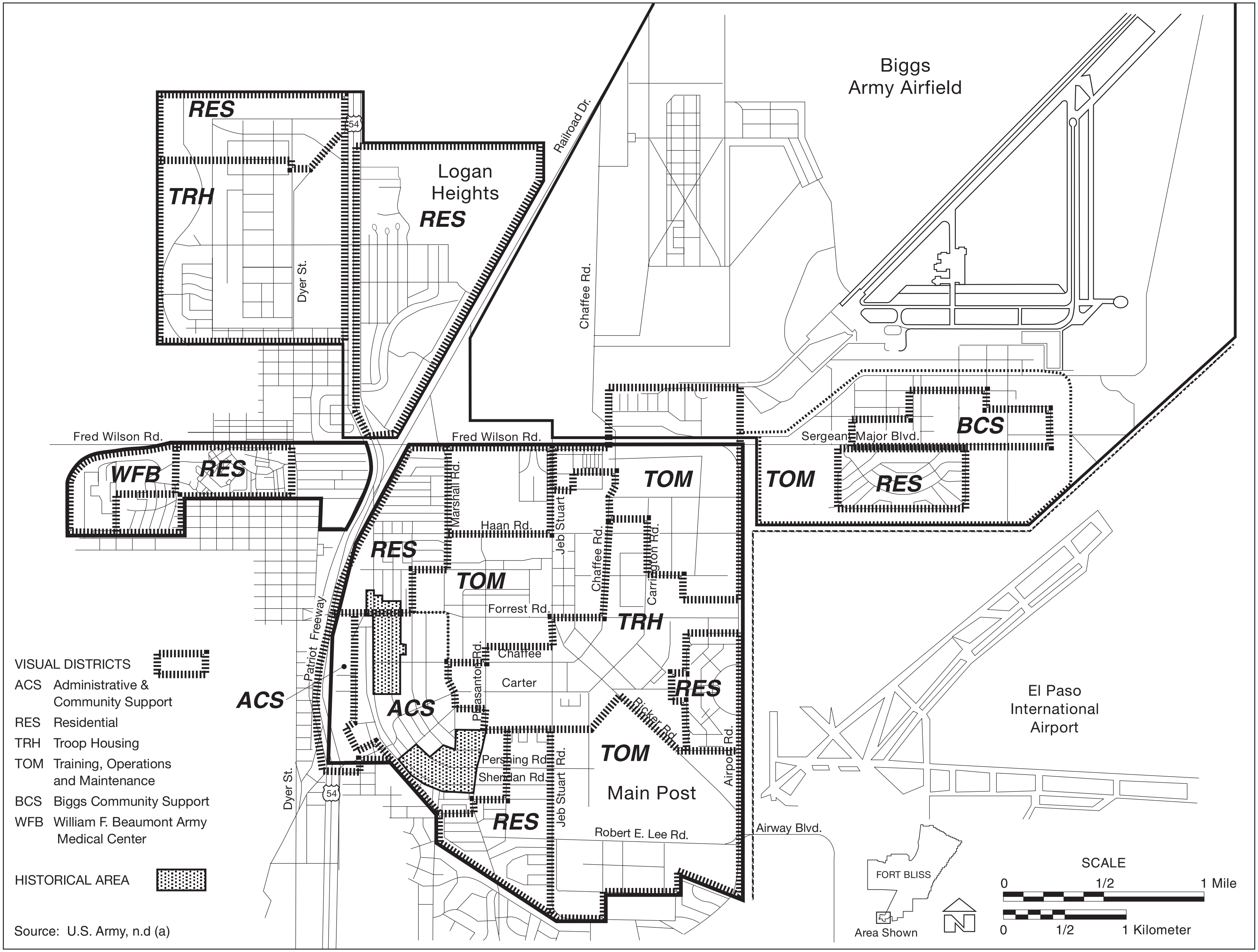

Figure 4.1-15. Visual Districts on the Main Cantonment.

The City of El Paso has several designated historic districts that provide pockets of strong visual and cultural identity for the community. The architectural style of many in these districts is characterized by Spanish colonial materials and form. The city has also designated portions of Fort Bliss, including the Old Post along Sheridan and Pershing Drives and Horse Cavalry area, as historic areas (see Figure 4.1-13), and the old section of WBAMC. Austin Terrace (also known as Government Hills) is the closest historic district to the main cantonment, located less than half a mile south of the Old Post historic area on the Main Post.

The city's *1988 Plan* (El Paso, 1988) includes general goals for improving the appearance of the city through creation of scenic corridors, sign control, landscaping, and litter control. Zoning ordinances address signage and landscaping standards, and Scenic Corridors with restrictive signage standards have been established to lessen visual intrusion from signs and billboards. Airport Drive and Fred Wilson Road from Robert E. Lee to Railroad Drive, located to the north and east of the Main Post, is the closest scenic corridor to the main cantonment.

4.1.3.2 Fort Bliss Training Complex and Surrounding Areas

The natural context of the Fort Bliss Training Complex and surrounding areas is semi-arid to arid Chihuahuan Desert, characterized by vistas framed by distant mountain ranges or escarpments, dominated by the overlying blue sky. Variations in elevation and precipitation result in a range of vegetative regimes with indistinct boundaries. These create a patchwork of varying textures and patterns in the middle and distant landscape, caused by bunched or continuous grassy vegetation and areas of scattered shrubby vegetation. Broad valley floors and alluvial slopes are bisected by steep-sided but relatively shallow intermittent streams that provide visually interesting forms in the foreground, but that are less noticeable at a distance. Mixed hues of reddish brown, and gray-colored soils, rocks, and woody vegetation, are the dominant colors of the ground plane. In some areas, clumped or grassy vegetation introduce a range of pale sage and dark gray. Low angle light at sunset and sunrise augments the color of the sky and landscape and increases the visibility of sculpted forms. However, in general, the natural landscape does not have outstanding features of visual interest such as dramatic landforms with high relief or highly contrasting variations in color or texture.

The cultural landscape is defined by both the natural setting and human modifications. Throughout the area, man-made features are evidence of current and past uses and events. These include (but are not limited to) roadways (both paved and unpaved), fences, wooden corrals, isolated homesteads, powerlines, watering tanks, windmills, pipelines, antennae and satellite dishes. Most of these are noticeable in the foreground, but are either not perceptible, or only defined by subtle lines or forms in the middle and distant landscape. While visual resource management (VRM) objectives are generally aimed at minimizing the intrusion of manmade alterations on the landscape, these features can add interest and interpretative opportunities. In so far as the cultural landscape documents the activities of its builders and users over time, it can be endowed with meaning and importance.

In the training areas, the Organ Mountains on Doña Ana Range–North Training Areas have outstanding scenic quality due to dramatic forms of precipitous mountains. The remaining areas on Doña Ana Range–North Training Areas are mostly comprised of hummocky mesquite dunes. From vantage points, this terrain forms a homogenous pattern of dark shrubs against a sandy ground plane. When passing through the mesquite dunes, visibility is restricted to the foreground because of obstruction by the surrounding clumpy dunes. Some areas have been disturbed by off-road tracked vehicle operations that have flattened the dunes and created denuded sandy areas. These intrusions are visible in the foreground, but do not alter the overall middle and distant vistas. The Doña Ana Range Camp is visible when traveling along some roadways, but specific qualities of its built environment are not discernible, and it also tends to be unobtrusive in the overall landscape. Other constructed or mobile military structures and equipment are smaller in scale and therefore less visible to public viewers using roadways. Man-made modifications tend to be most visible to persons on foot or horseback due to closer viewing distances. However, relatively few people have this vantage point.

McGregor Range is visually typical of Chihuahuan Desert landscape described above. Withdrawn public land on McGregor Range has been categorized under the BLM's VRM classification system. The purpose of this system is to provide an inventory of visual resources and to provide management objectives according to the visual quality and sensitivity of an area. BLM lands are classified as VRM Classes I, II, III, IV, and unclassified (from the most valued and sensitive to alteration, to the least). Areas along U.S. Highway 54 and New Mexico Highway 506 are Class III, where changes in the basic elements of the landscape may be evident but should remain subordinate. Culp Canyon WSA is rated as Class II to preserve the character of the natural landscape. The remainder of McGregor Range is rated as Class IV where the level of change to characteristic landscape can be high. This classification is applied to areas where visual sensitivity is lower due to lower viewer numbers in areas away from public access roadways. Evidence of man-made features is similar to Doña Ana Range–North Training Areas. Historic and current uses for livestock operations are evident in supporting infrastructure. In the immediate vicinity of watering areas and stock corrals, vegetation is limited.

The South Training Areas in El Paso county are comprised of mesquite dunes similar to Doña Ana Range–North Training Areas. Portions of the South Training Areas have also been disturbed and flattened by off-road tracked vehicle operations, leaving denuded patches that are highly noticeable in the foreground, but do not alter the overall middle and distant visual character. Northeast of the South Training Areas, the Hueco Mountains foothills rise from the desert floor providing moderate visual interest in the distance. The lower slopes have relatively little, mostly low-growing vegetation. The new Loop 375 highway corridor is defined by chain link fences.

Adjacent BLM and USFS land has been classified according to their visual quality and sensitivity. An 8,947-acre portion of the Organ Mountains to the west of Doña Ana Range–North Training Areas, is designated as a scenic ACEC within the proposed Organ Mountains NCA and is managed as a VRM Class I area (where management actions should not alter the natural landscape). Views from most locations in the ACEC onto Fort Bliss are obstructed by intervening terrain of the Organ Peaks. Most of the proposed NCA is VRM Class II, including the WSAs, the Organ and Franklin mountains, and most mountain ranges and hills throughout the region. The Sacramento Escarpment ACEC, located north of McGregor Range, is also managed as VRM Class I. Distant views of the northwest corner of McGregor Range may be visible from some viewing locations in this ACEC. Areas to the west of U.S. Highway 54, and east of McGregor Range that include portions of Otero Mesa, generally have lower visual resource values due to lack of distinguishing landscape features, low number of viewers, and existing infrastructure.

77 The BLM has completed preliminary work on evaluating Otero Mesa as part of a rural historic landscape, potentially eligible to the NRHP. Other historic landscapes may also be present on Fort Bliss. Therefore, in addition to adherence to the VRM classifications, landscapes on McGregor Range must be managed to preserve their eligibility to the NRHP. As such, proposed modifications would be evaluated in respect to visual intrusion on historic landscapes.

The USFS uses visual quality objective (VQO) categories to manage visual resources. Areas are classified as Preservation (with the highest visual value and most sensitive to man-made changes, similar to VRM Class I), Retention, Partial Retention, Modification, and Maximum Modification (with diminishing visual value and sensitivity to visible alterations). Adjacent land in Lincoln National Forest, the Sacramento district is primarily classified as Modification Areas due to alterations (such as roads, signage, and evidence of productive uses), and relatively low visual quality. There are some areas classified as Retention, mostly in mountainous terrain, where changes within the natural landscape should not be evident.

In general, when viewed from locations beyond the installation boundary, isolated facilities and equipment in the middle and far distance within training areas are visually subordinate to the natural landscape. Viewing locations on the east side of the Organ Mountains of Doña Ana Range–North Training Areas are not open to the public. Areas of higher elevation in the Sacramento Mountains and its foothills have distant views onto McGregor Range, including expansive vistas of grasslands on Otero Mesa, that appear relatively uninterrupted by man-made structures, except for a few roadways, stock corrals, and water improvements.

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Main Cantonment Area Infrastructure

4.2

4.2 MAIN CANTONMENT AREA INFRASTRUCTURE

Infrastructure within the Main Cantonment Area is composed of the following systems: transportation, utility, energy, and communications. The ROI for the transportation system is El Paso County, Texas, and Doña Ana and Otero counties, New Mexico.

The ROI for assessing utility systems is made up of the service areas of each utility purveyor servicing the facilities operated by Fort Bliss in Texas and New Mexico. The ROI will include El Paso County in Texas, and Doña Ana and Otero counties in New Mexico; the cities of El Paso, Texas, and Alamogordo and Las Cruces, New Mexico; and the service areas of the EPEC, El Paso Gas Company (EPGC), and other utility service areas.

4.2.1 Ground Transportation

This section discusses the existing ground transportation in the ROI. The current highway systems, roads, and railways will be described.

4.2.1.1 Roadways

The evaluation of roadway conditions is based on capacity estimates (Transportation Research Board, 1994). The capacity of a roadway depends on the number of lanes, lateral obstructions, percentage of trucks in the traffic stream, intersection control, and other physical factors depending on the type of roadway. Traffic volume is typically reported as Annual Average Daily Traffic (AADT), which is the total number of vehicles per day, averaged over an entire year. The AADT may be measured directly with continuous count equipment, but locations with such equipment are limited. The AADT may also be estimated by taking short traffic counts called Average Daily Traffic (ADT), with portable equipment (usually for two consecutive days) and adjusting the counts with factors derived from the AADTs to account for daily and seasonal variations.

The AADT factors for estimating the percent of daily traffic that occurs during the peak hour are called K-factors. Further, capacity analysis for highways with four or more lanes is conducted for direction during the peak hour. Therefore, continuous count locations are used to estimate peak hour directional distributions factors, called D-factors. Applying K- and D-factors to an AADT value establishes the peak hour volume (phv) that is used in determining the capacity of a particular roadway.

A comparison of a roadway's AADT to its capacity is expressed in terms of level of service (LOS). The LOS scale ranges from A to F, where A is the best (free-flow conditions) and F is the worst (stop-and-go conditions). LOSs A, B, and C are considered good operating conditions while LOS D is considered below average, and LOSs E and F are considered unacceptable. Volume (AADT)-to-capacity ratios as they relate to LOS values are shown in Table 4.2-1.

The two major interstates that provide access to El Paso and Fort Bliss are Interstate 10 (I-10) and I-25 as shown in Figures 3.2-1 and 4.2-1. The major east-west access is I-10, which runs through downtown El Paso and passes just south of the Main Cantonment Area. I-10 is the most heavily traveled roadway in El Paso. I-25 provides the major northern access and is available by following I-10 approximately 44 miles northwest to Las Cruces, New Mexico. U.S. Highway 54 (Patriot Freeway), a major non-Interstate freeway, also provides northern access to Alamogordo, New Mexico. Montana Avenue (U.S. 62/180) provides access east to mid-Texas. The geographic constraints of the international boundary with Mexico, the Franklin Mountains, and Fort Bliss cause I-10 and other cross-town routes to carry most of the traffic. Due to the geography of the region, major traffic corridors leading into the city characterize

Table 4.2-1. Roadway Levels of Service

LOS	*Description*	*Criteria (Volume/Capacity)*		
		Freeways	*Signalized Intersections*	*Two-lane Highways*
A	Free flow with users unaffected by presence of other users of roadway	0.32	0.50	0.15
B	Stable flow, but presence of the users in traffic stream becomes noticeable	0.50	0.65	0.27
C	Stable flow, but operation of single users becomes affected by interactions with others in traffic stream	0.75	0.85	0.43
D	High density, but stable flow; speed and freedom of movement are severely restricted; poor level of comfort and convenience	0.90	0.95	0.64
E	Unstable flow; operating conditions at capacity with reduced speeds, maneuvering difficulty, and extremely poor levels of comfort and convenience	1.00	1.00	1.00
F	Forced breakdown flow with traffic demand exceeding capacity; unstable stop-and-go traffic	>1.00	>1.00	>1.00

Source: Transportation Research Board, 1994.

El Paso's road system. The four major transportation corridors (Northeast, Northwest, Southeast, and Central City) all come together within the vicinity of the Main Cantonment Area and the EPIA. Another important traffic corridor is Loop 375, which connects the northeast and eastern portions of the city and helps to reduce traffic congestion. Loop 375 crosses the Fort Bliss installation between Montana Avenue and U.S. Highway 54. Overpasses have been constructed to allow military vehicles and equipment to pass under the roadway avoiding interference with military operations. West of U.S. Highway 54, Loop 375 becomes Woodrow Bean Trans Mountain Drive, which connects to I-10 northwest of El Paso, and has the advantage of few cross streets allowing traffic to be carried at high speeds. Trans Mountain Drive passes through the Castner Range just west of U.S. Highway 54. Figure 4.2-1 depicts the area's regional roadway network, including roads and highways on the Fort Bliss installation.

The Main Cantonment Area of Fort Bliss is surrounded on two sides by major arterial city streets. The north boundary is Fred Wilson Road and the east boundary is Airport Road. Patriot Freeway (U.S. Highway 54) forms the west boundary. Other major roadways in the area of the installation are Railroad Drive and BU-54 (Dyer Street) as shown on Figure 4.2-2.

The road network on the Fort Bliss main cantonment consists of two- and four-lane asphaltic concrete paved surfaces, mostly with curb and gutter. The primary roadways provide motor access to all areas of the installation and are capable of handling all types of highway vehicles. Minor delays and congestion occur during the morning and afternoon peak travel periods. The primary roads include Jeb Stuart, Ricker, and Forrest roads, and portions of Marshall, Sheridan, Haan, and Robert E. Lee roads. Secondary roads include Pershing, Pleasanton, Chaffee, Carter, Carrington, and Sanitary Fill roads, and Ellerthorpe Avenue. Portions of Sheridan, Haan, and Robert E. Lee roads also serve as secondary roads.

Access to the main cantonment is provided by seven gates (Figure 4.2-3). There are two gates on the east boundary providing access to Airport Road. These gates are located at Forrest, and Robert E. Lee roads. The gate at Robert E. Lee Road is directly across from the EPIA. The southern gate is located at Jeb Stewart Road. Gates at Marshall and Chaffee roads provide access to Fred Wilson Road on the north. The western boundary has two gates, one at Forrest Road that provides access to the Patriot Freeway and the Pershing Gate located in the southwest. There is one gate on Biggs AAF and three gates on WBAMC. Traffic counts at each of the gates are not available.

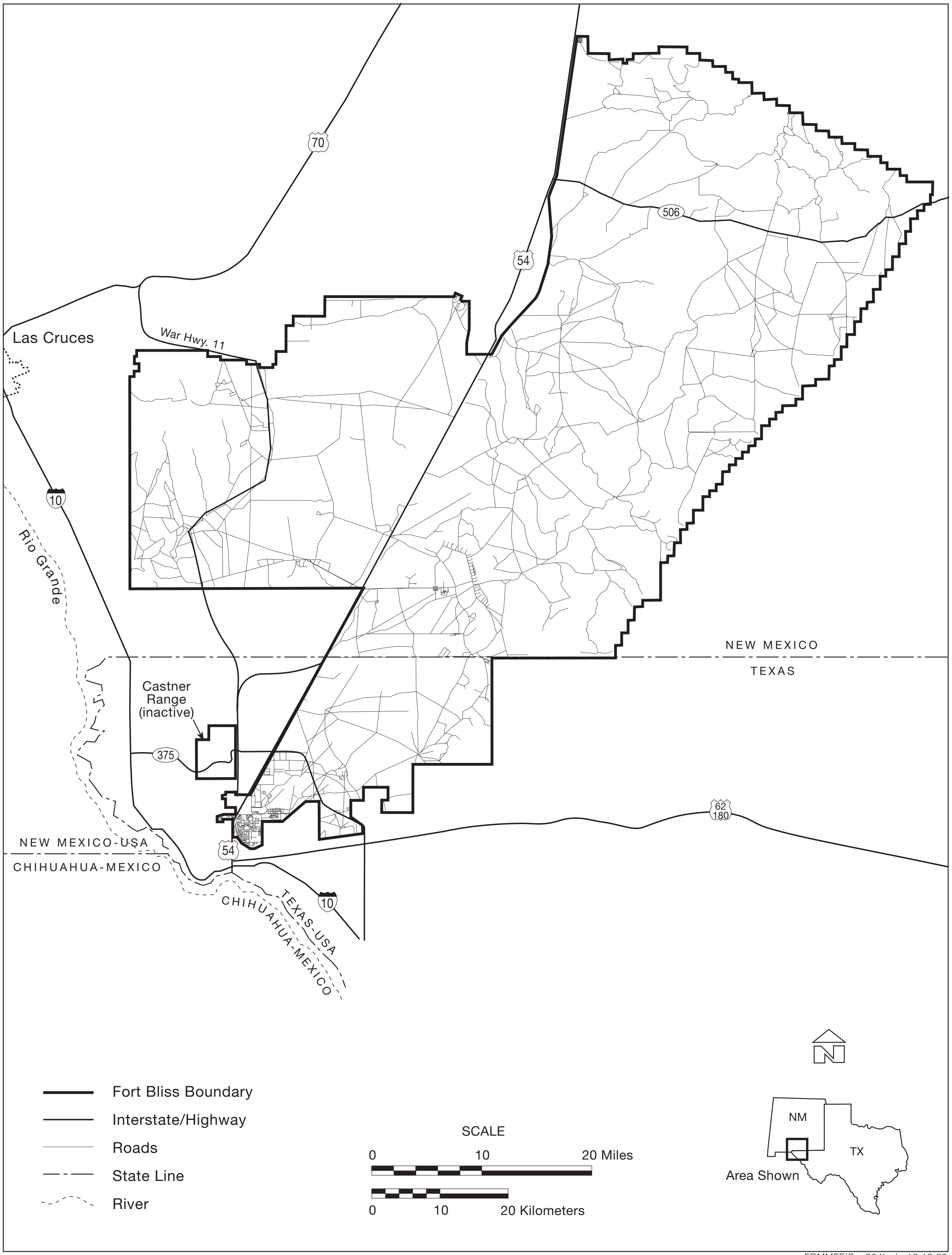

Figure 4.2-1. Fort Bliss Regional Roadway Network.

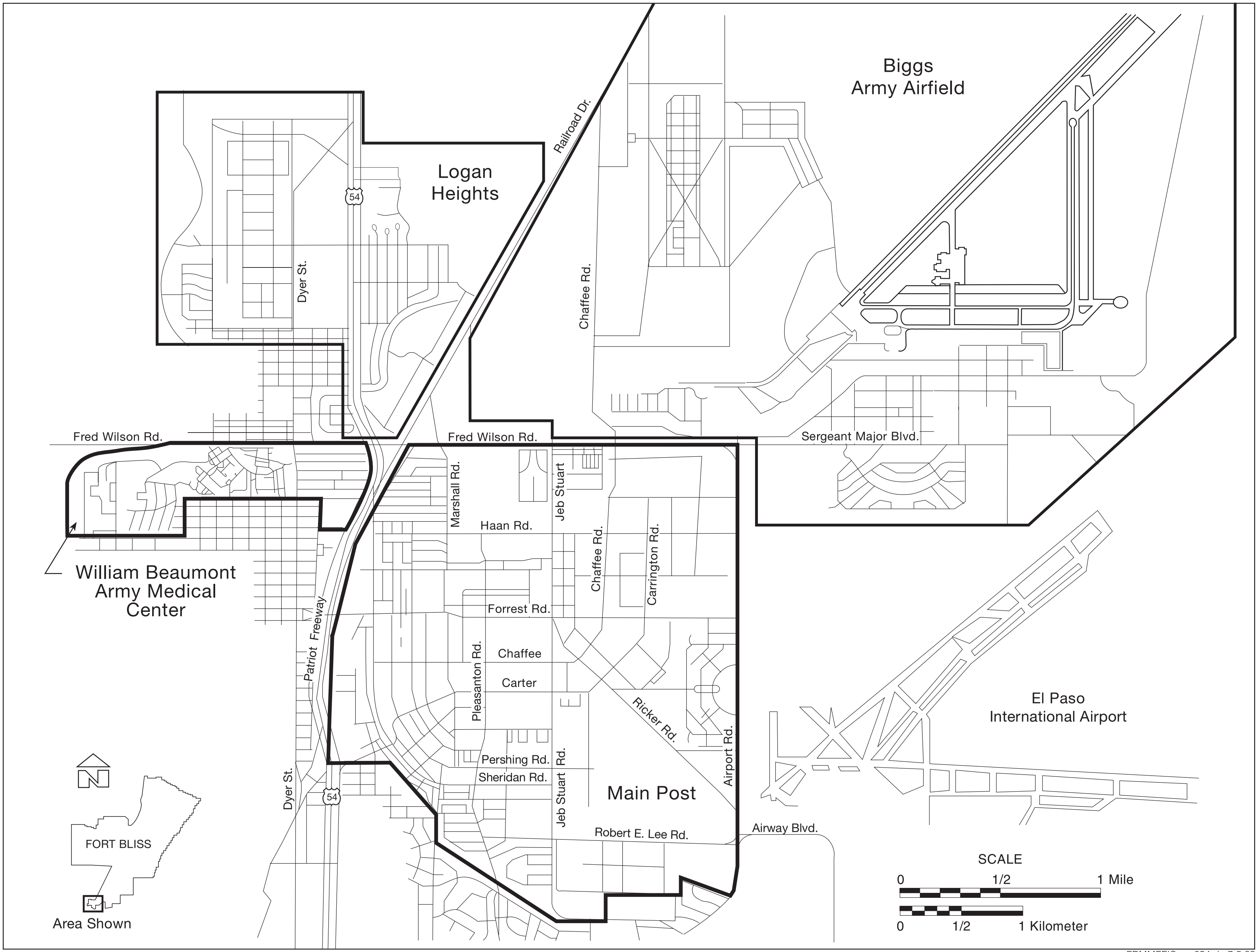

Figure 4.2-2. Fort Bliss Main Cantonment Area Road Network.

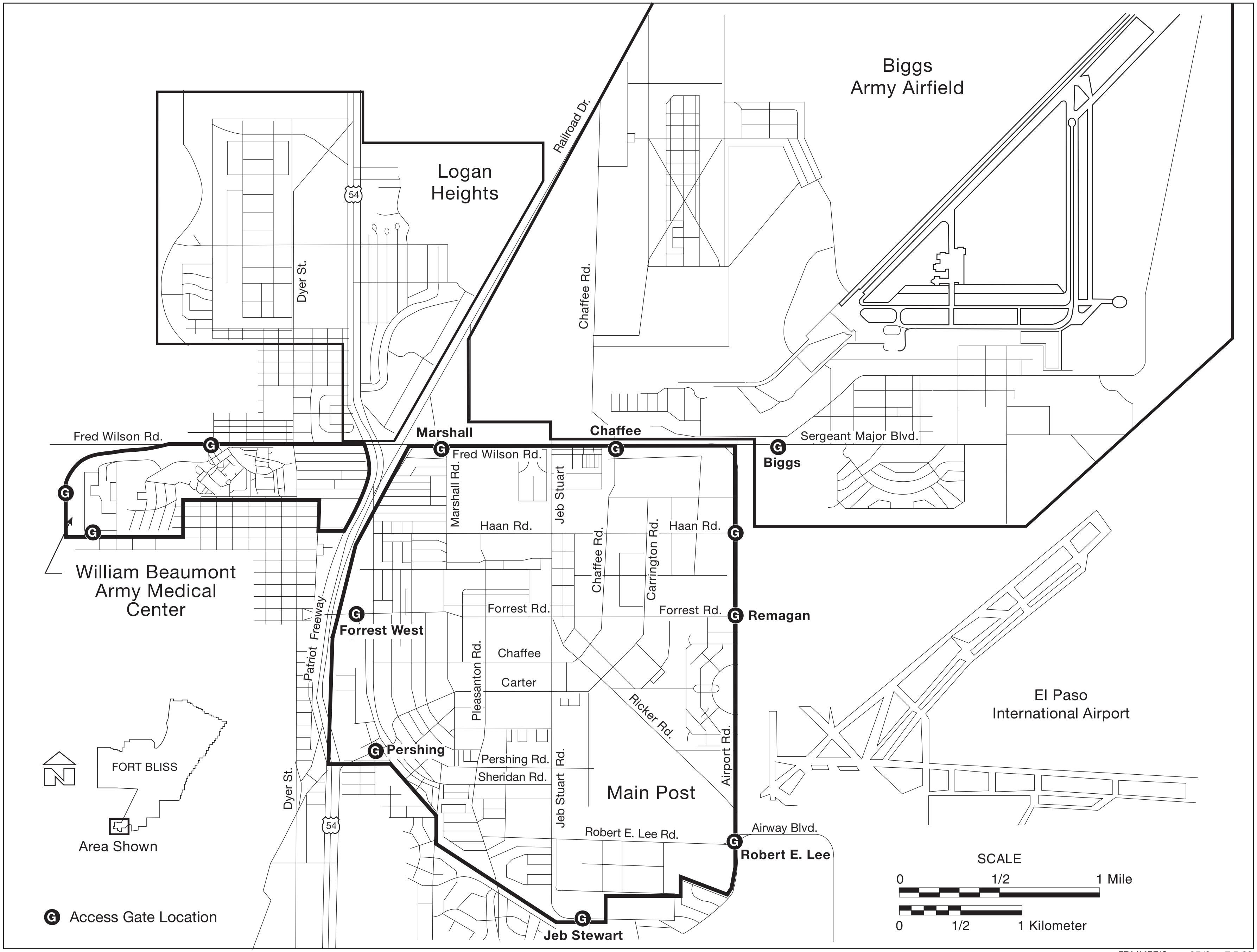

Figure 4.2-3. Fort Bliss Main Cantonment Access Gates.

Vehicles exiting the Main Cantonment Area for the training areas must either cross Fred Wilson Road at Chaffee, or Airport Road at Haan Road. The majority of the tracked vehicles and truck convoys cross at the Chaffee/Fred Wilson crossing.

Table 4.2-2 presents the results of capacity analyses on selected roadway segments in the study area around Fort Bliss. The traffic numbers represent the AADTs from which the peak vehicles per hour (vph) terms were derived. The comparison of the vph terms to the capacity figures resulted in the volume-to-capacity numbers, which in turn were used to select the applicable LOS from Table 4.2-1. The capacity terms were derived by using the following assumptions:

- 2,300 vehicles per hour per lane (vphpl) for freeways and interstates; and
- 900 vphpl for signalized arterials, with the exception of Montana Avenue, which assumed 1,100 vphpl.

Table 4.2-2. Capacity Analysis of Area Roadways, 1996

Roadway	*Traffic*	*VPH*	*Capacity*	*V/C**	*LOS*
U.S. Highway 54 (Patriot Freeway) North of Forrest Rd.	57,000	3,090	4,140	0.75	C
Loop 375 at Montana Ave.	6,580	350	6,210	0.06	A
Loop 375 at Dyer St.	12,718	690	8,280	0.08	A
Loop 375 at U.S. Highway 54	18,547	1,000	4,140	0.24	A
Trans Mountain Dr. West of U.S. Highway 54	9,100	490	4,140	0.12	A
U.S. 62/180 (Montana Ave.) at Hawkins Rd.	43,903	2,750	2,970	0.93	D
U.S. 62/180 (Montana Ave.) East of Yarbrough Rd.	25,237	1,580	1,980	0.80	C
Fred Wilson Rd. at Jeb Stuart Rd.	31,636	1,980	2430	0.82	C
Airport Rd. at Haan Rd.	36,499	2,290	2,430	0.94	D
Airport Rd. South of Airway Rd.	14,504	910	1,620	0.56	B
BU-54 (Dyer St.) North of U.S. Highway 54	26,550	1,730	2,430	0.71	C
Railroad Dr. North of Fred Wilson Rd.	29,777	1,940	2,430	0.80	C
Railroad Dr. South of Loop 375	7,008	450	1,620	0.28	A

*V/C = Volume-to-Capacity Ratio.
Source: El Paso, 1996a.

Additionally, K- and D-factors were developed using the 1994 Highway Performance Monitoring System data collected by the Texas Department of Transportation and the City of El Paso, for roadways in the El Paso area. Capacity flow rates were reduced by 10 percent to account for trucks in the traffic stream and other physical factors affecting capacity. All roadways in the study area operate at LOS D or better.

Several highway construction projects have been identified that would improve several of the roadways in the study area. Funds have been allocated for an additional lane in each direction on U.S. Highway 54 from Yandell Drive to Van Buren Avenue (near the Fort Bliss entrance). There is a proposal for an Inner Loop that will connect Yarbrough Drive to Lee Trevino in east El Paso, with Fred Wilson Road at the airport/Fred Wilson intersection. The loop will be located east and north of the EPIA, passing between EPIA and Biggs AAF. Fred Wilson Road was scheduled for repaving in FY 98 (El Paso, 1993).

During 1996, there were also plans within the ASMP and El Paso Metropolitan Transportation Plan Inner Loop to construct a deploying tactical vehicle overpass and access road that would span Fred Wilson Road and the adjacent railroad tracks. Currently, units going out to the field for training must cross Fred Wilson Road and, therefore, disrupt traffic flow. Another project planned for Fort Bliss was the realignment and widening of Marshall Road from Pike to Forrest roads. Parking areas, curbs, and gutters would be provided on the west side. The final width would be four lanes. This section was opened to traffic in March 1998.

4.2.1.2 Railways

Two commercial carriers, the UP/SP, and the Burlington Northern and Santa Fe (BNSF) railroads, provide rail service to El Paso. The UP/SP is the most important to operations at Fort Bliss because it provides direct service from El Paso to the post and acts as a common carrier for the installation. The UP/SP has three lines in the El Paso area: the northeast trackage parallels U.S. Highway 54; the west trackage parallels I-10; and the southeast trackage also parallels I-10. To support its operations, the UP/SP operates and maintains 11 yards in the El Paso area. The yards that are of particular importance to Fort Bliss are the Davis, Alfalfa, and Stanton rail yards. All three yards have storage and handling facilities to service hundreds of railcars. The Davis yard, however, is the only one suitable for loading and outloading during military deployments. A disadvantage of this site is its location in the downtown area, which is congested. To support installation activities, the Strategic Rail Corridor Network (STRACNET) can be accessed through the main UP/SP track running west to Tucson, Arizona and northeast to Alamogordo, New Mexico. Access from Fort Bliss to these STRACNET lines is coordinated through UP/SP.

The Fort Bliss rail network consists of approximately 15 miles of track that is located mainly in the western portion of the post. The rail system is used primarily for shipping and receiving tactical vehicles, ammunition, and other material. Government-owned railroad tracks serve the vehicle staging areas on the Main Cantonment Area and Biggs AAF. These tracks connect to the rail facilities owned by the UP/SP at the western and southeastern post boundaries. The spur line that serves the ASP is also owned by UP/SP. This section is primarily used to store built trains prior to being delivered to the UP/SP main line (U.S. Army, 1996g).

Under the Army Forces Command Rail Maintenance Program, the post rail system was recently repaired and upgraded. The project alleviated deficiencies in the existing system through the replacement of rails, switches, crossties, and grade crossings, and the realignment of problem turnout locations. Other improvements included the realignment of four sharp curve tracks; primary tracks were upgraded to 115-pound rails and all secondary tracks were upgraded to 80- and 90-pound rails.

Construction of a new rail deployment facility is being planned (U.S. Army, 1998a). This facility will support the deployment of strategic mobility forces, and will consist of rail loading spurs with loading ramps, rail storage spurs, turnouts, switches, and other support facilities.

4.2.2 Utilities

This infrastructure resource includes the facilities and utilities used for potable water pumping, treatment, storage, and distribution; wastewater collection and treatment; solid waste collection, recycling and disposal; and energy generation and distribution, including electrical, natural gas and propane, and communication systems.

4.2.2.1 Water Supply

Potable water is currently provided to the Main Cantonment Area including Logan Heights, Biggs AAF, and WBAMC from two different sources. Fort Bliss operates two well fields that withdraw water from the Hueco Bolson. The 18 groundwater wells (15 in Texas and 3 in New Mexico) have a 24-hour pumping capability of 13.0 million gallons per day (mgd). The City of El Paso has various interconnections with the Fort Bliss potable water system. The city can guarantee the post 4.24 mgd.

Potable water storage totals 11.788 million gallons (mg) within the Main Cantonment Area. Potable water in storage is: 3.24 mg at the main cantonment; 4.10 mg at WBAMC; 1.21 mg at Logan Heights; 1.10 mg at Biggs AAF; and 2.09 mg at the well fields. In addition to normal water levels, the Main Cantonment Area also requires a reliable flow of water to fight fires. Assuming 4-hour fire durations, the Main Cantonment Area fire-fighting water requirements are 2.10 mg.

Fort Bliss has an established water conservation policy (Appendix K) that limits irrigation during the months of May to September, to the hours of 0500 to 0900 and 1830 to 2200. Lawns can be watered only twice a week for a maximum of 45 minutes. The policy specifies other restrictions during the rest of the year and provides guidance on car washes and grass height.

The city revised its rate structure for potable water purchases. This change increased the cost of water by approximately $0.15 per 1,000 gallons. To reduce its potable water costs, Fort Bliss switched to its well fields for its major source of water. In FY 96, the post consumed 5.049 mgd, for personal, municipal, and industrial uses. Approximately 0.430 mgd was purchased from the city, while the rest came from the post's two well fields. Additional information regarding water supply and demand affecting Fort Bliss is presented in Section 4.7.5.1 of the *Water Resources* Section.

4.2.2.2 Wastewater Treatment

Wastewater generated at Fort Bliss flows through five connections to the City of El Paso's sewer system. This wastewater flows approximately 3 miles to the City of El Paso's Delta Street wastewater treatment plant. The existing contract between the city and Fort Bliss allows for an average of 3.0 mgd to be discharged to the city's system. In FY 96 the Main Cantonment Area generated approximately 2.976 mgd of wastewater.

Storm Water. Storm water runoff from the Main Cantonment Area of Fort Bliss flows through a series of storm drainage channels, pipes, and storm water pump stations to various storm water retention ponds. Storm water that enters these ponds is contained and typically leaves only by evaporation or infiltration. No outfalls have been identified at the Main Cantonment Area of Fort Bliss.

Much of the storm water from the Main Cantonment Area flows to storm drainage channels along Jeb Stuart Road and Chaffee Road/J Avenue into the main storm water retention pond located north of Fred Wilson Road and east of the UP/SP Railroad. This area has been claimed as a jurisdictional wetland by USACE (see Section 4.8.2). The capacity of this main pond is 2,250 acre feet (af) and is adequate to store runoff generated by a 100-year storm (U.S. Army, 1985). Storm water overflow from Landfill Road, the officers' housing on Sheridan Road, and off-post areas is also collected in a large retention basin northwest of Pershing Street Gate and west of the Officers Club. If spillway levels are ever reached, storm water from this basin would flow into a lined, open drainageway down the escarpment, south to the Rio Grande.

At Biggs AAF, storm water is collected and discharged to a pair of retention basins northwest of the field. There is also a single 8-inch storm drain that ends at a set of dry wells near the southwest end of the primary runway.

Fort Bliss has submitted a notice of intent to obtain coverage under the Multi-Sector General Permit (MSGP) and was previously included in the Army's Group Permit Application.

According to the November 16, 1990, *Federal Register* and 40 CFR 122, only industrial activities which have the potential to discharge storm water to Waters of the U.S., are required to be permitted under the National Pollution Discharge Elimination System (NPDES) program. All industrial activities on Fort Bliss are covered under the NPDES multi-sector general permit. All storm water discharges will be sampled periodically.

4.2.2.3 Solid Waste Land Disposal

Domestic solid waste (Texas Waste Classification Type I) generated on Fort Bliss is collected and disposed of by private contractor at an existing 106-acre landfill, located 3 miles north of the intersection of Fred Wilson and Chaffee roads. The landfill has cells that handle Type I waste (refuse) and Type IV waste (construction and demolition wastes). It is estimated that the Type I cells have a remaining capacity of 429,367 cubic yards and approximately 13 years of useable life. The Type IV cells have a remaining capacity of 53,583, cubic yards and a useable life of 6 months to 2 years.

Current solid waste reports (Lenhart, 1998) indicate that in 1996 Fort Bliss generated 13,160 tons/year of Type I wastes, of which 2,210 tons/year were recycled, and 10,950 tons/year (40 tons/day) are disposed. Type IV wastes vary considerably with demolition activities, but the average disposal rate is about 25 to 150 tons/day. The Type IV wastes are delivered to the landfill by construction contractors and Fort Bliss employees who have permission to use the installation's landfill. As of July 1, 1997, there were 33,436 cubic yards left in Type I cells and 131,931 cubic yards left in Type IV cells. The landfill contractor only picks up refuse. All other Type I and IV wastes are delivered by shops, units, or contractors. Truck scales were installed at the landfill in March 1997. Prior to that date, tonnage amounts were estimated from volumetric estimates based on truck capacity. Comparison of the solid waste reports prior to March 1997 with the more recent reports indicate that the volumetric estimates were inaccurate and are not reliable. However, it appears that Type I waste disposal in 1996 was about 40 tons/day. The rate for Type IV waste disposal in 1996 probably was about 60 tons per day. This is less than the current rate because of increased demolition in 1997 that was used to calculate the current estimate of 75 tons/day. The landfill contains household refuse, post solid wastes, bulky items, grass and tree trimmings from family housing, refuse from litter cans, construction debris, classified waste (dry), dead animals, asbestos, and empty oil cans.

The Municipal Solid Waste Landfill (MSWLF) is located in the Hueco Bolson, 4 miles east of the Franklin Mountains. Water issues related to the landfill are discussed in Section 4.7.5.2. Soils at and adjacent to the MSWLF are nearly level to gently sloping, have a fine sandy loam subsoil, and are moderately deep over caliche.

A new on-post 233-acre landfill adjacent to the north side of the existing landfill is being considered. Included with the landfill will be a 70-foot truck scale. The landfill expansion will consist of 113 acres for Type IV waste and 121 acres for Type I waste. The Type IV waste area will have a lifespan of 22 years, based on 75 tons/day of routine construction waste and 84 tons/day of special project waste. The Type I waste area will have a lifespan of 64 years, assuming 45 tons/day of waste are generated.

The recycling program at Fort Bliss has been in existence since 1987 and includes a broad range of materials. In 1996, 2,210 tons (6 tons per day) of solid waste was recycled resulting in a gross income of $163,300.

4.2.3 Energy

Electrical power is provided to the Main Cantonment Area, Logan Heights, and Biggs AAF by EPEC. The EPEC has a net installed generating capacity of approximately 1,500 megawatts (MW). This includes the Newman, Rio Grande, and Copper power stations in the El Paso area, and entitlements from Palo Verde in Arizona and Four Corners, New Mexico. In 1990, the total system peak load was 1,098 MW, and in 1996 it increased to 1,387 MW. Energy sales rose from 7,003,653 thousand to 8,632,466 thousand kilowatt-hours (kWh) in 1996 (EPEC, 1997).

Fort Bliss has a contract with EPEC for service through 2002 with two option years. The EPEC operates a 115-kV transmission loop system in the region that provides service to Fort Bliss, the City of El Paso, and the surrounding area. The system can feed Fort Bliss from two directions and has a loading capability of approximately 150 megavolt-amperes (MVA). This system connects to the 50-MVA EPEC substation near the intersection of Jeb Stuart and Chaffee roads. The post has its main regulator station on the southeast corner and has 10 outgoing feeders that supply power to the Main Cantonment Area.

4.2.4 Communications

Existing communication conditions that connect the Main Cantonment Area including Biggs AAF with the ranges and training areas are presented in this section. Communications are discussed in relation to the telephone system, cellular telephones, the microwave system, fiber optics systems, the radio system, and television.

Fort Bliss is served by a contract-operated commercial telephone system. The central exchange has more than 350 city connections and 78 FTS2000 Integrated Switch Digital Network (ISDN) trunk lines. Fort Bliss is also currently using the Defense Switched Network (DSN) as a communication link with other U.S. military lines. There are 96 trunk lines. The DSN bypasses and operates separately from commercial telephone networks. The DSN gives a higher degree of security to communications than commercial systems and is reserved exclusively for intragovernmental service.

Fort Bliss also has secure telephones that are accomplished using secure telephone lines. Presently, there are 12 systems on the installation that require only a single commercial service line to operate, as opposed to the dual line Automatic Secure Voice Communications system that is no longer in use. System maintenance is conducted by the private operator working under contract with the military.

The Fort Bliss Telecommunications Center (TCC) is located in Building 56A. The majority of official organizational message communications, up to and including Secret, are conducted from this building. An Automatic Digital Network (AUTODIN) capability is supported via a Worldwide Area Network (WAN) using the Desktop Interface Network to the AUTODIN Host (DINAH). DINAH diskettes containing organizational messages are hand carried to the TCC and transmitted virtually anywhere in the world. A government-owned and contractor-operated switchboard is located at the installation to handle telephone traffic. All operators are employed by the contractor, but work under the direction of the Fort Bliss Telecommunications authority.

The installation currently has cellular telephones leased from a private contractor. The systems are completely portable and have a range of approximately 60 miles, but are limited by the location of the antenna station in the southern Franklin Mountains.

Microwave and fiber optic systems have been established at Fort Bliss that allow communication within the entire installation. The radio systems on the installation include amplitude modulation (AM), very high frequency (VHF), and trunking radios. System users range from military units with emergency nets with the Military Police and fire department, to aircraft and their ground controls. A Military Affiliate Radio System station is also in operation on the post. This station is used as the net for communications and mobilization exercises. To ensure that frequencies for all these systems are properly assigned and utilized according to federal law, Army regulations, and post orders, two frequency managers are assigned to the installation.

There are four television networks on the post. Two are closed circuit systems. One is located at the Air Defense School and the other at the Sergeants Major Academy on Biggs AAF. Commercial cable television is available to housing occupants, and WBAMC has its own television network.

Fort Bliss operates a number of electromagnetic (EM) radiation emitters and systems with potential to adversely affect radio telescopes operating in allocated radio astronomy frequencies within the region. Electromagnetic radiation, or emission, refers to microwave radiation in the frequency range from 10 to 300,000 megahertz (MHz). This radiation normally is from antennas associated with television, frequency modulation (FM), and radar transmitters, and industrial or commercial microwave sources (U.S. Army, 1998f).

EM emissions can affect very large array (VLA) and very long baseline array (VLBA) radio telescopes in the allocated radio astronomy bands. The National Radio Astronomy Observatory (NRAO) operates two radio telescope facilities from its Socorro, New Mexico, Array Operations Center. One is a VLA consisting of 27 25-meter diameter radio antennas distributed over a 36-kilometer diameter area on the Plains of Agustin in south-central New Mexico. The other is a transcontinental VLBA of ten 25-meter diameter antennas, three of which are in the Fort Bliss area; at Fort Davis, Texas; Pie Town, New Mexico; and Los Alamos, New Mexico (Mertely, 1998). All of the antennas are equipped with low noise receivers and are designed to detect the extremely weak signals from cosmic radio sources. Consequently, radio frequency interference can affect the research conducted by the NRAO. 143

The VLA is about 170 miles north of Fort Bliss. However, the low mountains between Fort Bliss and the VLA do not attenuate EM signals sufficiently to decrease even weak signals at ground level fully below the harmful power density thresholds established by the International Telecommunications Union (ITU) for successful radio astronomy observations (Mertely, 1988). The Fort Bliss frequency coordinator works with the Army regional frequency coordinator at WSMR to ensure frequencies being used at Fort Bliss are known to other users and potential effects of radio frequency interference is minimized.

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Training Area Infrastructure

4.3

4.3 TRAINING AREA INFRASTRUCTURE

Infrastructure within the training area complex is composed of the following systems: transportation, utilities, and energy. The ROI for these systems on the installation training complex is the South Training Areas, Doña Ana Range–North Training Areas, and McGregor Range.

4.3.1 South Training Areas

Infrastructure for the South Training Areas is discussed in this section. The infrastructure addressed includes ground transportation, utilities, and energy.

4.3.1.1 Ground Transportation

The South Training Areas are located to the northeast of the Fort Bliss main cantonment and are bordered on the north by the New Mexico state line. TA 1 is located adjacent to the Main Cantonment Area, the EPIA, and Biggs AAF. U.S. Highway 54 and the adjacent UP/SP rail line run along the northwest boundary. The southern most boundary of TA 1 is U.S. Highway 62/180 (Montana Avenue). TA 2 adjoins TA 1 on the east. TA 2 does not border any major roadways, but comes very close to Montana Avenue just east of Loop 375. Figure 4.3-1 illustrates the road network and authorized pipeline crossing points in the South Training Areas.

4.3.1.2 Utilities

Utilities in the South Training Areas include potable water supply, wastewater treatment, storm water, and landfills.

Water Supply. Located east of the Main Cantonment Area is the Site Monitor location. This facility receives its potable water from a well that was drilled in 1990. The facility has a chlorination system and 30,000-gallon storage tank.

Wastewater Treatment. Wastewater generated at four Site Monitor buildings is collected in septic tanks that flow to drain fields or dry wells. Wastewater flows are estimated at 2,160 gpd and no problems have been reported with system operation.

Storm Water. The Site Monitor is located almost 10 miles east of the Main Post in a relatively flat area with many sand dunes, with the general slope to the west. Based on studies conducted in 1982, the facility is located in Basin 7A and 7B (U.S. Army, 1982a). Basin 7A includes most of the compound and slopes to the northwest. The existing drainage pattern consists of sheet flow that is directed to outlets cut through the perimeter fence, which release storm water to the dune area. Basin 7B covers the southwest corner of the compound and gently slopes to the west. The existing drainage pattern consists of sheet flow and small swales directing storm water to the dune area west of the compound. Ten- and 25-year storm water events were evaluated and the facilities at the Site Monitor were determined to be adequate (U.S. Army, 1982a).

Landfills. Solid waste generated at the Site Monitor facility is placed in dumpsters and picked up by the private contractor that services the Main Cantonment Area. The solid waste is then disposed of in the landfill located 3 miles north of the intersection of Fred Wilson and Chaffee roads.

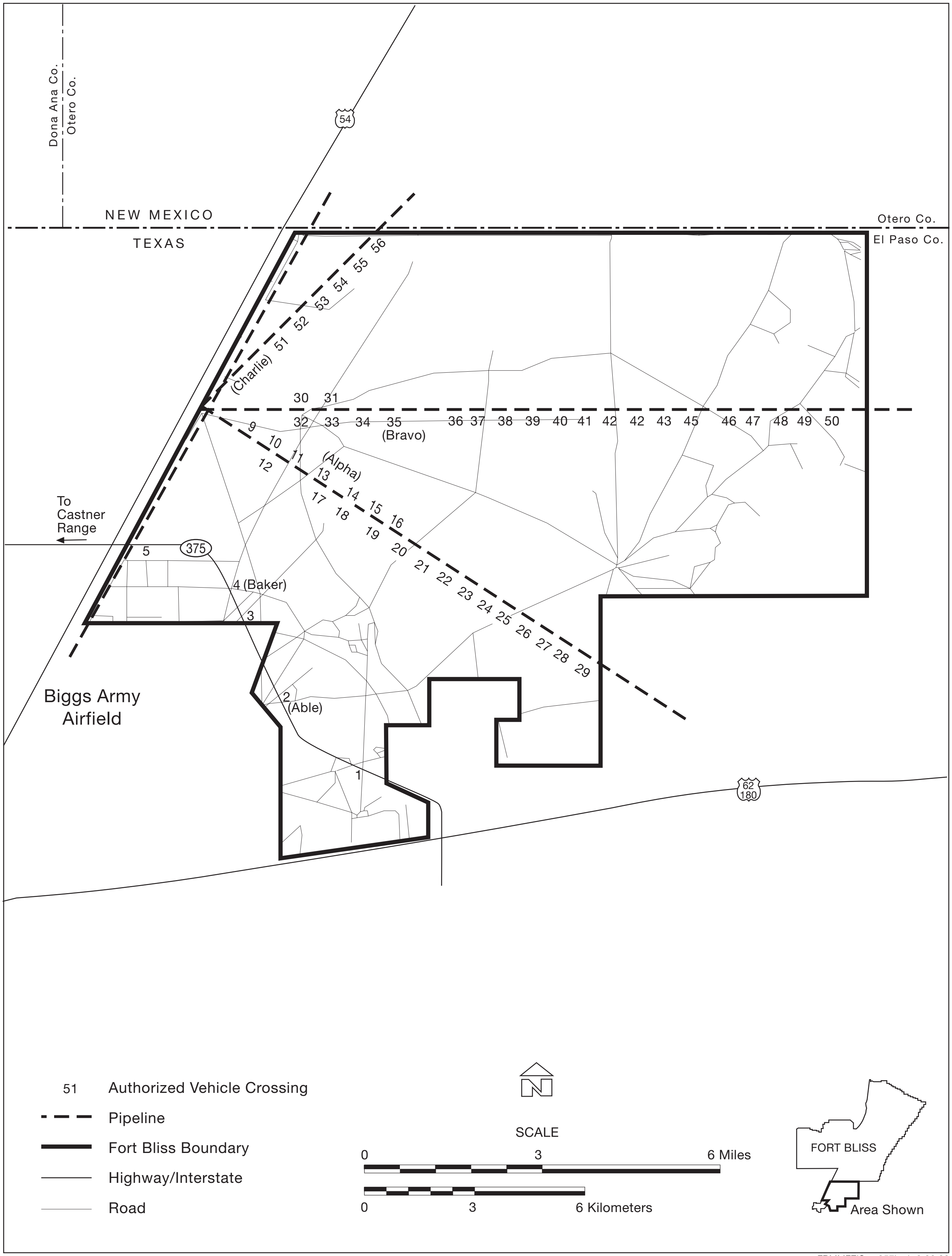

Figure 4.3-1. South Training Areas Authorized Vehicle Crossings.

4.3.1.3 Energy

Energy resources for the South Training Areas described in this section include electricity, natural gas, and liquid petroleum gas (LPG).

Electricity. Electrical power is supplied by EPEC through a metering station. Peak demand measured for the site was 268 kW.

Natural Gas. There is no natural gas service at this location.

Liquid Petroleum Gas. LPG is delivered to the facility and stored in four 1,000-gallon tanks, one 800-gallon tank, and one 500-gallon tank. A distribution system provides service to various buildings within the facility.

4.3.2 Doña Ana Range–North Training Areas

Infrastructure for the Doña Ana Range–North Training Areas is discussed in this section. Ground transportation, utilities, and energy are also discussed.

4.3.2.1 Ground Transportation

The major roadway providing access to the Doña Ana Range Camp is War Highway 11, which runs along the Organ Mountains on the eastern boundary of the range. This highway provides access to U.S. Highway 70 and WSMR to the north. Operations on the range require War Highway 11 to be closed occasionally for safety reasons. The road-closing schedule is posted for the public to alleviate unnecessary delays. Figure 4.3-2 illustrates the road network and authorized vehicle crossings on Doña Ana Range–North Training Areas.

4.3.2.2 Utilities

The infrastructure resources for the Doña Ana Range–North Training Areas include potable water supply, wastewater treatment, storm water, and landfills.

Water Supply. Potable water for the Doña Ana Range Camp is provided from two wells with the total capability of 0.437 mgd (based on 16 hours of pumping). Each well has a reservoir, a booster pump, and a chlorinator. The wells are located on the east and west sides of the cantonment area and integrated with the camp's distribution network. The range camp has one water storage facility with a total storage capacity of 150,000 gallons.

Potable water for Orogrande Range Camp and WSMR is provided from one well in the Fort Bliss Soledad Well Field (SGI wells) (Mathis, 1998). The capacity of the well is rated at 1.0 mgd. The water is piped to WSMR, chlorinated, and delivered to the Orogrande Range Camp through a 20-mile pipeline with the help of two booster pumps. The camp has two storage tanks with a total capacity of 0.2 mg.

Wastewater Treatment. Wastewater generated at the Doña Ana Range Camp is collected and discharged into one cell of a two-cell lagoon. Each cell in the lagoon has a surface area of 3.75 acres and can support a population of 1,500. Wastewater from the Orogrande Range Camp flows by gravity to a one-cell lagoon located on land leased from WSMR, with a surface area of 4.74 acres. This lagoon can support a population of 948.

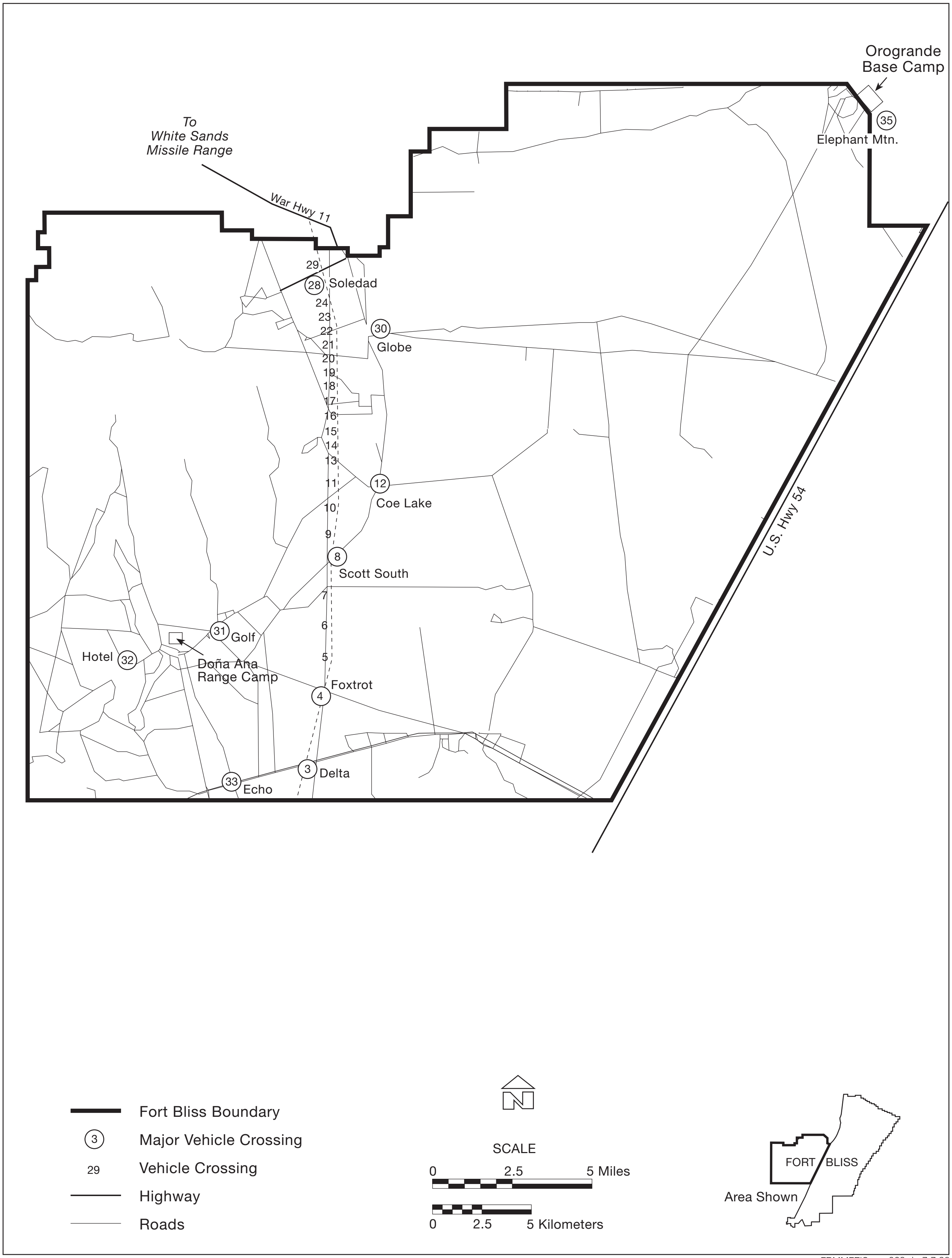

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Figure 4.3-2. Doña Ana Range—North Training Areas Authorized Vehicle Crossings.

Storm Water. The Doña Ana Range Camp is located approximately 23 miles north of the Main Post in a gently sloping area at the southeast foothills of the Organ Mountains. The camp and the entire range are within one watershed that empties into the Tularosa Basin on the east and southeast sides of the Organ Mountains. Storm water consists of sheet flow, most of which is channelized into a graded ditch that runs along the south loop of the access road. Drainage from the ditch and sheet flows south of the access road and to the southeast towards a dry lake. Ten- and 25-year storm water events were evaluated and the facilities at the range camp were determined to be adequate (U.S. Army, 1985).

The Orogrande Range Camp is located approximately 4.5 miles off U.S. Highway 54 in a relatively flat area with a gentle slope to the northwest. An analysis of the storm water drainage system in 1983 indicated that arroyos and graded ditches had adequate capacity to carry 10-year storm flows; however, four culverts within the camp were insufficiently sized for 10-year storms (U.S. Army, 1984).

Landfills. Solid waste generated at the range camp is placed in dumpsters and picked up by the private contractor that services the Main Cantonment Area. Solid waste is then disposed of at the Type I landfill.

4.3.2.3 Energy

Energy resources described for the Doña Ana Range–North Training Areas include electricity, natural gas, and LPG.

Electricity. The EPEC provides electricity to Doña Ana Range Camp from a 14.4/24.9-kV transmission line that enters the southwest corner of the camp and connects to the existing EPEC substation. The substation has two transformers rated at 750 kilovolt amperes (kVA) that provide service to the camp and Range 40. Facilities on Ranges 49, 51, 52, and 54 (Figure 3.3-6) obtain electrical power from WSMR Feeder No. 3.

Electrical power to Orogrande Range Camp is provided by either EPEC or WSMR. The EPEC has a 115-kV transmission line that runs along the east side of the camp that connects to a 10-MVA substation. The distribution line from WSMR connects with the camp's system near the southwest corner.

Natural Gas. There is no natural gas service available at either Doña Ana or Orogrande range camps.

Liquid Petroleum Gas. There are eight LPG storage tanks with an estimated storage capacity of 24,204 gallons at Doña Ana Range Camp. It is estimated that these tanks can provide a 30-day supply for approximately 3,120 persons. At Orogrande Range Camp, there are three LPG storage tanks with a total volume of 21,000 gallons. It is estimated that these tanks can provide a 30-day supply for an approximate population of 2,680 persons.

4.3.3 McGregor Range

Infrastructure for the McGregor Range is discussed in this section. Information is presented regarding ground transportation, utilities, and energy.

4.3.3.1 Ground Transportation

U.S. Highway 54, a two-lane highway that connects El Paso, Texas, with Alamogordo, New Mexico, is the major highway that runs along the UP/SP rail line on the western border of McGregor Range. The major road on McGregor Range is New Mexico Highway 506, which travels in an east-west direction and crosses the range in the northern area (Figure 4.3-3). This road provides access to McGregor Range

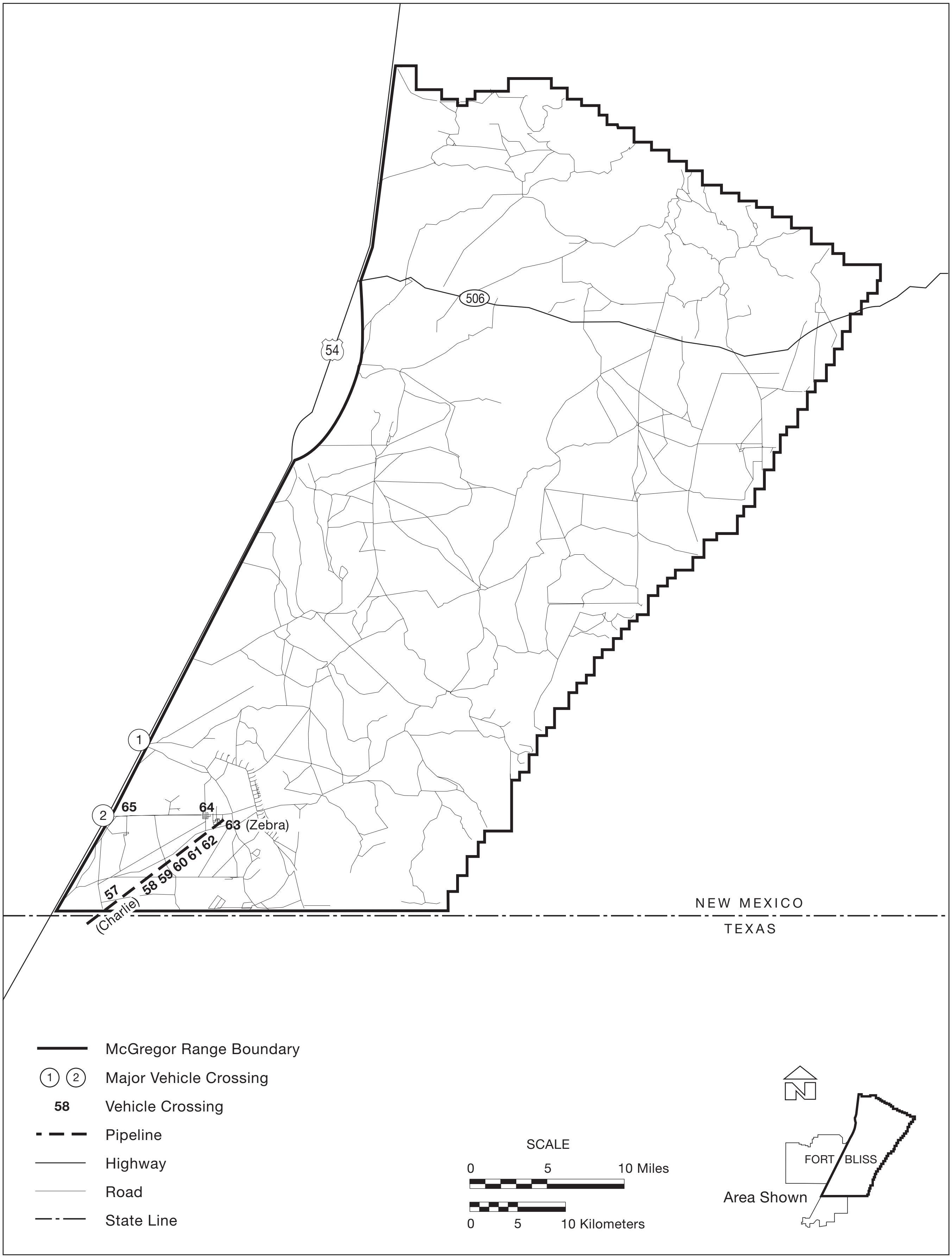

Figure 4.3-3. McGregor Range Regional Roadway Network and Authorized Vehicle Crossings.

on the west at U.S. Highway 54, and travels east where it intersects with County Road FO52, and continues northeast until it exits the range. New Mexico Highway 506 is a gravel road that is maintained by Otero County, and primarily serves as access to the communities of Timberon and Piñon, New Mexico, but also serves Dell City, Texas. The AADT volume on New Mexico Highway 506 was less than 30 vehicles per day in 1995. Operations on the range require New Mexico Highway 506 and U.S. Highway 54 be closed occasionally for safety reasons. The road-closing schedule is provided to Otero County and is available to the public to alleviate unnecessary delays. Figure 4.3-3 illustrates the McGregor Range road network; there are 1,002 miles of roads throughout McGregor Range training areas. There are three guard stations on New Mexico Highway 506 that are used to close the road when necessary; one is located at the intersection with U.S. Highway 54; the second is at the intersection with FO52; and the third is on the east end of the range at County Road EO1. There is a fourth guard station on FO52 at the boundary of the range south of the intersection with New Mexico Highway 506. Other Otero County roads that are in the northeast area of the range or to the east of the range include FO34, FO35, FO37, FO50, FO51, and FO67. There are numerous other roads in this vicinity and on the range that are not maintained by Otero County or the BLM. These are primarily dirt roads that provide access to much of the BLM land in the area. The Army maintains the road network on McGregor Range. ORV maneuver is allowed only in TA 8. Figure 4.3-3 also shows authorized points for crossing U.S. Highway 54 and the pipeline in TA 8 that traverses the training area.

4.3.3.2 Utilities

The infrastructure resource for the McGregor Range includes mission support facilities and utilities for potable water, wastewater treatment, storm water, and landfills.

Water Supply. No perennial streams exist on McGregor Range. Stream and spring flow have been captured in the Sacramento Mountains to the north and diverted to McGregor Range by ranchers since the late 1800s. In the early 1900s, pipelines began to replace the existing ditches. At the present time, two water delivery systems consisting of three main lines are in place. One line crosses the northwest quarter of McGregor Range to supply the community of Oro Grande with potable water. The other two, in a series of branches, deliver water to livestock and wildlife on the southern slopes of the Sacramento Mountains and that part of the Otero Mesa that lies in McGregor Range (BLM, 1985). The latter system normally delivers 75 gallons per minute (gpm) (about 120 acre feet per year [afy]) (U.S. Army, 1998g). In addition, numerous earthen dams collect runoff in channels of the larger arroyos in the grazing areas. Surface water on McGregor Range is too unreliable for development as a military or public water supply.

Groundwater resources in McGregor Range have not been developed extensively. A groundwater study was completed to determine if a supply of 100 gpm of potable water could be developed for the McGregor Range Camp (Rapp, 1958). In general, groundwater was too saline for human consumption, and the Army found it more economical to import El Paso city water to McGregor Range.

A 12-inch, 19.5-mile steel line with a capacity of 2,115 gpm (3.046 mgd), supplies water to McGregor Range Camp from a city booster station (U.S. Army, 1997a). A gravity-fed, looped distribution system, consisting of two elevated storage tanks, each of 250,000-gallon capacity, and several thousand feet of water line serve the range camp. The water is chlorinated as it enters the distribution system at the range camp. Water consumption at McGregor Range Camp, including that at Meyer Range, for FY 96 was 31,761,000 gallons (97 af), which included water used on two road construction projects that year. Consumption for the previous year (without road construction) was 25,116,000 gallons (77 af).

A composite 6-inch, 8-inch, and 10-inch AC line from McGregor Range Camp provides water to Meyer Range. The line is capable of handling a flow of 705 gpm or 1.02 mgd (U.S. Army, 1997a). The Meyer Range system consists of one storage tank; 3,120 feet of 8-inch line; 150 feet of 6-inch line; 790 feet of

4-inch line; 900 feet of 2-inch line; and service lines. The elevated steel storage tank provides for an on-site gravity system. This facility was built in 1966 and has a 25,000-gallon capacity. It is connected to the distribution system by an 8-inch AC line. An altitude valve on the incoming 6-inch line to the tank prevents the tank from overflowing, necessitated by a 63-foot drop in hydraulic pressure (head) between the range camp and Meyer Range (U.S. Army, 1985).

Davis Dome is serviced by a 4-inch line from the main 8-inch line. When pressures in the main system are not sufficient to properly serve Davis Dome, a small 30-gpm capacity booster pump station is utilized (U.S. Army, 1985).

A small 2,000-gallon steel water tank is used to supply water to the personnel stationed at the ASP west of McGregor Range Camp. The tank is free-standing and is not connected to the existing water system (U.S. Army, 1985). A small water distribution network serves the nearby radio controlled aerial target (RCAT) launching facility. Water is brought to the area by truck from McGregor Range Camp and pumped into a 10,000-gallon storage tank. This tank serves a fire hydrant and the repair shop. The pumphouse contains a 7.5 horsepower pump that is rated at 300 gpm against 60 feet of head. The distribution network consists of a 6-inch diameter pipe feeding the fire hydrant and a valved 2-inch diameter service line for the repair shop. The tank was relocated from the range camp and installed in 1959. The water is chlorinated before delivery (U.S. Army, 1985).

Capacity of the supply system is limited by pumping capability of the existing booster pump. Total available flow to McGregor Range Camp is limited to 0.81 mgd. The flow to Meyer Range is limited by the 6-inch line to 1.02 mgd.

Wastewater Treatment. The sanitary sewer system at McGregor Range Camp consists of a gravity system that flows approximately one-half mile to the southwest of the camp and empties into a single-cell lagoon with a surface area of 10.23 acres. The daily biochemical oxygen demand (BOD) load for the lagoon is 409.2 pounds per day, using a loading rate of 40 pounds per day per acre (Landis, 1997)

At Meyer Range, 6 miles southeast of McGregor Range Camp, a gravity flow system feeds into a lift station that pumps wastewater about one-half mile to a two-cell lagoon series with a surface of 1.68 acres each. The BOD load for the lagoons is 134.4 pounds per day, using a loading rate of 40 pounds per day per acre (Landis, 1997)

The sewage treatment system at the SHORAD range consists of a 100,000-gallon evaporation pond. The pond is seldom used and does not overflow (Landis, 1998).

Storm Water. Storm water from the McGregor Range Camp and Meyer Range, located 25 miles northeast of the Main Post, drains to the south and west either to small playa lakes within the basin or to larger playa lakes east of Newman, Texas. Storm water drainage within McGregor Range Camp consists of sheet flow to the west and southwest, eventually flowing into an ephemeral lake 1 mile southwest of the camp. Analysis of the storm drainage system indicated that the large ephemeral lake has adequate volume to contain a 10-year discharge. There may be a small amount of nuisance ponding within the range camp and at Meyer Range. Twenty-five-year storm water events were evaluated and the facilities at the Range Camp and Meyer Range were determined to be adequate (U.S. Army, 1985).

Landfills. Solid waste generated at the range camp is placed in dumpsters and picked up by the private contractor that services the Main Cantonment Area.

4.3.3.3 Energy

Energy resources discussed for the McGregor Range include electricity, natural gas, and LPG.

Electricity. Electrical power is provided by EPEC via a 39.8/69 kV transmission line that extends to the existing EPEC substation. The substation is equipped with a 7,500 kVA oil-cooled transformer.

Natural Gas. McGregor Range Camp receives natural gas from the Gas Company of New Mexico, who purchases the gas from the EPGC. A 2-inch, high-pressure natural gas pipeline extends 14.15 miles from an intrastate pipeline to meet the requirements of McGregor Range Camp. A 1-inch distribution system provides gas to buildings at the range camp. There is no natural gas service to Meyer Range.

Liquid Petroleum Gas. Meyer Range is dependent on LPG for heating. There are two 2,000-gallon tanks that serve the bivouac area and a 500-gallon tank for the range area.

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Airspace Use and Management

4.4

4.4 AIRSPACE USE AND MANAGEMENT

The ROI (Figure 4.4-1) considered for the Fort Bliss Mission and Master Plan PEIS is the airspace that is affected by aviation activities at the Biggs AAF and the military training activities on McGregor Range and the Doña Ana Range–North Training Areas.

Airspace, when describing its use for aviation purposes, is defined, managed, and utilized in a manner that best serves the competing needs of commercial aviation, general aviation, and defense-related activities. The FAA, which is responsible for the overall management of airspace, has established four airspace designations that are designed to protect aircraft while operating to or from an airport, transiting enroute between airports, or operating within "special use" areas identified for military purposes. These airspace designations are controlled airspace, uncontrolled airspace, special use airspace, and other airspace. Rules of flight and air traffic control (ATC) procedures have been established that govern how aircraft must operate within each type of designated airspace.

All aircraft operate under either instrument flight rules (IFRs) or visual flight rules (VFRs). Instrument weather conditions require the use of IFRs that entail specific aircraft operating requirements and adherence to ATC-assigned routes and altitudes. In visual weather conditions, aircraft may operate under VFRs in which pilots must observe and maneuver to avoid other aircraft. Pilots may fly along any desired route of flight without any ATC clearance when operating under VFRs.

The type and dimension of individual airspace areas within a given region and their spatial and procedural relationships to one another are contingent upon the different aviation activities conducted in that region. When any significant change is planned, such as new or revised defense-related activities within an airspace area or a change in the complexity or density of aircraft movements, the FAA reassesses the airspace configuration to determine if such changes could adversely affect (1) ATC systems and/or facilities; (2) movement of other air traffic in the area; or (3) airspace already designated and used for other purposes such as Restricted Areas or Military Training Routes (MTRs).

Biggs AAF mission activities occur within the airspace terminal area under the control of the FAA-operated El Paso Approach Control facility at the EPIA. The lateral boundaries of the El Paso Approach Control terminal area, which excludes any airspace beyond the United States-Mexico border, are approximately 25 nautical miles (nm) to the west of EPIA, 35 nm to the east and southeast of the EPIA, and 17 nm to the north of the EPIA. The Approach Control Area encompasses altitudes from the surface to 17,000 feet above mean sea level (msl). The Approach Control Area contains elements of controlled airspace, uncontrolled airspace, special use Restricted Area airspace, and MTRs.

The McGregor Range and the Doña Ana Range–North Training Areas are contained within Restricted Area airspace located north of El Paso in New Mexico. Restricted Areas are established around locations where hazardous activities such as artillery, missile firings, bombing, and gunnery are conducted. Access to this airspace is limited to only those aircraft participating in these activities when the airspace is active. When the FAA designates the area for joint use, these areas may be used by nonparticipating aircraft with permission of the controlling agency or using agency as appropriate.

4.4.1 Airports

The El Paso Approach Control Area boundaries encompass four public-use civil airports, one military airport (Biggs AAF), and one private-use civil airport (the Cielo Dorado Estates Airport). The four public-use civil airports are the EPIA, the West Texas Airport, the Doña Ana County Airport, and the Fabens Airport. Biggs AAF and EPIA are contiguous to each other with the Biggs Runway 03/21

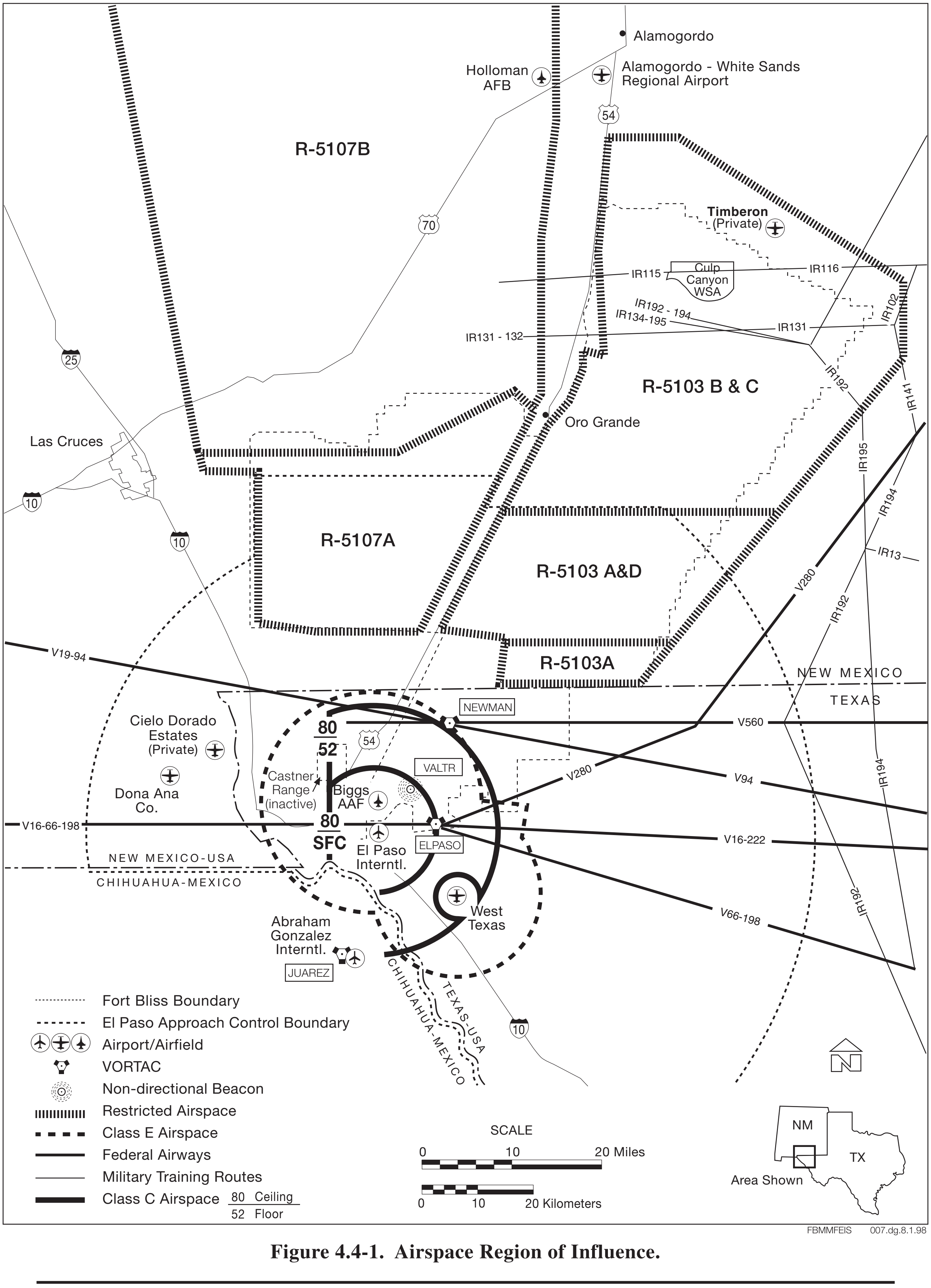

Figure 4.4-1. Airspace Region of Influence.

located approximately 1.4 nm north of EPIA's Runway 04/22. Both Biggs AAF and EPIA have Air Traffic Control Towers (ATCT) for the control of arriving and departing aircraft at each facility. El Paso Approach Control provides terminal area ATC radar services to Biggs AAF, EPIA, and the West Texas Airport. The West Texas Airport has no ATCT, but the airport is served by a published instrument approach procedure. The Doña Ana County and Cielo Dorado Estates airports are VFR-only airports for which there are no ATC services.

The Timberon Airport, a small, private-use VFR-only civil airport lies within the northeastern boundary of R-5103B. However, R-5103B excludes the airspace below 1,500 feet agl in the vicinity of the airport to protect the airport from the Restricted Area military activities.

Although Biggs AAF and the EPIA are contiguous, each has distinct airspace and ATC operating parameters and procedures. Simultaneous operations typically occur at both airports. However, their proximity to one another, and the relationship of their runway configurations, can require air traffic considerations, particularly during peak traffic periods or instrument weather conditions in which landings and takeoffs at both facilities may be coordinated and controlled as a single airport. Biggs AAF ATCT is open 10 hours on weekdays and closed on Saturday and Sunday, except when extended hours are requested. When the ATCT is closed, aircraft arriving to or departing from Biggs AAF receive air traffic advisories and departure clearances from El Paso Approach Control.

In CY 96, 44,811 aircraft operations (defined as one takeoff and one landing) were conducted at Biggs AAF (U.S. Army, 1996h) as shown in Table 4.4-1. Biggs AAF ATCT staff estimate that 25 percent of these operations (11,200) were touch-and-go (TGO) practice takeoffs and landings (Sepulveda, 1997). In CY 96, there were 134,601 aircraft operations at the EPIA, including 69,701 commercial air carrier and air cargo operations; 59,650 general aviation operations; and 5,250 military aircraft operations (EPIA, 1996).

Table 4.4-1. Annual Aircraft Operations and Touch-and-Go's at Biggs Army Airfield, Calendar Year 96

Aircraft Category	*Operations*		*TGOs*	
	Day	*Night*	*Day*	*Night*
Military	35,130	1,849	8,783	462
Civil	7,440	392	1,860	98
Total	*42,570*	*2,241*	*10,643*	*560*

Source: U.S. Army, 1996h.

4.4.2 Controlled/Uncontrolled Airspace

Controlled airspace is airspace within which ATC services are provided to IFR and VFR flights in accordance with procedures established for the type of controlled airspace. The controlled airspace structure within the ROI consists of: Class C airspace established around Biggs AAF and EPIA in conjunction with approach control and ATCT services for IFR operations; Class D airspace around Biggs AAF and EPIA in conjunction with ATCT services for landings, takeoffs, and instrument procedures at each respective airport; and, Class E airspace around Biggs AAF and the EPIA for aircraft transitioning between the airports and the enroute airspace environment. Because ATCT services are not available at the West Texas Airport, Class E airspace has been established to accommodate instrument operations at the airport and aircraft transitioning between the airport and the enroute airspace system.

The ROI also contains segments of seven low-altitude airways, which are also designated as Class E airspace. All other airspace within the ROI, including the McGregor Range and Doña Ana Range–North Training Areas, is uncontrolled airspace.

4.4.3 Restricted Airspace

The Doña Ana Range–North Training Areas are located in Restricted Area R-5107A, approximately 5 nm north of the New Mexico-Texas border and west of U.S. Highway 54. The lateral boundaries of this Restricted Area extend approximately 13 nm to the north and south. The east/west boundaries are approximately 13.5 nm wide at the southern boundary and 23 nm wide at the northern boundary. Altitudes in R-5107A extend from the surface to unlimited, but have a 2,000-foot agl restriction over the part of the Organ Mountains that contains potential raptor nesting habitat. Flight information publications stipulate that this Restricted Area is active 24 hours a day, 7 days per week. The number of air operations conducted at the Doña Ana Range–North Training Areas in CY 96 is delineated in Table 4.4-2.

Table 4.4-2. Doña Ana Range–North Training Areas Air Operations, 1996

Area	*Sorties*	*Percent of Total (approximate)*
Monroe DZ	1	—
Stewart DZ	7	—
Tularosa DZ	16	—
Doña Ana Range Camp	2	1.0
TAs 3 through 7	346	92.0
Firing Ranges 40, 45, 47, 48, and 49	26	6.0
Desperation DZ	2	1.0
Total Sorties	*400*	*100.0*

Note: An aircraft sortie is one takeoff and landing. This table shows the sorties through Fort Bliss airspace rather than takeoffs and landings from facilities on the ground. See Figures 3.3-5 and 3.3-6 for locations of areas.
Source: U.S. Army, 1996h.

The McGregor Range is located under Restricted Areas R-5103A, B, C, and D. The lateral boundaries of these Restricted Areas extend northward approximately 45 nm from the New Mexico-Texas border to approximately 8 nm south of Alamogordo, New Mexico, and eastward within a radius of 25 nm of U.S. Highway 54. The altitudes for R-5103A extend from the surface to, but not including 18,000 feet msl; for R-5103B from the surface to 12,500 feet msl; for R-5103C from 12,500 feet msl to unlimited; and R-5103D from 18,000 feet msl to unlimited. The published hours of operation for R-5103A/B/C/D are from 7:00 a.m. to 8:00 p.m. Monday through Friday (National Oceanic and Atmospheric Administration [NOAA], 1996). Changes to these restricted area hours of operation can occur and such changes are disseminated through the nationwide Notice to Airmen (NOTAM) system that pilots are expected to review prior to flight in the vicinity of restricted or other defense-related airspace. The number of air operations conducted at the McGregor Range in CY 96 is delineated in Table 4.4-3.

4.4.4 Military Training Routes

Defined as air routes of varying lengths, widths, and altitudes, MTRs are used for low altitude flight tactics and navigation at speeds greater than 250 knots. Segments of nine MTRs originate, terminate, or transit the McGregor Range restricted airspace, as shown on Figure 4.4-1. In FY 96, there was an average of 0.5 daily flight operations on MTR IR-134 (King, 1997). Aircraft normally use IR-134 during daylight hours. MTRs IR-102, IR-115, IR-116, IR-131, and IR-132 are limited to use for Air-launched Cruise

Table 4.4-3. McGregor Range Air Operations, 1996

Area	*Sorties*
McGregor Helipad	5
North McGregor / R5103 B & C	321
South McGregor / R5103 A & D	283
Orogrande	35
SHORAD	6
Ranger DZ	29
IFC-23	53
Wilde Benton Landing Zone	23
McGregor Range Class C Bombing Range (Bombing Circle)	1,151
Total Sorties	*1,906*

Note: An aircraft sortie is one takeoff and landing associated with the flight of an aircraft. This table shows the sorties through Fort Bliss airspace and includes sorties with >5 scheduled missions. Unscheduled missions such as medical evacuation, VIP transport, or other missions that include <5 aircraft are not included.

Source: U.S. Army, 1996h.

Missile (ALCM) missions and no ALCM missions were conducted on these routes in 1996. MTRs IR-192, IR-194, and IR-195 are new routes on which there was no activity in 1996. The USAF has proposed that the MTRs originally established for ALCM tests be consolidated and converted to low-level training routes. This proposal includes changes in aircraft operations along IR-102 and indirectly alters operations in IRs 134/195 and 192/194. The proposed changes occur outside of Fort Bliss airspace and are not depicted on Figure 4.4-1. Use by the USAF and GAF of the tactical target complex on 78
McGregor Range would not require any modifications to existing airspace. The training would use the airspace modifications proposed for the ALCM tests, if approved by the FAA. Figure 4.4-1 illustrates the entrance and exit points of training routes for the Fort Bliss Training Complex including the USAF tactical target complex. Table 4.4-4 summarizes the altitude and route widths for those segments of the MTRs located within the McGregor Range area.

Table 4.4-4. Military Training Routes within the Region of Influence

MTR	*Altitude Range*	*Route Width Range*	*Operating Hours*
IR-102	500' agl–10,000' msl	7–10 nm	Daylight hours by NOTAM
IR-115	500' agl–12,000' msl	10 nm	Daylight hours by NOTAM
IR-116	500' agl–12,000' msl	10 nm	Daylight hours by NOTAM
IR-131	500' agl–12,000' msl	10 nm	Daylight hours by NOTAM
IR-132	500' agl–12 000' msl	10 nm	Daylight hours by NOTAM
IR-134	100' agl–12,500' msl	Varied as defined by geographical coordinates	Sunrise–11:00 p.m.
IR-192	100' agl–12,500' msl	10–20 nm	Sunrise–11:00 p.m.
IR-194	100' agl–12,500' msl	7–24 nm	Sunrise–11:00 p.m.
IR-195	100' agl–12,500' msl	Varied as defined by geographical coordinates	Sunrise–11:00 p.m.

Source: DoD, 1997.

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Earth Resources

4.5

4.5 EARTH RESOURCES

The ROI for geology is, with the exception of seismicity, restricted to lands owned and controlled by the Army at Fort Bliss. The ROI for seismicity includes south-central New Mexico, west Texas, and northern Mexico because earthquakes that occur beyond the boundary of Fort Bliss could, if sufficiently powerful, affect facilities and activities on the installation.

4.5.1 Physiography

Fort Bliss lies within the Basin and Range physiographic province (Figure 4.5-1). Extension of the crust throughout the province during the past 30 million years has produced characteristic short, linear mountain ranges separated by intervening valleys (Stewart, 1978). Superimposed along the eastern side of the Basin and Range is a peculiar physiographic feature that extends from west Texas and northern Mexico northward through central New Mexico. This feature, the Rio Grande Rift Valley, extends northward into the Southern Rocky Mountains physiographic province of southern Colorado and northern New Mexico. From Albuquerque northward, the Rio Grande Rift Valley is a relatively distinct, continuous physiographic feature containing numerous basins. South of Albuquerque, the rift broadens and encompasses several valleys and small, linear mountain ranges. At about the latitude of El Paso, Texas, the Rio Grande Rift Valley turns abruptly to the southeast.

Much of Fort Bliss lies within the Tularosa Basin. The basin is about 100 miles long and 60 miles wide, and is one of the largest valleys in the Rio Grande rift. The Tularosa Basin merges with the Hueco Bolson (valley) at and south of El Paso, Texas. The Hueco Bolson is about 16 miles wide and extends into west Texas and Mexico. From south to north along the east side of Fort Bliss are the Hueco Mountains, Otero Mesa, and Sacramento Mountains. The Hueco Mountains form the western edge of the Diablo Plateau, which extends far into southeast New Mexico and Texas. Otero Mesa is continuous with the Diablo Plateau. Approximately 163,000 of the 1.2 million acres of Otero Mesa (USAF, 1998) and 17,000 acres of the Sacramento Mountains foothills are located within the Fort Bliss Training Complex. The Sacramento Mountains rise steeply from Otero Mesa and the Tularosa Basin north of Fort Bliss. Along the southwest side of Fort Bliss are the Franklin Mountains. Several miles north of the Franklin Mountains are the narrow, steep-sided Organ Mountains. The Organ Mountains are continuous northward with the San Andres Mountains and, together, form an unbroken 100-mile-long mountain range. A short distance north of the central part of Fort Bliss are the Jarilla Mountains, a small, circular cluster of hills rising from the Tularosa Basin.

4.5.2 Stratigraphy

The stratigraphy of the ROI is shown in Figures 4.5-2a and 2b. The geologic history of the area is summarized below.

The oldest rocks near Fort Bliss are exposed in the Organ and Franklin mountains. These mostly granite, schist, and gneiss rocks are the deep crustal roots of ranges that extended across much of western North America more than 1.3 billion years ago (Seager, 1981). During the next several hundred million years, these mountains were eroded by glaciers, rivers, and storms into a remarkably flat surface close to sea level.

Beginning about 550 million years ago, a sea lying west of the Fort Bliss region began advancing eastward across the eroded plain. Later, the seas retreated westward in response to gentle uplift of the crust and the carbonate deposits left by prior seas were partially or completely eroded before the seas again advanced across the region.

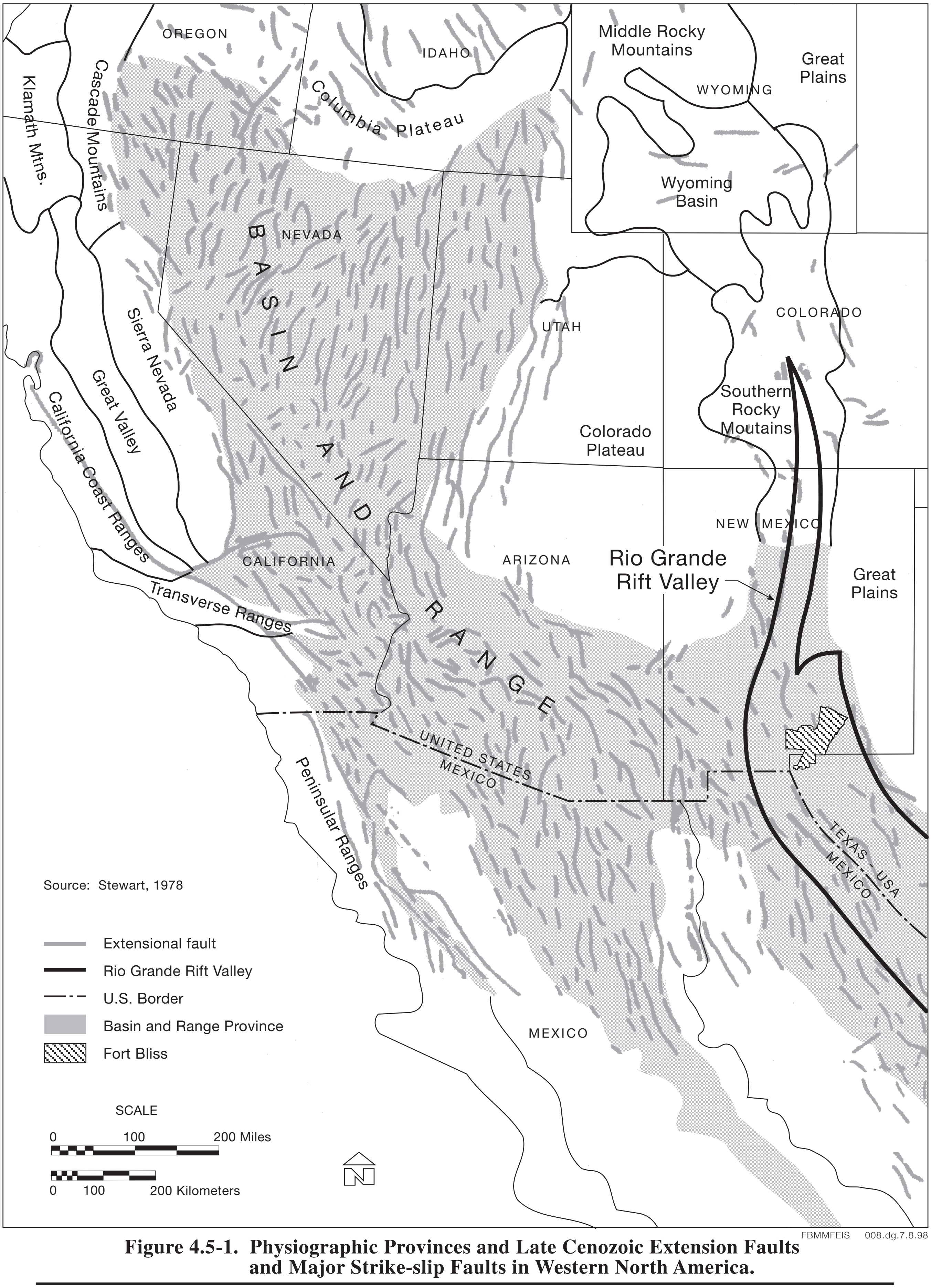

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Figure 4.5-1. Physiographic Provinces and Late Cenozoic Extension Faults and Major Strike-slip Faults in Western North America.

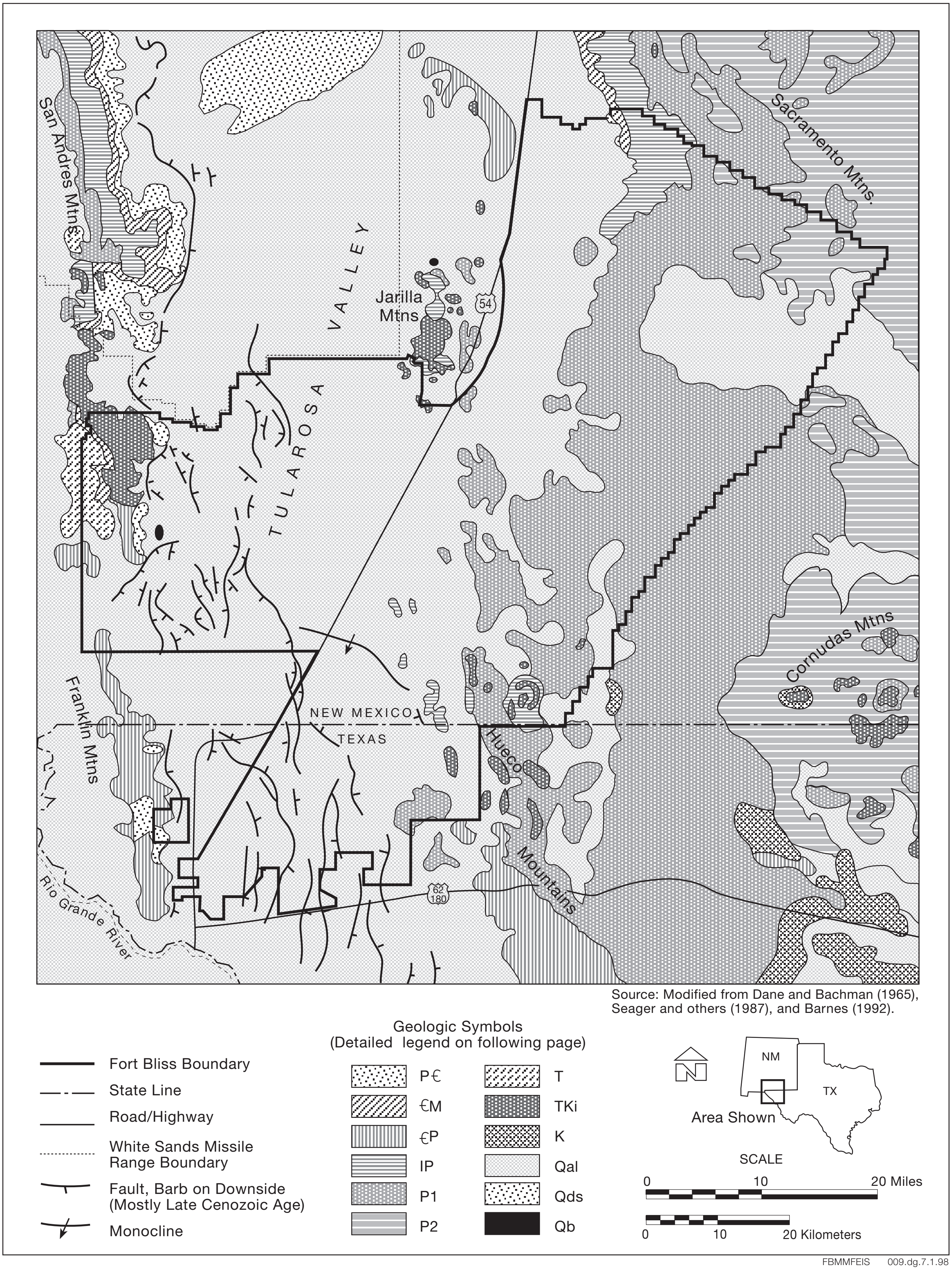

Figure 4.5-2a. Age and Dominant Rock Type in the Fort Bliss Area, Texas and New Mexico.

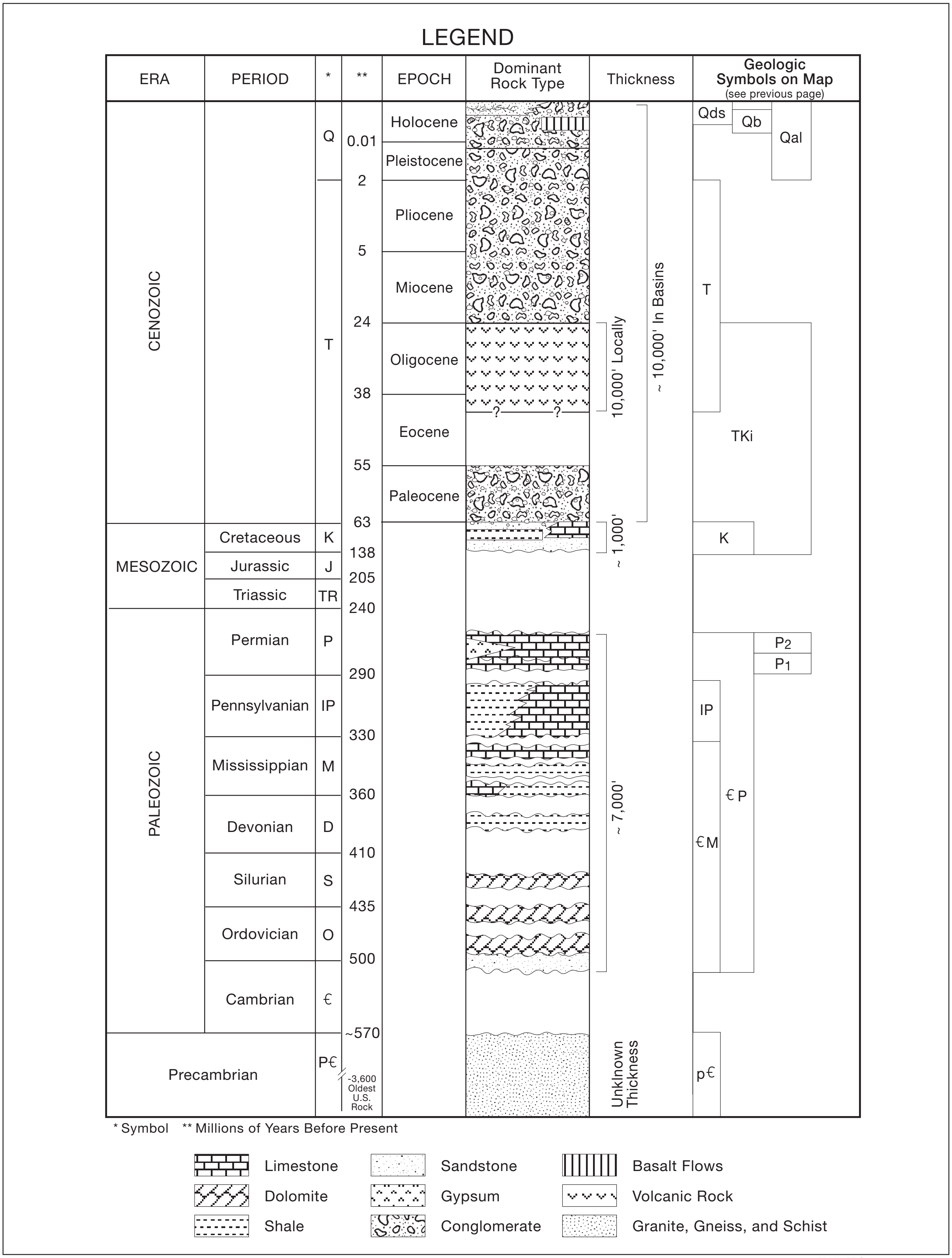

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Figure 4.5-2b. Age and Dominant Rock Type in the Fort Bliss Area, Texas and New Mexico. (continued)

The character of sedimentation changed over time from carbonates to silts and clays. These deposits are represented today by black, nonfossiliferous shale that contains abundant pyrite (Seager, 1981). Middle and Late Mississippian rocks preserve a record of deep basins in which black, calcareous muds accumulated. These basins were eventually filled in, the region was uplifted, and the sea retreated southward to about the location of El Paso, Texas. From El Paso southward, deposition was continuous from Mississippian to Pennsylvanian time (Harbour, 1972). The cyclical nature of carbonate deposits during the Pennsylvanian time may reflect changes in sea level that have been correlated with glaciations elsewhere in the world (Seager, 1981). These relatively stable marine conditions were interrupted on occasion by influxes of coarse sand and pebbles eroded from the broad Pedernal Uplift 100 miles east of 79
the Fort Bliss area. As the Pedernal Uplift grew in elevation, a large oval-shaped basin (the Orogrande Basin) developed along the uplift's west side.

In the southern part of the Fort Bliss area, the shoreline between the coarse debris flowing in from the north and the marine waters of the Orogrande Basin, advanced and retreated many times, depositing gypsiferous sand and silt and carbonate muds (the Yeso and San Andres Formations). The rock record in the Fort Bliss area, from Late Permian to Early Jurassic time, is missing. Sediments were either not deposited during this time span or, if deposited, were eroded away prior to deposition in Cretaceous time.

Early Cretaceous sands (such as the Dakota Sandstones) are overlain by mudstone and shale (the Mancos Shale). The abundance of sands and silts in the Late Cretaceous seas were early indicators of major and widespread uplifts that occurred throughout the region. This period of mountain building, referred to as the Laramide Orogeny, lasted for some 50 million years (Late Cretaceous time to Early Tertiary time). Large masses of molten rock were injected into the subsurface, and some are exposed today in the Organ, Jarilla, and Hueco mountains. Coarse debris eroded from the Laramide uplifts is preserved in various Early Tertiary rocks (i.e., the Love Ranch Formation). Beginning at the end of Cretaceous time, perhaps 80 million years ago, and continuing intermittently into the present, the Laramide Orogeny affected much of the Rocky Mountain region from Wyoming south to New Mexico (Kluth and Coney, 1981; Seager and Mack, 1986). Large blocks of the crust were uplifted, exposing Precambrian rocks that had been eroded flat in Precambrian time. These crustal blocks trended largely northward and were flanked by steep faults and folds. In the El Paso area, however, some of the Laramide uplifts trend northwestward, paralleling the trend of the Cordilleran orogenic belt. The Cordilleran belt extends southward from Alaska, through western Canada and the western United States. Near Las Vegas, Nevada, the belt abruptly changes to a southeasterly direction and continues through southern Arizona and southwestern New Mexico (Drewes, 1978). The belt continues into west Texas near El Paso and then southeastward through Mexico. Some of the major faults in the Franklin and Organ mountains developed during this time and may be related to compressional stresses that developed at the intersection of the Laramide and Cordilleran belts (Seager, 1981). Many other Laramide structures, however, are hidden beneath younger rocks in present-day valleys and are known only through geophysical surveys and drilling. Many of these buried Laramide structures have been further obscured by younger deformation associated with the development of the basin and range and the Rio Grande Rift.

Middle Tertiary time marks the beginning of extensive igneous activity in south-central New Mexico and west Texas. In the Organ Mountains, rhyolitic eruptions from the Organ caldera are more than 10,000 feet thick (Seager, 1981). Intrusive igneous rocks were emplaced in early Tertiary time in the Organ, Hueco, Jarilla, and Sacramento mountains. This phase of igneous activity was followed by the deposition of conglomerate, sandstone, caliche, shale, and gypsum (the Santa Fe Formation). During Oligocene time, the Rio Grande Rift began to develop and by about 17 million years ago, the broader basin and range began to develop. The present-day mountains in the Fort Bliss region began developing about 10 million years ago.

The Tularosa Basin and Hueco Bolson contain thick deposits of Cenozoic debris eroded from the adjacent mountains (Collins and Raney, 1991). Basaltic lava flows were extruded throughout the Fort Bliss area, with remnants preserved north of the Jarilla Mountains and east of the Organ Mountains. During the Pleistocene, a lake (Lake Otero) occupied the present-day White Sands National Monument. As this lake evaporated, the broad areas of gypsum-bearing sediments in today's Tularosa Basin were deposited.

4.5.3 Structure

Several major tectonic episodes have punctuated the geologic history of south-central New Mexico and adjacent parts of Texas and Mexico. Precambrian-age mountains developed throughout broad parts of the western United States, presumably in response to stresses caused by the horizontal motion and collision of enormous crustal plates (plate tectonics). Then, in late Paleozoic time, the crust in New Mexico was fragmented into large basins and uplifted as the Ancestral Rocky Mountains developed. During Late Cretaceous and Early Tertiary time the Laramide Orogeny compressed and folded the crust throughout New Mexico, producing broad basins and mountains.

Beginning about 30 million years ago (Oligocene time) the crust in south-central New Mexico and west Texas was pulled apart as the Rio Grande Rift began to develop (see Figure 4.5-1). Most extension occurred from 30 to 18 million years ago, and again from 10 million years ago to the present (Adams and Keller, 1994). Rift basins produced during the older period of extension trend northeast and were accompanied by eruptions and intrusions of alkali igneous rocks. Rift basins formed during the younger period of extension are oriented more northerly and were (and still are) accompanied by eruptions of basalt. The Tularosa Basin and the Hueco Bolson developed during this second period of rifting.

In New Mexico, the north-trending belt of faults coincides with the Rio Grande Rift. Figure 4.5-1 shows the location of Late Cenozoic faults in the vicinity of Fort Bliss. Most faults are along the west sides of the Tularosa Basin and the Hueco Bolson. The youngest fault displacements that rupture the surface probably occurred 1,000 years ago along the north-trending Organ Mountains fault; this may be the youngest fault in New Mexico (Gile, 1987, 1994). A single-event surface rupture of almost 10 feet is reported (Collins and Raney, 1991) to have occurred in Pleistocene time along the east side of the Franklin Mountains. The dip of this fault ranges from vertical to 60 degrees east (Lovejoy and Hawley, 1978).

4.5.4 Seismicity

Between the years 1849 and 1975, New Mexico had about 1,100 earthquakes that were felt or measured (Northrop, 1976). Of these, 76 percent were in the Rio Grande Rift, and 96 percent of those were restricted to a 75-mile-long segment between Socorro and Albuquerque. Only a few earthquakes were recorded in south-central New Mexico during this 127-year interval, and none had an instrumentally recorded Richter magnitude that exceeded 4 (post-1962). Based on subjective observations of the intensity of shaking and the areal extent of perceptibility, an earthquake with a magnitude of 6.5 probably occurred near Socorro in 1906 and another, of magnitude 6, occurred near Valentine, Texas, (approximately 150 miles southeast of El Paso) in 1931 (Northrop, 1976; Davis et al., 1989).

The 1931 Valentine earthquake is the largest known earthquake in Texas and it caused severe damage in the epicentral region (Davis et al., 1989). Smaller earthquakes have struck the El Paso-Juarez area in 1889, 1923, 1931, 1936, 1937, 1969, and 1972. The 1923 earthquake was felt throughout a large region, but the strongest shaking was in El Paso and Juarez (Davis et al., 1989). The 1937, 1969, and 1972 earthquakes were felt more strongly on the east side of El Paso than the west side. According to some, earthquakes in the west Texas region are related to a zone of crustal weakness, referred to as the Texas Lineament, that extends at least as far west as southern Nevada (Muehlberger, 1980; Drewes, 1978).

According to Sandford et al. (1972), an earthquake of magnitude 6 can be expected every 100 years in the Rio Grande Rift, particularly in that part of the rift from Socorro to Albuquerque. This estimate is based largely on the region's earthquake record, which now extends back about 150 years. However, the historic pattern of earthquakes in the western United States is episodic; areas can apparently remain inactive for tens to thousands of years and then, for no apparent reason, suddenly be struck by swarms of earthquakes, only to return just as suddenly to a period of quiescence (Smith, 1978). Gile (1994) recognizes an episodic pattern of displacement along the Organ Mountains fault. This fault ruptured about 1,000 years ago and has an estimated rupture-recurrence interval of 4,000 to more than 5,000 years (Gile, 1994; Machette, 1987). If this fault is continuous northward with the fault along the east base of the San Andres Mountains and southward with the fault along the east base of the Franklin Mountains, then it exceeds 100 miles in length. A rupture along the entire length of this fault could exceed a magnitude of 6 and cause widespread and severe damage to man-made structures in west Texas and south-central New Mexico. Gravity sliding of large rock masses from the steeper parts of the Franklin and Organ mountains could also occur, as may have happened in the past (Lovejoy and Hawley, 1978).

4.5.5 Mineral and Energy Resources

Figure 4.5-3 shows the location of mining districts, quarries, geothermal areas, and exploration holes for oil and gas in the Fort Bliss area. Table 4.5-1 lists and briefly describes the mining districts in the area. Mineral and energy resources will be discussed in relation to metallic minerals, industrial minerals and materials, geothermal resources, oil and gas resources, and uranium resources.

4.5.5.1 Metallic Minerals

Five mining districts in the Fort Bliss area have produced metallic minerals (see #s 1, 3, 10, 13, and 18 on Figure 4.5-3 and Table 4.5-1). None of these districts are currently active (Hatton et al., 1995). The Orogrande district in the Jarilla Mountains (#1) and the Organ district in the Organ Mountains (#10) have been the largest producers in the area, producing chiefly copper, gold, lead, silver, zinc, and iron. The value of production at each district was less than $10 million (Mardirosian, 1977). Small amounts of metallic minerals have also been produced from the Black Mountain district (#13–gold), the Green Crawford district (#18–copper), and the North Franklin Mountains district (#3–iron), all of which are in the Organ and San Andres mountains.

The mountainous areas in and near Fort Bliss have the potential for the discovery of additional small deposits of metallic minerals at and near the surface. Subsurface deposits could be considerably larger, but much more expensive to extract.

4.5.5.2 Industrial Minerals and Materials

Industrial minerals and materials are currently produced from numerous quarries in the Fort Bliss area (see Figure 4.5-3). The materials produced are mostly sand, gravel, and limestone. Except for #4 on Figure 4.5-3, none of these quarries are within established or recognized mining districts and are shown on Figure 4.5-3 as "active quarries." Large amounts of sand, gravel, and building stone are available throughout the Tularosa Basin and Hueco Bolson, as is limestone from Paleozoic rocks in neighboring mountains and mesas.

Mining districts that have produced industrial minerals and materials are chiefly in the Franklin, Organ, and San Andres mountains (see Figure 4.5-3). Materials produced include limestone, clay, and shale for cement; building stone; flourspar; and barite. The value of the materials produced has been less than $1 million at each district. Only the Vado quarries (#4) are currently active (Hatton et al., 1995). Small

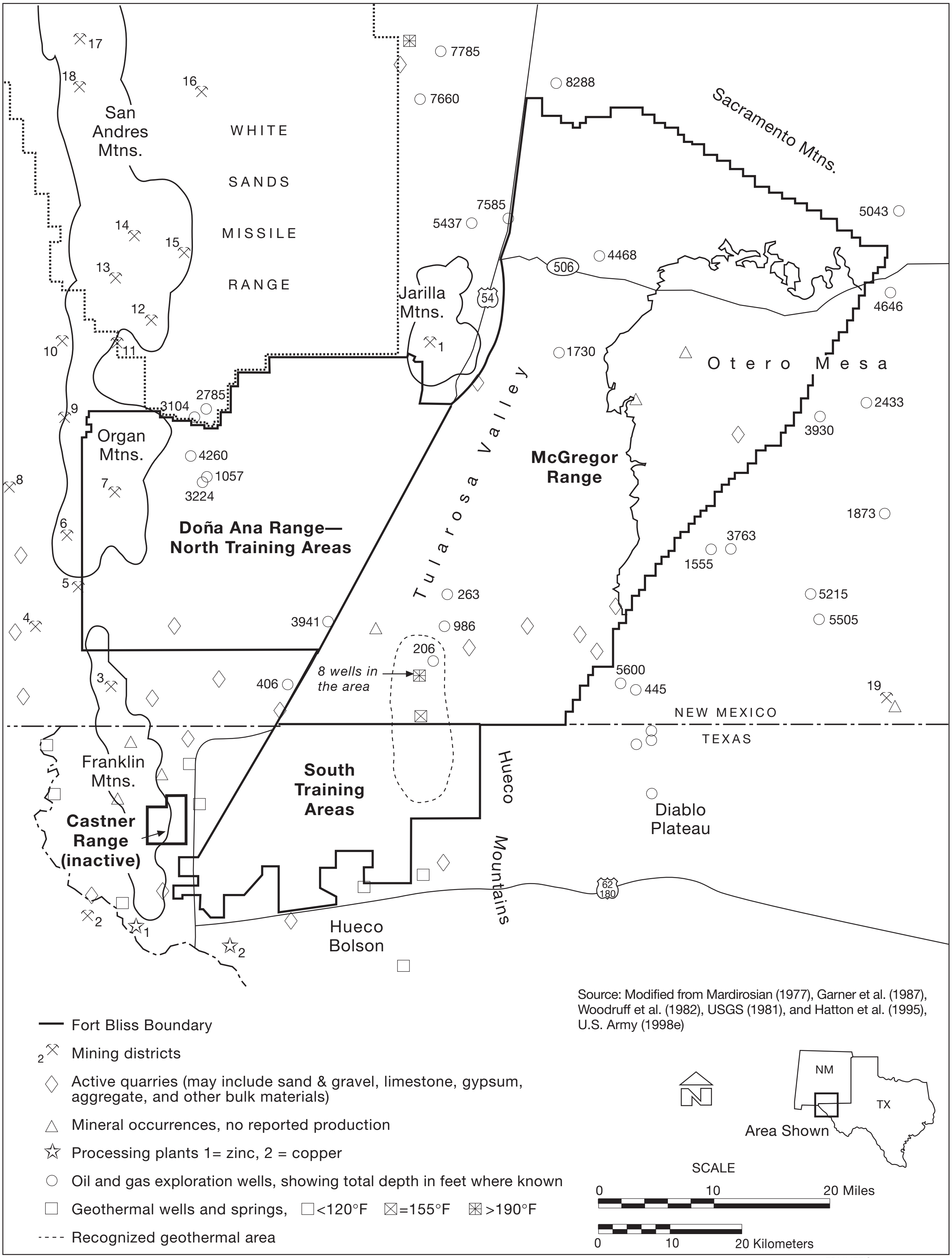

Figure 4.5-3. Mineral and Energy Resources in the Fort Bliss Area, Texas and New Mexico.

Table 4.5-1. Mining Districts in the Vicinity of Fort Bliss

	Mining District (see Figure 4.5-3)	*Description*
1	Orogrande (Jarilla)	Replacement and skarn deposits of copper, lead, gold, silver, and iron in Pennsylvanian carbonate rocks adjacent to Tertiary intrusive rocks. Also placer deposits. Production estimated between $1 and 10 million.
2	Brickland	Limestone, clay, and shale from Cretaceous rocks for cement. Production less than $1 million.
3	North Franklin Mtns. (Copiapo)	Iron from replacement deposits in limestone along shear zones. Lead and fluorspar from veins in dolomite. Gypsum from limestone beds. Production less than $1 million.
4	East Vado (active)	Building stone. Production less than $1 million.
5	Mesquite	Clay from Pennsylvanian (?) shale. Production less than $1 million.
6	Bishop Cap	Fluorspar from veins in limestone. Production less than $1 million.
7	White Spar	Barite from veins in limestone. Production less than $1 million.
8	Tortugas	Fluorspar from veins and faults in limestone and shale. Production less than $1 million.
9	Ruby (also called Hayner)	Fluorspar from veins in limestone and shale. Production less than $1 million.
10	Organ	Replacement deposits of copper, gold, lead, silver, and zinc in Paleozoic carbonate rocks near Tertiary intrusive rocks. Production estimated between $1 and $10 million.
11	Golden Lily	Fluorspar from veins in Precambrian granite. Production less than $1 million.
12	Tennessee	Fluorspar from contact zone between Precambrian granite and dikes. Production less than $1 million.
13	Black Mountain	Gold from irregular replacement deposits in dolomite. Production less than $1 million.
14	Bear Canyon	Barite and lead from replacement deposits in limestone. Production less than $1 million.
15	Stevens	Fluorspar and barite from replacement deposits in limestone. Production less than $1 million.
16	Lake Lucero	Sodium compounds and borax from brines in Lake Lucero and surface deposits in nearby alkali flats. Production less than $1 million.
17	San Andres	Barite and lead from irregular replacement deposits in limestone. Production less than $1 million.
18	Green Crawford	Copper veins in limestone. Production less than $1 million.

Source: Mardirosian, 1977 and Garner et al., 1987.

amounts of sodium compounds and borax have been produced from a district near White Sands Monument (#16 on Figure 4.5-3)

4.5.5.3 Energy Resources

Geothermal, oil and gas, and uranium resources are discussed in this section.

Geothermal. Geothermal resources of commercial proportion (generally hotter than 194°F and capable of generating commercial amounts of electricity) are most prevalent in areas of crustal instability, high heat-flow, and young igneous rocks (Muffler et al., 1978). In contrast, low-temperature geothermal resources (less than 194°F) occur widely, apparently originating from deep groundwater circulation in regions with normal or higher-than-normal geothermal gradients.

The Rio Grande Rift is characterized by crustal instability, moderate to high heat-flow (from 1.5 to more than 2.5 heat-flow units), and warm to hot subsurface waters. The Army is investigating the potential of the geothermal area to supply electricity for operations at Fort Bliss near Davis Dome, where temperatures up to 192.4°F have been recorded (also refer to Section 4.7.12). Water temperatures within the 25-mile-long geothermal area range from 176° to 230°F (Henry and Gluck, 1981). Temperatures as high as 134°F have been reported from well depths of only 450 feet (Woodruff et al., 1982). The concentration of dissolved solids ranges from 1,100 to 12,500 milligrams per liter (mg/l). The source of the dissolved solids is presumably the evaporite deposits in the basin fill or Paleozoic rocks or both (Henry and Gluck, 1981). Other parts of Fort Bliss have potential for low- to moderate-temperature geothermal waters that could be used locally for space heating.

Oil and Gas. Most investigators considered the organic remains, typically contained in sedimentary rocks such as shale and limestone, to be the chief source rocks for the world's hydrocarbons. This organic debris is generally more abundant and accumulates more rapidly in near-shore marine environments where life flourishes, although some nonmarine environments may also contain significant accumulations of organic debris. Where such accumulations of organic debris are heated during deep burial, a series of poorly understood chemical and physical reactions can transform part of the organic material into petroleum (a process called maturation). The word petroleum applies to gaseous, liquid, and solid materials, and includes crude oil and natural gas.

Continued compaction from the weight of overlying sedimentary layers can expel the gaseous and fluid portions of the petroleum, which then migrate towards areas of lower pressure. The distance that oil and gas can migrate is a matter of considerable debate among geologists. Some believe fluid migration of several hundred to even thousands of miles is possible, whereas others believe that oil and gas migrate very little from the point at which they are generated. If the transmissivity of the rocks is sufficient, and favorable *reservoir rocks* and *traps* exist, pools of oil and gas can accumulate.

The favorability of an area to contain commercial quantities of oil and gas depends on many factors. Important factors include: the presence and volume of source rock, the degree of maturation of the source rocks, the availability of reservoir rocks, and the availability of stratigraphic or structural features to trap the migrating oil and gas. The severity of post-entrapment tectonic, igneous, and geothermal activity which, if too intense, can vaporize the petroleum or allow it to escape to the atmosphere or hydrosphere along faults and fractures and by fresh-water flushing.

The Tularosa Basin contains numerous Paleozoic source and reservoir rocks (King and Harder, 1985). Through 1980, numerous oil and gas exploration wells had been drilled in the Fort Bliss area (see Figure 4.5-3), but all were dry (U.S. Geological Survey [USGS], 1981). Foster (1978) lists the wells that had oil and gas shows. The most successful test wells were drilled in 1974 at the northern end of the Tularosa Basin near Three Rivers, where noncommercial volumes of natural gas were recovered from Pennsylvanian and Permian strata (King and Harder, 1985). Most oil and gas shows from the Tularosa Basin have been from Pennsylvanian and Permian rocks and a few from Mesozoic rocks (Foster, 1978). Testing of pre-Pennsylvanian rocks has been limited and generally unsuccessful. According to the appraisal by King and Harder (1985), the Tularosa Basin contains abundant source rocks, reservoir rocks, and hydrocarbon traps (stratigraphic pinchouts, unconformities, and structural traps).

The results of exploration drilling on the Otero Mesa-Diablo Plateau have been disappointing (Black, 1975; King and Harder, 1985). Silurian and Permian rocks account for most of the shows. Black (1975) suggests that the Lower Paleozoic rocks of the Orogrande Basin are adequate source rocks and that fault and stratigraphic traps along the flanks of the Late Paleozoic Padernal uplift are favorable targets. Otherwise, the Otero Mesa-Diablo Plateau is not considered by King and Harder (1985) as a particularly favorable area for hydrocarbons because of a relatively small volume of source rocks, few traps, Late Tertiary uplift and erosion, and fresh-water flushing.

In addition to the less-than-promising results of drilling to date in the Tularosa Basin, the overall geologic history of south-central New Mexico and west Texas is not particularly favorable for the preservation of moderate to large accumulations of oil and gas (Thompson, 1976). Late Cenozoic crustal extension and high heat-flow during development of the basin and range and the Rio Grande Rift probably destroyed any moderate- to large-size reservoirs that had survived Early- to Middle-Tertiary igneous activity in the region (reservoirs with more than 10 million barrels of recoverable oil or 60 billion cubic feet of recoverable gas). If oil and gas resources exist in this region, they are likely to be very small (less than 10 million barrels of recoverable oil or 60 billion cubic feet of recoverable gas). A well drilled recently east of McGregor Range has been determined to be a commercial gas well. This indicates that commercially viable gas resources may exist in the Pennsylvanian rocks on McGregor Range (Jentgen, 1998). This discovery off McGregor Range has prompted oil companies to express interest to the BLM regarding future exploration on McGregor Range (Sanders, 1998), however, there has been no formal request for exploration on McGregor Range.

Uranium. The Grants mineral belt in northwest New Mexico is the nation's largest producer of uranium (U.S. Department of Energy [USDOE], 1980). Although uranium can occur in a variety of geologic environments, sandstone of Jurassic age has been the most prolific source (Chenoweth, 1976). Jurassic rocks do not occur in south-central New Mexico and west Texas.

Uranium minerals have been reported from several areas at and near Fort Bliss. The potential to develop commercial quantities of uranium at these sites, or elsewhere in the region, is relatively low.

4.5.6 Soils

Due to the different scales of activity (i.e., programmatic, site-wide, and project-specific) and impacts on soil resources, there are several ROIs for soils in the Fort Bliss area. For programmatic and site-wide activities, the ROI focuses on lands within the boundaries of Fort Bliss including the Main Cantonment Area, the Doña Ana Range–North Training Areas, and McGregor Range. In addition, the ROI includes areas outside the boundaries of Fort Bliss that have the potential to be impacted by wind and water erosion caused by activities on Fort Bliss. For project-specific activities, the ROI will be the project area and an area around the facility that may be impacted by erosion.

Nearly all of the 1.12 million acres of Fort Bliss is included in three, second- and third-order surveys conducted and published by the NRCS. The survey areas include Otero (U.S. Department of Agriculture [USDA], 1981) and Doña Ana (USDA, 1980) county areas in New Mexico, and El Paso County, Texas (USDA, 1971). Surveys were mapped to the series, association, or complex levels. An effort is currently underway to resurvey the entire Fort Bliss area in New Mexico and Texas. The purpose of the new survey is to update and refine the current surveys, and to map soils that were not previously surveyed to the series level at a scale of 1:24,000.

The majority of soils in the Fort Bliss area are classified as either aridisols or entisols, although a few mollisols are also found in the area. Aridisols are soils with well-developed pedogenic horizons, which developed under conditions of low moisture, and have very little water leaching through the profile (Donahue et al., 1977). Consequently, some of these soils have lime-cemented hardpans (caliche). Entisols, young soils with little or no development of soil horizons, are located in areas where the soil is actively eroding (slopes) or receiving new deposits of soil materials (alluvial fans, flood plains, and eolian sand dunes). A few mollisols occur in the mountains of the Fort Bliss area. These soils are distinguished by a deep, dark-colored surface horizon, rich in organic matter and saturated with bases.

Soils in the Fort Bliss area generally consist of sandy, silty, and gravely loams, and fine sands and silts. The soils are alkaline and calcareous, having developed from the weathering of gypsum, sandstone, limestone, igneous, and metamorphic rocks. Windblown sediments from exposed lakebeds occur widely. Wind is an important soil forming agent in the Fort Bliss area. Windblown sand is common, with the greatest accumulations in the basins, often forming dunes.

The soils of the Fort Bliss area can be separated into two general categories based upon the following physiographic positions: valleys and basin floors; and mountains, mountain foot slopes, and escarpments. Soils in valleys and basins are shallow to deep, nearly level to very steep, well-drained to excessively drained soils that formed in alluvium, alluvium modified by wind, and eolian material (USDA, 1971, 1980, 1981). Most of the basin floors are covered by coppice dunes (eolian deposits trapped by mesquite thickets) and eolian sheet deposits. These soils are found mainly in the Tularosa Basin and Hueco Bolson. Major soil units in this category include Bluepoint, Caliza-Bluepoint-Yturbide, Pajarito-Onite-Pintura, Pintura-Wink, Berino-Doña Ana, Mimbres-Stellar, Nickel-Upton, Tome-Mimbres, Philder-Armesa-Reyab, Nickel-Tencee, Bluepoint-Onite-Wink, and Pintura-Doña Ana, Hueco-Wink, and Turney-Berino. These soil units are combinations of soil associations and series that are described in greater detail in Tables 4.5-2 and 4.5-4. Table 4.5-3 summarizes miscellaneous landform types found in soil associations. Figures 4.5-4, 4.5-5, and 4.5-6 show the distribution of soil associations on the Main Cantonment Area and South Training Areas, Doña Ana Range–North Training Areas, and McGregor Range, respectively. Soils in valleys and basins are used mainly for grazing, wildlife habitat, and watershed. Military uses include ground troop training, wheeled and tracked vehicle maneuvering, and missile launching.

Land surfaces on mountains, mountain foot slopes, and escarpments are either rock outcrops or shallow to deep, well-drained, and nearly level to extremely steep soils that formed in alluvium and colluvium, mostly derived from limestone (USDA, 1971, 1980, 1981). These soils are found mainly in the Sacramento, Hueco, and Organ mountains, and on Otero Mesa. Major soil units in this category include: Rock outcrop-Torriorthents, Deama-Tortugas-Rock outcrop, Ector-Rock outcrop, Delnorte-Canutio, and Lozier Rock outcrop. See Tables 4.5-2 and 4.5-3 for a description of the distribution of soil series within associations, and more details about the soil series that make up the above general soil units. These soils
80 are used mainly for grazing, wildlife habitat, and watershed. Military uses are limited in the mountainous
areas because of steep slopes and rough terrain, although limited vehicle traffic, ground-troop training, and missile launching does occur on these soils.

Wind and water erosion are currently the most significant processes affecting soils in the Fort Bliss area. Soils unprotected by vegetation are susceptible to erosion from wind and water runoff. Gullying is the most prevalent form of erosion, but sheet and rill erosion from water, and wind erosion are processes that can also significantly affect soil movement.

Erodibility of soils varies considerably across the Fort Bliss area. Figure 4.5-7 shows the erodibility of soils as well as the location of steep slopes in the Fort Bliss area. In general, soil erodibility is a function of soil type, slope, and vegetative cover. Sandy soils are extremely wind erodible (USDA, 1981). Loamy sands are highly erodible and capable of supporting a protective vegetative cover. Soils with large amounts of clay are moderately erodible when undisturbed; however, when these soils are substantially
80 disturbed, they become highly erodible and a possible source of particulate matter less than
10 micrometers in diameter (PM_{10}) emissions. Loamy soils with less than 35 percent clay are slightly erodible, and stony or gravelly soils and rock outcrops are not generally subject to erosion.

The majority of the steep rocky hills and mountains in the Fort Bliss area have only slight erosion potential, although during periods of severe thunderstorm activity, large volumes of runoff can build up

Table 4.5-2. Description of Soil Series that Occur within the Fort Bliss Area

Soil Series	*Description*
Agustin	Deep, pale-brown, gravelly soils at the base of limestone and igneous mountains and on alluvial fans, generally near gravelly arroyos.
Aladdin	Deep, well drained soils that formed in mixed alluvium along mountain fronts and on fans and terraces. Slopes are from 2-10 percent.
Arizo	Deep, excessively drained soils formed in mixed alluvium on valley floors or wide arroyos. Slopes are 0-5 percent.
Argids	Shallow to deep, well drained soils on hills and dry mountains. Slopes are 15-80 percent.
Armesa	Deep, well drained soils formed in medium textured alluvium and eolian sediment that are high in carbonate. They are on old alluvial fans and terraces. Slopes are 0-5 percent.
Berino	Deep, well drained soils formed in medium textured upland alluvium and eolian deposits. They are on nearly level to undulating sandy plains and side slopes of pediments. Slopes are 0-5 percent.
Bluepoint	Deep, somewhat excessively drained soils formed in coarse textured eolian deposits. They are on coppice dunes on sandy uplands. Slopes are 0-5 percent.
Brewster	Very shallow, stony soils on igneous mountains generally developed over granite rock. They are friable, noncalcareous, and mildly alkaline. Slopes are usually greater than 20 percent.
Bucklebar	Deep, well drained soils formed in alluvium modified by wind on fans and coalescent fan piedmonts. Slopes are 1-5 percent.
Cacique	Moderately deep, well drained soils formed in alluvium on level basin floors. Slopes are 0-3 percent.
Cale	Deep, well drained soils formed in highly calcareous fine and medium textured sediment derived from weathered limestone. They are on broad dissected upland valleys. Slopes are 0-5 percent.
Caliza	Deep, well drained soils formed in gravelly alluvium on fans or river deposits of Pleistocene age. Slopes are 15-40 percent.
Canutio	Deep, very gravelly soils formed in recently deposited gravelly, loamy sediments having high lime content, in and near the active parts of arroyos and alluvial fans. Slope is 1-8 percent.
Casito	Shallow, well drained soils formed in very gravelly sediments on fans and terraces. Slopes are 1-8 percent.
Cave	Shallow, well drained soils formed in gravelly alluvium in old valley fill. Slopes are 1-5 percent.
Coxwell	Moderately deep, well drained soils formed in gravelly alluvium overweathered granitic bedrock. They are on ridges along mountain toe slopes. Slopes are 5-15 percent.
Crowflats	Deep, well drained soils formed in calcareous mixed alluvium. They are on basin floors. Slope is 0-2 percent.
Deama	Shallow, well drained soils formed in residuum from limestone bedrock. They are on steep limestone hills. Slopes are 0-50 percent.
Delnorte	Shallow or very shallow to hard caliche. Very gravelly soils formed over outwash material of sand and gravel. They occur on foot slopes and outwash plains of igneous and limestone mountains. Slopes are 1-8 percent.
Doña Ana	Deep, well drained soils formed in medium and coarse textured eolian material and alluvium. They are on toe slopes of pediments and sandy uplands. Slopes are 0-5 percent.
Ector	Shallow, well drained soils formed in material weathered from limestone bedrock. They are on sides of steep limestone hills and mesas and plateaus dissected by narrow drainage ways. Slopes are 20-50 percent.
Espy	Shallow, well drained soils formed in mixed alluvium. They are over indurated caliche on alluvial fans and terraces. Slopes are 0-5 percent.
Harrisburg	Moderately deep, well drained soils that formed in residuum of sandstone and eolian material from sandstone and from sandstone, volcanic ash, and shale. They are on desert mesas. Slopes are 1-10 percent.
Holloman	Shallow, well drained soils over gypsum that formed in gypsiferous sediment of eolian and alluvial origin. They are on nearly level to gently sloping uplands. Slopes are 0-5 percent.

Table 4.5-2. Description of Soil Series that Occur within the Fort Bliss Area (Continued)

Soil Series	*Description*
Hueco	Sandy, noncalcareous, and mildly or moderately alkaline soils that formed over outwash sediments from nearby mountains. Hueco soils are underlain by an indurated caliche layer at a depth of 20 to 40 inches. Slopes are 0.5-1.5 percent.
Jerag	Shallow, well drained soils formed in medium textured eolian and alluvial sediment. They are over indurated caliche. They are on broad slightly concave uplands. Slopes are 0-3 percent.
Kerrick	Moderately deep, well drained soils that formed in mixed alluvium. They are over indurated caliche. They are in upland valleys. Slopes are 0-2 percent.
Lozier	Shallow, well drained soils formed in material weathered from limestone. They are on hillsides, ridgetops, benches, and escarpment caps. Slopes are 0-50 percent.
Mimbres	Deep, well drained soils formed in silty calcareous alluvial sediment weathered from limestone. They are on broad flood plains on the lower parts of long, gently sloping alluvial fans terminating on valley floors. Slopes are 0-3 percent.
Nickel	Deep, well drained soils formed in very gravelly alluvium mainly from limestone. They are on middle and upper parts of side slopes of pediments and on alluvial fans. Slopes are 1-30 percent.
Nolam	Deep, well drained soils formed in very gravelly alluvium on the sides of strongly dissected terraces and ridges. Slopes are 3-15 percent.
Onite	Deep, well drained soils formed in mixed alluvium. They are on broad alluvial fans. Slopes are 0-5 percent.
Pajarito	Deep, loamy soils that formed on alluvial fans or old terraces. They are calcareous and moderately alkaline. Slopes are 0-3 percent.
Pena	Deep, well drained soils formed in mixed alluvium. They are in broad, dissected upland valleys. Slopes are 0-10 percent.
Pinaleno	Deep, well drained soils formed in alluvium on fans, fan piedmonts, and terraces. Slopes are 1-10 percent.
Philder	Shallow, well drained soils formed in alluvium influenced by eolian sediment. They are over indurated caliche and are found on upland fans on pediments. Slopes are 0-15 percent.
Pintura	Deep, somewhat excessively drained soils formed in coarse textured eolian material. They are on coppice dunes on uplands with 0-5 percent slopes. The dunes have slopes of 20 percent to more than 80 percent.
Reagan	Deep, well drained soils formed in alluvium on fans and basin floors. Slopes are 1-3 percent.
Reakor	Deep, well drained soils formed in mixed alluvium weathered from limestone bedrock. They are found on uplands. Slopes are 1-5 percent.
Reeves	Deep, well drained soils formed in medium textured calcareous and gypsiferous alluvium. They are on broad valley floors and alluvial toe slopes. Slopes are 0-2 percent.
Reyab	Deep, well drained soils formed in alluvium weathered mainly from limestone. They are on alluvial bottoms, terraces, and fans on broad uplands. Slopes are 0-5 percent.
Shanta Variant	Deep, well drained soils formed in mixed alluvium. They are on drainage ways of dissected terraces and valley bottoms. Slopes are 0-2 percent.
Simona	Gravelly, loamy soils that formed in outwash material and are calcareous and moderately alkaline. They have a layer of indurated caliche within a depth of 20 inches.
Stellar	Deep, well drained soils formed in sediments derived from igneous rock on basin floors and on toe slopes of fans. Slopes are 0-3 percent.
Tencee	Shallow, well drained soils formed in gravelly calcareous alluvium. They are over indurated caliche, mainly on side slopes of pediments and the upper parts of older alluvial fans at the base of limestone hills and escarpments. Slopes are 0-10 percent.
Turney	Moderately deep to weakly cemented caliche formed over outwash material from the nearby mountains. They are calcareous and moderately alkaline Slopes are 0-2 percent.
Upton	Shallow, well drained soils formed on piedmont slopes and ridges in gravelly alluvium derived from limestone. Slopes are 3-15 percent.

Table 4.5-2. Description of Soil Series that Occur within the Fort Bliss Area (Continued)

Soil Series	*Description*
Wink	Deep, well drained soils formed in calcareous eolian sediment. They are on upland pediments. Slopes are 0-3 percent.
Yturbide	Deep, excessively drained soils formed in alluvium along side and on terminal fans of arroyos and old river deposits. Slopes are 1-5 percent.
Lithic Argiborolls	Moderately deep cobbly loams. Slopes are 16-18 percent.
Lithic Argiustolls	Shallow loams to shallow gravelly loams. Slopes are 0-80 percent.
Lithic Torriorthents	Shallow gravelly to very gravelly loams. Slopes are 0-80 percent.
Rock Outcrop	Slopes are 0-80 percent.
Typic Argiborolls	Moderately deep cobbly loams. Slopes are 16-80 percent.
Typic Argiustolls	Moderately deep gravelly to very gravelly loams. Slopes are 16-80 percent.
Typic Calciorthids	Very deep gravelly loams. Slopes are 0-10 percent.
Typic Camborthids	Moderately deep very gravelly to extremely gravelly loams. Slopes are 16-80 percent.

Sources: USDA, 1971, 1980, 1981.

Table 4.5-3. Miscellaneous Land Types Found in Soil Associations

Land Type	*Description*
Badlands	Heavy, plastic clay stratified with layers of calcareous very fine sandy loam. Also includes caliche ridgetops and gravelly sand overlying clay. Slopes are convex and range from 5–40 percent.
Dune land	Active sand dunes formed by noncalcareous fine sand.
Igneous rock land	Exposed, stratified igneous rocks, mostly granite, andesite, syenite, and rhyolite. Slopes range from 30 percent to almost vertical escarpments several hundred feet thick.
Limestone rock land	Exposed, stratified limestone bedrock. Slopes range from 30 percent to almost vertical escarpments.
Rock outcrop	Rough extensions and escarpments, ledges, ridges, and cliffs. Slopes are 15–90 percent.

Sources: USDA, 1971,1980,1981.

Table 4.5-4. Series Composition of Soil Associations within the Fort Bliss Area

Association	*Series*
AGB – Agustin, undulating	65 percent Agustin, 35 percent Simona, Pajarito, Delnorte, Wink
AM – Aladdin-Coxwell	35 percent Aladdin, 30 percent Coxwell, 25 percent Rock outcrop
AMC – Armesa very fine sandy loam	20 to 90 percent Armesa, 10 to 20 percent Philder, Reyab, Lozier, Rock outcrop
BJ – Berino-Bucklebar	35 percent Berino, 25 percent Bucklebar, 25 percent Doña Ana, 15 percent Pintura, Pajarito, Onite

Table 4.5-4. Series Composition of Soil Associations within the Fort Bliss Area (Continued)

Association	*Series*
BK – Berino-Doña Ana	50 percent Berino, 30 percent Doña Ana, 20 percent Reagan, Stellar, Bucklebar, Cacique, Simona
B/L – Berino-Pintura complex	50 percent Berino, 25 percent Pintura, 25 percent Doña Ana, Buckelbar, Onite, Pajarito
BOA – Bluepoint-Onite-Wink	35 percent Bluepoint, 25 percent Onite, 20 percent Wink, 20 percent Pintura, Berino, Holloman
BP – Bluepoint-Caliza-Yturbide complex	25 percent Bluepoint, 25 percent Caliza, 20 percent Yturbide, 30 percent Arizo, Canutio, Tencee, Nickel
DCB – Delnorte-Canutio, undulating	75 percent Delnorte, 25 percent Canutio, and small amounts of Bluepoint and Badlands
DCD – Delnorte-Canutia, hilly	55 percent Delnorte, 18 percent Canutia, 27 percent Bluepoint, Agustin, Pajarito
DRF – Deama-Rock outcrop complex	70 percent Deama, 15 percent Rock outcrop, 15 percent Ector, Pena, Kerrick, Cale
DTB – Doña Ana-Berino	40 percent Doña Ana, 35 percent Berino, 25 percent Pintura, Bluepoint, Onite, Wink, Nickel
ECF – Ector-Rock outcrop	60 percent Ector, 25 percent Rock outcrop, 15 percent Deama, Lozier
ESB – Espy-Shanta Variant	55 percent Espy, 20 percent Shanta Variant, 25 percent Lozier
HPB – Holloman-Reeves, nearly level	60 percent Holloman, 30 percent Reeves, 10 percent Tome, Crowflat
HW – Hueco-Wink	42 percent Hueco, 38 percent Wink, 20 percent Turney, Berino, Duneland, Limestone rock land
IN – Igneous rock land-Brewster	50 to 75 percent Igneous rock land, 15 to 50 percent Brewster
JEC – Jerag-Philder, gently rolling	40 percent Jerag, 40 percent Philder, 20 percent Reyba, Shanta Variant, Lozier, Tencee,
LOB – Lozier-Rock outcrop complex	75 percent Lozier, 15 percent Rock outcrop, 10 percent Tencee, Reakor
LOD – Lozier-Rock outcrop	60 percent Lozier, 25 percent Rock outcrop, 15 percent Tencee, Nickel
MO – Mimbres silty clay loam	80 percent Mimbres silty clay loam, 20 percent Reagan, Stellar, Berino, Bucklebar, Doña Ana
MTA – Mimbres-Tome, nearly level	45 percent Mimbres, 40 percent Tome, 15 percent Nickel, Reyab
NTD – Nickel-Tencee	50 percent Nickel, 35 percent Tencee, 15 percent Lozier, Tome, Reakor
NU – Nickel-Upton	50 percent Nickel, 25 percent Upton, 25 percent Tencee, Cave, Simona
PAA – Pajarito, level	75 percent Pajarito, 25 percent Agustin, Simona, Bluepoint, Turney, Wink, Mimbres
PCB – Penta-Cale-Kerrick	35 percent Penta, 30 percent Cale, 15 percent Kerrick, 20 percent Ector, Deama
PEC – Philder very fine sandy loam	85 percent Philder, 15 percent Reyba, Tencee, Armesa
PFB – Philder-Armesa, undulating	45 percent Philder, 40 percent Armesa, 15 percent Reyab, Tome, Tencee, Lozier
PGB – Pintura-Doña Ana complex	45 percent Pintura, 35 percent Doña Ana, 20 percent Berino, Onite, Bluepoint, Mimbres, Holloman
PHB – Pintura-Tome-Doña Ana complex	30 percent Pintura, 25 percent Tome, 20 percent Doña Ana, 25 percent Holloman, Wink, Berino
PN – Pinaleno-Nolam	45 percent Pinaleno, 35 percent Nolam 20 percent Casito, Terino

Table 4.5-4. Series Composition of Soil Associations within the Fort Bliss Area (Continued)

Association	*Series*
RAB – Reaker-Tome-Tencee	35 percent Reaker, 30 percent Tome, 20 percent Tencee, 15 percent Lozier
RFA – Reyab-Armesa	60 percent Reyab, 30 percent Armesa, 5 percent Philder, Lozier, Rock outcrop
RG – Rock outcrop-Argids	40 percent Rock outcrop, 30 percent Argids, 20 percent Argids, cool, 10 percent alluvium and alluvial soils
RH – Rock outcrop-Argids, cool	45 percent Rock outcrop, 35 percent Argids, cool, 20 percent colluvial and alluvial soils
RL – Rock outcrop-Lozier	45 percent Rock outcrop, 30 percent Lozier, 25 percent Sandstone, Shell and small Igneous dikes
ROG – Rock outcrop	80 percent Rock outcrop, 20 percent Lozier, Tencee
RRF – Rock outcrop-Lozier complex	50 percent Rock outcrop, 35 percent Lozier, 15 percent Reakor, Tome, Tencee
TBB – Turney-Berino, undulating	75 percent Turney, 20 percent Berino, 5 percent Pajarito, Hueco
TDB – Tome silt loam	85 percent Tome, 15 percent Crowflats, Tencee, Nickel
TE – Tencee-Upton	35 percent Tencee, 20 percent Upton, 45 percent Nickel, Cave, Simona
TF – Terino-Casito	40 percent Terino, 30 percent Casito, 10 percent hard surface soils

Sources: USDA, 1971, 1980, 1981.

rapidly, causing flash floods that can produce large gullies (BLM, 1988b). Soils covered by grasses such as those on Otero Mesa have relatively low amounts of erosion, unless they are disturbed, while areas that are predominantly shrublands (Creosotebush and mesquite) have higher rates of erosion due to the large amounts of exposed soil between shrubs.

Currently, there are several areas where accelerated erosion is a problem on Fort Bliss. Soils in the coppice-dunes area of the Tularosa Basin are subject to wind erosion. The acceleration of these erodible dunes is caused by a breakdown of surface crusts on the soils between dunes, caused in part by the maneuvering of tracked vehicles (Marston, 1984). Most of the soil movement in this area is localized from dune to dune, but on windy days blowing dust particles rise to the atmosphere (BLM, 1988b). This process could significantly lower air quality. On training areas in the Tularosa Basin, roads have been constructed in such a manner that they have become channels for rainwater runoff. This has caused a considerable amount of erosion (BLM, 1988b). A similar problem has occurred on roads leading up to Otero Mesa (USAF, 1998). Other activities can deplete the vegetative cover and expose the soil surface 81
to erosion. This is occurring in localized areas on Fort Bliss. Grazing by livestock has reduced the vegetative cover and exposed the soil surface to erosion in localized areas on Otero Mesa. Examples of these areas are livestock holding areas, watering points, and mineral licks.

Qualitative observations during the BLM's field season indicated that near water facilities, the soil is compacted by livestock over areas as large as 10 acres. On clay soils, the reduction could be 15 to 30 percent. There is no effect on sandy or gravelly soils. Because of the reduced infiltration, soil 82
moisture is reduced in the vicinity of water supplies, and the survival potential of seeds may be reduced slightly. In areas away from water the effects of grazing generally relate to the breaking of soil crusts by trampling (BLM, 1990a).

Soil contamination is not a major problem in the Fort Bliss area, although the potential for releases of reportable soil contaminants does exist. See Section 4.12 (*Hazardous Material and Items of Special Concern*) for details concerning soil contamination.

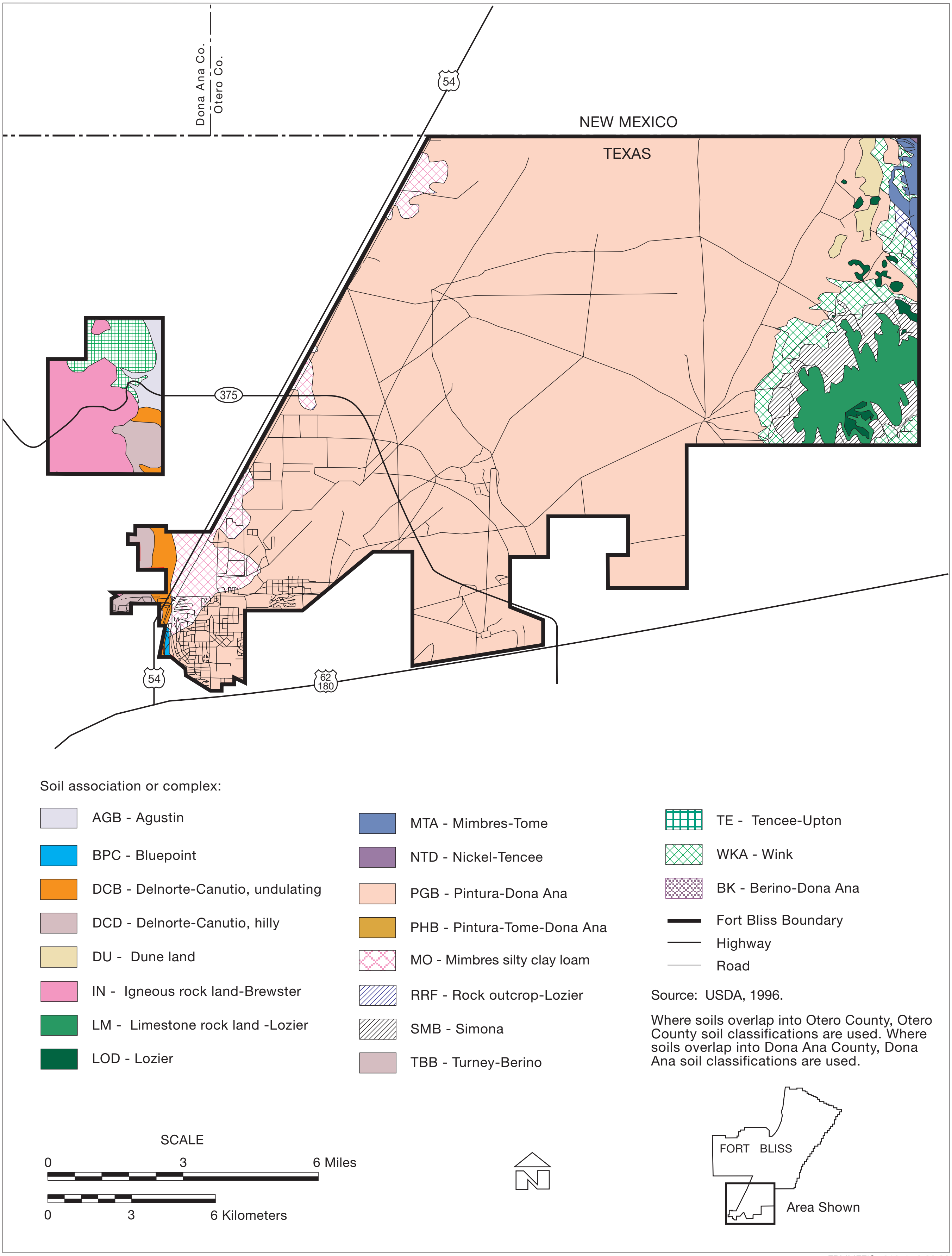

Figure 4.5-4. Distribution of Soil Associations on the Main Cantonment, Castner Range, and South Training Areas.

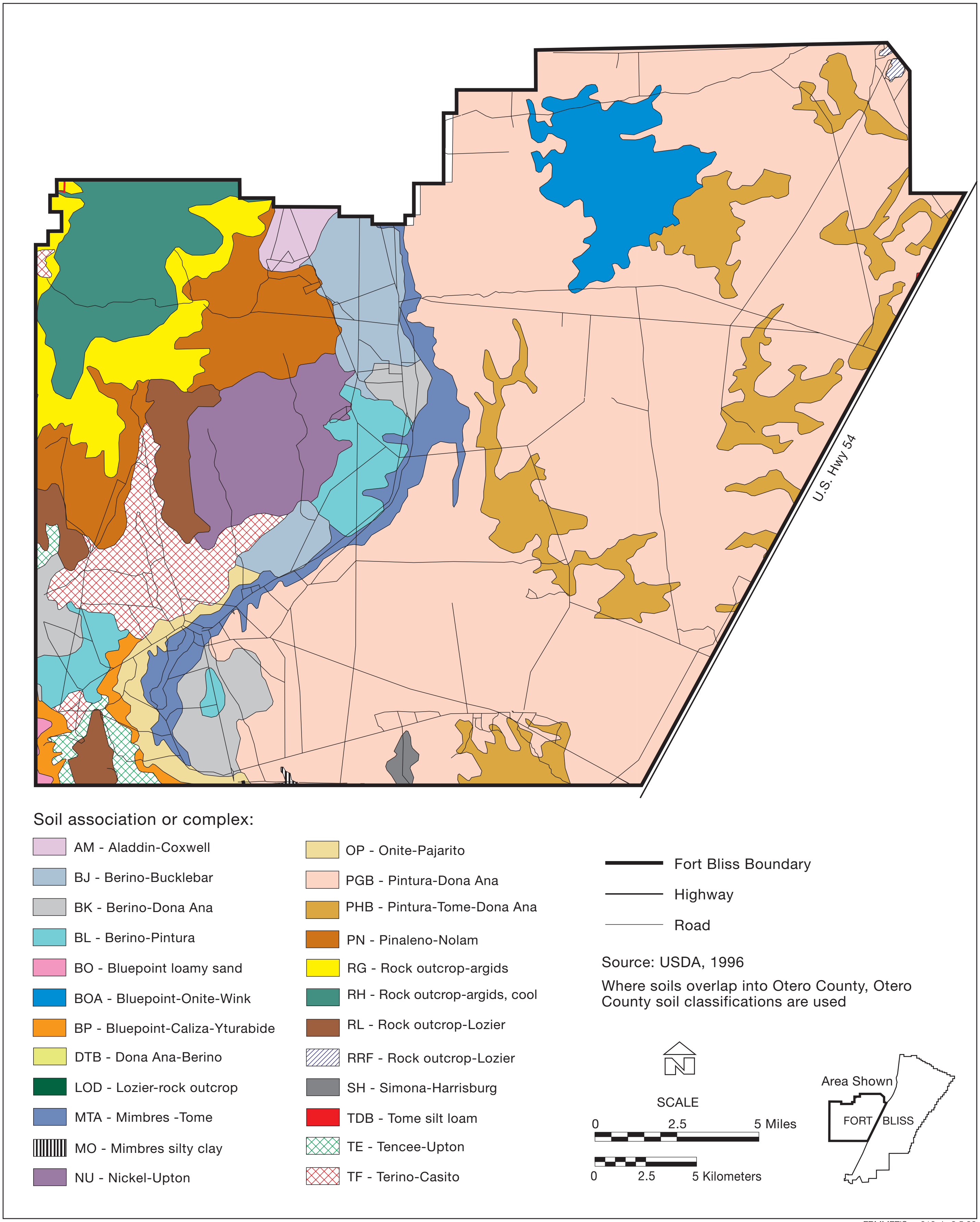

Figure 4.5-5. Distribution of Soil Associations in the Doña Ana Range–North Training Areas.

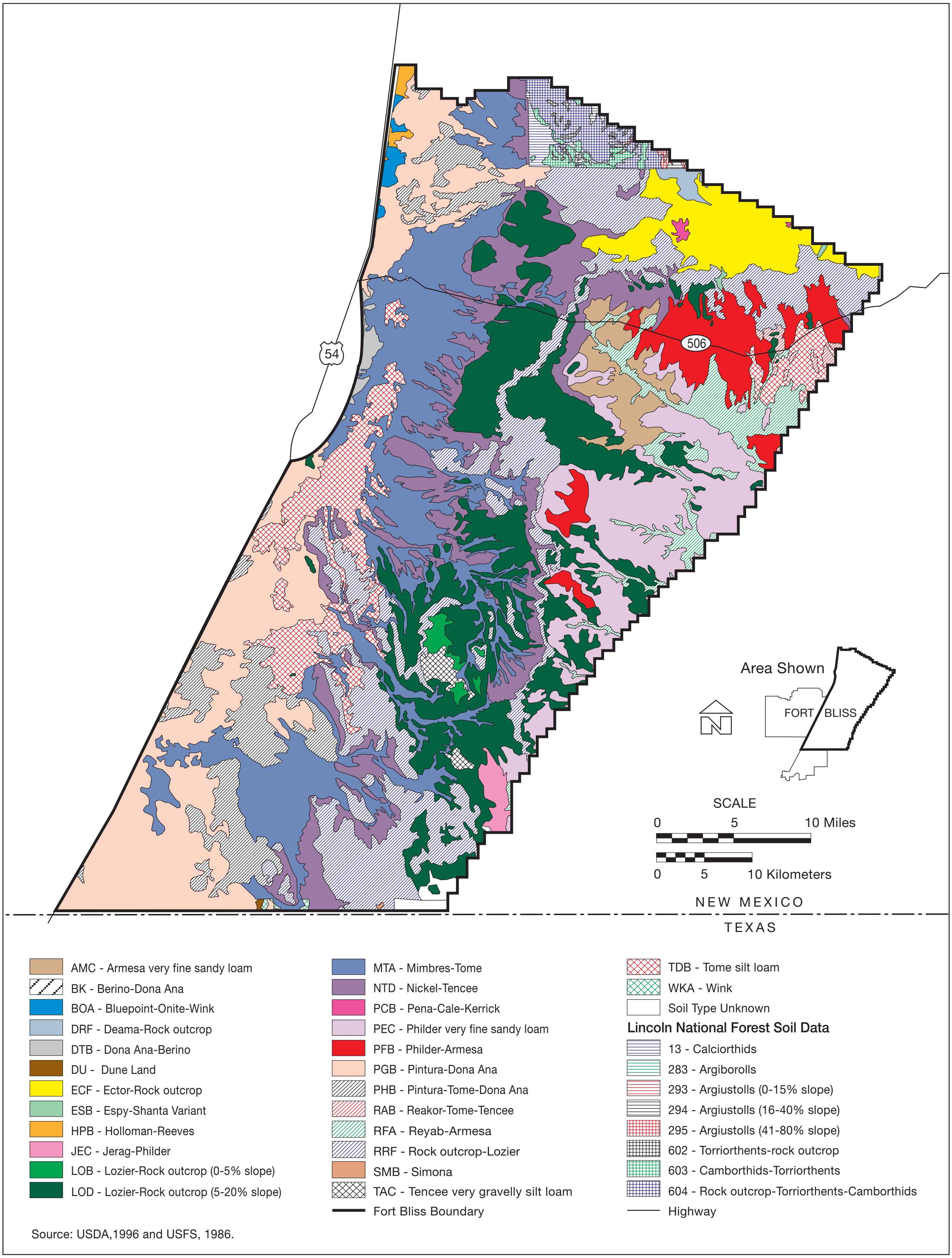

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Figure 4.5-6. Distribution of Soil Associations on McGregor Range.

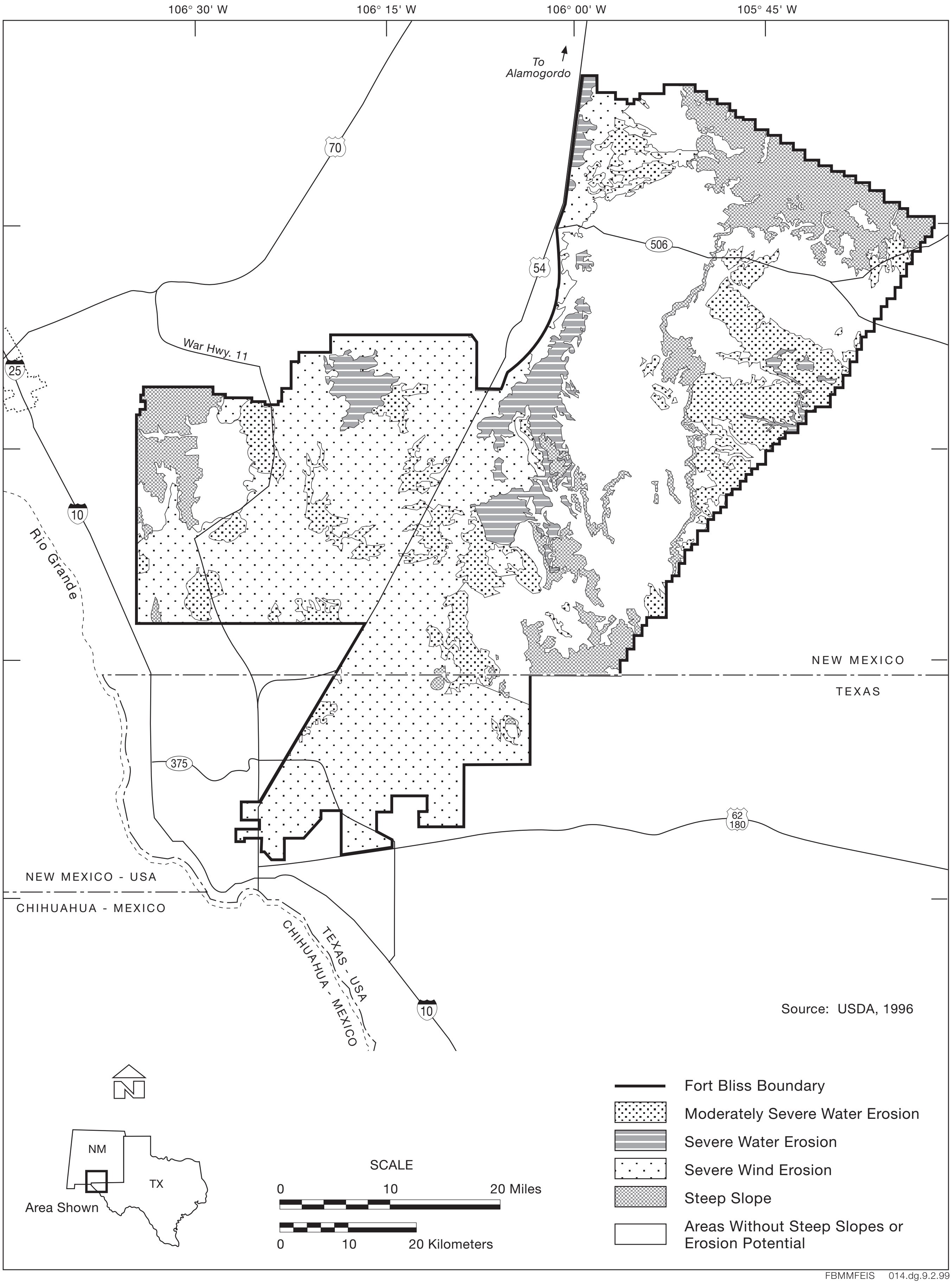

Figure 4.5-7. Steep Slopes and Erodible Soils within Fort Bliss.

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Air Quality

4.6

4.6 AIR QUALITY

This section presents the current air quality conditions in the vicinity of Fort Bliss, and compares it to the relative federal and state air quality standards. In addition, a 1996 air emissions inventory is presented, to represent current air emissions from Fort Bliss.

The ROI for air quality is Doña Ana and Otero counties, New Mexico, and El Paso County, Texas. Air quality in a given location can be described by the concentration of individual pollutants in the atmosphere, and is generally expressed in units of parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$). Air quality is determined by the type and amount of pollutants emitted into the atmosphere; the size and topography of the air basin; and the prevailing meteorological conditions. Meteorological conditions have a significant impact on the pollutant concentrations, because they control the dispersion or mixing of pollutants in the atmosphere through the influences of wind speed, wind direction, atmospheric stability and other meteorological variables. Summer thunderstorms can produce dust storms that carry large quantities of particulate matter (PM_{10}) high into the atmosphere.

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4.6.1 Applicable Regulations and Standards

Federal, Texas, and New Mexico regulations and standards affect the Main Cantonment Area within Texas and the Fort Bliss Training Complex within the appropriate state.

4.6.1.1 Federal Air Quality Standards

The significance of a pollutant in a region or geographical area is determined by comparing the concentration in the atmosphere to federal and state ambient air quality standards for the pollutant. Under the authority of the CAA, the EPA has established nationwide air quality standards to protect public health and welfare, with an adequate margin of safety. These federal standards, known as the National Ambient Air Quality Standards (NAAQS), were developed for six "criteria" pollutants: ozone (O_3), nitrogen dioxide (NO_2), carbon monoxide (CO), $PM_{10,}$ and particulate matter less than 2.5 micrometers in diameter ($PM_{2.5}$), sulfur dioxide (SO_2), and lead (Pb). The standards are defined in terms of concentration (*e.g.*, ppm) determined over various periods of time (averaging periods). Short-term standards (1-hour, 8-hour, or 24-hour periods) were established for pollutants with acute health effects, while long-term standards (annual periods) were established for pollutants with chronic health effects. These standards are shown in Table 4.6-1.

Two of these standards have been newly promulgated by EPA in 1997: a new 8-hour O_3 standard (which will eventually replace the historic 1-hour standard); and a new standard for $PM_{2.5}$, which was not regulated until this year. EPA has stated that both of these new standards will be implemented over an extended period. In the case of the O_3 standard, the 1-hour standard will continue to apply to areas not attaining it for an "interim period" (expected to be several years). For the new $PM_{2.5}$ standard, there will be a 3-year period during which air-monitoring data will be acquired to determine present ambient levels of $PM_{2.5}$, since no previous monitoring has been conducted for this pollutant. Designation of areas as attainment or nonattainment of the $PM_{2.5}$ standard is not scheduled until the 2002 to 2005 timeframe.

In a semi-arid to arid region like Fort Bliss, a new particulate $PM_{2.5}$ standard could be a cause of concern, particularly when there is essentially no ambient monitoring data available at present to determine current compliance status. However, fine particles (measured by $PM_{2.5}$) are generally produced by combustion processes (e.g., boilers, internal combustion engines), while coarse particles (measured by PM_{10}) result from windblown dust on deserts and fields or road dust kicked up from motor vehicles. Considering the relatively small size and number of combustion sources at Fort Bliss, it is not expected that their emissions

Table 4.6-1. Ambient Air Quality Standards

Air Pollutant	*Averaging Time*	*Federal NAAQS*		*New Mexico AAQS*		*Texas AAQS*	
		Primary	*Secondary*	*Primary*	*Secondary*	*Primary*	*Secondary*
Carbon Monoxide (CO)	8-hour 1-hour	9 ppm 35 ppm	— —	8.7 ppm 13.1 ppm	— —	9 ppm 35 ppm	— —
Nitrogen Dioxide (NO_2)	AAM 24-hour	0.053 ppm	0.053 ppm —	0.05 ppm 0.10 ppm	0.053 ppm —	0.053 ppm —	0.053 ppm —
Sulfur Dioxide (SO_2)	AAM 24-hour 3-hour	0.03 ppm 0.14 ppm —	— — 0.5 ppm	0.02 ppm 0.10 ppm —	— — 0.5 ppm	0.03 ppm 0.14 ppm —	— — 0.5 ppm
Particulate Matter (PM_{10})	AAM 24-hr	50 $\mu g/m^3$ 150 $\mu g/m^3$	50 $\mu g/m^3$ 150 $\mu g/m^3$	— —	50 $\mu g/m^3$ 150 $\mu g/m^3$	50 $\mu g/m^3$ 150 $\mu g/m^3$	50 $\mu g/m^3$ 150 $\mu g/m^3$
Particulate[(a)] Matter ($PM_{2.5}$)	AAM 24-hour	15 $\mu g/m^3$ 65 $\mu g/m^3$	15 $\mu g/m^3$ 65 $\mu g/m^3$	— —	— —	— —	— —
Total Suspended Particulates (TSP)	AGM 30-day 7-day 24-hour	— — — —	— — — —	60 $\mu g/m^3$ 90 $\mu g/m^3$ 110 $\mu g/m^3$ 150 $\mu g/m^3$	— — — —	— — — —	— — — —
Ozone (O_3) [(b)]	1-hour 8-hour	0.12 ppm 0.08 ppm	0.12 ppm —	0.12 ppm —	0.12 ppm —	0.12 ppm —	0.12 ppm —
Lead (Pb) and Lead Compounds	Calendar Quarter	1.5 $\mu g/m^3$	1.5 $\mu g/m^3$	1.5 $\mu g/m^3$	1.5 $\mu g/m^3$	1.5 $\mu g/m^3$	1.5 $\mu g/m^3$

Notes:
[a] The 8-hour O_3 standard was promulgated in 1997, and will eventually replace the 1-hour standard. However, the 1-hour O_3 standard will continue to apply to areas not attaining it for an interim period.
[b] The $PM_{2.5}$ standard (particulate matter with a 2.5 µm diameter) was promulgated in 1997, and will be implemented over an extended time frame. Areas will not be designated as in attainment or nonattainment of the $PM_{2.5}$ standard until the 2002–2005 timeframe.
NAAQS = National Ambient Air Quality Standards; AAQS = Ambient Air Quality Standards; AAM = Annual Arithmetic Mean;
AGM = Annual Geometric Mean; PPM = parts per million; $\mu g/m^3$ = micrograms per cubic meter.
Sources: New Mexico Environment Department (NMED), 1994; Ball, 1997; TNRCC, 1997a.

will contribute significantly to exceedances of the $PM_{2.5}$ standard. However, the El Paso, Texas–Juarez, Mexico, metropolitan area may have difficulty meeting the new standard when it is fully implemented.

4.6.1.2 State Air Quality Standards

Under the CAA, state and local agencies may establish air quality standards and regulations of their own, provided these are at least as stringent as the federal requirements. Activities on the Fort Bliss Military Reservation are measured against air quality standards in New Mexico and Texas. The State of New Mexico revised its ambient air quality standards AAQS in November 1995. According to the preamble of the new regulation, the New Mexico AAQS are not intended to provide a sharp dividing line between air of satisfactory quality and air of unsatisfactory quality. They are, however, numbers that represent objectives that will preserve the State's air resources. The State of Texas has adopted the NAAQS as their state standards. Table 4.6-1 shows the national and state ambient air quality standards that apply with respect to the Fort Bliss Military Reservation (Ball, 1997; TNRCC, 1997a).

4.6.1.3 Attainment Areas

EPA has classified all areas of the United States as meeting the NAAQS (in attainment) or not meeting the NAAQS (in nonattainment) for each individual criteria pollutant. Under the CAA, state and local agencies may establish air quality standards and regulations of their own, provided they are at least as stringent as Federal requirements. The CAA Amendments (CAAA) of 1990 established a framework to achieve attainment and maintenance of the health-protective NAAQS. Title I sets provisions for the attainment and maintenance of the NAAQS.

4.6.1.4 State Implementation Plans

Individual states are required to establish a State Implementation Plan (SIP), which is approved by EPA. A SIP is a document designed to provide a plan for maintaining existing air quality in attainment areas, and programmatically eliminating or reducing the severity and number of NAAQS violations in nonattainment areas, with an underlying goal to bring state air quality conditions into (and maintain) compliance with the NAAQS.

The principal method of maintaining or improving ambient air quality is by controlling emissions from sources: the SIP establishes regulations to control stationary emission sources; EPA establishes regulations to control mobile sources, which are installed by vehicle manufacturers. In attainment areas, Prevention of Significant Deterioration (PSD) regulations apply; in nonattainment areas, New Source Review regulations apply.

A complex web of control regulations can apply to large stationary emission sources, including Best Available Control Technology (BACT), New Source Performance Standards (NSPS), National Emission Standards for Hazardous Air Pollutants (NESHAPs), and Maximum Achievable Control Technology (MACT). Based on the type of source, the emission levels of criteria pollutants, and the location, one or more of these control requirements may be applicable.

The PSD regulations provide special protection from air quality impacts for certain areas, primarily National Parks and Wilderness Areas, that have been designated as “Class I” areas. Mandatory PSD Class I areas established under the CAAA of 1977 for the States of New Mexico and Texas are listed under 40 CFR 81.421 and 81.429, respectively. These are areas where visibility has been determined to be an important issue by the EPA Administrator, in consultation with the Secretary of the Interior. The nearest PSD Class I area to the Fort Bliss Military Reservation is Guadalupe Mountains National Park, which is 45 miles to the southeast. Other PSD Class I areas in the region include Big Bend National Park, Carlsbad Caverns National Park, the White Mountain wilderness area, and the Bosque del Apache wilderness area. However, these PSD Class I areas are not expected to be impacted by the proposed action.

4.6.1.5 Conformity Rule

Under the General Conformity Rule of the CAA, Section 176(c), activities must not: (a) cause or contribute to any new violation, (b) increase the frequency or severity of any existing violation, or (c) delay timely attainment of any standard, interim emission reductions, or milestones in conformity to a SIP’s purpose of eliminating or reducing the severity and number of NAAQS violations or achieving attainment of the NAAQS.

Fort Bliss has entered into an Agreed Final Judgment (Appendix J) with the State of Texas as a result of an air quality enforcement action involving asbestos management, dust control, gasoline truck inspections, and oxygenated fuels.

4.6.2 Current Attainment Status

Fort Bliss covers portions of south-central New Mexico (Doña Ana and Otero counties) and western Texas (El Paso County). A review of the attainment status for New Mexico indicated that the counties of Otero and Doña Ana are designated as attainment for all criteria pollutants, with the exception of a portion of Doña Ana County that is classified as a marginal nonattainment area for O_3. This area, whose eastern border is the New Mexico-Texas border, is located west of the Fort Bliss Military Reservation and therefore not covered by the military reservation. As discussed above, this attainment status is based on the historic 1-hour O_3 standard rather than the new 8-hour standard, because the historic standard will continue to apply to nonattainment areas. In addition, there will be no attainment/nonattainment designations for $PM_{2.5}$ until the 2002 to 2205 timeframe.

83 In general, the locations of activities that generate PM_{10} are well spread out over the Fort Bliss Training
Complex. Therefore, PM_{10} emissions are dispersed throughout the training areas. The natural dispersion
83 of the emissions generally reduce the ambient air concentrations to low levels by the time they reach the
installation boundaries. While there are no monitoring stations on the installation boundaries, Table 4.6-2
presents PM_{10} data from city of El Paso monitoring stations to the south and east of the training complex.

El Paso County, Texas, is classified as serious nonattainment for O_3 and attainment for the other criteria pollutants, with the exception of the City of El Paso, which is designated as moderate nonattainment for CO and PM_{10}.

159 The evaluation of El Paso air quality issues is governed by special provisions of the CAA for international
border areas. In addition, El Paso has received a federal waiver from nitrogen oxides (NO_x) control requirements based on photochemical dispersion modeling showing that, but for NO_x emissions emanating from Mexico, the area would be in attainment of the O_3 standard. The continuation of this waiver is conditioned upon results of future modeling. Based upon these future modeling results, the federal waiver could either remain in effect for El Paso, or NO_x controls could possibly be imposed in the El Paso area on one or both sides of the border (Beyer, 1998).

The area or ROI affected by a project's emission sources will vary depending upon the pollutant type. For inert pollutants (all pollutants other than O_3 and its precursors, such as NO_2, the ROI is generally limited to an area extending a few miles downwind from the source. O_3 is a secondary pollutant formed in the atmosphere by photochemical reactions of previously emitted pollutants, or precursors. O_3 precursors are mainly volatile organic compounds (VOCs) in the form of hydrocarbons, and NO_x. The ROI for O_3 may extend much farther downwind than for inert pollutants. Consequently, nonattainment areas around large metropolitan areas will often be larger for O_3 than for other pollutants.

The New Mexico Air Quality Bureau does not monitor ambient air pollutant concentrations on the Fort Bliss Military Reservation. Routine air quality monitoring occurs at several stations located west and north of the military reservation. Monitoring data for 1993 through 1995 from these areas are presented in Table 4.6-2 and indicate generally good air quality. PM_{10} is the only criteria pollutant that exceeded the federal standard, mainly during extremely high wind conditions.

The Texas Office of Air Quality has several monitoring sites in El Paso County, the majority of which are located within or near the El Paso city limits. The data from the city monitoring sites are not of the air quality over the Fort Bliss Military Reservation and therefore have not been considered for this evaluation, with the exception of SO_2, which is only *measured* within the city of El Paso. On the eastern side of the city of El Paso, three monitoring stations located south and east of the military reservation provide data on air quality in that area. The only pollutant that exceeded the federal standards is O_3, which is expected due to its designation as a serious O_3 nonattainment area.

Table 4.6-2. Air Quality Monitoring Data for South-central New Mexico

Pollutant/Monitoring Station	*Averaging Time/ Measurement*	*Maximum Concentration by Year*		
		1993	*1994*	*1995*
CO (ppm)				
Las Cruces Armory	8-hour	3.8	3.5	3.4
Las Cruces University		8.9	5.1	4.5
Las Cruces Armory	1-hour	8.4	6.6	6.2
Las Cruces University		12.2	8.3	6.9
O_3 (ppm)				
La Union	1-hour	0.125	0.100	0.111
Sunland Park		0.140	0.137	0.137
Las Cruces University		0.054	0.079	0.080
PM_{10} ($\mu g/m^3$)				
Las Cruces, Env. Dept.	AAM	21	22	24
Las Cruces, Roadrunner Blvd.		—	—	21
Las Cruces, Holman Rd.		—	—	21
Anthony		37	41	40
Sunland Park		32	35	41
Sunland Park (continuous)		—	53	47
La Luz		—	—	14
Las Cruces, Env. Dept.	24-hour	53	53	71
Las Cruces, Roadrunner Blvd.		—	—	79
Las Cruces, Holman Rd.		—	—	40
Anthony		99	154	142
Sunland Park		103	106	165
Sunland Park (continuous)		—	491	309
La Luz		—	—	23
NO_2 (ppm)				
Las Cruces, Holman Rd.	AAM	—	—	0.005
SO_2 (ppm)				
La Union	AAM	0.002	0.001	0.002
Sunland Park		0.010	0.007	0.007
La Union	24-hour	0.020	0.006	0.006
Sunland Park		0.100	0.057	0.040
La Union	3-hour	0.080	0.035	0.025
Sunland Park		0.380	0.181	0.190
Pb ($\mu g/m^3$)				
Sunland Park Racetrack	QAM	0.13	0.040	0.045
Sunland Park		0.11	0.041	0.046

Notes: ppm = part per million by volume; $\mu g/m^3$ = micrograms per cubic meter; AAM = Annual Arithmetic Mean; QAM = Quarterly Arithmetic Mean.
Source: NMED, 1994.

Monitoring data for 1993 through 1995 from these stations are presented in Table 4.6-3 (NMED, 1994; Ball, 1997; TNRCC, 1997a).

4.6.3 Climate

The climate in the Fort Bliss area is described in Section 4.0.

Table 4.6-3. Air Quality Monitoring Data for El Paso, Texas

Pollutant/Monitoring Station	*Averaging Time/ Measurement*	*Maximum Concentration by Year*		
		1993	*1994*	*1995*
CO (ppm)				
Chamizal	8-hour	10.7	7.6	7.6
El Paso East		8.7	7.2	7.8
Chamizal	1-hour	23.3	13.7	15.3
El Paso East		12.3	9.9	11.4
O_3 (ppm)				
Chamizal	1-hour	0.111	0.120	0.126
El Paso East		0.094	0.153	0.134
PM_{10} (µg/m^3)				
Ivanhoe	AAM	21.9	20.9	26.2
Chamizal		23.2	21.8	—
Ivanhoe	24-hour	71	66	105
Chamizal		100	143	84
SO_2 (ppm)				
El Paso Downtown	AAM	0.008	0.007	0.007
	24-hour	0.038	0.036	0.029
	3-hour	0.163	0.159	0.111

Notes: ppm = part per million by volume; µg/m^3 = micrograms per cubic meter; AAM = Annual Arithmetic Mean.
Source: TNRCC, 1997a.

4.6.4 Existing Air Quality Emissions

The Fort Bliss Army installation encompasses portions of Texas and New Mexico, with the Main Cantonment Area and several of the training areas in Texas, and several ranges in New Mexico, the largest of which are the McGregor Range and the Doña Ana Range–North Training Areas.

To develop the air emissions inventory and conduct subsequent analyses, the Fort Bliss Military Reservation was divided into two sections, by state. This is a logical division, although the two parts of Fort Bliss are adjoining, because Texas and New Mexico have different attainment status for some of the criteria pollutants, and there are differences in their air quality regulations.

The emissions inventory is therefore presented separately for Fort Bliss, Texas, and Fort Bliss, New Mexico.

4.6.4.1 Current Emissions: Fort Bliss, Texas

An emissions inventory for 1996 was conducted for Fort Bliss, Texas (U.S. Army, 1997e), which is summarized in Table 4.6-4. These sources can be divided into several groups:

Table 4.6-4. U.S. Army Air Defense Artillery /Fort Bliss 1996 Emission Inventory Update

FIN	*EPN*	*Plant ID*	*Facility Name*	*Annual Emissions (in tons per year)*					
				VOC	PM_{10}	NO_x	*CO*	SO_x	*TSP*
GS-15	GS-15	B-4101	Army Reserves	0.00	0.00	0.00	0.00	0.00	0.00
DEGR1	DEGR1	B-2418	Degreaser Zone 1	0.61	0.00	0.00	0.00	0.00	0.00
DEGR2	DEGR2	B-2423	Degreaser Zone 2	0.00	0.00	0.00	0.00	0.00	0.00
DEGR3	DEGR3	DG-2431	Degreaser Zone 3	0.61	0.00	0.00	0.00	0.00	0.00
DEGR4	DEGR4	B-2467	Degreaser Zone 4	0.61	0.00	0.00	0.00	0.00	0.00
DEGR5	DEGR5	B-2471	Degreaser Zone 5	0.61	0.00	0.00	0.00	0.00	0.00
GENR-D	GENR-D	GENR-D	Diesel Emergency Generators	0.16	0.14	2.00	0.44	0.13	0.14
ICE-001	ICE-001	B-2515	Dynocalibrator (Bldg #2515)	0.49	0.43	6.00	1.30	0.40	0.43
ICE-002	ICE-002	B-2537	Dynocalibrator (Bldg #2537)	0.10	0.09	1.21	0.26	0.08	0.09
T-5885-1	T-5885-1	T-5885-1	Elec Peak Shaving Plant-Fuel Storage Tanks	0.00	0.00	0.00	0.00	0.00	0.00
T-5885-2	T-5885-2	T-5885-2	Elec Peak Shaving Plant-Fuel Storage Tanks	0.00	0.00	0.00	0.00	0.00	0.00
T-5885-3	T-5885-3	T-5885-3	Elec Peak Shaving Plant-Fuel Storage Tanks	0.00	0.00	0.00	0.00	0.00	0.00
GP-5885-4	GP-5885-4	GP-5885-4	Electric Peak Shaving Plant Generator #63416	0.01	0.01	0.26	0.11	0.01	0.01
GP-5885-5	GP-5885-5	GP-5885-5	Electric Peak Shaving Plant Generator #63419	0.02	0.01	0.35	0.15	0.01	0.01
GP-5885-6	GP-5885-6	GP-5885-6	Electric Peak Shaving Plant Generator #63423	0.01	0.01	0.25	0.11	0.01	0.01
GP-5885-3	GP-5885-3	GP-5885-3	Electric Peak Shaving Plant Generator #63436	0.01	0.01	0.22	0.09	0.01	0.01
GP-5885-2	GP-5885-2	GP-5885-2	Electric Peak Shaving Plant Generator #63438	0.01	0.00	0.17	0.08	0.01	0.00
GP-5885-1	GP-5885-1	GP-5885-1	Electric Peak Shaving Plant Generator #63418	0.01	0.01	0.22	0.01	0.01	0.01
GENR-G	GENR-G	GENR-G	Emergency Generators (Gasoline)	0.15	0.00	0.08	3.05	0.37	0.00
NG-UNITS-1	NG-UNITS-1	NG-UNITS-1	Ext Comb-NG<0.3 MMBTU/hr Postwide	0.66	1.01	8.52	3.62	0.05	1.01
NG-UNITS-2	NG-UNITS-2	NG-UNITS-2	Ext Comb-NG<10 MMBTU/hr Postwide	0.99	2.30	19.15	2.56	0.12	2.30
FB00ST02	FB00ST02	B-11024	FB00ST02	0.03	0.00	0.00	0.00	0.00	0.00
FB00ST03	FB00ST03	B-11019	FB00ST03	0.01	0.00	0.00	0.00	0.00	0.00
FB00ST04	FB00ST04	B-11020	FB00ST04	0.01	0.00	0.00	0.00	0.00	0.00
GS-19	GS-19	B-1610	Fuel Dispensing (Bldg #610)	6.09	0.00	0.00	0.00	0.00	0.00
GS-22	GS-22	GS-22	Fuel Dispensing (Bldg #11284)	0.72	0.00	0.00	0.00	0.00	0.00
GS-20	GS-20	B-199	Fuel Dispensing (Bldg #199)	1.21	0.00	0.00	0.00	0.00	0.00
GS-21	GS-21	GS-21	Fuel Dispensing (Bldg #2996)	0.56	0.00	0.00	0.00	0.00	0.00
GS-10	GS-10	B-2940	GS-10	0.13	0.00	0.00	0.00	0.00	0.00

Table 4.6-4. U.S. Army Air Defense Artillery /Fort Bliss 1996 Emission Inventory Update (Continued)

FIN	*EPN*	*Plant Id*	*Facility Name*	*Annual Emissions (in tons per year)*					
				VOC	*PM_{10}*	*NO_x*	*CO*	*SO_x*	*TSP*
GS-11	GS-11	B-2970	GS-11	0.00	0.00	0.00	0.00	0.00	0.00
GS-12	GS-12	B-2990	GS-12	0.00	0.00	0.00	0.00	0.00	0.00
GS-14	GS-14	B-3006	GS-14	0.02	0.00	0.00	0.00	0.00	0.00
GS-16	GS-16	B-11182	GS-16	0.00	0.00	0.00	0.00	0.00	0.00
GS-18	GS-18	B-11515	GS-18	0.00	0.00	0.00	0.00	0.00	0.00
GS-2	GS-2	B-1047	GS-2	0.01	0.00	0.00	0.00	0.00	0.00
GS-3	GS-3	B-1326	GS-3	0.61	0.00	0.00	0.00	0.00	0.00
GS-7	GS-7	B-2634	GS-7	0.00	0.00	0.00	0.00	0.00	0.00
GS-8	GS-8	B-2673	GS-8	0.94	0.00	0.00	0.00	0.00	0.00
GS-9	GS-9	B-2921	GS-9	0.00	0.01	0.00	0.00	0.00	0.00
INCINI	INCINI	B-56	Incinerator	0.01	9.85	0.00	0.01	0.00	0.01
INTMOBLRTE	INTMOBLRTE	INTMOBLRTE	Interior Mobilization Route	0.00	0.00	0.00	0.00	0.00	21.89
AF-1	AF-1	B-11385	Oasis Aviation Fuel Farm	1.23	0.00	0.00	0.00	0.00	0.00
PM0004	PM0004	2518	Paint Booth #1 (Bldg #2518)	0.98	0.00	0.00	0.00	0.00	0.00
PM0005	PM0005	2529	Paint Booth #2 (Bldg #2529)	3.20	0.00	0.00	0.00	0.00	0.00
FB00ST01	ST-1	11108	Paint Booth #3 (Bldg #11108)	0.08	0.00	0.00	0.00	0.00	0.00
GENR-PORTD	GENR-PORTD	GENR-PORTD	Portable Diesel/JP-8 Generators	1.17	1.03	14.41	3.11	0.96	1.03
GENR-PORTG	GENR-PORTG	GENR-PORTD	Portable Gasoline Generators/engines	0.13	0.00	0.07	2.66	0.00	0.00
MSWLF-01	MSWLF-01	LANDFILL	Sanitary Landfill	0.34	0.00	0.00	0.00	0.00	0.00
LANDFILLRD	LANDFILLRD	SLFRD	Sanitary Landfill Road	0.00	2.81	0.00	0.00	0.00	15.63
SOLV-USE	SOLV-USE	SOLV-USE	Solvent Usage - Postwide	6.20	0.00	0.00	0.00	0.00	0.00
FB00ST01	ST-1	11018	Storage Tank - Gasoline	1.59	0.00	0.00	0.00	0.00	0.00
EOSTER-1	EOSTER-1	EOSTER-1	WBAMC - Surgical Sterilizer	0.00	0.00	0.00	0.00	0.00	0.00
LAB-1	LAB-1	B-7777	WBAMC Biology Research (B-7777)	0.50	0.00	0.00	0.00	0.00	0.00
01302	01302	B-7145-1	WBAMC Boiler Plant (01302)	0.00	0.00	0.00	0.00	0.00	0.00
01303	01303	B-7776	WBAMC Boiler Plant (01303)	0.18	0.43	4.43	1.12	0.10	0.43
01304	01304	B-7145-2	WBAMC Boiler Plant (01304)	0.01	0.03	0.33	0.08	0.00	0.03
1996 total Emissions (in tons)				*31.03*	*18.18*	*57.67*	*18.85*	*2.27*	*43.04*

Source: U.S. Army, 1997e.

• Combustion sources	Portable gasoline/diesel/JP-8-fired generators, diesel emergency generators, electric peak shaving plant generators, natural gas-fired boilers, and an incinerator.
• Solvent Degreasers	A number of degreasers are used for maintenance and repair in motor pools and other facilities.
• Miscellaneous Sources	Fuel storage tanks, an aviation fuel farm, fuel dispensing facilities, sanitary landfill, miscellaneous post-wide solvent use, and a biological research facility.
• Surface Coating	Surface coating operations occur in several paint spray booths. Emissions have been reduced by the use of low VOC paints.
• Fugitive Dust Emissions	These result from the sanitary landfill road and the Interior Mobilization Route. Emissions from the landfill road are kept to a minimum by a strictly enforced 10 mph speed limit.

4.6.4.2 Current Emissions: Fort Bliss, New Mexico

Fort Bliss, New Mexico, is not considered to be a major source of air emissions source by the Air Quality Bureau of the State of New Mexico, because it is primarily comprised of multiple minor individual emission sources that are included on the Air Quality Bureau's List of Insignificant Activities. Consequently, an updated emissions inventory was not conducted for the facility. However, the Army is committed to proactive environmental management, and will minimize air emissions at their facilities whenever feasible.

4.6.4.3 Current Status of Air Quality Permits for Fort Bliss

Fort Bliss, Texas, has been able to retire its existing air quality permits with the State of Texas Office of Air Quality by the use of standard exemptions and proactive management. An example of this approach is the use of low-VOC paints in all of the paint booths. However, at some point the paint booths may be subject to the NESHAPS for aerospace manufacturing and rework facilities, because they work on Army helicopters.

The Air Quality Bureau of New Mexico considers Fort Bliss, New Mexico, a minor source of emissions. Consequently, it is not currently required to have any air quality permits for the operations. However, due to new environmental regulatory requirements imposed by the CAAA, Fort Bliss will apply for a Title V air permit in the future.

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Water Resources

4.7

4.7 WATER RESOURCES

The water resource ROI for Fort Bliss encompasses three interrelated geographic areas: the upper Hueco Bolson, the lower Tularosa Basin, and the western Salt Basin (Figure 4.0-1). The El Paso area (including the Main Cantonment Area) lies mostly within the upper Hueco Bolson, but also depends on water from the Mesilla Bolson and the Rio Grande. Ciudad Juarez, Mexico, relies on the Hueco Bolson and the Rio Grande for its water. These areas, together with the Rio Grande in southern New Mexico and at El Paso, comprise the ROI for the Fort Bliss, El Paso, and Ciudad Juarez areas from the standpoint of water resources.

The population of the El Paso service area is projected to more than double from 554,500 in 1990 to 1,342,500 in 2040. Corresponding annual water demand would increase from 124,200 af to 294,700 af (El Paso County, 1992). Ciudad Juarez, with an estimated population of 1,286,734, is estimated to have a proportionally larger water demand compared to the El Paso service area. Fort Bliss, with a 1996 population of 29,200 and a water demand of 5,654 af (Mathis, 1997), is expected to remain fairly steady. Fort Bliss has its own well field, and in 1996, it bought less than 10 percent of its potable water from El Paso. However, the Fort Bliss wells and many of the El Paso and Ciudad Juarez wells pump from the same aquifer. Water issues that impact El Paso and Ciudad Juarez can also impact Fort Bliss.

4.7.1 Upper Hueco Bolson

The Upper Hueco Bolson is that part of the Hueco Bolson that is north of the Rio Grande. It extends north from El Paso County, Texas, to parts of Doña Ana and Otero counties in south central New Mexico. The bolson is bounded on the east by the Hueco Mountains and Otero Mesa, and on the west by the Franklin and Organ mountains (see Figure 4.0-1). A gentle topographic rise, 5 to 10 miles north of the New Mexico-Texas state line, separates the basin from the geologically similar Tularosa Basin to the north (Orr and White, 1985). The topographic divide, however, is not the groundwater divide (Knowles and Kennedy, 1956), and the New Mexico State Engineer put the north boundary of the Hueco Groundwater Basin about 20 miles north of the state line. This designation affects only the southwest corner of the Tularosa Basin; the Hueco Groundwater Basin, as defined, does not extend eastward onto the McGregor Range. Geologically, however the Hueco Bolson in New Mexico extends eastward to the Hueco Mountains and Otero Mesa. This administrative rather than physical demarcation resulted from applications for groundwater withdrawals by the City of El Paso north of the New Mexico-Texas state line (Chudnoff, l997). Army facilities in the Upper Hueco Bolson include: the McGregor Range Camp, the Doña Ana Range Camp, and related military facilities.

4.7.1.1 Surface Water

The mountain slopes and foothill areas around the margins of the bolson are characterized by small ephemeral streams (arroyos) which, during periods of heavy or prolonged storms, discharge onto the bolson floor, where the runoff infiltrates or is lost to evapotranspiration. No well-defined natural drainage channels, except the Rio Grande, are present on the bolson floor in Texas or New Mexico. Surface water that originates in the upper Hueco Bolson is not considered an adequate or dependable source of supply.

4.7.1.2 Groundwater

Water-bearing Units. The Hueco Bolson is a basin formed by faulting and is characterized by a series of subparallel step faults that form a deep structural bedrock trough on the west side of the basin. Many of the faults extend to the surface, where they offset basin-fill deposits. The upper Hueco Bolson contains Tertiary and Quaternary basin-fill sedimentary deposits that extend northward into the Tularosa Basin and southward into the lower Hueco Bolson. Basin-fill deposits are bounded by less permeable carbonate rocks of the Hueco Mountains and Otero Mesa escarpment to the east; by less permeable igneous, metamorphic, and sedimentary rocks of the Organ and Franklin mountains to the west; and are underlain by less permeable consolidated rocks. Data from geophysical surveys and deep test wells indicate that basin-fill deposits in the trough are as much as 8,000 feet thick (Orr and Risser, 1992). Eastward from the trough, near the front of the Hueco Mountains and the Otero Mesa escarpment, the thickness of the basin-fill deposits taper to near zero.

Lithologic and geophysical logs of wells in the vicinity of the New Mexico-Texas state line indicate the presence of extensive sand, gravel, and clay deposits extending south from the Tularosa Basin into the Hueco Bolson (Rapp, 1958). These deposits appear to be more than 500 feet thick in places and probably are underlain by fine-grained lake deposits. A USGS investigation in the south-central part of the Tularosa Basin concluded that geologic strata encountered north of the New Mexico-Texas state line represent a northward extension of the Hueco Bolson (Orr and Meyers, 1986). Stream and wind deposits east of U.S. Highway 54 in the McGregor Range may be less than 200 feet thick and probably consist of fine-grained sand, silt, and clay. Throughout most of the west side of the Hueco Bolson, the percentage of clay increases with depth (Orr and Risser, 1992). The maximum sand and gravel thickness at the front of the Franklin and Organ mountains apparently tapers toward the east, as grain size decreases and the percentage of clay increases to the east and with depth.

Occurrence of Groundwater. Water enters the groundwater flow system in the basin-fill deposits mostly as mountain-front recharge from storm runoff in alluvial fan areas adjacent to the Organ and Franklin mountains. Recharge on the east side of the basin is less significant, as surface water from the Hueco Mountains drains primarily to the east, and because of the fine-grained nature of the basin-fill deposits near the Hueco Mountains. Subsurface recharge also occurs as underflow from the Tularosa Basin along the northern boundary of the Hueco Bolson and from the Mesilla Bolson through Fillmore Pass between the Franklin and Organ mountains (Orr and Risser, 1992). Flow modeling by the USGS indicates that 3.1 percent of the precipitation falling on adjacent mountain drainage areas reaches the saturated zone. Their investigation estimated an annual recharge rate of 4,500 afy to the Hueco Bolson from the Organ and Franklin mountains. Underflows of 3,800 afy from the Tularosa Basin and 260 afy through Fillmore Pass were indicated (Orr and Risser, 1992). Based on these results, annual recharge to the upper Hueco Bolson is approximately 8,560 afy.

It is estimated that about 17.6 million af of sediments on the west side of the Hueco Bolson in New Mexico are saturated with fresh water (Knowles and Kennedy, 1956). Herrick (1960) estimated a specific yield of 15 percent for water-bearing deposits in the Post Headquarters area of the WSMR. Assuming a specific yield of 15 percent, about 2.6 million af of fresh water may be in storage in the New Mexico part of the upper Hueco Bolson. However, the thickness of the fresh-water zone in New Mexico decreases from west to east (Orr and Risser, 1992). A line representing the eastern limit of fresh water containing less than 1,000 mg/l of total dissolved solids (TDS) extends from near Newman at the southwest corner of McGregor Range north through the length of the basin and into the Tularosa Basin (Figure 4.7-1). Rapp (1958) noted that the quality of groundwater greatly improves to the southwest of McGregor Range toward the Franklin Mountains. The sediments penetrated by a deep El Paso test well, 3 miles south of the New Mexico-Texas state line indicate the presence of an extensive aquifer; however, these sediments may contain large amounts of saline water. The thickness of this aquifer probably ranges from less than 180 feet to more than 500 feet (Orr and Meyers, 1986).

Movement of groundwater in the upper Hueco Bolson generally is southward toward El Paso and the Rio Grande Valley. Unusual subsurface conditions exist at Davis Dome near McGregor Range Camp, where the groundwater contains more than 2,000 mg/l TDS and is heated geothermally (see following discussion in *Groundwater Development*).

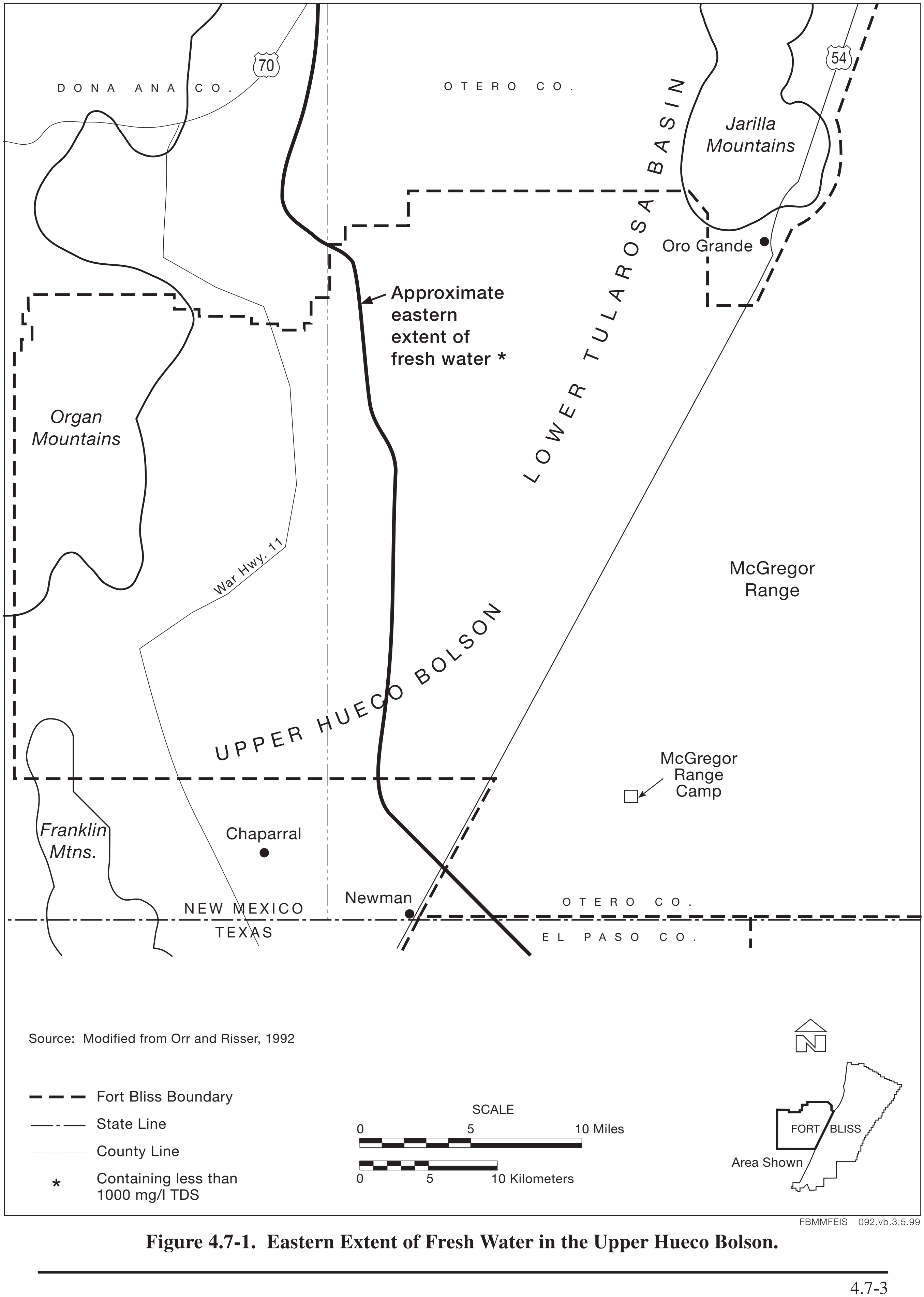

Figure 4.7-1. Eastern Extent of Fresh Water in the Upper Hueco Bolson.

Evapotranspiration is not a significant component of the groundwater flow system in the northern part of the Hueco Bolson, because the depth to groundwater is generally deeper than 200 feet.

Aquifer Characteristics. Coarse-grained alluvial aquifers near the mountain fronts are characterized by relatively high values of hydraulic conductivity. Fine-grained alluvial deposits are characterized by relatively low hydraulic conductivity. Large ratios of horizontal to vertical hydraulic conductivity are due to discontinuous, thinly bedded clay units throughout most of the basin-fill deposits. Aquifer-test results in wells in the upper Hueco Bolson indicate that the small ratio of vertical to horizontal hydraulic conductivity results in delayed drainage of water from overlying deposits and that, in the long-term, the storage coefficient should approach the specific yield of an unconfined aquifer (Orr and Risser, 1992).

Hydraulic conductivity estimates were derived from aquifer tests in wells in the western half of the Hueco Bolson. Most of these wells penetrate only the upper 1,000 feet or less of basin-fill deposits. Based upon these aquifer-test data, hydraulic conductivity estimates for basin-fill deposits range from less than 1 to more than 200 feet per day. Transmissivities of 5,000 to 22,000 square feet per day have been reported from aquifer tests on the western side of the Hueco Bolson in Texas. Hydraulic conductivity estimates from these wells range from 15 to 43 feet per day. Hydraulic conductivity for two wells completed in alluvial-fan deposits of Soledad Canyon is estimated at 50 to 60 feet per day, and in the WSMR Post Headquarters area, estimates range from 1 to 210 feet per day (Orr and Risser, 1992).

Groundwater Development. Groundwater resources in the upper Hueco Bolson outside of the El Paso area have not been developed extensively. Currently the largest producer of groundwater on the New Mexico side of the state line is Chaparral Water Company. Historically the military has operated a small capacity well intermittently at the old Hueco Camp on the Doña Ana Range–North Training Areas, two wells at the Doña Ana Range Camp, and a small well field on alluvial fans adjacent to the WSMR. However, as a general statement, areas of the upper Hueco aquifer that underlie military properties in New Mexico remain substantially undeveloped.

A groundwater study was completed for the USACE (Rapp, 1958) to determine if a supply of 100 gpm of potable water could be developed for the McGregor Range Camp. Except for isolated areas, groundwater was too saline for human consumption, and the Army found it more economical to import El Paso city water to McGregor Range.

Fort Bliss currently is conducting an exploration program for geothermal resources at Davis Dome, 1 mile east of McGregor Range Camp. Geothermal water at temperatures ranging from 180° to 185°F is present at depths of 400 to 600 feet (Luna, 1997). The maximum recorded temperature was 192.4°F at a depth of 2,258 feet (Mathis, 1998). Fort Bliss engineering personnel indicated that the site could produce 3 MW of electric power that could be used to power a desalination plant producing 7 mgd of drinking water from the saline aquifer at a significantly lower cost than Fort Bliss now pays for water. Two desalination methods of choice currently under investigation are an experimental Aerojel process being developed by Lawrence Livermore National Laboratory and vacuum flash distillation (Luna, 1997). This source would be used to augment or replace water currently pumped by Fort Bliss from the Hueco Bolson in Texas.

4.7.2 Lower Tularosa Basin

The Tularosa Basin encompasses approximately 6,500 square miles in south central New Mexico and includes parts of Doña Ana, Sierra, Otero, and Lincoln counties. Alamogordo is the principal center of population. Military bases in the area are HAFB, WSMR, and in the southern part of the basin, the Doña Ana Range–North Training Areas and the McGregor Range of Fort Bliss. The area also includes White Sands National Monument, managed by the NPS, and large tracts of federal lands managed by the BLM. Only the lower part, roughly the southern third, of the basin is within the Fort Bliss ROI (see

Figure 4.0-1). The lower Tularosa Basin is bounded on the east by the Sacramento Mountains and Otero Mesa, and on the west by the Organ and San Andres mountains. On the south, the basin is contiguous with the geologically similar upper Hueco Bolson.

4.7.2.1 Surface Water

The Tularosa Basin is characterized by small ephemeral streams and arroyos which, during periods of heavy or prolonged storms, discharge to the central part of the basin, where the water is contained in shallow ephemeral lakes (playas). Several playas have become permanent features, including Lake Lucero in the lower basin. Many of the surface water drainages that originate in the mountains are perennial in their upper reaches and support wetlands and aquatic wildlife (Figure 4.7-2). A total of 1,228 dry washes with distinct streambeds and sides comprising 1,874 miles were mapped on McGregor Range while 142 dry washes comprising 545 miles were mapped on Doña Ana Range–North Training Areas. Eleven intermittently flooded lakes with distinct ordinary high-water marks totaling 127 acres and 79 artificial water resources (802 acres) including sewage lagoons, storm-water retention basins, and cattle tanks were mapped on McGregor Range (U.S. Army, 1998h). A total of 17 dry lakes comprising 216 acres and 26 water resources (sewage treatment ponds, storm retention basins, and cattle tanks) totaling 6 acres were mapped on Doña Ana Range–North Training Areas (U.S. Army, 1998h). Most are classified by the Army (1998h) as Waters of the U.S. Additional discussion of probable Waters of the U.S. is provided in Section 4.8.2, *Wetlands and Arroyo-Riparian Drainages*. Historically, surface water has been captured and developed, primarily for livestock, in the perennial reaches of these streams. Under normal conditions, the mountain drainages are not tributary to larger streams. No significant volume of surface water is discharged from the basin.

4.7.2.2 Groundwater

Water-bearing Units. The Tularosa Basin was formed as a structural trough during a period of Middle to Late Cenozoic faulting. The faulting exposed Precambrian through Tertiary-age igneous and sedimentary rocks along the scarps bounding the basin. These same rocks underlie Cenozoic fill deposits in the central area of the basin. Some of the Paleozoic and Mesozoic rocks are known to yield small quantities of water to wells in adjacent areas but are not considered to be major aquifers. Deposition of alluvial fill accompanied the faulting in the Tularosa Basin. Fill deposits include sand, gravel, and clay in alluvial fans along basin margins and extensive lake, alluvial, and evaporite deposits within the interior basin. Large quantities of saline water occur within most of the Tularosa Basin sediments (Orr and Meyers, 1986). Two primary sources of groundwater in the lower Tularosa Basin are: (a) the central basin aquifer, which consists of alluvial, wind, and lake deposits; and (b) alluvial aquifers at the mouths of major canyons on the valley perimeter.

The central basin aquifer is characterized by lake deposits with lesser amounts of alluvial and wind deposits. While large quantities of water are available in this unit, the quality of the water is poor and generally unsuitable for public consumption without treatment. Evaporate deposits in the central basin may contain large amounts of very saline water.

The alluvial aquifers consist of coarse to fine-grained sediments in a series of coalescing alluvial fans along the margins of the basin. These fans were formed from detritus derived from source areas in the bordering mountains. The sizes of the fans vary, depending on the size of their respective drainage areas. The fan deposits occur in the subsurface as thin veneers overlying bedrock and as thicker units basinward, where they intertongue with central basin deposits (Orr and Meyers, 1986).

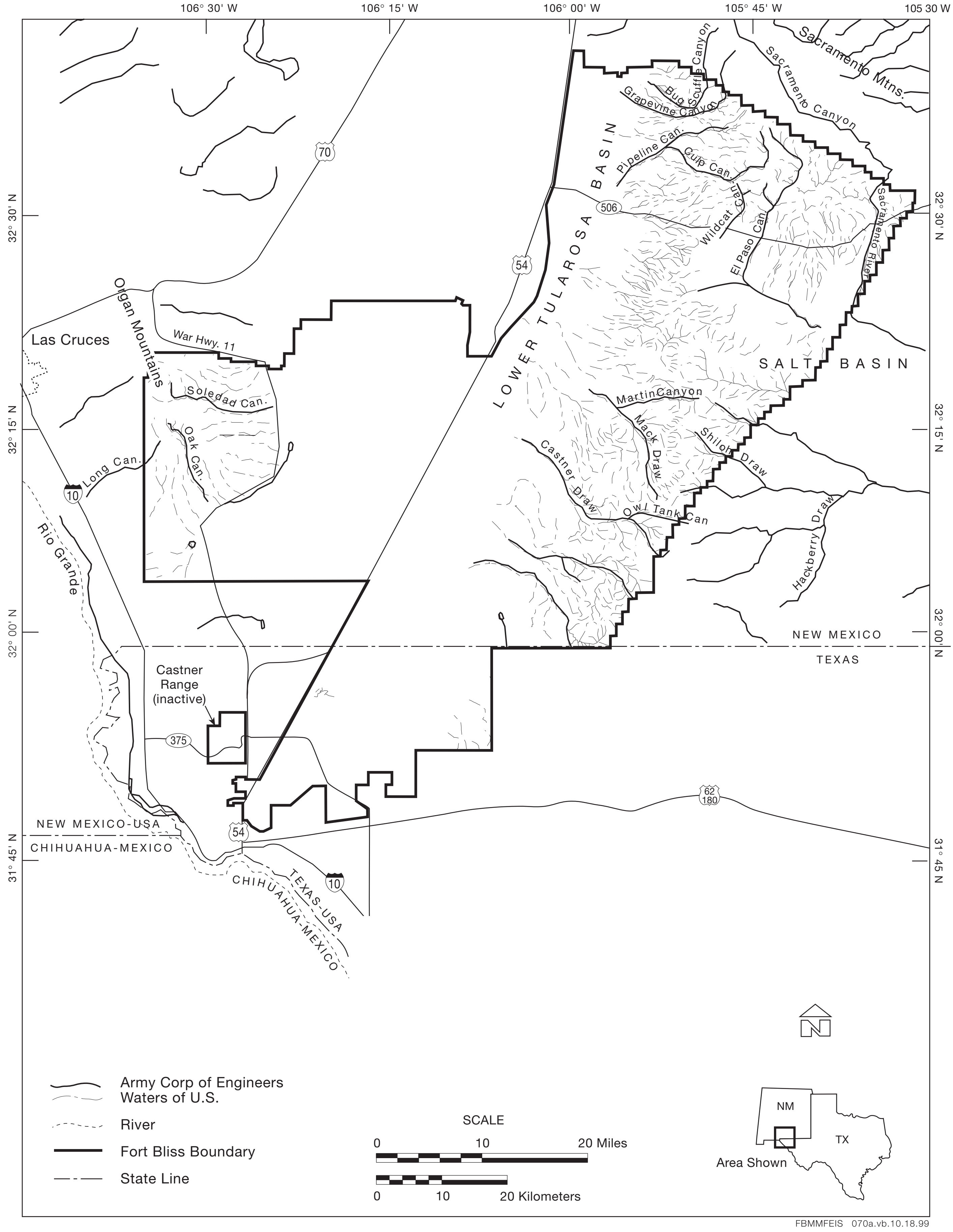

Figure 4.7-2. Surface Water Drainage in the Fort Bliss Area.

The thickness of alluvial fan deposits ranges from less than 100 feet on the higher step-faulted blocks adjacent to the Sacramento escarpment to about 4,000 feet in the San Andres Canyon area northwest of the Doña Ana Range–North Training Areas. Surficially, these deposits are characterized by very coarse, poorly sorted sediments adjacent to the mountain front and by well-sorted, increasingly fine-grained sediments basinward. Abrupt lithologic changes occur at the surface in places where lenticular beds of gravel and sand grade horizontally to silt and clay (Orr and Meyers, 1986).

Occurrence of Groundwater. Water enters the groundwater flow system in the lower Tularosa Basin principally as mountain-front recharge from storm runoff in alluvial fan areas adjacent to the mountains. Models used by the USGS in the Franklin and Organ mountains indicate 3.1 percent of the precipitation falling in the Organ Mountain drainage areas reaches the saturated zone (Orr and Risser, 1992).

Surface drainage areas in the Organ Mountains that contribute water to the lower Tularosa Basin were estimated in this investigation at 225 square miles (Figure 4.7-2). If the average annual precipitation over that area is 12 inches and actual recharge to the basin-fill deposits is 3.1 percent of the precipitation on mountain drainage areas, mountain-front recharge to the western Tularosa Basin is about 4,460 afy.

Surface drainage areas on the south flank of the Sacramento Mountains are slightly smaller; however, the total drainage is assumed to be similar due to higher elevations and exposed rock surface. Calculations suggest 4,500 afy of recharge in the northern area of the McGregor Range (U.S. Army, 1998g).

Potentiometric surfaces in wells on the east margin of the Tularosa Basin reveal the presence of groundwater ridges in proximity to the mouths of major canyons. Such ridges in the water table indicate recharge to the aquifer by infiltration of surface flow. Alluvial fan sediments west of the Sacramento Mountains, from the mouth of Grapevine Canyon to beyond the northern boundary of McGregor Range, were found to be saturated with fresh water in a zone about 3-miles wide and from 0- to about 1,400-feet thick. The USGS estimated 1.4 to 2.1 million af of fresh water is in storage in the area from Grapevine Canyon to Escondido Canyon (about 3 miles south of Alamogordo) (Orr and Meyers, 1986). An additional 3.6 to 5.4 million af of slightly saline water may be in storage in the same area. Movement of groundwater is westerly, toward the center of the basin, at a gradient of 10 to 50 feet per mile. The investigation did not extend southeast of Grapevine Canyon, and it is not known how far similar hydrologic conditions may extend in that direction.

It is estimated that about 51 million af of sediments on the west side of the lower basin, from Soledad Canyon in the south to the Post Headquarters area of WSMR in the north, are saturated with fresh water (Wilson and Myers, 1981; and Kelly and Hearne, 1976). Herrick (1960) estimated a specific yield of 15 percent for water-bearing deposits in the Post Headquarters area. Assuming a specific yield of 15 percent, about 2.6 million af of fresh water may be in storage on the west side of the lower basin. Movement of groundwater is generally to the east, toward the center of the basin.

Evapotranspiration in the Tularosa Basin is not a significant component of the groundwater flow system because the depth of groundwater generally is more than 200 feet below the surface.

Aquifer Characteristics. The estimated fresh-water hydraulic conductivities of alluvial fan deposits and basin-fill deposits in the lower Tularosa Basin range from 1 to more than 300 feet per day. However, because of the higher viscosity of saline water, the saline-water hydraulic conductivity is less than that of similar fresh-water aquifers. Water levels in these deposits respond to short-term pumping stress as if under leaky-confined conditions probably because the interbedded clays restrict the vertical flow of water. Under long-term stress, the storage coefficient in alluvial deposits should approach the specific yield, which has been estimated at 15 to 20 percent. Saturated sand units comprise roughly 3 to 26 percent of the basin-fill sediments. The hydraulic conductivities of such sand units may be about 1 foot per day, and the units probably respond to stress as leaky confined aquifers (Orr and Meyers, 1986).

Groundwater Development. Well fields supply water for the Doña Ana Range Camp and the WSMR Post Headquarters area, and at Alamogordo, about 15 miles north of McGregor Range. Groundwater development in the Tularosa Basin area of McGregor Range, except for a few livestock wells, has not been extensive primarily because of the salinity of the water. A groundwater testing program was undertaken for the USAF MX Missile program 2 to 6 miles west of Grapevine Canyon (Orr, 1997). Three wells were drilled to depths of about 900 feet in August and September 1985. A fourth well is believed to have been abandoned during drilling. Electrical and geophysical logs were run in the wells; however, the wells were abandoned without testing because of unfavorable yields or poor water quality. No published information is known to have resulted from this activity, and attempts to obtain copies or interpretations of the geophysical logs have been unsuccessful.

4.7.3 Western Salt Basin

Roughly, the northeast quarter of McGregor Range, including the southern slopes and the Sacramento Mountains foothills and the western part of the Otero Mesa, is within the Salt Basin, which is listed as an undeclared groundwater basin by the New Mexico State Engineer. At the west side of Otero Mesa a 500- to 1,000-foot escarpment separates the mesa from the floor of the Hueco Bolson and Tularosa Basin (see Figure 4.0-1). The escarpment extends north from the Hueco Mountains to the Sacramento Mountains. The basin is bounded on the east by the Guadalupe Mountains and extends from Otero County, New Mexico, south into Texas. Elevations in the McGregor Range part of the basin are from about 4,700 feet above msl on Otero Mesa to 7,500 feet in the Sacramento Mountains. The Salt Basin contains no population centers or other Army facilities; however, the BLM, the USFS, and the NPS manage large tracts of federal lands. Those areas include Lincoln National Forest, Guadalupe National Park, and Carlsbad Caverns National Park.

4.7.3.1 Surface Water

The Salt Basin watershed in the ROI includes the western part of the Otero Mesa and the southern slopes of the Sacramento Mountains foothills. Similar to the Tularosa Basin, the Salt Basin is characterized by small ephemeral streams that discharge toward the central areas of the basin (see Figure 4.7-2). Virtually all stream channels in the Sacramento Mountains and Otero Mesa on McGregor Range are classified as probable Waters of the U.S. by the USACE (U.S. Army, 1998h). Under natural conditions, small playas would develop in low-lying areas during periods of high runoff; however, earthen dams now capture most of the available water for livestock. The principle difference between this and the Tularosa Basin is the higher elevation of the Salt Basin, particularly in the Sacramento Mountains, which results in higher runoff for the Salt Basin. A few streams are perennial in their upper reaches outside the boundary of the McGregor Range. However the Sacramento River, prior to the installation of upstream diversions, probably was perennial for at least part of its course through McGregor Range. Three such diversions capture water for use on the McGregor Range and the adjoining community of Oro Grande. The diverted water is transported, via three pipelines; one crosses the northwest quarter of McGregor Range to Oro Grande, and the other two supply water to numerous storage tanks and water troughs across Otero Mesa (Figure 4.7-3a). Figure 4.7-3b shows the earthen impoundments on McGregor Range. The Army holds water right number 01657 for the diversions. A change in the beneficial use from “livestock and domestic purposes” to “the preservation of fish and wildlife” was granted in 1963 by the New Mexico State Engineers Office (NMSEO). The right entitles the Army to divert 60,000 gpd of surface water flow from the Sacramento River and 50,000 gpd from Carrisa Springs (U.S. Army, 1998g).

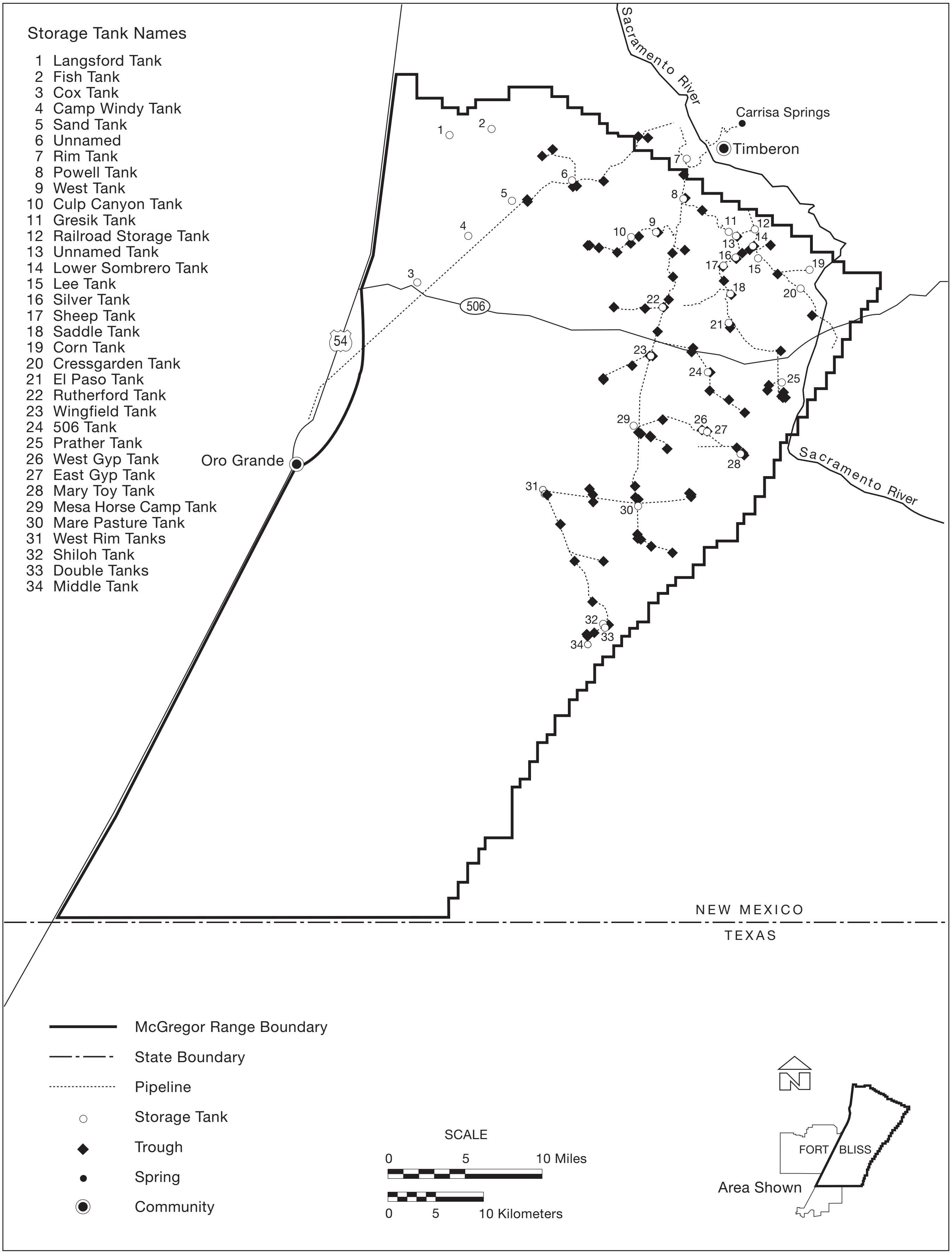

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Figure 4.7-3a. Water Pipelines, Storage Tanks, and Watering Troughs on McGregor Range.

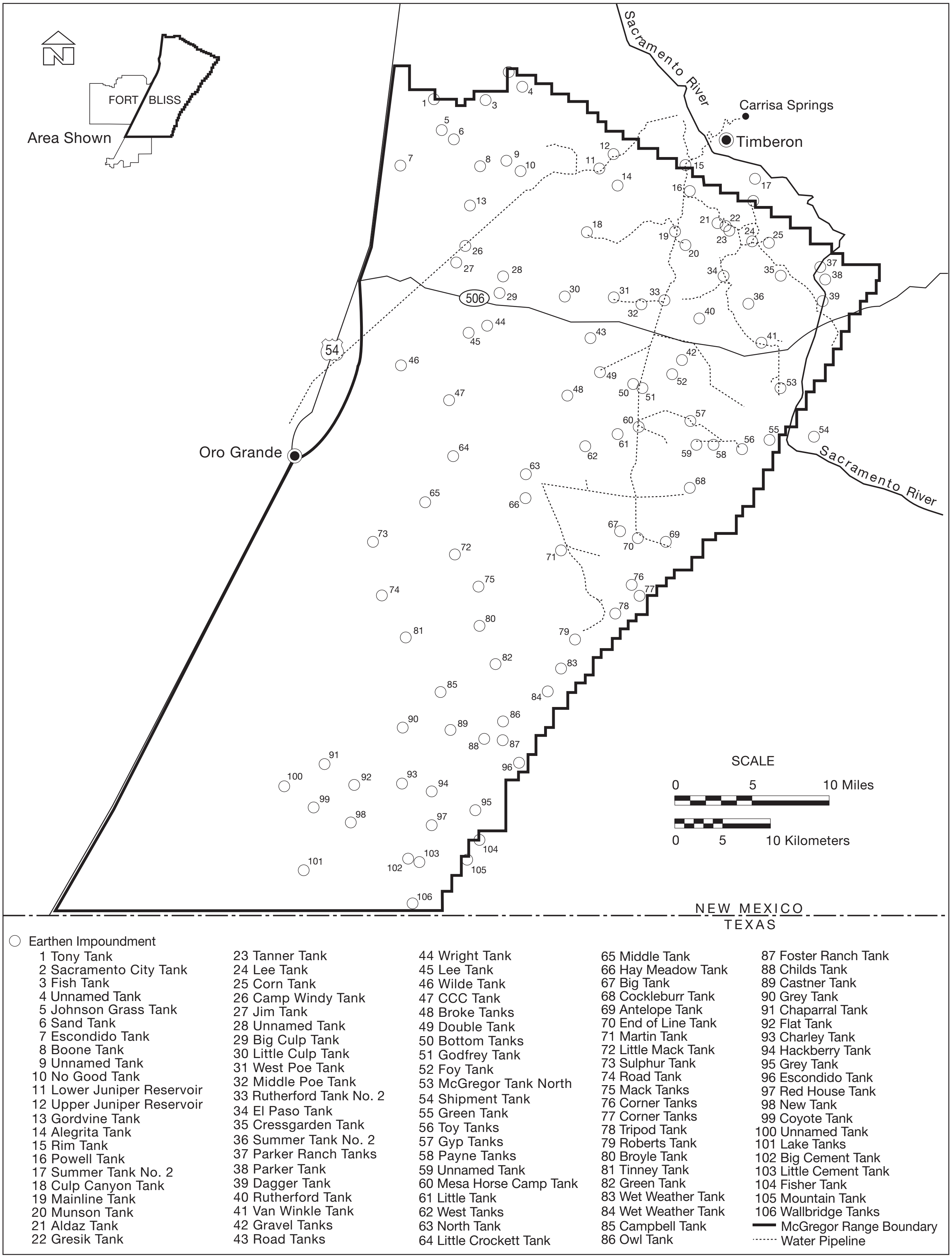

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Figure 4.7-3b. Water Pipelines and Earthen Impoundments on McGregor Range.

The McGregor pipeline system (exclusive of the Oro Grande system) is a large gravity-fed water network that is operated and maintained by the BLM for wildlife and livestock. The system has been in existence since the early 1900s and has been modified, expanded, and relocated extensively since then, mostly in piecemeal fashion. The three intakes (sources) for the system are in the Sacramento Mountains, north of McGregor Range. Two lines feed Rim Tank, an open reservoir with a capacity of 2 mg, on the north boundary of McGregor Range. The system is designed to gravity flow from this reservoir, or bypass it (or a combination of both), into the McGregor pipeline—a 65-mile trunk and branching system that feeds several branches and lines in the Sacramento Mountains foothills and the western part of Otero Mesa (BLM, 1985). A smaller system, the El Paso line, runs through El Paso Canyon to the east boundary of McGregor Range in the north part of Otero Mesa. The total flow of both lines is about 76 gpm (about 110 afy) (Christensen, 1998). 85

4.7.3.2 Groundwater

Water-bearing Units. Middle Cenozoic block faulting in the Otero Mesa area exposed Paleozoic and Mesozoic carbonate rocks, but did not produce the downfaulted blocks and alluvial fill that are characteristic of the Tularosa Basin. The carbonate rocks are known to yield small quantities of saline water (the source of the basin name), but are not considered major aquifers.

Coarse- to fine-grained sediments form a series of coalescing alluvial fans along the north margin of the Salt Basin. The fans contain detritus derived from source areas in the bordering Sacramento Mountains. Their sizes vary according to the sizes of their respective drainage areas (Orr and Meyers, 1986).

In general, groundwater developed from the Paleozoic and Mesozoic formations in the basin is brackish to saline. However, fresh-water bearing sediments on the east side of the Tularosa Basin near Grapevine Canyon (see Section 4.7.2.2) probably extend into the alluvial areas south of the Sacramento Mountains (McClean 1970). The thickness of fan deposits saturated with fresh water (containing less than 1,000 mg/l TDS) is estimated to range from 0 to as much as 1,400 feet. Saturated sediments include poorly sorted boulders, sand, and silt near fan apexes, and silt and clay near the base of the fans (Orr and Meyers, 1986).

Occurrence of Groundwater. Recharge to the basin-fill deposits on the east side of the Tularosa Basin occurs as storm-water runoff to alluvial fans adjacent to the Sacramento Mountains (see Section 4.7.2.2). An unknown but possibly significant amount of recharge also may occur to the southeast in similar areas in the Salt Basin. Additional work needs to be done in that area to determine the possible presence of a fresh-water aquifer and the size of its likely recharge. The brackish to saline groundwater in the carbonate rocks of Otero Mesa flows easterly toward the center of the Salt Basin (Orr and Meyers, 1986).

Development of Groundwater. Groundwater resources are not extensively developed in the Salt Basin, and no significant use of groundwater occurs in the basin within McGregor Range. A few small-capacity stock and domestic wells have been completed on Otero Mesa, but none are known to be in operation.

The possibility of a fresh-water aquifer in the alluvium south of the Sacramento Mountains represents a potential resource for nondomestic use in that area of McGregor Range.

4.7.4 Fort Bliss, El Paso, and Ciudad Juarez Area

Most of metropolitan El Paso lies in the Hueco Bolson between the Hueco and the Franklin Mountains and in the Rio Grande Valley south of the Franklin Mountains (see Figure 4.0-1). The extreme western part of the area is in the lower (southern) Mesilla Bolson, a large intermontane basin west of the Franklin and Organ mountains. South of El Paso across the Rio Grande, Ciudad Juarez, Mexico, has a metropolitan population in excess of 1 million.

Water for the El Paso area is supplied by surface water from the Rio Grande and by groundwater from the lower Hueco and lower Mesilla bolsons, including Rio Grande alluvium along the river. Currently, surface water is used for irrigation, and most groundwater is used for public supply.

4.7.4.1 Surface Water—the Rio Grande

Water from the Rio Grande is part of a U.S. Bureau of Reclamation (USBR) irrigation project that regulates and administers the flow of the Rio Grande below Elephant Butte Reservoir in New Mexico. The reservoir stores and releases water for power generation. Caballo Reservoir, downstream of Elephant Butte Reservoir, regulates releases to meet downstream demands through the January to October irrigation season. Five diversion dams on the river divert flows to the Elephant Butte Irrigation District, New Mexico; the El Paso County Water Improvement District #1 (EPCWID), Texas; and to Mexico (Cushing, 1996).

The Rio Grande Compact Commission apportions water from the river among Colorado, New Mexico, and Texas by interstate agreement. The compact provides for normal releases of 790,000 afy to the irrigation districts, including 60,000 afy to Mexico. In a normal water year the EPCWID allotment is 43 percent of the available U.S. project water, or about 310,000 afy (El Paso County, 1992). Return flows and other water entering the system below Caballo Reservoir increase the amount delivered to the EPCWID in a normal year to about 360,000 afy. In years when Rio Grande flows are below normal, less than full allotments are released, and the deliveries are decreased proportionately. Provisions of the contract allow Colorado and New Mexico to incur debits in their deliveries to Texas and to cancel accrued debits when reservoir spills occur during years of high flow (Cushing, 1996). Currently, almost all of the agricultural production in El Paso County occurs within the irrigated area of the EPCWID and areas contiguous to the district that irrigate with groundwater. The EPCWID has an area of 76,114 acres, and the contiguous areas irrigated by pumping on an additional 8,600 acres (USBR, 1973).

El Paso is an EPCWID customer. Municipal and industrial supplies are obtained through water rights owned, leased, and assigned through the USBR and through purchased rights. Municipal and industrial waters are diverted at river plants in El Paso and Zaragosa, Texas, during the irrigation season. Diversions, which represent approximately 43 percent of El Paso's total municipal and industrial supply (Cushing, 1996), amounted to 46,166 af in 1996 (Sperka, 1997).

The quality of the Rio Grande water, which generally is of the sodium sulfate type, varies greatly during the year because of return flows of irrigation water between Caballo Dam and El Paso. Concentrations of sulfates and TDS increase during the irrigation season until, near the end of the season, the water quality reaches a point where it no longer meets federal drinking water standards after treatment. The quality remains below standards until the following irrigation season. Shortly after irrigation releases begin in late winter, water quality improves sufficiently to be utilized by the treatment plants (EPWU, 1995).

Surface water is preferred over groundwater for irrigation because of its lower cost and, in the Hueco Bolson, the superior quality of the river water. However, during years of inadequate surface-water supply, shallow wells in the Rio Grande alluvium are pumped to augment the diversions. In 1985, 99 percent of the water used for irrigation was diverted from the Rio Grande. In that year almost 164,000 af, 57 percent of water used for all purposes in El Paso County, was used for irrigation (Texas Water Development Board [TWDB], 1988).

4.7.4.2 Groundwater

Hueco Bolson. The Hueco Bolson is an intermontane basin, incised by the Rio Grande Valley. That part of the basin north of the Rio Grande is referred to as the upper Hueco Bolson. The geography and geohydrology of the area are described in Section 4.7.1. The Rio Grande Valley in the Hueco Bolson is known as the lower valley and is separated from the bolson floor by an abrupt drop of 200 to 300 feet. The bolson floor in that area is known locally as the mesa, although on some maps it is referred to as La Noria Mesa.

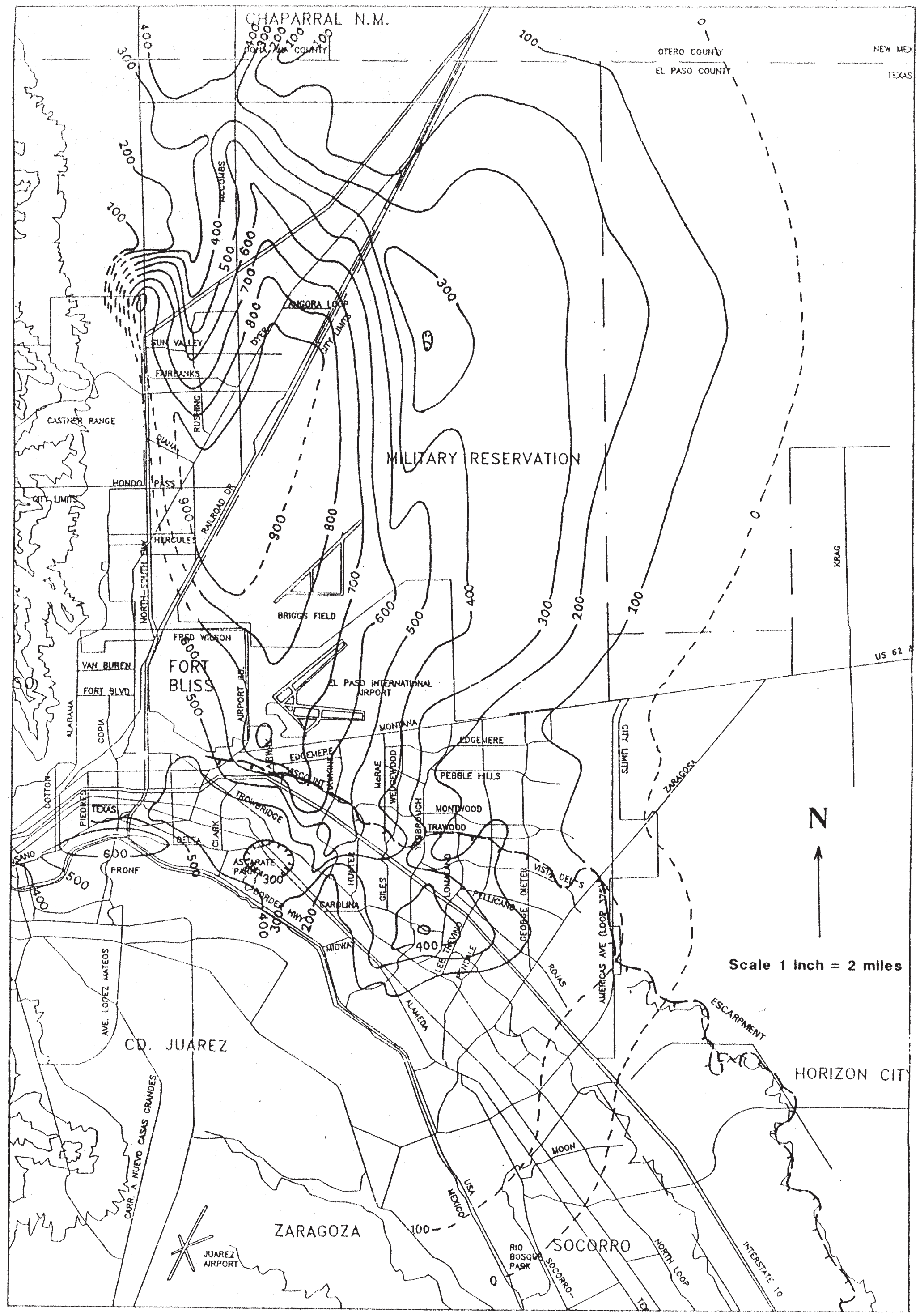
The bedrock that underlies the bolson deposits and makes up the surrounding mountains is relatively impermeable and will not supply large quantities of water to wells. Caliche occurs nearly everywhere beneath the surface of the bolson and is relatively effective as a barrier to infiltration of rainfall. The caliche beds are partially or completely missing beneath depressions in the bolson, however, and recharge to the underlying aquifer takes place when water collects in the depressions during periods of heavy rainfall (Knowles and Kennedy, 1956).

The principal area of recharge to the bolson is along the eastern edge of the Franklin and Organ mountains, where runoff from the mountains infiltrates into the coarse gravel of alluvial fans. USGS modeling efforts in the area indicate natural recharge from infiltration of 5,600 afy (Meyer, 1976). Most of the Rio Grande channel through the El Paso metropolitan area has been lined since 1968, virtually eliminating infiltration to the aquifer from the river in that area. Since 1985 the Fred Harvey water reclamation plant has recharged the basin artificially through injection of effluent into the aquifer. In 1996, 3,669 af of effluent was injected (Sperka, 1997).

Most of the fresh water in the aquifer lies along the eastern front of the Franklin Mountains (EPWU, 1995). An isopach map of the major fresh-water deposit in the basin shows the thickest part of the aquifer underlying Fort Bliss and northeast El Paso (Figure 4.7-4). Eastward the fresh water thins until, east of the “zero” isopach, only brackish water is present. Small pockets of fresh water, too small to be shown on the figure, occur along the front of the Hueco Mountains and serve as a water supply for commercial and residential users. Fresh water in the aquifer is generally of the sodium bicarbonate type (EPWU, 1995). USGS models show that discharge from the bolson occurs by pumpage from wells and naturally as groundwater seeps into the Rio Grande alluvium (Alvarez and Buckner, 1980).

Groundwater withdrawals by the City of El Paso from the Hueco Bolson in 1950 totaled 12,550 af (White, 1983). In 1996 municipal pumpage from the basin was 56,702 af (Sperka, 1997). Groundwater withdrawals from the Hueco Bolson by military wells in Texas during the late 1980s were slightly more than 5,000 afy (Orr and White, 1985). In 1996, Fort Bliss wells pumped 5,172 af of groundwater (Mathis, 1997). Water at the Main Post, WBAMC, Logan Heights, and Biggs AAF is supplied from the on-post well fields. The City of El Paso supplies water to McGregor Range and the North Hills Housing Area (U.S. Army, 1985). The major source of water to Fort Bliss and related military facilities is groundwater from the Hueco Bolson that is pumped from the Main Post, Tobin, and Biggs well fields. Within the last 2 years, the Utilities Division at Fort Bliss has been removing the post from the El Paso water system (Mathis, 1997).

Groundwater withdrawals from the Hueco Bolson by Ciudad Juarez, Mexico, were about 15,000 afy, in the late 1950s and throughout the 1960s, but in the early 1970s water use began to increase sharply to the extent that withdrawals in 1984 amounted to 66,000 afy (Orr and White, 1985). Present pumpage from the Hueco Bolson by Ciudad Juarez probably exceeds 100,000 afy.



Source: EPWU, 1995

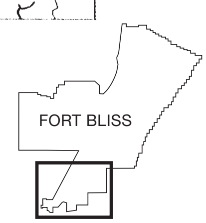


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Figure 4.7-4. Thickness of Sediments Containing Fresh Water in Feet, Hueco Bolson, El Paso.

The water in the Hueco Bolson aquifer underlying La Noria Mesa is unconfined, and is generally of good quality. Water levels in the aquifer have been affected by extensive withdrawals that have caused major water-level declines. Two large cones of depression, one in the lower valley and one on the mesa, have formed around centers of large withdrawals of groundwater (Figure 4.7-5). Depth to water ranges from more than 350 feet near pumping centers to less than 100 feet elsewhere. The decline of water levels from 1903 to 1994 in the El Paso area ranged from less than 10 to 150 feet (Figure 4.7-6). The lowering of water levels in the bolson deposits has permitted the infiltration of salt water into the fresh-water zones in those areas. Dissolved-solids concentrations in the early 1980s ranged from less than 500 to more than 1,500 mg/l. A water-quality survey indicated an average dissolved-solids concentration of 642 mg/l in samples from wells in the United States and 736 mg/l from wells in Ciudad Juarez (White, 1983).

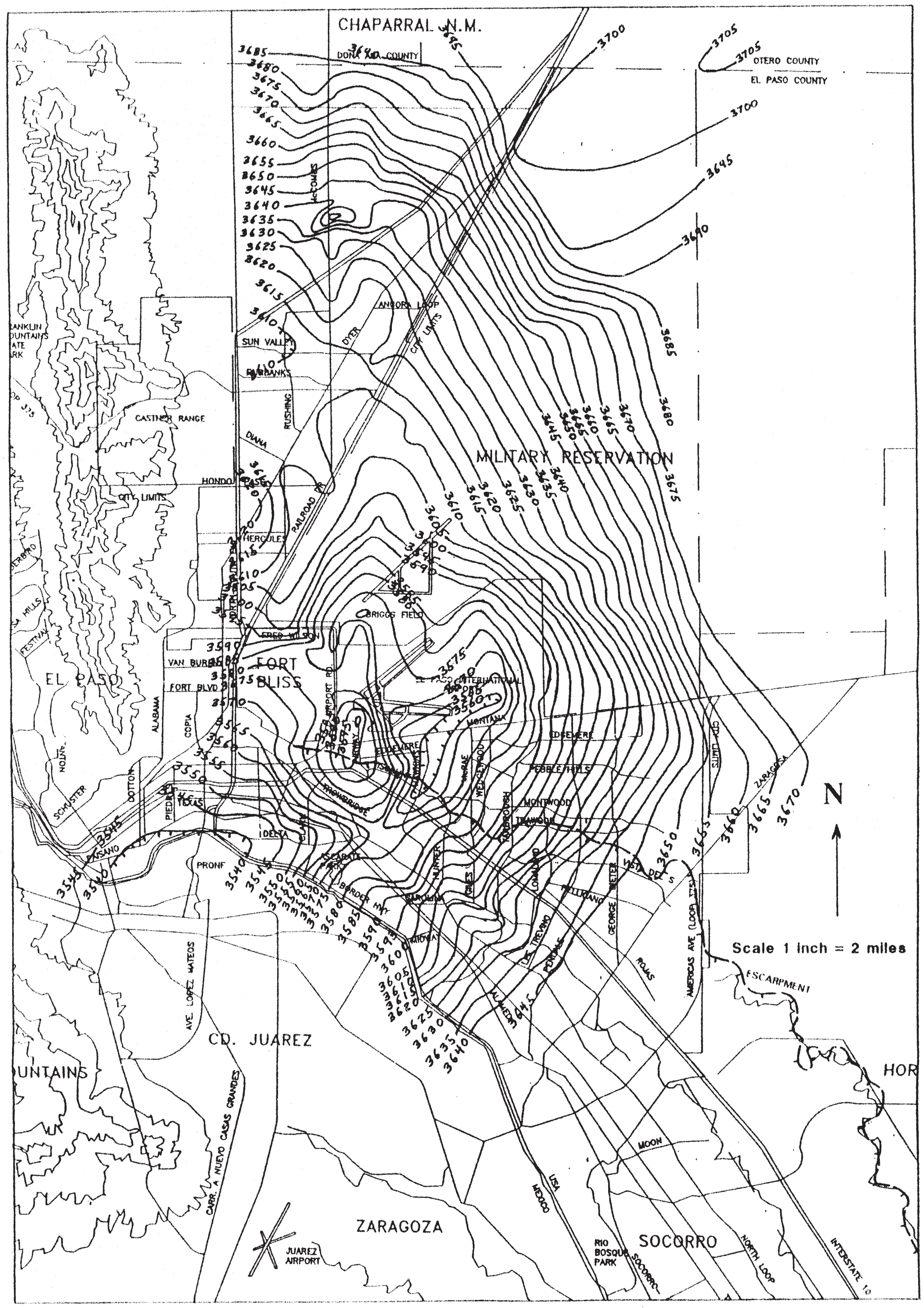
The Mesilla Bolson and Rio Grande Alluvium. A large intermontane basin, occupying the Rio Grande Valley west of the Franklin and Organ mountains in southern New Mexico and western Texas, and extending south into Mexico, is known as the Mesilla Bolson (Figure 4.7-7). The Rio Grande runs along the east side of the basin in New Mexico, and exits the basin in Texas at the south end of the Franklin Mountains. The low land along the river is known as the Mesilla Valley.

The aquifer in the Mesilla Bolson has been subdivided into four fresh-water zones (Nickerson, 1989). The Rio Grande alluvium, or shallow zone, up to 80 feet thick, consists of poorly sorted re-worked river deposits of sand, clay, and gravel. The upper intermediate zone, about 170 feet thick, is hydrologically connected to the shallow zone and consists of sand, clay, and gravel lenses. The lower intermediate zone, 250 feet thick, contains fewer clay lenses than the upper intermediate zone. The deep zone, about 400 feet thick, is separated from the lower intermediate zone by a 10- to 40-foot thick clay layer and consists of uniform, fine-grained sand with small lenses of clay. This zone contains the best quality water. A limestone conglomerate containing brackish water underlies the deep zone.

The aquifer in the Texas part of the basin is estimated to contain 500,000 af of stored water. The city operates a large well field at Canutillo, where water is pumped for municipal, industrial and irrigation supply from bolson (basin-fill) deposits and from the Rio Grande alluvium. Pumpage from municipal wells in the Mesilla Bolson was 26,015 af in 1996 (Sperka, 1997). Recharge to the aquifers in the lower Mesilla Valley was estimated at 18,000 afy (Leggat et al., 1962). The Rio Grande continuously recharges groundwater in the Mesilla Valley, unlike that in the Hueco Bolson, during the irrigation season. The quality of the groundwater is nearly twice as good as that of the Hueco Bolson (Cushing, 1996) and, unlike that in the Hueco Bolson, generally is superior to the quality of surface water (Cushing, 1997). Recharge also occurs by infiltration of rainfall and runoff, and by leakage from the canals and excess irrigation water on the heavily cultivated flood plain. However, recharge from the Rio Grande is increasing, probably in response to a lowering of water levels in the aquifer due to pumping. Leakage from the Rio Grande to the alluvium increased from 15,000 af in 1968 to 30,000 af in 1983 (Land and Armstrong, 1985).

The Rio Grande alluvium consists of stream-channel and flood-plain deposits composed of poorly sorted clay, silt, sand, and gravel that are derived from upstream areas and from erosion and redeposition of underlying bolson deposits. The alluvium reaches a maximum thickness of about 80 feet. Groundwater in the river alluvium is hydraulically connected to the shallower groundwater zones of the bolson deposits. The river alluvium groundwater is an important source for supplemental irrigation when the surface-water flow in the Rio Grande is insufficient to meet the needs of the valley farmers.

Groundwater in the alluvium is under water-table conditions and is generally only a few feet below land surface except in areas where the water level has declined due to direct pumpage from the alluvium or due to downward leakage into underlying heavily pumped aquifers. The alluvium has been drained completely in parts of downtown El Paso and Ciudad Juarez (Ashworth, 1990).



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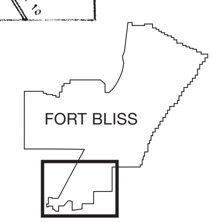

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Figure 4.7-5. Elevation of Water Table in the Mesa and Potentiometric Surface in the Valley Area, El Paso, January 1994 (USGS datum).

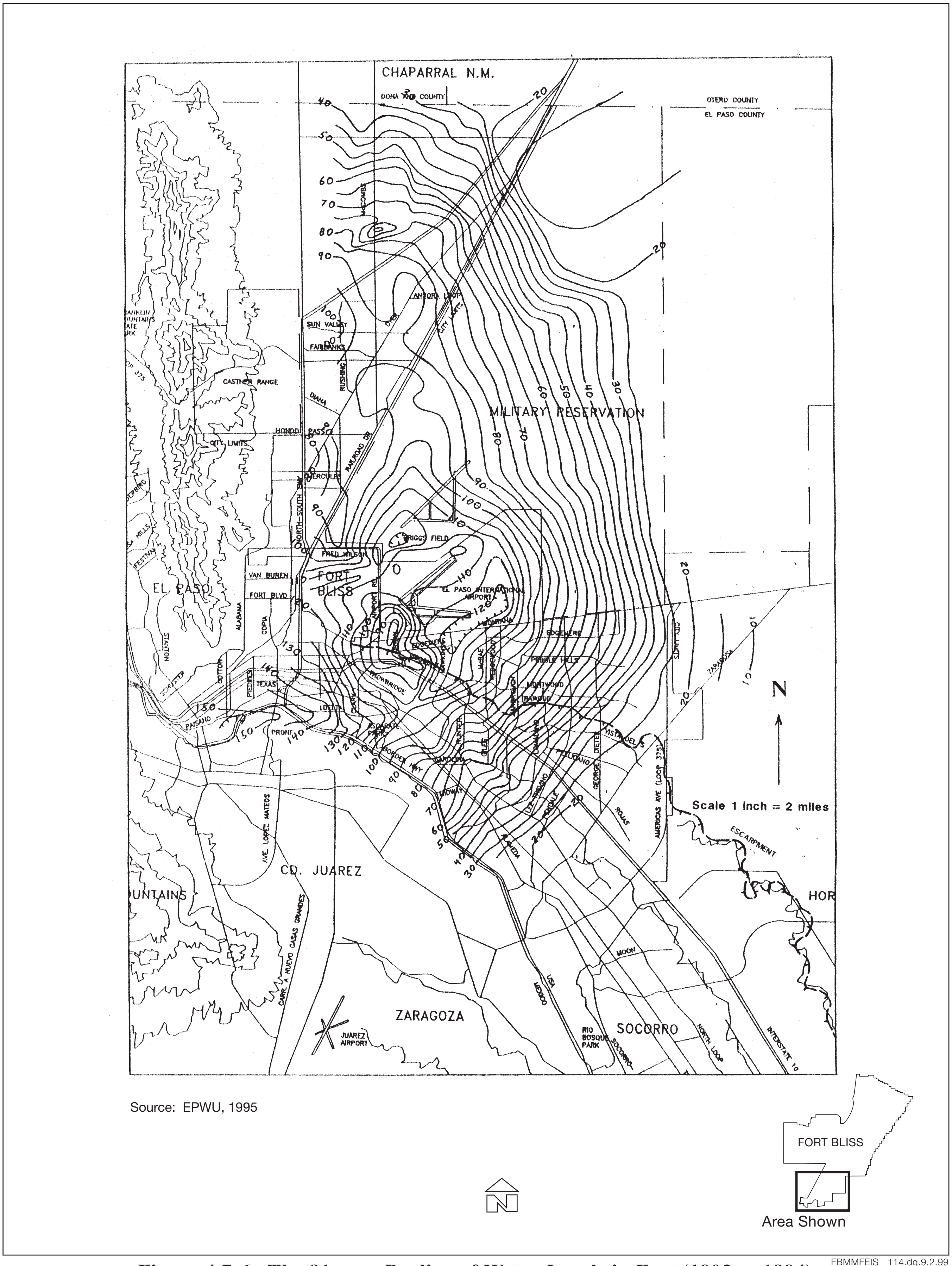

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Figure 4.7-6. The 91-year Decline of Water Levels in Feet (1903 to 1994), Hueco Bolson, El Paso.

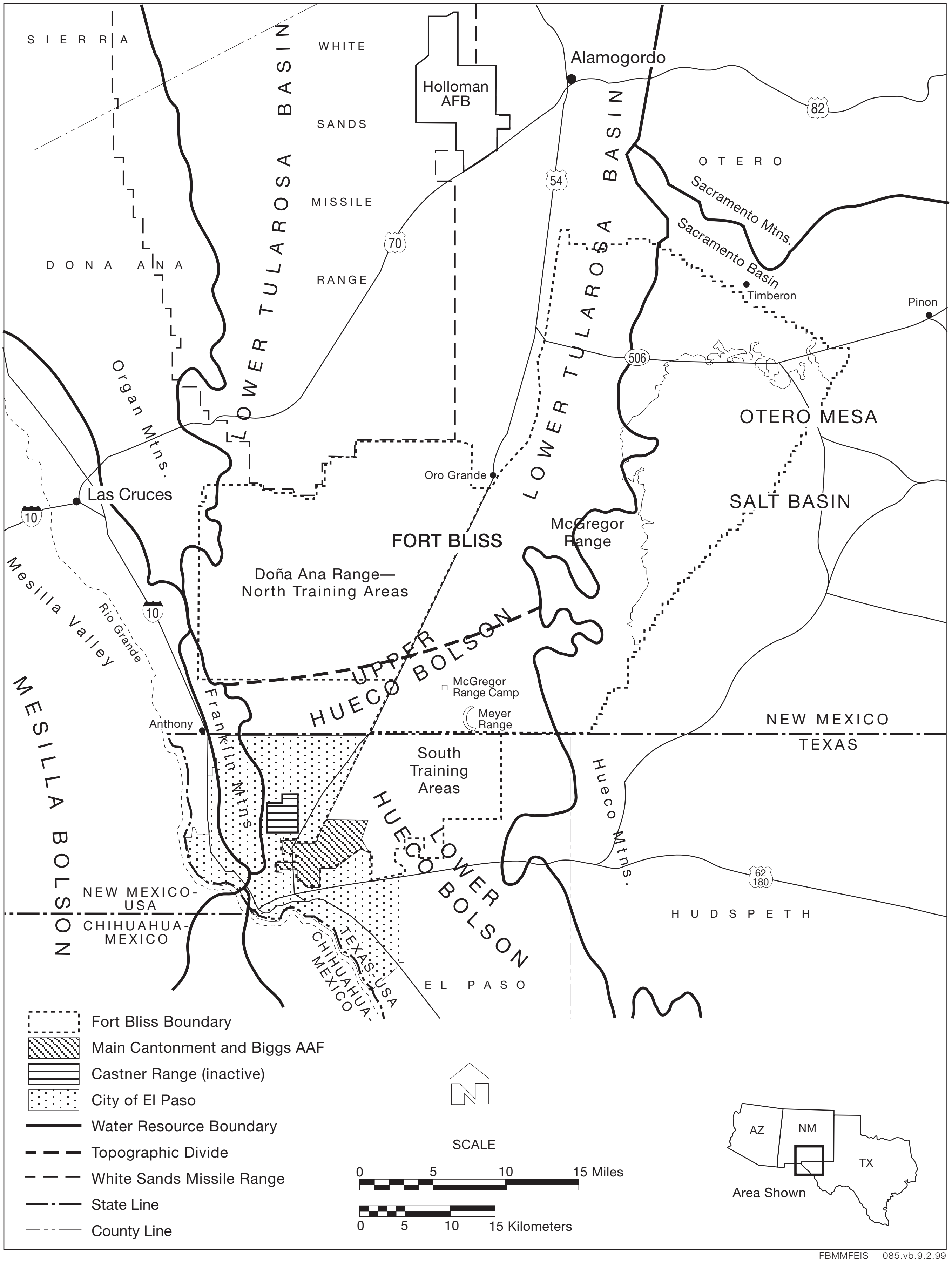

Figure 4.7-7. Regional Water Resources within the Fort Bliss Area.

Water in the Rio Grande alluvium generally ranges from slightly to moderately saline (1,000 to 10,000 mg/l TDS). The freshest water occurs near the river where the alluvium is being recharged. Poorer quality water occurs in areas where irrigation brings leached minerals into the groundwater. Downward leakage of poor quality water from the alluvium has caused problems in areas where the underlying bolson aquifers are being heavily pumped (Ashworth, 1990).

4.7.5 Water Issues

4.7.5.1 Water Supply and Demand

The EPWU is the largest water user on the U.S. side of the international boundary in the El Paso area. Historical data show that production, especially from the Hueco Bolson, has increased at an accelerated rate (Figure 4.7-8). In recent years the share of surface water from the Rio Grande has increased, resulting in a decline in pumpage from the Hueco Bolson. The following table (Table 4.7-1) shows amounts and percentages of supply for 1993 and 1996.

Table 4.7-1. Sources and Recent Water-supply Amounts for El Paso Water Utilities

Source	*1993**			*1996***	
	Aquifer	*Demand (af)*	*% of Total Demand*	*Demand (af)*	*% of Total Demand*
Hueco Bolson	Valley	7,950	6.7		
	Mesa	49,412	41.7		
	Total	57,363	48.4	56,702	44.0
Mesilla Bolson	Shallow	818	0.7		
	Intermediate	8,201	6.9		
	Deep	6,458	5.4		
	Total	15,477	13.1	26,015	20.2
Groundwater		72,840	61.5	82,717	64.2
Surface Water (Rio Grande)		45,663	38.5	46,166	35.8
Total Demand		*118,504*	*100.0*	*128,883*	*100.0*

* Source: EPWU, 1995.
** Source: Sperka, 1997.

The rate of pumping from the Hueco Bolson exceeds the rate of recharge, which means that the aquifer is in an overdraft condition, and is experiencing accelerated rates of water-level decline (Cushing, 1996). The largest declines have occurred adjacent to municipal well fields. Rates of water-level decline in the metro El Paso area range from less than 0.5 feet per year in the east to more than 5 feet per year near pumpage centers (White, 1983). Historically, from 1903 through 1989, declines of as much as 150 feet have occurred in the downtown areas of El Paso and Ciudad Juarez. Declines of more than 50 feet occurred in the same general area during the 10-year period before 1989 (Ashworth, 1990).

In a special report on the water resources of the El Paso area (USBR, 1973), future regional water supply and demand were projected under two scenarios. Under a current-trends scenario, with no increased surface-water supply, it was estimated that the Hueco Bolson will be practically exhausted by 2013. (USBR, 1973). Under a scenario with 120,000 afy transferred from agricultural to municipal and industrial use, the life of the Hueco Bolson could be extended to 2034. However, no mechanism was detailed for obtaining the rights to the 120,000 afy of surface water.

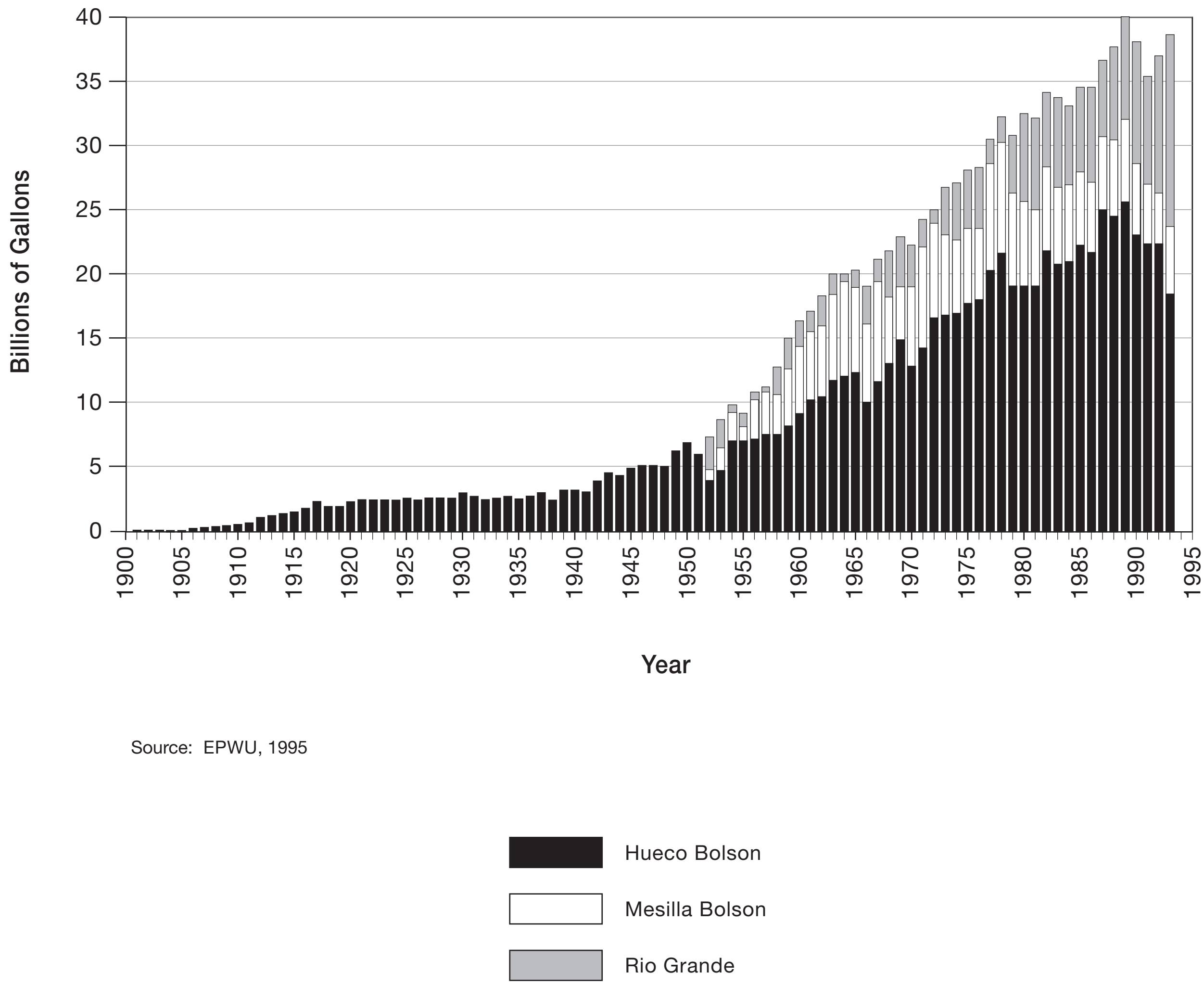

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Figure 4.7-8. Historical El Paso Water Utilities Groundwater Pumpage and Surface Water Diversions for Water Supply.

In 1980, the City of El Paso filed applications with the New Mexico State Engineer for 266 well permits in the Mesilla Bolson (246,000 afy) and 21 well permits in the Hueco Bolson (10,000 afy). Fort Bliss filed for 36 permits in the Hueco Bolson in New Mexico. The New Mexico State Engineer denied all the permits. El Paso pursued obtaining the permits through litigation with the state, and settlement was reached through an agreement dated March 6, 1991. Because of New Mexico statutes governing the appropriation of water for use within and outside the state, groundwater derived from New Mexico sources is considered an uncertain source of supply within Texas. However, for the purposes of that study it was assumed that with the Joint Settlement Commission formed as a result of the settlement, groundwater pumped in New Mexico will become available by the year 2000 (El Paso County, 1992). Thus the upper Hueco Bolson, the Mesilla Valley, and lower Tularosa Basin have been considered a primary source of new water supply.

In 1989, El Paso and the EPCWID signed a MOU to work together on a long-range *Water Resource Management Plan*. Boyle Engineering Corp. was hired to prepare the plan and concluded that the Hueco Bolson would be exhausted of recoverable fresh water by 2025, causing a massive water-supply shortage to the area (EPWU, 1995). As a result, conservation efforts at Fort Bliss and El Paso have aggressively addressed the forecast shortage through the creation of a 50-year plan for development of alternative water supplies (U.S. Army, 1997a). The strategy for meeting the projected El Paso area water demand of 294,700 afy by 2040 includes the implementation of an aggressive water conservation program, increased reuse of treated wastewater, and the acquisition of additional Rio Grande Project water (El Paso County, 1992). In addition, El Paso, the EPCWID, and the New Mexico/Texas Water Commission (formerly Joint Settlement Commission) are pursuing implementation of a joint conveyance facility to transport Rio Grande water from Caballo Dam to the American Dam. The facility would make higher quality surface water available on a year-round basis (EPWU, 1995).

El Paso is planning a water treatment plant near Anthony, Texas, to supply water to Ciudad Juarez, southern New Mexico, and El Paso County. The plant would allow El Paso to treat and transport surface water to northeast El Paso, where it could be injected into the Hueco Bolson. The EPWU also is planning a pilot plant to obtain information for the final design of a desalination plant to use the large amount of brackish groundwater available in the Hueco Bolson. It is estimated that 10 mgd of fresh water could be provided by such a plant in its first stage (EPWU, 1995).

An additional estimated 70,000 afy can be developed through construction of new wells in Texas on nonmilitary lands and an additional 60,000 afy through development of groundwater that underlies military lands in Texas by spacing wells at half-mile intervals in areas of high transmissivity (Cushing, 1996). Production at the Canutillo well field in the Mesilla Bolson can be expanded to 50,000 afy by new well construction. The Mesilla aquifers, unlike the Hueco Bolson aquifer, are recharged continuously by the Rio Grande during the irrigation season. Although the Hueco Bolson continues to be the primary source of supply, utilization of groundwater from the Mesilla Bolson and surface water from the Rio Grande is increasing (Cushing, 1996).

Ten recharge wells were drilled about 3 miles west of the Fred Harvey water reclamation plant to recharge the aquifer in the Hueco Bolson with effluent from the plant. All effluent from the plant was injected from 1985 to 1992, at which time the plant began selling water to the EPEC and the Painted Dunes Golf Course. In 1993, 1,241.5 mg(3,810 af) were injected into the aquifer, 689.6 mg (2,116 af) were sold to the electric company, and 127.3 mg(391 af) were sold to the golf course (EPWU, 1995). Since 1979, the Haskell Street waste-water treatment plant has sold effluent to the Asacarte Golf Course for irrigation. In 1993, 331.2 mg (1,016 af) were sold to the golf course, and the remaining effluent, 8,394 mg (25,761 af) was discharged to the Rio Grande (EPWU, 1995).

Other possibilities of securing additional water for El Paso, if pertinent statutory, political, and other impediments could be overcome are (Cushing, 1996):

1. Approximately 42 percent of the flows delivered to the diversion dams are lost to evaporation and seepage via unlined conveyances. Most of the losses could be salvaged with pipelines and lined canals.

2. There is no reservoir "carry-over" storage of Rio Grande water to the following year; hence, any unused annual allotment at the end of the season is reapportioned to Texas and New Mexico users the following year. EPCWID has not used all of its allotment in the last 15 years, and each year it attempts to receive credit through a carry-over plan. Unused Texas allotment water or water spilled from upstream reservoirs could be stored for later use. Underground storage through injection wells is suggested.

3. In drought years, contingency plans could be put into effect where farmers are paid to "go on vacation" while municipal and industrial supply uses the reduced surface water allotments.

Water demand at Fort Bliss is projected to remain essentially constant at around 5,654 afy or decrease with aggressive conservation measures. Historically, the EPWU has supplied potable water to El Paso area military facilities. In 1995, the Fort Bliss Directorate of Public Works and Logistics reactivated the Post and Biggs AAF well fields, and now draws potable water directly from the Hueco Bolson aquifer beneath the main cantonment (Figure 4.7-9). Fort Bliss also draws water from Tobin and Site Monitor well fields. Other wells in the area are El Paso municipal wells in the Airport, Mesa-Nevins, and Cielo Vista well fields; and private wells at Carlsbad and Red Arrow (mobile home) Parks, and Evergreen Cemetery. In 1996, Fort Bliss purchased 481 af of water from El Paso and produced 5,173 af from military well fields, for a total of 5,654 af. This amounts to a per capita usage of 202 gpd, based on the on-post population and multipliers applied to off-post workers and military personnel, visitors, and retirees that use post facilities. This per capita usage cannot be compared with any figures generated by the City of El Paso as there is very little comparison in the way the city calculates the population base. These amounts include irrigation water for two 18-hole golf courses on the post. Water levels in the Fort Bliss wells have been declining about 1 foot per year in recent years and can undergo nearly 100 feet of additional decline before the wells will require deepening (Mathis, 1997).

It is projected that by 2000, the implementation of water conservation measures would substantially decrease water demand and per capita consumption at Fort Bliss (U.S. Army, 1997a). Fort Bliss plans to reduce the installation's impact to the aquifer through increased conservation. Fort Bliss has a relatively high per capita water consumption rate, which is due in part to the flat billing rate within housing units, irrigation of parade fields and golf courses with potable water, and other military uses. Reducing these factors, together with the small stable population, lends well to water conservation measures. Fort Bliss already has a residential water conservation policy in effect that limits outdoor watering during the summer (Costello, 1997).

4.7.5.2 Water Quality

There are these water quality considerations at Fort Bliss; intrusion of saline water, the municipal solid waste landfill, and the Old Mesa Well Field.

Intrusion of Saline Water Increasing dissolved solids concentrations in fresh-water zones of both the Hueco and Mesilla bolsons are attributed mainly to downward leakage of brackish water from shallow zones and possible upconing of brackish water from below due to pumpage. Water analyses from wells

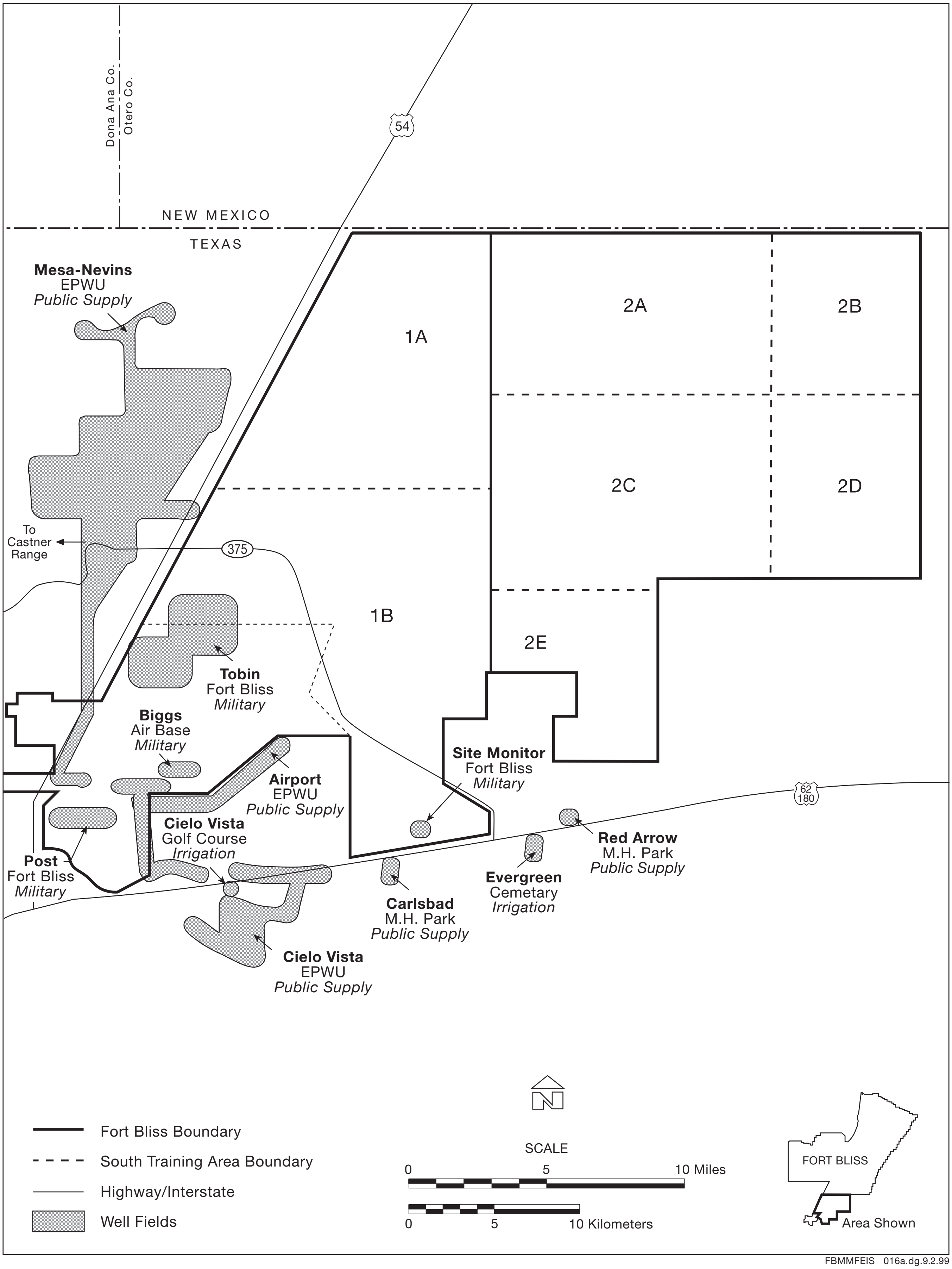

Figure 4.7-9. Well Fields in and near the Fort Bliss Main Cantonment Area.

completed in the Hueco Bolson show an average annual increase in dissolved solids of about 10 mg/l since the 1950s and 1960s in Texas, and about 30 mg/l since the 1970s in Ciudad Juarez. In parts of downtown El Paso and Ciudad Juarez, the dissolved solids concentration in groundwater has increased at rates of 40 to 60 mg/l per year during these periods. Concentrations of dissolved solids have increased also in groundwater produced from the intermediate zone of the Mesilla Bolson, at an average rate of about 9 mg/l per year (White, 1983).

In 1993, 20 city wells in the Lower Valley, Town, and Water Plant well fields produced water that exceeded the maximum contaminant level (MCL) for TDS or chloride and were shut down. Many of those wells were being recharged with treated surface water in 1994 to extend their lives. Chloride concentrations are increasing at the Eastwood well field and the East Airport well field (adjacent to Fort Bliss wells), where water from as many as 11 wells exceeds the 300 mg/l limit. Blending of water in the Montana reservoir has been satisfactory, but it is a temporary solution (EPWU, 1995). By 1997, the water from four wells in the East Airport well field was too saline to be blended, and the wells were not being used (Sperka, 1998). The water from seven high-salinity wells was being blended successfully. The maximum field capacity of 34.38 mgd had decreased to 24.26 mgd because of salinity, and without blending, only 13.14 mgd could be produced. Projections for the East Airport well field indicate that by 2005, maximum field capacity will decrease to 17.05 mgd with blending and 8.24 mgd without blending (Orr and Risser, 1992), and by 2015 the respective quantities will be 12.48 mgd and 6.37 mgd (Sperka, 1998).

Recent analyses of water from the Fort Bliss well fields indicate a range of 300 to 500 mg/l TDS (Mathis, 1997). Evaluation of water quality data from 1992 to 1995 did not show any problems with the Fort Bliss water supply. All constituents were below regulated MCLs. Maximum concentrations of arsenic at Biggs AAF, Site Monitor, and Main Base wells are 0.0062, 0.0056, and 0.0032 mg/l, respectively. If the MCL remains at 0.05 mg/l no treatment will be necessary, but if the MCL is reduced to less than 0.0032 mg/l, as proposed, treatment will be required at all three water systems (U.S. Army, 1996i). Future declines of water levels in the Hueco Bolson can be expected to result in increasing salinity in the Fort Bliss area.

Fort Bliss Municipal Solid Waste Landfill. Domestic solid waste generated on Fort Bliss is collected and disposed of by a private contractor at a 106-acre landfill 3 miles north of the intersection of Fred Wilson Avenue and Chaffee Road (see Section 4.2.2.3). Investigations by the USGS (Abeyta, 1995) examined hydrogeologic conditions in the area and potential contamination of the local aquifer due to the landfill. The investigation determined a 200-year travel time for leachate to reach the aquifer, in the event of a leak through the engineered barrier system. No evidence was found to indicate that the landfill is causing any water-quality deterioration of the aquifer in that part of the Hueco Bolson.

Old Mesa Well Field. In the early 1900s, the Old Mesa well field, a high-density municipal well field, was located on parts of the main cantonment and Biggs AAF and on city land. The general area is bounded on the west by Railroad Drive, on the east by Airport Road, and centered on Fred Wilson Drive (see Figure 4.7-9). Before abandonment of the field in 1926, a private company, predating EPWU, drilled 100 to 200 small-diameter wells. The firm subsequently went out of business, and most of the wells were left uncapped (Cushing, 1997). A USGS investigation (White, 1983) located nine of the Old Mesa wells, four of which had shallow groundwater seeping into them. The investigation concluded that a "substantial amount" of inferior-quality groundwater with high TDS and nitrate concentrations is being recharged into the Hueco Bolson aquifer through the abandoned wells. The seepage is believed to originate from urban runoff and possibly by deep percolation of lawn irrigation water. Fort Bliss is aware of the situation, and is planning an investigative survey to determine the nature and extent of any contamination and to locate and cap abandoned wells in accordance with state and federal regulations (Cushing, 1997).

4.7.5.3 Land Subsidence

The decline in water levels has resulted in some land subsidence due to the dewatering of clay beds in some areas (Land and Armstrong, 1985). Releveling of benchmarks in the metropolitan area has shown land-surface subsidence of about 0.2 feet. Local areas of subsidence indicated by surface fractures and cracks in buildings, coincide with areas that historically were swamps along the Rio Grande. Subsidence is not expected to increase dramatically, nor is it expected to be a problem at Fort Bliss in the foreseeable future.

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Biological Resources

4.8

4.8 BIOLOGICAL RESOURCES

Existing biological resources are discussed in this section. The ROI for biological resources encompasses Fort Bliss and the surrounding area including the Organ Mountains, Sacramento Mountains, Hueco Mountains, Otero Mesa, and Tularosa Basin.

Due to its large size (1.12 million acres) and varied topography (see Figure 4.0-1), Fort Bliss exhibits a high degree of biodiversity. The vegetation mirrors this diversity in that plant communities on post range from the Chihuahuan Desert plant communities in the Tularosa Basin to Rocky Mountain conifer forests in the Organ Mountains (U.S. Army, 1996j, 1997f). Of the approximately 4,000 plant species in New Mexico, an estimated 1,000 species are on Fort Bliss with over 800 species in the Organ Mountains alone (Corral, 1997; U.S. Army, 1997g). There are several endemic plant species in the Organ (four species) and Hueco, (one species) mountains of Fort Bliss. Most of the known populations of these plant species in the Organ Mountains and the entire population in the Hueco Mountains occur on Fort Bliss (U.S. Army, 1994b).

Wildlife species diversity is also high where, for example, of the State of New Mexico's 123 species of amphibians and reptiles, 47 species occur and 19 species have the potential to occur on Fort Bliss (U.S. Army, 1997h; Degenhardt et al., 1996). There are an estimated 509 species of birds recorded in New Mexico and 334 species (68 percent) have been recorded on Fort Bliss (U.S. Army, 1996k, 1997i). 182
Studies on Fort Bliss have demonstrated that arroyo-riparian drainage areas are used more extensively by wildlife than adjacent upland areas (Kozma and Mathews 1997; U.S. Army 1997j). Over 3,000 miles of these arroyos have been mapped on Fort Bliss (U.S. Army 1998h) and given that over 75 percent (830,000 acres) of Fort Bliss has not been grazed for decades, many of these arroyos as well as upland areas are likely in good to excellent condition in terms of providing wildlife habitat.

From a regional perspective, Fort Bliss supports some of the most important examples of southwestern ecosystem types such as black grama grasslands on McGregor Range and relatively undisturbed Rocky Mountain forests and woodlands in the Organ Mountains. The Organ Mountains are an exceptionally important area in terms of quality and diversity in the southwest. Numerous endemic and sensitive species occur in these mountains, and they support Rocky Mountain forests and woodlands that have been left relatively undisturbed for the last 50 years with some higher elevation areas probably undisturbed since the 1880s. Other areas such as WSMR, Carlsbad Caverns National Park, Big Bend National Park, and various preserves and national parks in Arizona also support important examples of southwestern ecosystem types. However, these areas do not support the same type and mix of ecosystems as Fort Bliss, which indicates that some of the ecosystems on Fort Bliss are important from a regional perspective (U.S. Army, 1997f). The following sections provide details regarding the biological resources on Fort Bliss with additional information provided in Appendix F.

4.8.1 Vegetation

The major plant community types in the area of Fort Bliss are desert grasslands, Chihuahuan Desert scrub, and plains mesa sandscrub. Types that occur in the mountains in the area are juniper savanna, conifer and mixed woodlands, and montane conifer forests (Dick-Peddie, 1993). The vegetation of Fort Bliss was characterized and mapped (U.S. Army, 1996j, 1997f) and this section is based on those reports. The vegetation on Fort Bliss is diverse, ranging from Chihuahuan Desert scrub in the Tularosa Basin to Rocky Mountain conifer forests in the Organ Mountains (Figures 4.8-1, 4.8-2, and 4.8-3). Within the basin, alluvial fans and piedmonts support desert shrub and grassland plant communities. Desert shrub plant communities dominate the Tularosa Basin floor, and Otero Mesa generally supports desert grassland plant communities. The upper Sacramento Mountains foothills generally support a wooded plant

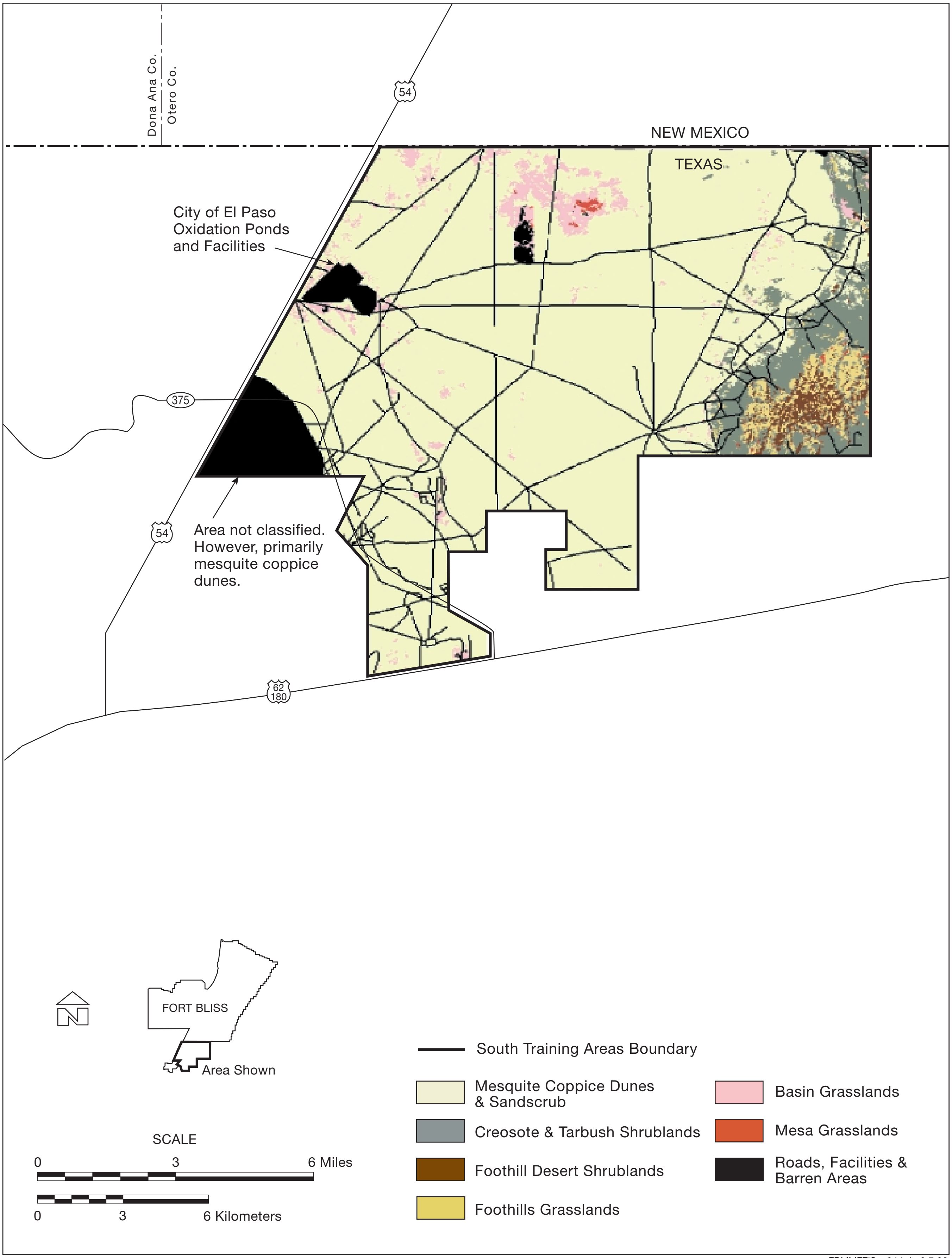

Figure 4.8-1. South Training Areas Vegetation.

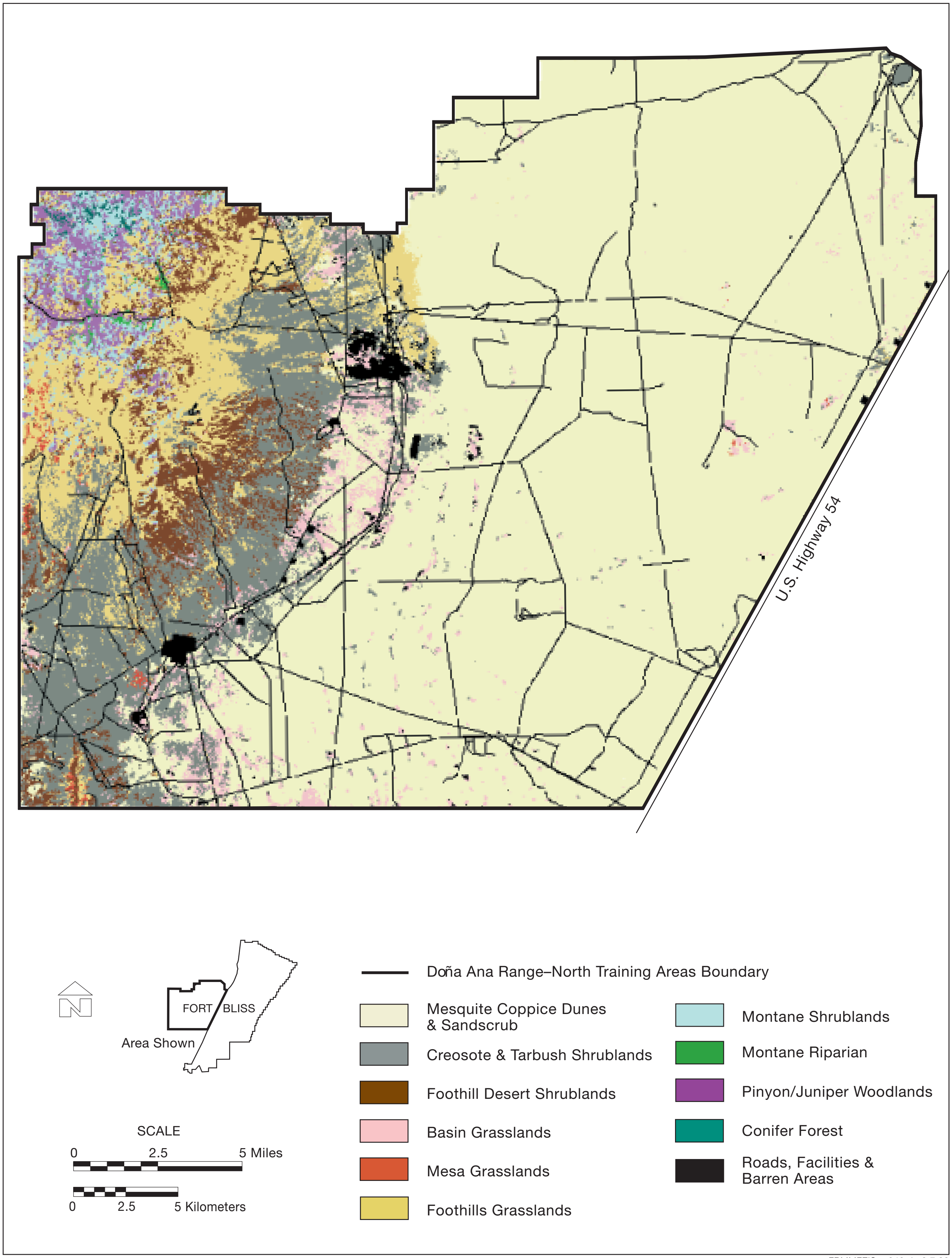

Figure 4.8-2. Doña Ana Range–North Training Areas Vegetation.

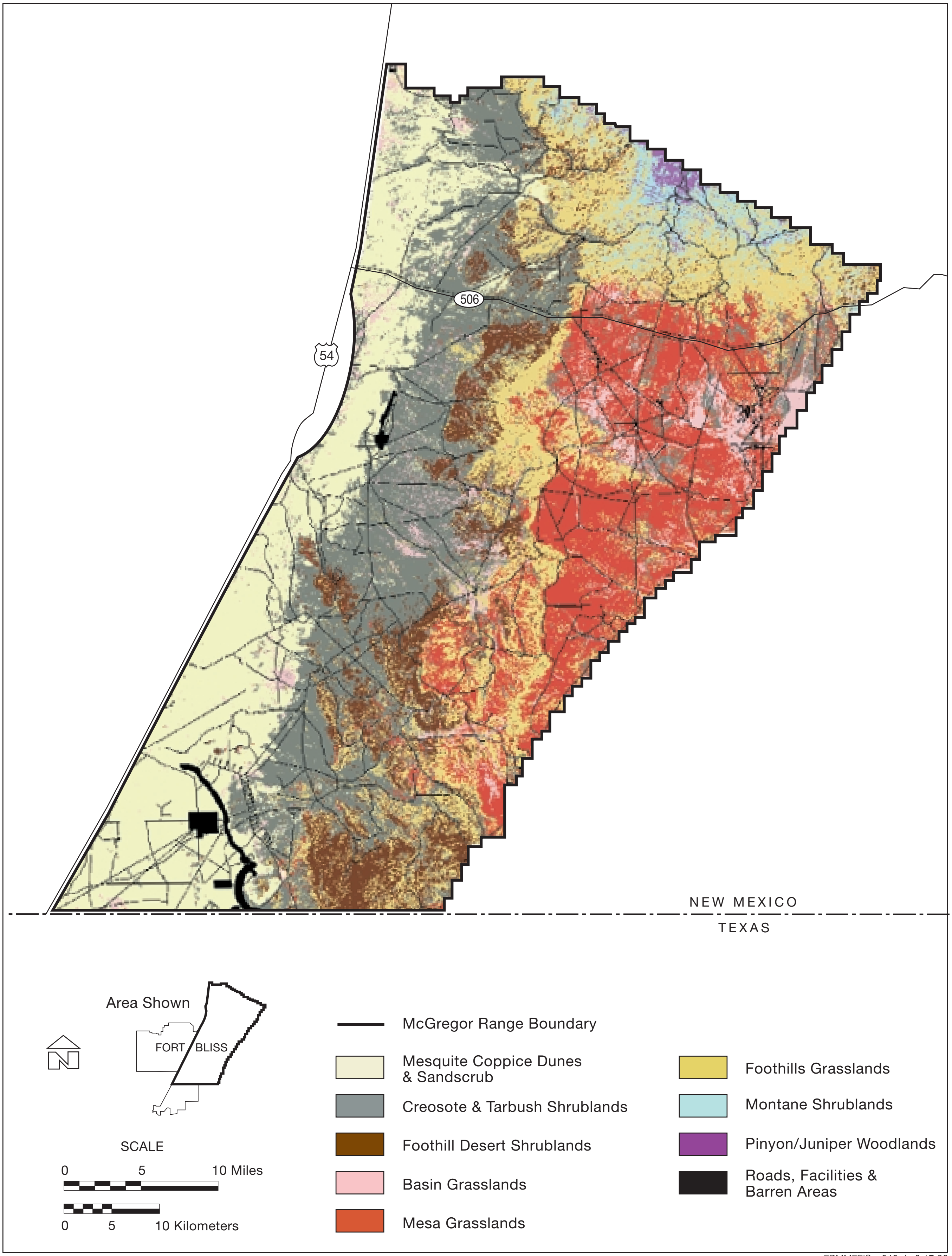

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Figure 4.8-3. McGregor Range Vegetation.

community dominated by open and closed stands of pinyon pine (*Pinus edulis*) and juniper (*Juniperus monosperma, and J. deppeana*). This woodland type also occurs in the Organ Mountains as well as oak woodlands and Rocky Mountain montane conifer forest.

The plant communities and other areas on the main cantonment, the South Training Areas, Doña Ana Range–North Training Areas and McGregor Range were mapped using satellite imagery (U.S. Army, 1996j). Thirty-four mapping units including some property now adjacent to the installation, total 1,113,403 acres (Table 4.8-1). Of this total, more than 67,000 acres (6 percent of the total installation area) consists of rock, barren soil, military cantonment, military facilities, and roads (mapping units 32, 33, 34). Military roads by themselves constitute almost 45,000 acres (4 percent) of total land cover on the installation and exceed the cover percentage of some plant community types on Fort Bliss. The 34 mapping units were lumped into 11 categories (Table 4.8-2) and mapped (Figures 4.8-1 through 4.8-3). The various types of shrubland total 708,375 acres (63.6 percent) while there are 327,391 acres of grasslands (29.4 percent) and 10,205 acres of woodland (0.9 percent) (Table 4.8-2).

As indicated above, about 64 percent or 708,375 acres of land on Fort Bliss are desert shrublands, mostly in the Tularosa Basin (Table 4.8-2). About 415,800 acres of the shrublands (37 percent of Fort Bliss) are covered with mesquite-dominated plant communities most of which are coppice dunes. Creosote dominated plant communities cover over 201,000 acres or 18 percent of the total land. Shrub-dominated plant communities have replaced grassland plant communities (including black grama grasslands) over large areas in southern New Mexico in the last century (Buffington and Herbel, 1965). For example, over 86,000 acres of a 144,500-acre study area on the Jornada Experimental Range were grasslands with no shrubs in 1858; no such habitat remained by 1963. During the same time period, mesquite-dominated habitat increased from 6,266 acres in 1858 to 66,151 acres in 1963 and creosote-dominated areas increased from 640 acres to about 12,000 acres during the same period. Mesquite-dominated areas have continued to expand even after livestock have been removed from the range for many years. Long-term studies in permanent enclosures at the Jornada Experiment Station from 1935 to 1980 showed that black grama grass had totally disappeared by 1980, even in areas where it was the dominant species in 1935; the greatest decline in black grama took place between 1950 and 1955 during a severe drought. These former black grama grasslands are now mesquite-dominated areas (Hennessy et al., 1983). It is believed that the formation of mesquite coppice dunes is related to cattle grazing and drought. Under heavy livestock grazing and/or drought, grass cover was reduced. In addition, cattle feed on mesquite seeds and the dispersal of these seeds is of "great importance in the spread of mesquite to adjacent areas" (Buffington and Herbel, 1965). Openings created by the reduction in grass cover were occupied by mesquite and the establishment of this species altered the site and extensive soil movement occurred, forming coppice dunes. In addition, soil moisture conditions and competition were such that black grama could not become re-established (Hennessy et al., 1983).

It is likely that much of the mesquite- and creosote-dominated areas on Fort Bliss were once grasslands and this conversion from grassland to shrublands is considered a step in the desertification process (Schlesinger et al., 1990). Long-term studies carried out at the Jornada Experimental Range have shown that the conversion to shrublands has resulted in a reduction in plant species diversity (Huenneke, 1995). Grasslands had 2.5 times more plant species than mesquite and 1.7 times more plant species than the creosote type. Net primary productivity did not differ significantly between the grassland and shrubland types (Huenneke, 1995).

Once established, coppice dunes persist. The return to grasslands, even in areas where livestock have been excluded for many years, is highly unlikely (Gardner, 1951; Buffington and Herbel, 1965; Hennessy et al., 1983). Chemical treatment has proven successful in reducing mesquite growth over the short-term (about 3 years). Satellite imagery data over a several-year period was used to track photo-synthetic

Table 4.8-1. Number of Acres and Description of 34 Mapping Units at Fort Bliss

Plant Community (Mapping Units)	*Number of Acres (% of Total)*	*Description*
		Shrublands
Basin desert shrublands (coppice dunes) (1)	323,968 (29.1)	Consists of large coppice dunes in the Tularosa Basin. Honey mesquite (*Prosopis glandulosa)* is the dominant shrub with four-winged saltbush (*Atriplex canescens*) common in some areas. Sparse undergrowth; mesa dropseed (*Sporobolus flexuosus)* common in some areas.
Plains/coppice dunes sandscrub (2)	38,016 (3.4)	Sandsage (*Artemisia filifolia)* common with some mesquite and Mesa dropseed. Occurs at north and south end of coppice dune fields.
Plains sandscrub (3)	46,291 (4.2)	Sandsage/mesa dropseed common plants. Located on sandy areas mostly in Tularosa Basin with small amounts on Otero Mesa.
Basin desert shrubland (4)	7,517 (0.7)	Dominated by honey mesquite and alkali sacaton (*Sporobolus airoides*) in broad clay depressions at northern edge of coppice dunes.
Basin/lowland desert shrubland (5)	40,484 (3.6)	Bottomland tarbush (*Flourensia cernua*) dominant with tobosagrass *(Hilaria mutica*) and burrograss (*Scleropogon brevifolius*) also common. Occurs on silty alluvial fan toe slopes and bottomlands on northern Otero Mesa and in the basin below mesa.
Lower piedmont desert shrubland - creosotebush and tarbush (6)	90,203 (8.1)	Dominated by creosotebush (*Larrea tridentata)* and bush muhly (*Muhlenbergia porteri)*; tarbush is common in some areas. Occurs in heavy depositional soils of the lower toe slopes and the basin bottom.
Lower piedmont desert shrubland - creosotebush and honey mesquite (7)	6,370 (0.6)	Creosotebush and honey mesquite are dominant. Occurs on gravely or silty soils on eastern piedmont of the Organ Mountains.
Upper piedmont desert shrubland-creosotebush and bush muhly (8)	64,159 (5.8)	Dominated by creosotebush and bush muhly. Occurs on gravely soil of the upper piedmont and Sacramento Mountains foothills.
Foothill desert shrubland - white thorn acacia (9)	42,130 (3.8)	Dominated by viscid acacia (*Acacia noevernicosa*); other species are sideoats grama (*Bouteloua curtipendula*), black grama (*B. eriopoda)*, and ocotillo (*Fouquieria splendens*). Occurs on shallow gravely soils of foothills, mesa escarpments, and upper piedmont.
Foothill desert shrubland - mimosa/sideoats grama (10)	2,370 (0.2)	Dominated by mimosa (*Mimosa aculeaticarpa*) and sideoats grama. Occurs on gravely slopes in canyons on the east side of the Organ Mountains.
Foothill desert shrubland - ocotillo - mariola (11)	9,936 (0.9)	Ocotillo and mariola (*Parthenium incanum*) are common plant species. Occurs on the rocky foothills of the Sacramento, Organ, and Franklin mountains.
Foothill desert shrubland - Lechugilla/sideoats grama (12)	13,817 (1.2)	Dominated by lechugilla (*Agave lechuguilla)* and sideoats grama. Occurs on all aspects of the Hueco Mountains and unnamed hills.
Montane shrubland - mountain mahogany (13)	22,397 (2.0)	Mountain mahogany (*Cercocarpus montanus)* , curlyleaf muhly, and New Mexico needlegrass are dominant. Occurs predominantly on rocky south facing slopes at mid-elevation in the Organ and Sacramento mountains.
Montane shrubland - Gambel's oak (14)	717 (0.1)	Gambel's oak (*Quercus gambelii)* and whortleleaf snowberry (*Symphoricarpos oreophilus)* are dominant. Occurs in dense stands on north facing slopes at mid- to high-elevation in the Organ Mountains.
		Grasslands
Sandy plains desert grassland (15)	7,969 (0.7)	Dominated by mesa dropseed and soaptree yucca (*Yucca elata)*. Occurs mostly south of McGregor Range Camp on sandy sites.
Basin/lowland desert grassland-tobosa-grass and alkali sacaton (16)	39,120 (3.5)	Dominated by tobosagrass and alkali sacaton and occurs in heavy depositional soils on flats, bottomlands, and swales. Usually associated with drainages on Otero Mesa, and Sacramento and Organ mountains.

Table 4.8-1. Number of Acres and Description of 34 Mapping Units at Fort Bliss (Continued)

Plant Community (Mapping Units)	*Number of Acres (% of Total)*	*Description*
Basin/lowland desert grassland-burrograss (17)	3,173 (0.3)	Monotypic growth of burrograss. Occurs in drainage's on Otero Mesa and broad alluvial depressions in the basin.
Upper piedmont desert grassland (18)	7,512 (0.7)	Codominants are black grama, Torrey's jointfir (*Ephedra torreyana)*, and honey mesquite in the gravely upper piedmont of the Organ Mountains.
Foothills piedmont desert grassland (19)	32,627 (2.9)	Black and sideoats grama dominant with soaptree yucca and creosotebush. Occurs on gravely footslopes and piedmont of the Sacramento, Hueco, and, Franklin mountains.
Foothills grassland (20)	57,543 (5.2)	Dominated by sideoats grama, sacahuista (*Nolina microcarpa)*, and curlyleaf muhly (*Muhlenbergia setifolia)*. Occurs on gravely or rocky slopes near Otero Mesa escarpment and canyon walls of the escarpment.
Mesa grassland - blue grama/alkali sacaton (21)	7,475 (0.7)	Blue grama (*Bouteloua gracilis)* and alkali sacaton common along with soaptree yucca and purple threeawn (*Aristida purpurea)*. Occurs on silty-clay soils near the Sacramento Mountains foothills.
Mesa grassland - black and blue grama/soaptree yucca (22)	84,994 (7.6)	Dominated by blue and black grama plus soaptree yucca and banana yucca (*Yucca baccata)*. Covers extensive areas on fine silty soil on Otero Mesa and low Tablelands beneath the mesa.
Mesa grassland - black and blue grama/banana yucca (23)	5,713 (0.5)	Black and blue grama plus banana yucca are dominant. Occurs on shallow soils on southern Otero Mesa.
Mesa/foothills grassland (24)	17,462 (1.6)	New Mexico needlegrass (*Stipa neomexicana),* sideoats grama, black grama, banana yucca common. Occurs on rocky ridges of slopes of the southern Otero Mesa.
Foothills grassland - sideoats grama, curlyleaf muhly (25)	54,972 (4.9)	Sideoats grama, curleyleaf muhly, skeletonleaf goldeneye (*Viguiera stenoloba)*, ocotillo, and common sotol (*Dasylirion wheeleri)* are common. Occurs on Otero Mesa escarpment and rocky slopes of the Sacramento and Hueco mountains.
Foothills grassland - sideoats grama/sotol (26)	5,102 (0.5)	Dominated by sideoats grama, common sotol, and hairy grama (*Bouteloua hirsuta)*. This type found on low to mid elevation slopes in canyons of the Organ Mountains.
Piedmont grassland (disturbed) (27)	3,729 (0.3)	Streambed bristlegrass (*Setaria leucopila)* and Arizona cottontop (*Digitaria californica)* are common species. Occur in areas disturbed by exploded ordnance on the piedmont east and west of Rattlesnake Ridge in the Organ Mountains.
Woodlands		
Montane riparian (28)	395 (0.03)	Composed of forested and shrub dominated riparian plant communities; coyote willow (*Salix exigua)*, box elder (*Acer negundo)*, and velvet ash (*Fraxinus velutina)* are common species. Occurs in mountain valley drainages in the Organ Mountains.
Woodland - oneseed juniper (29)	2,886 (0.3)	Oneseed juniper, curlyleaf muhly, and hairy grama are dominant. Occurs on rocky, gravely slopes at moderately high elevation in the Sacramento and Organ mountains.
Woodland - pinyon pine (30)	6,553 (0.6)	Pinyon pine, alligator juniper, sideoats grama, sandpaper oak (*Quercus pungens)*, and gray oak (*Quercus grisea)* are dominant. Occurs on rocky, well developed soils on high elevation slopes of the Sacramento and Organ mountains.

Table 4.8-1. Number of Acres and Description of 34 Mapping Units at Fort Bliss (Continued)

Plant Community (Mapping Units)	*Number of Acres (% of Total)*	*Description*
Conifer forest (31)	371 (0.03)	Ponderosa pine (*Pinus ponderosa)*, Douglas fir (*Psuedotsuga menziesii)*, Gambel's oak, and mountain muhly (*Mulenbergia montana)* are common species. Occurs on the upper elevation of the Organ Mountains generally on steep slopes.
Military Lands And Roads		
Barren military land (32)	3,612 (0.3)	Rock, barren soil, military cantonment, surface impact areas.
Military facilities (33)	18,826 (1.7)	Military facilities.
Roads (34)	44,994 (4.0)	Roads.
Total	*1,113,403*	

Source: U.S. Army, 1996j.
Note: Mapping units renumbered from those presented in the source document.

Table 4.8-2. Summary of Desert Shrubland, Grassland, and Woodland Plant Communities and Disturbed Ground on Fort Bliss

General Plant Community Type	*Mapping Units* [a]	*Acres* [a]	
		Number	*Percent*
Shrublands			
Mesquite coppice dunes and sandscrub	1, 2, 3, 4	415,792	37.30
Creosotebush and tarbush shrublands	5, 6, 7, 8	201,216	18.10
Foothill desert shrublands	9, 10, 11, 12	68,253	6.10
Montane shrublands	13, 14	23,114	2.10
Total shrublands		*708,375*	*63.6*
Grasslands			
Basin grasslands	15, 16, 17	50,262	4.50
Mesa grasslands	21, 22, 23, 24	115,644	10.40
Foothill grasslands	18, 19, 20, 25, 26, 27	161,485	14.50
Total grasslands		*327,391*	*29.40*
Woodlands			
Montane riparian	28	395	0.04
Pinyon/juniper woodlands	29, 30	9,439	0.80
Conifer forest	31	371	0.03
Total woodlands		*10,205*	*0.9*
Disturbed Ground			
Roads, facilities and barren areas	32,33,34	67,432	6.10
Total		*1,113,403*	*100.00*

[a] From Table 4.8-1.
Source: U.S. Army, 1996j.
Note: Mapping units renumbered from those presented in the source document.

activity of the mesquite canopy. No ground transects were sampled. The satellite data indicated that during the first 3 years of treatment, an increase in grass growth was noted. After 3 years, mesquite began to recover and a reduction in grass growth resulted (Eve and Peters, 1995).

Grassland plant communities cover about 327,400 acres, which accounts for over 29 percent of the land on Fort Bliss (Table 4.8-2). Within Fort Bliss, Otero Mesa covers about 161,400 acres (U.S. Army, 1996j) and most of this area is covered by grassland plant communities. The remainder of the grassland plant communities occur in the Tularosa Basin and in the foothills of the Organ Mountains.

Woodland plant communities cover about 10,200 acres or about 1 percent of Fort Bliss (Table 4.8-2); these plant community types are in the Organ Mountains and Sacramento Mountains foothills. Pinyon pine-juniper woodlands occur in both mountain ranges. The montane riparian and montane conifer forest occur only in the Organ Mountains. In addition, montane shrublands dominated by mountain mahogany occur in both mountain ranges, while montane shrublands dominated by Gambel's oak occur in the Organ Mountains only (U.S. Army, 1996j).

The South Training Areas are located in Texas, and Chihuahuan Desert shrublands dominate this area. Figure 4.8-1 shows a triangular area of roads, facilities and barren areas in the southwest corner of the South Training Areas along U.S. Highway 54. This triangular area is actually native plant communities dominated by mesquite coppice dunes. Basin desert shrublands dominated by honey mesquite coppice dunes and sandscrub are common here; four-winged saltbush is also evident in this type and mesa dropseed is in the sparse understory. In some areas, sandsage is common along with mesquite. Basin and mesa grasslands occur in the north central portion of these training areas. The mesquite dunes give way to the creosotebush plant community on the east side of the South Training Areas (Figure 4.8-1). Bush muhly and tarbush are common in some areas. Creosotebush gives way to foothills desert shrublands dominated by lechugilla and creosotebush on the shallow rocky slopes of the Hueco Mountains. Grasslands are supported on the alluvial deposits of these mountains and sideoats grama and black grama are common (U.S. Army, 1996j).

On the Doña Ana Range–North Training Areas the dominant plant community type in the eastern two-thirds is mesquite coppice dunes (Figure 4.8-2). The dunes give way to creosotebush-dominated areas that grade into foothill desert shrublands and grasslands on the Organ Mountains piedmont. The dominant shrubs in the foothill desert shrublands are creosotebush and mimosa, while black, sideoats, and hairy grama are common in the grassland plant communities. In the Organ Mountains, steep elevation gradients and diverse geological substrate combine to support the highest vegetation diversity on Fort Bliss. The mountains support Rocky Mountain conifer forests and woodlands and montane shrublands. Canyons support diverse woodland and grassland riparian plant communities (U.S. Army, 1996j).

On McGregor Range, coppice dunes and sandscrub plant communities dominate the western one-fifth of the range; honey mesquite is the dominant plant in some areas and sandsage is dominant in others (Figure 4.8-3). These types give way to creosotebush-dominated plant communities where tarbush and lowland grasslands are associated with loamy soils in the drainages. The Hueco Mountains are in the southeast portion of McGregor Range, and lechugilla, creosotebush, and mariola communities dominate the shallow soils on the steep slopes, while desert grasslands dominated by sideoats grama and black grama occupy the gentler slopes. The eastern part of McGregor Range is dominated by the Otero Mesa. Otero Mesa extends southeast away from McGregor Range (see Figure 4.5-3) and covers about 1,202,000 acres (USAF, 1998). Approximately 161,400 acres or 13.4 percent of Otero Mesa occurs on McGregor Range (U.S. Army, 1996j). Vegetation on Otero Mesa is predominately basin and mesa grasslands dominated by black and blue grama with tobosagrass and burrograss in the broad drainages. New Mexico needlegrass and various shrubs can be found on rocky ridges. The Sacramento Mountain piedmont is west of the Sacramento Mountains and east of the Tularosa Basin and includes part of the Otero Mesa escarpment. Soils are shallow and rocky on the escarpment where vegetation is a mixture of shrublands and grasslands (mostly sideoats grama and curlyleaf muhly). Creosotebush and mariola plant communities occur on the coarse rocky soil of the upper piedmont giving way to almost pure stands of creosotebush further down on the piedmont. The Sacramento Mountains foothills are at the north end of McGregor Range and vegetation is predominately pinyon pine/juniper woodlands and montane shrublands (mountain mahogany) in the upper slopes of the foothills; these types give way to creosote and tarbush along other foothill desert shrublands at lower elevations (U.S. Army, 1996j).

The Natural Heritage Program on behalf of the Army identified plant communities on Fort Bliss that are thought to be approaching presettlement conditions. These include black grama/blue grama grasslands, sand sage, mesa dropseed, and tobosagrass swale communities (U.S. Army, 1997k). Some of these areas have been excluded from grazing for almost 90 years while others are currently grazed. One such area is a 123,500-acre black grama-blue grama grassland tract on and below southern Otero Mesa. The area is
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characterized by high grass cover with a low incidence of shrubs and weedy species and a general absence of exposed and eroded soil. The black grama grasslands in this area are particularly important because they had been much reduced starting in the 19th century, as indicated above. Three high-quality sand sagebrush communities are also found on Fort Bliss. These communities are on the east side of the Jarilla Mountains in the central Tularosa Basin, on the Sacramento Mountains foothills, and on the northern Otero Mesa. The nearest known sand sagebrush plant community of the type found on northern Otero Mesa of similar high quality is 150 miles north on WSMR. Mesa dropseed grasslands occur on isolated patches within the mesquite coppice dune fields. One of the largest grasslands of this type (1,230 acres) is located along the New Mexico-Texas border near Newman, and another dropseed grassland is northeast of Orogrande in the Tularosa Basin. These areas may be remnants of much larger grasslands that covered the Tularosa Basin before intensive livestock grazing and the encroachment of mesquite. Tobosagrass swales occur in drainages on and below the Otero Mesa escarpment. These high-quality vegetation types plus the Organ Mountains comprise about 15 percent of Fort Bliss, while about 45 percent of Fort Bliss is built-up areas, grazed lands, or training areas. The remaining 40 percent are mostly rocky shrublands or grasslands that are used infrequently by the military (U.S. Army, 1997k).

Exotic plant species have become established on some areas on Fort Bliss. African rue has become established on Otero Mesa. It invades disturbed sites and once successfully established, it can spread and outcompete the native grasses. Russian thistle is another species that becomes established on disturbed ground and this species can be found throughout Fort Bliss. Salt cedar has become established at some stock tanks and at other widely scattered locations on Fort Bliss. Another potential problem plant is malta thistle, which is currently known to grow along U.S. Highway 54 and may occur along other roadways on Fort Bliss. Another exotic species of concern is Johnson grass, which occurs in some drainages on Fort Bliss. Fort Bliss has initiated a 2-year study to map the distribution and abundance of some of the exotic plant species. From this information, a strategy will be developed to control any exotic plants that Fort Bliss deemed necessary to maintain the biological diversity on post or for other appropriate reasons.

4.8.2 Wetlands and Arroyo-riparian Drainages

Wetlands and arroyo-riparian drainages have been studied on Fort Bliss (more detailed information appears in Appendix F). The USACE Waterways Experiment Station is currently mapping and characterizing all wetlands and other Waters of the U.S. (referred to as arroyo-riparian drainages or washes), on Fort Bliss (U.S. Army, 1998h). To qualify as a USACE jurisdictional wetland, it must have hydric soil, have evidence of saturation to the surface sometime during the growing season, and contain wetland plant species (U.S. Army, 1987). Waters of the U.S. includes “water such as intrastate lakes, rivers, streams (including intermittent streams)” (33 CFR 328.3[a][3]).

Probable Waters of the U.S. have been mapped on McGregor Range, Doña Ana Range–North Training Areas and South Training Areas (Figure 4.8-4), and are being mapped on the remainder of Fort Bliss (Castner Range) (U.S. Army, 1998h). The exact boundary of the Waters of the U.S. will be delineated for site-specific projects and a final determination by the USACE district engineer is needed before their delineation is confirmed. A total of 1,228 dry washes with distinct streambeds and sides comprising 1,874 miles were mapped on the South Training Areas and McGregor Range while 142 dry washes comprising 545 miles were mapped on Doña Ana Range–North Training Areas. Eleven intermittently flooded lakes with distinct ordinary high water marks totaling 127 acres and 79 artificial water resources (802 acres) including sewage lagoons, storm-water retention basins, and cattle tanks were mapped on the South Training Areas and McGregor Range. A total of 17 dry lakes comprising 216 acres and 26 water resources (sewage treatment ponds, storm retention basins, and cattle tanks) totaling 6 acres were mapped on Doña Ana Range–North Training Areas (U.S. Army, 1998h).

The vast majority of arroyo-riparian drainages on Fort Bliss do not qualify as USACE jurisdictional wetlands but, as indicted above, thousands of miles of these waterways are probable Waters of the U.S. In addition to the wetlands mapped on the ranges, a storm water retention pond on the main cantonment has been identified as a jurisdictional wetland by USACE.

Perennial riparian corridors of the western U.S. have been studied extensively and the density and diversity of flora and fauna in many of these areas determined. However, the flora and fauna of arroyo-riparian drainages on Fort Bliss and elsewhere have not been fully studied (Cockman, 1996; Kozma, 1995). Cockman (1996) and U.S. Army (1991a) studied ephemeral drainages on McGregor Range and Doña Ana Range–North Training Areas and determined that ephemeral drainages had the following characteristics in relation to upland areas:

- Shrub, tree, and forb cover are higher on the main channel than the surrounding area;
- Species richness of shrubs, trees, grasses, and forbs are higher in the main channel than all other locations;
- Heights of shrubs along the main channel are nearly twice that of shrubs in the uplands;
- Obligate species such as desert willow tended to be taller than nondrainage species; and
- Obligate species at one elevation may occur outside of the drainage at another elevation. For example, Apache plume is obligate in the submesa drainages but occurs outside the drainages in the foothills. Species such as little and big-leaf sumac are not obligate species in the foothill and submesa drainages because they occur in many locations outside the drainages (Cockman et al., 1996). Little-leaf sumac occurs frequently in drainages in the Tularosa Basin, but it also occurs in deep sandy soils not obviously associated with drainages.

Montane riparian plant communities cover 395 acres in the Organ Mountains and include forested and shrub-dominated types. Forested riparian areas dominated by box elder and velvet ash occur in Fillmore and Soledad canyons and forested riparian type dominated by netleaf hackberry (*Celtis reticulata)* and river walnut (*Juglans microcarpa)* occur in Long Canyon. Shrub-dominated montane riparian plant communities include a coyote willow dominated type along the perennial streams in Rucker Canyon and a black cherry (*Prunus serotina)* and mountain leaftail (*Pericome caudata)* type on rock-covered slopes in North Canyon (U.S. Army, 1994b).

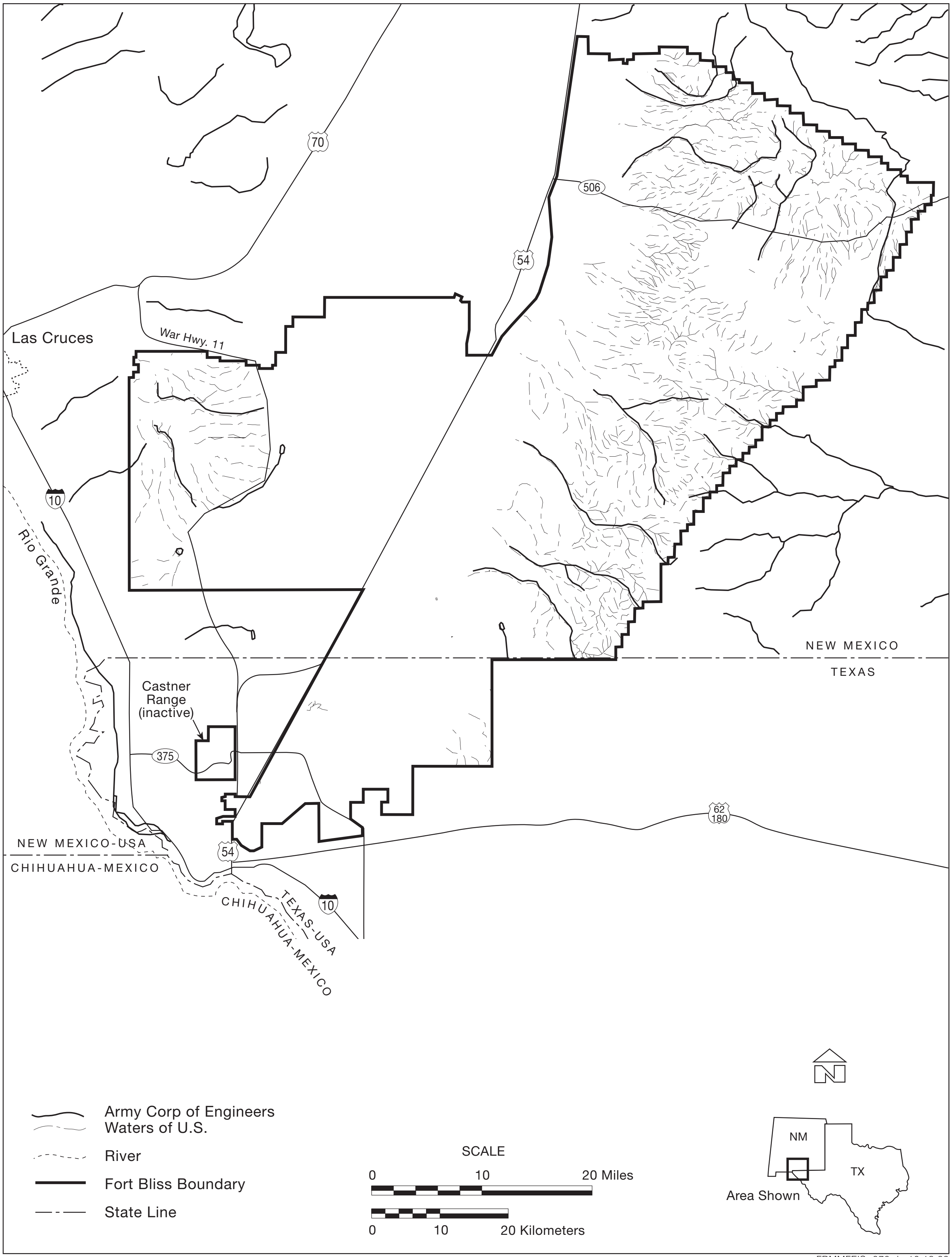

Figure 4.8-4. Probable Waters of the U.S. in the Fort Bliss Area.

4.8.3 Wildlife

Information regarding amphibians and reptiles, avifauna, and mammals is presented in this section. More detailed information is presented in Appendix F.

4.8.3.1 Amphibians and Reptiles

Surveys for amphibians and reptiles were conducted on Otero Mesa and in the Tularosa Basin on the McGregor Range in 1996 and 1997 (Figure 4.8-5). Based on these surveys and other information, 8 species of amphibians and 39 species of reptiles have been observed on Fort Bliss; an additional 19 species of amphibians and reptiles have the potential to occur (U.S. Army; 1996l; 1997h, k) (see Table F-1 in Appendix F). Seven of the amphibian species are toads and the eighth species is the barred tiger salamander (*Ambystoma tigrinum mavortium)* which is found in stock tanks on the Otero Mesa and in the Tularosa Basin. The box turtle (*Terrapene ornata)* is the only species of turtle observed on Fort Bliss and is most common in the grassland plant communities on the Otero Mesa although it has been regularly observed in the desert shrubland communities in the Tularosa Basin (U.S. Army, 1996l, m; 1997h, k).

The most diverse group of reptiles are the lizards: 20 species have been recorded from Fort Bliss including 6 species of whiptails (see Table F-1 in Appendix F) (U.S. Army, 1997h). The largest number of lizard species occur in the grassland habitat (17 species) followed by the desert shrublands (13), Sacramento Mountains foothills (10), and Organ Mountains (6) (U.S. Army, 1997h). Some species such as the western marbled whiptail (*Cnemidophorus marmoratus)* and Texas horned lizard (*Phrynosoma cornutum*) are found in essentially all areas on Fort Bliss while others such as the leopard lizard (*Gambelia wislizenii*) have been reported only from the desert shrubland habitat and the lined tree lizard (*Urosaurus ornatus)* only in the wooded habitat of the Sacramento Mountains foothills and Organ Mountains (U.S. Army, 1997h). Common species encountered on Otero Mesa were the northern earless lizard (*Holbrookia maculata)*, Southern prairie lizard (*Sceloporus undulatus)*, and striped whiptail (*Cnemidophorus inornatus)* and common species in the desert shrublands in the Tularosa Basin were the striped whiptail, side-blotched lizard (*Uta stansburiana)*, and marbled whiptail (see Table F-2 in Appendix F) (U.S. Army, 1997k; 1996lm).

Eighteen species of snakes have been recorded from Fort Bliss (U.S. Army, 1997h; 1996l) (see Table F-1 in Appendix F). The largest number of species occur in the grassland habitat on Otero Mesa (13 species) followed by the desert shrubland and Sacramento Mountains foothills (11) and the Organ Mountains (6). Species such as the western diamondback rattlesnake (*Crotalus atrox)* and bull snake (*Pituophis catenifersayi)* are common and widespread throughout Fort Bliss. Other species such as the Mojave (*C. scutulatus)* and prairie (*C. viridis)* rattlesnakes have been reported only from the grassland habitat on Otero Mesa and the Texas long-nosed snake (*Rhinocheilus lecontei)* was observed only in the Sacramento Mountains foothills (U.S. Army, 1997k) and the desert shrubland habitat of the Tularosa Basin (U.S. Army, 1996m).

4.8.3.2 Avifauna

A total of 334 species of birds have been recorded from Fort Bliss (see Table F-3 in Appendix F). Eighty species occur throughout the year, 129 species are seen only during migration, 42 species are spring and summer residents, and the remaining species occur principally during the winter. Thirty-two species are common, 89 fairly common, 72 uncommon, and 141 rare to very rare (see Table F-3 in Appendix F).

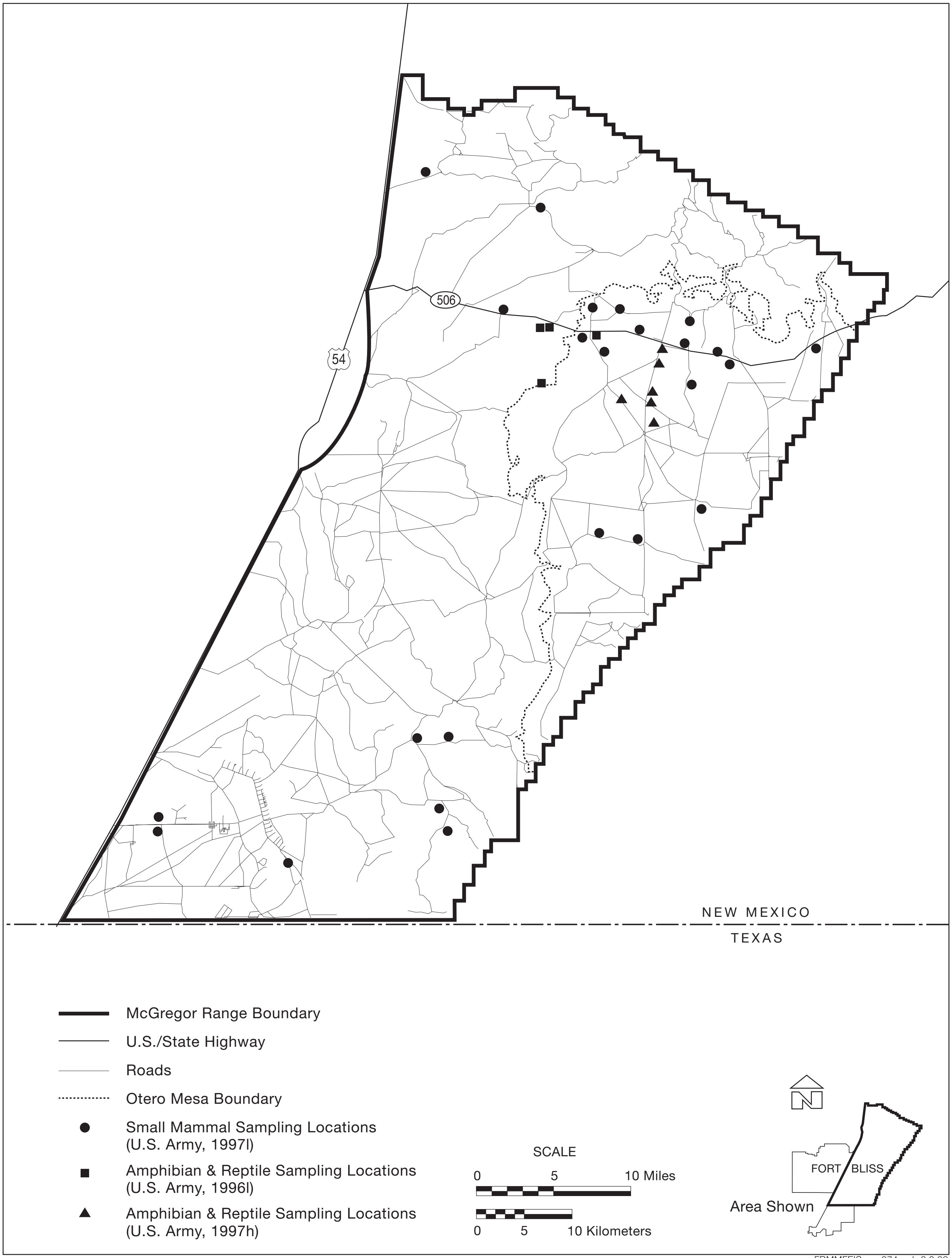

Figure 4.8-5. Amphibian, Reptile, and Small Mammal Sampling Locations on McGregor Range.

In recent years, detailed studies of the bird life in various habitats on Fort Bliss were conducted and some of these studies are still in progress. These studies have centered on determining existing conditions and have concentrated on documenting breeding bird communities in various habitats, the occurrence of neotropical migrants, and the status of sensitive species. This section summarizes the results of the breeding bird, neotropical migrant, and raptor studies while sensitive species are addressed in Section 4.8.4. This section emphasizes bird life on the McGregor Range and the Sacramento Mountains foothills and the Organ Mountains on Doña Ana Range–North Training Areas because that is where most of the current research has been focused and where the majority of the more diverse bird habitat is located on Fort Bliss. It is assumed that the bird life on Castner Range is similar to that found in habitats of the Organ Mountains. Bird species composition and diversity in the desert habitat on Doña Ana Range–North Training Areas is similar to that reported below for McGregor Range. Bird life in the built-up cantonment area is typical for such areas and species such as the house sparrow (*Passer domesticus*), great-tailed grackle (*Quiscalus mexicanus*), house finch (*Carpodacus mexicanus*), and Rock Dove (*Columba livia*) are common. The El Paso Oxidation Ponds occur near the cantonment area and many of the 101 species of diving birds, wading birds, waterfowl, shorebirds, gulls, and terns observed on Fort Bliss have been observed at these ponds. These bird species also have been observed on playa lakes and stock tanks on the South Training Areas, Doña Ana Range–North Training Areas, and McGregor Range.

<u>Tularosa Basin</u>

Breeding Birds. In 1996 and 1997, 24 sites were sampled for breeding birds in the Tularosa Basin in desert shrub habitats dominated by sandsage, mesquite, creosote, and whitethorn (U.S. Army, 1996n) (see Table F-4 in Appendix F and Figure 4.8-6). The black-throated sparrow (*Amphispiza bilineata)* was by far the most common species recorded in all four habitats in 1996 and 1997 (U.S. Army, 1996n, 1997i). The western kingbird (*Tyrannus verticalis),* Scott's oriole (*Icterus parisorum),* and ash-throated flycatcher (*Myiarchus cinerascens)* were other common species.

Breeding bird studies at eight sample locations in arroyo and upland habitats in the Chihuahuan Desert (Figure 4.8-6) showed the black-throated sparrow, northern mockingbird, verdin (*Auriparus flaviceps)*, brown-headed cowbird (*Molothrus ater)*, mourning dove (*Zenaida macroura)*, and ash-throated flycatcher were the most common species. For 4 out of 5 years of this study, more species were detected in arroyos than uplands (U.S. Army, 1996o, 1997j; Kozma, 1995; Kozma and Mathews, 1997). A total of 1,214 nests of 32 species were detected from 1993 through 1997 (U.S. Army, 1997j). The number of nests observed ranged from a low of 156 in 1996 to a high of 438 in 1997. The number of nests observed in 1997 was about 2.0 to 2.8 times greater than the previous 4 years; this increase may have been due to greater than average precipitation during the 1996 rainy season and during the spring of 1997 (U.S. Army, 1997j). Nest density was about twice as high in arroyo habitats than the adjacent uplands. Banana yucca, javelina bush (*Microrhamnus ericoides)*, and little-leaf sumac were most frequently used for nesting even though these shrubs were among the lowest in density (Kozma and Mathews, 1997).

Breeding bird surveys conducted along eight transects at four arroyo/upland sites in the Chihuahuan Desert below the Otero Mesa escarpment in 1997 (Figure 4.8-6) resulted in 40 species of birds comprising 689 individuals being recorded (USAF, 1997a, b) (see Table F-5 in Appendix F). Seventeen percent more species and 29 percent more individuals were recorded in the arroyos than the uplands and the black-throated sparrow accounted for 25 percent of the birds recorded, followed by the northern mockingbird (8 percent), and the ash-throated flycatcher (7 percent). Species such as the black-throated sparrow and Scott's oriole were more common in the uplands while species such as the mourning dove, ash-throated flycatcher, western kingbird, and northern mockingbird were more abundant in the arroyos (see Table F-5 in Appendix F).

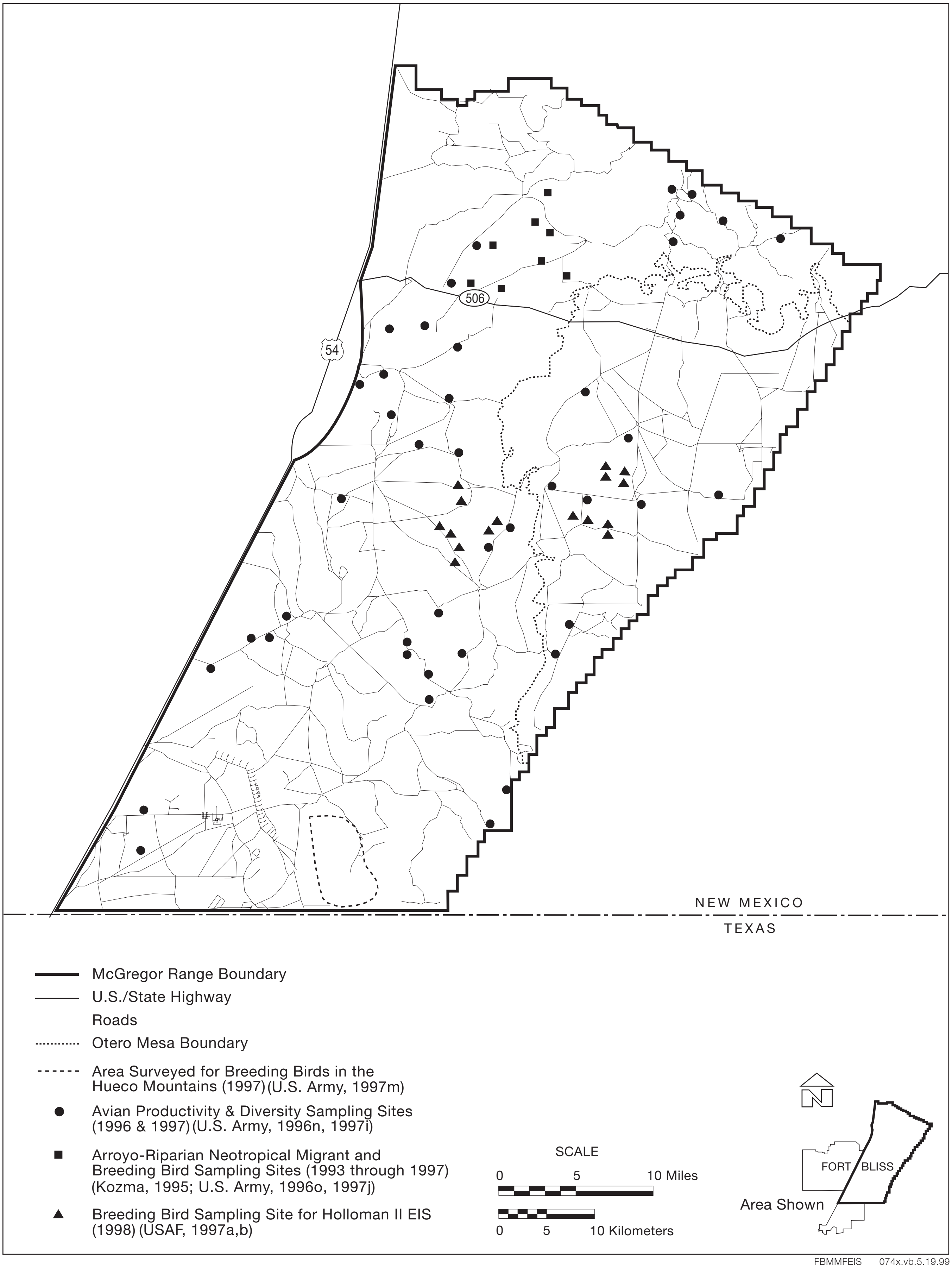

Figure 4.8-6. Breeding Bird Survey Locations on McGregor Range.

Neotropical Migrants. Many bird species that breed in North America, winter in Central and South America (called neotropical migrants), and many of these species started to decline in the early 1980s (Robbins et al., 1993). Forest fragmentation on the breeding grounds, the elimination of wintering habitat in the tropics, and the loss of important stop-over habitat are likely major reasons for these declines (Flather and Saure, 1996; Sheery and Holmes, 1996; Moore et al., 1993).

In the West, over 60 percent of the neotropical migrants use riparian areas for stop-over habitat during migration or for breeding (Krueper, 1993); most of the riparian areas that have been studied are mesic sites dominated by species such as willow *(Salix)* and cottonwoods *(Populus)*. Fort Bliss contains few mesic riparian areas except for in the Organ Mountains. The arroyo-riparian drainages over the rest of Fort Bliss seem to have a similar attraction to neotropical migrants (Kozma, 1995; Kozma and Mathews, 1997; U.S. Army, 1996o). During a 5-year mist netting study, 290 neotropical migrants (comprising 24 species) were captured in arroyos, while 52 neotropical migrants (comprising 14 species) were captured in adjacent upland habitat. Neotropical migrants captured all 5 years included the Virginia's (*Vermivora virginiae),* orange-crowned (*Vermivora celata)*, and Wilson's (*Wilsonia pusilla)* warblers; these species were much more common in arroyos than the adjacent uplands.

Studies of nesting and migratory birds at Fort Bliss demonstrate that arroyo-riparian drainages are used by more species more consistently than adjacent upland sites. As indicated in Section 4.8.2, approximately 2,475 miles and 532 miles of arroyos with well-developed channels and sides occur on South Training Areas/McGregor Range and Doña Ana Range–North Training Areas, respectively. Many of these arroyo-riparian drainages, as well as similar areas on other parts of Fort Bliss such as on Castner Range likely provide habitat that is more consistently used than adjacent non-arroyo habitat by nesting birds and neotropical migrants moving through the Chihuahuan Desert on Fort Bliss. These studies occurred primarily in arroyo-riparian drainages in the foothill desert shrublands on McGregor Range. The use of arroyo-riparian drainages by nesting and neotropical migrant birds in other plant community types on Fort Bliss has not been characterized, so the relationship between arroyo-riparian drainages and bird use documented in the foothill desert shrublands may not apply for all areas on post.

Raptors. Data collected at 24 breeding bird sample locations in 1996 showed that the Swainson's hawk (*Buteo swainsonii)* and turkey vulture *(Cathartes aura)* were the most common raptors observed in the desert shrublands during spring and summer of 1996 (see Table F-6 in Appendix F) (U.S. Army, 1996n). Surveys along the Otero Mesa escarpment in 1997 revealed that a breeding pair of falcons consisting of a prairie falcon (*Falco mexicanus)* and a possible prairie/peregrine falcon (*Falco peregrinus)* hybrid were nesting near Rough Canyon (USAF, 1997c, d). In 1997, numerous stick nests and a number of golden eagles (*Aquila chrysaetos)* were also observed but nesting was not confirmed. However, raptor surveys conducted in 1998 along additional sections of the escarpment and Hueco Mountains, resulted in the observation of an active golden eagle nest on the Otero Mesa escarpment just north of Pendejo Wash and a golden eagle, but no nest, along the Hueco Mountain escarpment (U.S. Army, 1998i). The red-railed hawk (*Buteo jamaicensis)*, American kestrel (*Falco sparverius)*, great horned owl (*Bubo virginianus),* and barn owl (*Tyto alba)* nested in the area of the escarpment in 1997 (USAF, 1997e, f). During the raptor surveys, an unconfirmed sighting of an immature aplomado falcon (*Falco femoralis)* was reported in the desert shrubland habitat south of Martin Canyon on 23 May, 1997 (USAF, 1997d); it was not seen in this area during subsequent surveys in June 1997 (USAF, 1997b) and is assumed to have left the area. Data from wintering bald eagle (*Haliaeetus leucocephalus)* surveys during the winters of 1994 to 1995 and 1995 to 1996 in the desert shrubland habitat showed that the golden eagle and red-tailed hawk were the most common wintering species (U.S. Army, 1995f; 1996p) (see Table F-7 in Appendix F).

Otero Mesa

Breeding Birds. In 1996 and 1997, eight sites were sampled for breeding birds in the black grama grasslands and the mesa grasslands (dominated by blue grama grass), and additional four sites were sampled in the black grama grasslands of the Tularosa Basin (U.S. Army, 1996n, 1997m). As in the desert shrublands habitats, there was a substantial increase in the number of birds recorded in the grassland habitats in 1997; approximately twice as many birds were detected in 1997 than 1996 (Table F-8 in Appendix F). In 1996, the horned lark (*Eremophila alpestris*) was the most common species recorded in the mesa grasslands; the eastern meadowlark (*Sturnella magna*)was most abundant in the mesa grasslands in 1997, and the black grama grasslands both years. Other common breeding bird species were black-throated sparrow, mourning dove, northern mockingbird, common nighthawk (*Chordeiles minor*), Scott's oriole, and ash-throated flycatcher.

Breeding bird surveys along eight transects in the grassland habitat of Otero Mesa in 1997 (Figure 4.8-6) resulted in the observation of 45 species comprising 720 individuals (USAF, 1997a, b) (see Table F-8 in Appendix F). For the combined transects, 45 percent more species and 34 percent more birds were observed in the grassland swales than adjacent uplands. The eastern meadowlark was the most abundant species (17 percent of the total) followed by the northern mockingbird (13 percent), mourning dove (13 percent), and black-throated sparrow (10 percent). The eastern meadowlark, northern mockingbird, mourning dove, and cactus wren (*Campylorhynchus brunneicapillus)* were more abundant in the swales while the black-throated sparrow, horned lark, and lark sparrow were more abundant in the adjacent uplands (see Table F-9 in Appendix F).

Raptors. The turkey vulture was the most common species of raptor observed at 12 breeding bird sampling sites (see Table F-6 in Appendix F) (U.S. Army, 1996n). Additional species observed on Otero Mesa during the spring and summer were the golden eagle, merlin (*Falco columbarius)*, burrowing owl (*Athene cunicularia)*, and great horned owl. Two active red-tailed hawk nests were observed (USAF, 1997e, f). The ferruginous hawk (*Buteo regalis)* has been observed on the Mesa in the winter and spring (U.S. Army, 1994c). During surveys for wintering bald eagles, the red-tailed hawk was the most common raptor observed (U.S. Army, 1995f; 1996p) (see Table F-7 in Appendix F). The golden eagle and American kestrel were also fairly common wintering species.

Hueco Mountains

Breeding Birds. Reconnaissance surveys for breeding birds were conducted in the Hueco Mountains on McGregor range in June 1997 (U.S. Army, 1997m) (Figure 4.8-6). Six routes totaling about 28 miles were traversed along arroyos and in uplands within an approximately 6,700-acre area. A total of 40 species comprising 737 individuals were recorded during six surveys on June 10 and 12, 1997 (see Table F-10 in Appendix F). Almost 200 black-throated sparrows were recorded (27 percent of total) and this was the most common species encountered. Other common species were the northern mockingbird (10 percent), cactus wren (7 percent), canyon towhee (*Pipilo fuscus)* (6 percent), house finch (6 percent), and mourning dove (6 percent). Scaled (*Callipepla squamata*) and Gambel's (*Callipepla gambelii)* quail were fairly common and were most frequently associated with the larger arroyo-riparian drainages (U.S. Army, 1997m).

Sacramento Mountains

Breeding Birds. The Sacramento Mountains foothills occur within Fort Bliss, and breeding birds were sampled in the pinyon pine/juniper woods. In 1996 and 1997, six locations were sampled (Figure 4.8-6). The most common breeding birds recorded were the northern mockingbird, bushtit (*Psaltriparus* *minimus)*, spotted towhee (*Pipilo maculatus)*, and black-chinned sparrow (*Spizella atrogularis)* (U.S. Army, 1996n, 1997i) (see Table F-11 in Appendix F).

Raptors. Data from the six breeding bird sampling locations in the pinyon pine-juniper habitat indicated the turkey vulture was by far the most common species of raptor observed. The red-tailed hawk was observed occasionally while the golden eagle and sharp-shinned hawk (*Accipiter striatus)* were seen once (see Table F-6 in Appendix F) (U.S. Army, 1996n). The bald eagle winters in small numbers in the foothills (see Table F-7 in Appendix F). The only known roost site in the vicinity of Fort Bliss is located approximately 4 miles outside the installation boundary, in the Lincoln National Forest (U.S. Army, 1996p). During surveys for this species in two winters, the golden eagle was the most common species observed. The red-tailed hawk was also commonly observed especially during the winter of 1995 to 1996; the American kestrel was also a fairly common wintering species (see Table F-7 in Appendix F) (U.S. Army, 1995g; 1996p). The great horned owl and western screech owl (*Otus kennicottii)* were detected during spotted owl (*Strix occidentalis)* surveys during the winter of 1995 to 1996; no spotted owls were observed (U.S. Army, 1996q).

Organ Mountains

Breeding Birds. Breeding bird surveys were carried out in the Organ Mountains in 1991 and 1992 (U.S. Army, 1994b). A total of 53 species were recorded from 6 habitat types (see Table F-12 in Appendix F). Common species in the oak/juniper habitat were the mourning dove, house finch, bushtit, Bewick's wren, (*Thryomanes bewickii)* and canyon wren (*Catherpes mexicanus).* The gray vireo (*Vireo vicinior)*, a State of New Mexico threatened species, was also observed in this habitat type (see Section 4.8.4) (U.S. Army, 1994b).

The montane shrubland habitat is dominated by mountain mahogany and the canyon wren was the most common species encountered (U.S. Army, 1994b) (see Table F-12. in Appendix F). Other common species were the house finch, rock wren (*Salpinctes obsoletus)*, and rufous-crowned sparrow (*Aimophila ruficeps)*. The riparian forest habitat is dominated by velvet ash, gray oak, box elder, and narrow-leaf cottonwood. Plumbeous vireo *(Vireo plumbeus)*, black-headed grosbeak (*Pheucticus melanocephalus)*, western wood-pewee (*Contopus sordidulus)*, black-chinned sparrow, and black-chinned hummingbird (*Archilochus alexandri)* were the most common species recorded in this habitat. Within the mesic shrubland habitat (box elder and aspen are dominant), Virginia's warbler was the most common species noted followed by the bushtit, house finch, canyon wren, and spotted towhee.

The mixed conifer forest is dominated by Douglas fir and ponderosa pine, and spotted towhee, Virginia's warbler, and Cassin's vireo were the most common species. Within the ponderosa pine forest, the house finch, and bushtit were common. Other common species were the canyon wren, spotted towhee, Bewick's wren, western wood-pewee, rock wren, and plumbeous vireo.

Raptors. A survey of all potential peregrine falcon habitat in the Organ Mountains in 1980 resulted in the identification of four prairie falcon and three golden eagle eyries (U.S. Army, 1980a). Other raptor species observed included the American kestrel, red-tailed hawk, and Cooper's hawk (*Accipiter cooperii)*. All these species plus the turkey vulture and sharp-shinned hawk were observed during breeding bird surveys in 1991 and 1992 (U.S. Army, 1994b). In 1991, territorial great-horned owls and western screech owls were recorded in the Organ Mountains; the turkey vulture, red-tailed, hawk, golden eagle, and prairie falcon were also observed (U.S. Army, 1991b).

4.8.3.3 Mammals

A total of 58 species of mammals are known to occur and an additional 20 species have the potential to occur on Fort Bliss including 17 species of bats (see Table F-13 in Appendix F) (does not include domesticated species such as dogs, cats, cattle or horses). A maternity colony of pallid bats (*Antrozous pallidus*) currently resides at the Orogrande Range Camp and two maternity colonies of the fringed myotis (*Myotis thysanodes*) were observed in 1979 in the Sacramento Mountains foothills (Howell, 1997; Smartt, 1980). Surveys for bats along the Otero Mesa escarpment and nearby stock tanks (Figure 4.8-7) indicated that bats roost in small scattered groups; no large roost sites were observed. Western pipistrelles (*Pipistrellus hesperus)*, *Myotis* sp., and free-tailed bats (*Tadarida* sp.) were observed emerging from the escarpment and at some stock tanks (USAF, 1997g, h).

Fort Bliss conducted rodent surveys at 24 sampling sites in 12 habitat types on McGregor Range in 1997 and 1998 (U.S. Army, 1997l) (Figure 4.8-5)**.** The largest number of rodents were captured in the swale and the acacia scrub habitat and the lowest number was in the mesquite dunes. Capture rates ranged from 48 to 75 percent in swale and acacia scrub habitats and 5 to 17 percent in mesquite coppice dunes. The largest number of species were in the sandy arroyo scrub (14) and *Chilopsis* arroyo (14) and the smallest number (7) was in the mesquite dunes (U.S. Army, 1997l). In 1997, the most abundant species were the silky pocket mouse (*Perognathus flavus)* and Merriam's kangaroo rat (*Dipodomys merriami)* (see Table F-14 in Appendix F). The silky pocket mouse was most common in the grassland habitats while Merriam's kangaroo rat was more common in the desert shrub and arroyo habitats. Other common species were the deer mouse (*Peromyscus maniculatus)*, hispid cotton rat (*Sigmodon hispidus)*, white-footed mouse (*Peromyscus leucopus)*, cactus mouse (*Peromyscus eremicus),* western harvest mouse (*Reithrodontomys megalotis),* and Ord's kangaroo rat (*Dipodomys ordii)*. The deer and cactus mice were most common in the acacia scrub habitat while the white-footed mouse, hispid cotton rat, and western harvest mouse were most common in the swale.

Other rodents observed were the Texas antelope squirrel (*Ammospermophilus interpres)*, rock squirrel (*Spermophilus variegatus)*, Botta's pocket gopher (*Thomomys bottae)*, and yellow-faced pocket gopher (*Cratogeomys castanops)*. In addition, the porcupine (*Erethizon dorsatum)*, coyote (*Canis latrans)*, badger (*Taxidea taxus),* and bobcat *(Lynx rufus)* were observed (U.S. Army, 1997l).

Jorgensen and Demarais (U.S. Army, 1996m) studied rodents in arroyos and associated adjacent upland habitats in the Chihuahuan Desert for 2 years on the McGregor Range and found the relative abundance was greater in the arroyos than the adjacent uplands. The white-footed mouse, deer mouse, western harvest mouse, white-throated woodrat (*Neotoma albigula),* hispid cotton rat, rock pocket mouse (*Chaetodipus intermedius),* and desert pocket mouse (*C. penicillatus)* were more common in the arroyos than the adjacent habitats. Merriam's kangaroo rat, and the desert plains pocket mouse (*Perognathus flavescens)* were more abundant in the uplands. The relative abundance of rodents was over six times greater in the lower elevation arroyos than the adjacent habitats (U.S. Army, 1996m). Small mammal trapping took place at 27 sampling locations on TA 9 on the Doña Ana Range–North Training Areas and 21 species were recorded (U.S. Army, 1992). The banner-tailed kangaroo rat (*Dipodomys spectabilis)*, Merriam's kangaroo rat, plains pocket mouse, silky pocket mouse, and spotted ground squirrel (*Spermophilis spilosoma)* showed a strong preference for grasslands and uplands. The white-throated woodrat, cactus mouse, white-footed mouse, and hispid cotton rat were more common in arroyos (U.S. Army, 1992).

The desert cottontail (*Sylvilagus audubonii)* and black-tailed jackrabbit (*Lepus californicus),* are common on post. Smartt (1980) found these species to be more common in the desert shrubland habitat than the

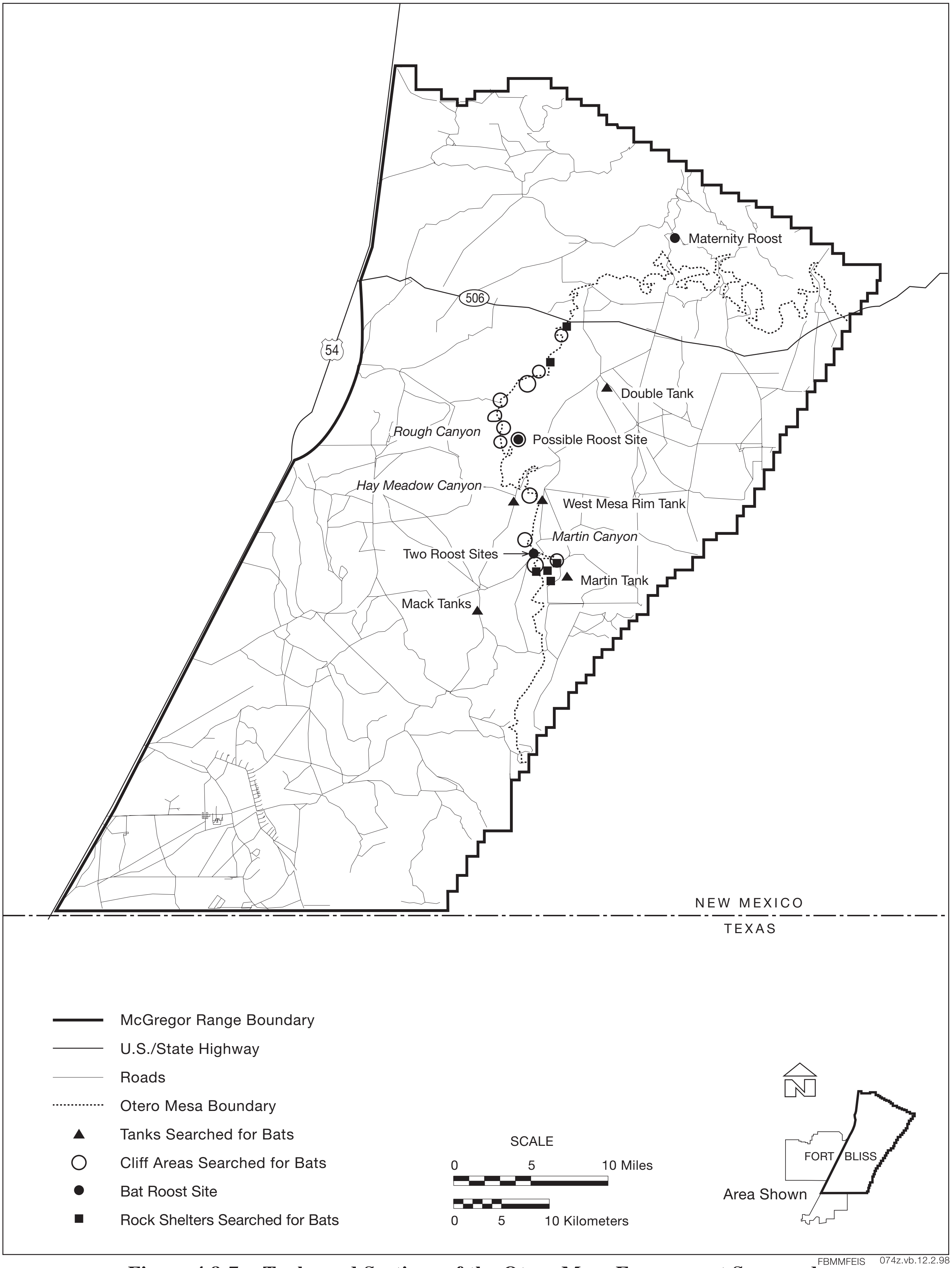

Figure 4.8-7. Tanks and Sections of the Otero Mesa Escarpment Surveyed for Bat Fauna in 1997 and 1998.

grassland habitat on Otero Mesa. The density of these two species in the desert shrublands of the Tularosa Basin ranged from 22 in 1995 to 13 per square mile in 1994 (U.S. Army, 1996r).

The coyote, kit fox (*Vulpes macrotis*), badger, and bobcat are predators in the desert shrubland and grassland habitats. The kit fox on Fort Bliss is morphologically indistinguishable from its close relative the swift fox (*Vulpes velox)*; Fort Bliss is within the area where the ranges of these two species overlap (U.S. Army, 1996r). The mountain lion (*Puma concolor*) was observed in the Sacramento Mountains foothills and along the Otero Mesa escarpment in 1979 (Smartt, 1980) and in Rough Canyon along the Otero Mesa escarpment in 1996 (U.S. Army, 1997n).

The mule deer (*Odocoileus hemionus*) occurs throughout Fort Bliss and is most common in the mountainous portions including the foothills of the Sacramento and Organ mountains. The number of mule deer in the Sacramento Mountains foothills on McGregor Range ranged from 587 in 1984 to 206 in 1995 (see Table F-15 in Appendix F) (NMDGF, 1997). During this time period, there has been a general decline in the mule deer population. In addition, the number of deer observed north of the New Mexico Highway 506 was substantially greater than the number observed south of this route (see Table F-15 in Appendix F). Data from aerial surveys of the Hueco Mountains in Texas from 1985 through 1990 indicate that the number of mule deer ranged from 1.2 to 6.1 per 1,000 acres except for 1986 when there were an estimated 23.1 per 1,000 acres (Cantu, 1990).

The pronghorn antelope (*Antilocapra americana*) occurs mostly in the grassland communities of the Otero Mesa and adjoining grasslands below the mesa, with occasional use of the desert shrubland habitat in the Tularosa Basin. An estimated 500 to 700 pronghorn inhabit the Otero Mesa of Fort Bliss. The oryx (*Oryx gazella)* is common in the desert shrubland communities and was observed in the area of Mack Tanks in the Tularosa Basin while sign was common at New Tank in the Hueco Mountains (U.S. Army, 1997m; USAF, 1997f). Oryx have become common in Doña Ana Range–North Training Areas in desert shrubland communities and in the Tularosa Basin portions of McGregor Range. Javelina (*Dicotyles tajacu*) are widely dispersed but uncommon in the Tularosa Basin and on Fort Bliss and have been observed infrequently in many locations. Javelina observations include one animal in an arroyo about 3 miles east of Hay Meadow Tank and sign about 1 mile east of Martin Canyon (USAF, 1997e, f).

4.8.4 Sensitive Species

Various species of flora and fauna known to occur, or having the potential to occur, on Fort Bliss are listed as threatened, endangered, or species of concern by the USFWS and the states of New Mexico and Texas (sensitive species) (Table 4.8-3). In addition, the diverse habitats on Fort Bliss have the potential to support species that have not been confirmed as occurring on post. The following sections present brief summaries of sensitive species known to occur or having the potential to occur on Fort Bliss.

In addition, federally listed threatened and endangered species will be addressed in greater detail in a biological assessment that will be prepared separately from this PEIS. The draft biological assessment is currently scheduled to be completed during 1999.

4.8.4.1 Plants

Sneed pincushion cactus. The Sneed pincushion cactus (*Coryphantha sneedii* var. *sneedii)* is a federal endangered species and is also considered endangered in New Mexico and Texas. This species is known only from limestone substrates in the Franklin Mountains in El Paso County, Texas, and Doña Ana County, New Mexico (U.S. Army, 1980b). Prior to the recent surveys, one population of this species

Table 4.8-3. Sensitive Species Known to or Having the Potential to Occur on Fort Bliss

Species	*Status* [a]			*Location on Fort Bliss*
	Federal	*New Mexico*	*Texas*	
PLANTS				
Sneed pincushion cactus *(Coryphantha sneedii* var. *sneedii)*	E	E	E	Limestone Hills, Doña Ana Range–North Training Areas
Alamo beardtongue *(Penstemon alamosensis)*	SC	RS	—	Hueco Mountains, South Training Areas
Organ Mountains evening primrose *(Oenothera organensis)*	SC	RS	—	Organ Mountains, Doña Ana Range–North Training Areas
Organ Mountains figwort *(Scrophularia laevis)*	SC	RS	—	Organ Mountains, Doña Ana Range–North Training Areas
Standley whitlowgrass *(Draba standleyi)*	SC	RS	—	Organ Mountains, Doña Ana Range–North Training Areas
Grama grass cactus *(Toumeya papyracantha)*	SC	—	—	Otero Mesa, McGregor Range
Night blooming cereus *(Peniocereus greggii)*	SC	E	—	Desert shrublands, Doña Ana Range–North Training Areas
Hueco Mountains rock daisy *(Perityle huecoensis)*	SC	—	—	Hueco Mountains, South Training Areas
Nodding cliff daisy *(Perityle cernua)*	SC	RS	—	Organ Mountains, Doña Ana Range–North Training Areas
Sand prickly pear (*Opuntia arenaria*)	SC	E	—	Low Potential to occur on Fort Bliss
Organ Mountains pincushion cactus *(Coryphantha organensis)*	—	E	—	Organ Mountains, Doña Ana Range–North Training Areas
Crested coral-root *(Hexalectris spicata)*	—	E	—	Organ Mountains, Doña Ana Range–North Training Areas
INVERTEBRATES [b]				
Franklin Mountain talussnail (*Sonorella metcalfi)*	SC	—	—	Rock talus slopes in the Franklin Mountains and possible in the Organ Mountains, Doña Ana Range–North Training Areas
Anthony blister beetle (*Lytta mirifica)*	SC	—	—	Not known to occur on Fort Bliss, but habitat occurs in sand dunes.
Los Olmos tiger beetle (*Cicindela nevadica*)	SC	—	—	Not known to occur on Fort Bliss. Could occur in areas of limestone soil
Boulder woodlandsnail *(Ashmunella anriculata)*	—	—	—	Organ Mountains, Doña Ana Range–North Training Areas
Maple Canyon woodlandsnail *(Ashmunella todseni)*	—	—	—	Organ Mountains, Doña Ana Range–North Training Areas
Organ Mountains woodlandsnail *(Ashmunella organensis)*	—	—	—	Organ Mountains, Doña Ana Range–North Training Areas
Beasley's woodlandsnail *(Ashmunella beasleyi)*	—	—	—	Organ Mountains, Doña Ana Range–North Training Areas
REPTILES				
Texas horned lizard *(Phrynosoma cornutum)*	SC	—	T	Widespread throughout post
Mountain short-horned lizard (*Phrynosoma douglasii hernandezii*)	—	—	T	Species occur on McGregor Range; subspecies not recorded on post

Table 4.8-3. Sensitive Species Known to or Having the Potential to Occur on Fort Bliss (Continued)

Species	*Status* [a]			*Location on Fort Bliss*
	Federal	*New Mexico*	*Texas*	
Mottled rock rattlesnake (*Crotalus lepidus lepidus*)	—	T	—	Species documented from the Organ Mountains; subspecies not recorded on post
Texas lyre snake (*Trimorphodon biscutatus vilkinsoni*)	—	—	T	Castner Range in Texas
BIRDS				
Interior least tern *(Sterna antillarum athalassos)*	E	E	E	Not known to occur on Fort Bliss. Could occur as very rare migrant at sewage lagoon on Fort Bliss
Peregrine falcon *(Falco peregrinus anatum)*	E	T	E	Occasional migrants observed on post
Northern aplomado falcon *(Falco femoralis septentrionalis)*	E	E	E	One unconfirmed sighting, best potential habitat on Otero Mesa, McGregor Range
Southwestern willow flycatcher *(Empidonax trailii extimus)*	E	E	—	Occasional migrant on McGregor Range
Bald eagle *(Haliaeetus leucocephalus)*	T	T	T	Winters in foothills of Sacramento Mountains, McGregor Range
Piping plover *(Charadrius melodus)*	T	E	—	Rare migrant on McGregor Range; observed once in 1987 at sewage lagoon on Fort Bliss
Mexican spotted owl *(Strix occidentalis lucida)*	T	—	T	Very rare on Fort Bliss. Not known to breed on site, best potential habitat in Organ mountains, Doña Ana Range–North Training Areas
Mountain plover *(Charadrius montanus)*	PT	—	—	Has the potential to occur in grassland habitat on Otero Mesa
Black tern *(Chlidonias niger)*	SC	—	—	Regular migrant through McGregor Range at perennial water sources
White-faced ibis *(Plegadis chihi)*	SC	—	T	Potential regular migrant through Fort Bliss; observed at sewage lagoons and on cantonment on McGregor Range
Northern goshawk (*Accipiter gentilis*)	SC	—	T	Uncommon migrant on Fort Bliss
Zone-tailed hawk (*Buteo albonotatus*)	—	—	T	Uncommon migrant on Fort Bliss
Ferruginous hawk *(Buteo regalis)*	SC	—	—	Wintering and migrant species; mostly on Otero Mesa, McGregor Range
Western burrowing owl *(Athene cunicularia)*	SC	—	—	Occurs throughout Fort Bliss except the mountain areas. Occurs in all desert shrubland and grassland vegetative communities on Fort Bliss
Costa's hummingbird (*Calypte costae*)	—	T	—	Uncommon migrant in arroyo-riparian habitat on Fort Bliss
Loggerhead shrike *(Lanius ludovicianus)*	SC	—	—	Winter and breeding bird from Otero Mesa and Tularosa Basin
Baird's sparrow *(Ammodramus bairdii)*	SC	T	—	Migrates through and winters in dense grasslands
Varied bunting *(Passerina versicolor)*	—	T	—	Very rare on Fort Bliss
Bell's vireo *(Vireo bellii)*	—	T	—	Occasional on Fort Bliss

Table 4.8-3. Sensitive Species Known to or Having the Potential to Occur on Fort Bliss (Continued)

Species	*Status* [a]			*Location on Fort Bliss*
	Federal	*New Mexico*	*Texas*	
Gray vireo *(Vireo vicinior)*	—	T	—	Nests in the Organ Mountains, Doña Ana Range–North Training Areas
MAMMALS				
Small-footed myotis *(Myotis ciliolabrum)*	SC	—	—	Distribution unknown
Long-eared myotis *(Myotis eyotis)*	SC	—	—	Distribution unknown
Eastern small-footed bat *(Myotis leibii)*	SC	—	—	Distribution unknown
Occult little brown bat *(Myotis lucifugus occultus)*	SC	—	—	Distribution unknown
Fringed myotis *(Myotis thysanodes)*	SC			Reported from the Sacramento Mountains foothills, McGregor Range
Cave myotis *(Myotis velifera)*	SC	—	—	Distribution unknown
Long-legged myotis *(Myotis volans)*	SC	—	—	Distribution unknown
Yuma myotis *(Myotis yumanensis)*	SC	—	—	Distribution unknown
Spotted bat *(Euderma maculatum)*	SC	T	T	Distribution unknown
Townsend's pale big-eared bat *(Plecotus townsendii pallescens)*	SC	—	—	Distribution unknown
Big free-tailed bat *(Nyctinomops macrotis)*	SC	—	—	Distribution unknown
Greater western mastiff bat *(Eumops perotis californicus)*	SC	—	—	Distribution unknown
Gray-footed chipmunk *(Tamias canipes)*	SC	T	—	Occurs in woodland and forest habitats in the Sacramento Mountains foothills on McGregor Range
Organ Mountain Colorado chipmunk *(Eutamias quadrivittatus australis)*	SC	T	—	Occurs in Organ Mountains, Doña Ana Range–North Training Areas
Arizona black-tailed prairie dog *(Cynomys ludovicianus arizonensis)*	SC	—	—	Occurs on Otero Mesa , McGregor Range
Desert bighorn sheep *(Ovis canadensis mexicana)*	—	E	—	Does not occur on Fort Bliss. Previously existed in Organ Mountains on Doña Ana Range–North Training Areas

[a] RS = rare and sensitive species; SC = federal species of concern; C = candidate species; E = endangered species; PT = proposed threatened; T = threatened species; — = not listed.
[b] No federal or state status but are globally imperiled (U.S. Army, 1994b).
Source: NMDGF, 1996; Sivinski and Lightfoot, 1995; TPWD, 1996; U.S. Army, 1998c.

was known to exist on rocky limestone habitats on Fort Bliss. This population is currently protected from military operations by steep terrain and/or environmental restrictions regarding access. Surveys for this species conducted in 1997 revealed two additional populations on the Doña Ana Range–North Training Areas (U.S. Army, 1998j). Surveys for this species were conducted in the Hueco Mountains in seemingly good habitat and none were observed (U.S. Army, 1991c).

Alamo beardtongue. The alamo beardtongue (*Penstemon alamosensis)* is a federal species of special concern and a rare and sensitive species in New Mexico. This species is known from the Sacramento and

San Andres mountains, and was discovered in the Hueco Mountains on Fort Bliss in 1981 (U.S. Army, 1991c). Surveys in 1991 revealed that this species was growing on rocky canyon bottoms and on cliffs in two canyons in the Hueco Mountains; a total of 105 plants were observed (U.S. Army, 1991c). A follow-up survey was conducted in 1997 to determine the current status of the species. A total of ten canyons in the Hueco Mountains were inspected, and populations were found only in the two canyons where this species was observed in 1991 (U.S. Army, 1998j).

Organ Mountains evening primrose. The Organ Mountains evening primrose (*Oenothera organensis)* is a federal species of special concern and a State of New Mexico rare and sensitive species. This species is known only from the Organ Mountains (U.S. Army, 1994b). This plant is found only in streambeds or adjacent hillside seeps where surface water is present for at least part of the growing season. This primrose typically grows in open, sunny areas in riparian woods dominated by mountain mahogany, box elder, and willow (U.S. Army, 1994b).

A total of 28 monitoring plots have been established in six canyons to monitor population size, density, and reproductive status. In addition, the effects of the 1994 fire on this species are being evaluated in relation to a control population. Preliminary results indicate the number of stems and seed capsules per plant are similar in both populations (U.S. Army, 1996t) and that fire has had no significant impact on the reproductive success of this species (U.S. Army, 1998k). The greatest current threat to this species on Fort Bliss is from trespass cattle and associated grazing and trampling effects.

Organ Mountains figwort. The Organ Mountains figwort (*Scrophularia laevis)* is a species of special federal concern and a State of New Mexico rare and sensitive species. This species occurs only in the Organ Mountains and grows at higher elevations in dark organic soil in canyon bottoms in the oak woodland plant community. This species may be palatable to livestock and if the area were opened to grazing, it could be negatively impacted (U.S. Army, 1994b).

Populations of the Organ Mountains figwort are being monitored at 10 locations for population size, density, height, and reproductive status. In addition, the impacts of the 1994 fire are being analyzed. Preliminary results indicate that the plants in the burn site had higher number of flowers, buds, and seed capsules per plant than plants in unburned sites. In addition, the mean number of plants in the burn site was similar to unburned sites (U.S. Army, 1996s, t). Fire frequently promotes flowering in herbaceous plants although the reasons for this are not clear. In addition, it is concluded that the reduction of canopy cover from the fire has not had a detrimental effect on the Organ Mountains figwort at least in the short term (U.S. Army, 1998k).

Standley whitlowgrass. Standley whitlowgrass (*Draba standleyi)* is a federal species of special concern and a State of New Mexico rare and sensitive species. This species is known from isolated locations in Arizona, Texas, and Mexico, as well as the Organ Mountains on Fort Bliss. It grows at elevation 6,000 to 9,400 feet in the mixed conifer zone on cliffs and large boulders typically in mesic sites on north-facing shaded locations. There are no apparent threats to this species: it survived a low intensity burn in the Chiricahua Mountains in Arizona (U.S. Army, 1994b). Monitoring locations have been established and the data from these locations are currently being analyzed (U.S. Army, 1996r).

Grama-grass cactus. The grama-grass cactus (*Toumeya papyracantha*) is a federal species of special concern and is not listed by the State of New Mexico. Prior to 1995, it was considered endangered by the state but is now listed as L4, which indicates that the species was once listed but is no longer because it is more common than originally thought. Prior to 1992, there were only two records for this species from Fort Bliss; both were in the grasslands on Otero Mesa on McGregor Range. Surveys in 1993 and 1994 showed that this species was much more abundant in the grassland habitat on McGregor Range, and this species is considered common on Otero Mesa (Corral, 1997).

Night blooming cereus. The night blooming cereus (*Peniocereus greggii)* is a federal species of special concern and an endangered species in New Mexico. This species occurs in the Chihuahuan Desert shrubland and is known to occur on Fort Bliss. Seven of these plants were located during a survey on the Doña Ana Range–North Training Areas (U.S. Army, 1990). No additional populations of this species were observed during 1997 surveys on McGregor Range in a 5,000-acre area in the Tularosa Basin below the Otero Mesa escarpment. A survey of a 15.6-square-mile area of potential habitat on the Doña Ana Range–North Training Areas also failed to identify any additional populations (U.S. Army, 1998j). Five of the seven plants from the original population were located (U.S. Army, 1998j).

Hueco Mountains rock daisy. The Hueco Mountains rock daisy (*Perityle huecoensis)* is a federal species of special concern. This species was first collected in 1977. Surveys in the Hueco Mountains in 1991 revealed the presence of three populations of this species on Fort Bliss in the State of Texas. It occurs on north facing slopes or on slopes protected from direct sunlight in relatively mesic canyons in these mountains (U.S. Army, 1991c). A 1997 follow-up survey conducted in ten canyons in the Hueco Mountains resulted in the observation of this species only in the areas where it was previously recorded (U.S. Army, 1998j).

Nodding cliff daisy. Nodding cliff daisy (*Perityle cernua)* is a species of special federal concern and a State of New Mexico rare and sensitive species. This species is found only in the Organ Mountains and all but one small population occur on Fort Bliss. It grows on shaded cliffs at elevations 5,412 to 7,806 feet and most of the populations are inaccessible to humans and grazing livestock so there is little potential threat to the species at this time (U.S. Army, 1994b).

Sand prickly pear. The sand prickly pear (*Opuntia arenaria*) is a federal species of special concern and a State of New Mexico endangered species. This cactus typically stands less than 1 foot high, but can form clumps up to 5 feet in diameter. The sand prickly pear grows in sandy dunes, flood plains, and foothills in the Rio Grande corridor between Las Cruces, New Mexico, and El Paso, Texas (USFWS, 1997). In 1988, a small population of sand prickly pear was discovered 0.8 mile from the western boundary of the Doña Ana Range–North Training Areas on BLM land. It was found in the mesquite coppice dune plant community with sparse grass cover. In December 1996, a 2-day survey for this species in potential habitat on the Doña Ana Range–North Training Areas took place in mesquite coppice dune plant community in proximity to the known population on BLM land. No populations of the sand prickly pear were found on Fort Bliss, although there appears to be suitable habitat for this species on Fort Bliss. In addition, extensive ongoing vegetation surveys have taken place at numerous locations on Fort Bliss and the species has never been recorded. The mesquite coppice dunes surveyed on Fort Bliss had more grass cover than similar habitat on BLM land which may detract from the suitability of this habitat for the sand prickly pear (U.S. Army, 1998j). Also, most known populations in the United States are in mesquite sand dunes in the vicinity of the Rio Grande, well away from Fort Bliss. Therefore, the possibility of this species occurring on Fort Bliss is very low.

Organ Mountains pincushion cactus. The Organ Mountains pincushion cactus (*Coryphantha organensis)* is a State of New Mexico endangered species. This species is known only from the Organ Mountains in Soledad Canyon and points north (U.S. Army, 1994b). This species is found growing among rocks at elevations of 5,707 to 8,495 feet in the pinyon pine-juniper and mixed conifer plant communities. Plants are found most frequently in mesic micro habitats with strong light and often are seen on the north side of boulders. Plants of this species are scattered throughout rugged terrain and the major portion of its range is inaccessible to humans thereby minimizing the potential for collection. It is believed that fire would damage only a small number of individuals (U.S. Army, 1994b).

Twenty-six monitoring plots were established for the Organ Mountains pincushion cactus and data collected at these plots show that clumps of this species range from a few square centimeters to

425 square centimeters and that there are 1 to 80 stems per cluster (U.S. Army, 1996t). Data from cacti in burned and unburned plots indicate there are no differences in important parameters such as number of stems, average plant size, and mean number of reproductive stems per plant. Some cacti were scorched by the fire and were alive. However, delayed mortality in small cactus from 1 to 3 years after a fire has been reported, so continued monitoring of these plants is required (U.S. Army, 1997o).

Crested coral-root. Crested coral-root (*Hexalectris spicata)* is a State of New Mexico endangered species and is widespread but rare in New Mexico. On Fort Bliss, it is found only in the Organ Mountains. It grows in shaded organic soil in the oak woodland plant community. The removal of the tree canopy would probably result in the elimination of this species (U.S. Army, 1994b).

4.8.4.2 Invertebrates

Franklin Mountain talussnail. The Franklin Mountain talussnail (*Sonorella metcalfi*) is a federal species of special concern and is not listed by the states of New Mexico or Texas. This species is known to occur in the Franklin Mountains and has the potential to occur in the Organ Mountains on Fort Bliss. It occurs in rock talus slopes in the Franklin Mountains.

Anthony blister beetle. The Anthony blister beetle (*Lytta mirifica*) is a federal species of special concern and is not listed by the states of New Mexico or Texas. This species has not been observed on Fort Bliss but has the potential to occur. It occurs in New Mexico including Doña Ana County, but the USFWS is not aware of any sighting of this species in New Mexico since 1963 (BISON-M, 1997a). The Anthony blister beetle occurs on flowers and foilage of various plant species including obligate plant species in sand dunes and agricultural plants (BISON-M, 1997a). Potential habitat would include sandy areas along arroyos, as well as mesquite coppice dunes.

Los Olmos tiger beetle. The Los Olmos tiger beetle (*Cincindela nevadica*) is a federal species of concern and is not listed by the states of New Mexico or Texas. This species has not been recorded from Fort Bliss. The population trend of this species is unknown and it is listed as a possible species for New Mexico (BISON-M, 1997b). The Los Olmos tiger beetle occurs in limestone soils often down slope from limestone rubble. It has the potential to occur in areas of limestone soil on Fort Bliss.

Woodlandsnails. The boulder woodlandsnail (*Ashmunella auriculata*), Maple Canyon woodlandsnail (*A. todseni*), Organ Mountains woodlandsnail (*A. organensis)* and Beasley's woodlandsnail *(A. beasleyi)* are found in the Organ Mountains on Fort Bliss and have no federal or state government status. However, they are critically imperiled or imperiled globally because of "extreme rarity, narrow endemism, and vulnerability to extinction" (U.S. Army, 1994b). These large land snails range from 11 to 15 millimeters in diameter and can be distinguished from each other by shell characteristics (U.S. Army, 1994b). The woodlandsnails are found in a variety of canyons in the Organ Mountains at elevations ranging from 5,297 to 7,400 feet.

The woodlandsnails occur in rock-covered slopes. Rocks provide a relative cool and moist environment necessary for the snails' survival. During periods of hot and or cold conditions, the snails will move deeper into the soil among the rocks for protection. During warm rains they may be found near the surface feeding on leaf litter. Recent surveys have verified that populations observed in the 1960s continue to persist (U.S. Army, 1994b). Continued monitoring of the woodlandsnails in the Organ Mountains has resulted in the identification of additional populations. In addition, Beasley's woodlandsnail was a recently discovered new species in the Organ Mountains (U.S. Army, 1997o; 1998l). This new species is known from only one talus slope in the Organ Mountains. Extensive surveys of other talus slopes in the Organ Mountain failed to discover other populations of this species. Therefore, it is likely this species has a highly restricted range in the Organ Mountain.

4.8.4.3 Reptiles

Texas horned lizard. The Texas horned lizard (*Phrynosoma cornutum)* is a federal species of special concern and is threatened in Texas. This species is common and widespread on Fort Bliss and is found in grassland and desert shrublands habitat throughout the area of the post (U.S. Army, 1997k).

Mountain short-horned lizard. The mountain short-horned lizard (*Phrynosoma douglasii hernandezii*) is a threatened species in Texas and is not listed by the Federal Government or the State of New Mexico. The short-horned lizard is the most widespread of the horned lizards and it occurs throughout the western two thirds of New Mexico. It is found in a wide variety of habitats from semi-arid shrublands through shortgrass prairie into pinyon pine-juniper and conifer forests. It is most common in open ponderosa pine and pinyon pine-juniper woodlands (Degenhardt et al., 1996). According to Degenhardt et al., (1996), *P.d. Hernandezii* is the only subspecies that occurs in New Mexico.

The short-horned lizard has been captured in the grasslands of Otero Mesa (U.S. Army, 1997k) but not in the Chihuahuan Desert shrublands in the Tularosa Basin (U.S. Army, 1996l, m). This species also is likely in the pinyon pine-juniper woodlands and montane shrublands in the Sacramento Mountains foothills and the Organ Mountains, as well as the conifer forest in the Organ Mountains.

Mottled rock rattlesnake. The mottled rock rattlesnake (*Crotalus lepidus lepidus*) is a State of New Mexico threatened species; it is not listed by the Federal Government or the State of Texas. It is typically found in rocky canyons or hillsides and in New Mexico is known only from the Guadalupe Mountains in Eddy County and extreme eastern Otero County (Degenhardt et al., 1996). The mottled rock rattlesnake has not been documented from Fort Bliss, although it has been recorded from the Organ Mountains near the post. Potential habitat occurs in the Hueco and Organ mountains, as well as the Otero Mesa escarpment.

Texas lyre snake. The Texas lyre snake (*Trimorphodon biscutatus vikinsoni*) is a threatened species in Texas and is not listed by the Federal Government or the State of New Mexico. This species occurs in a wide variety of habitats from desert shrublands and grasslands to montane woodlands and forests. Natural rock outcrops with deep fissures provide good habitat for this secretive species. In New Mexico, this species occupies the southern desert and foothills ranging north along the Rio Grande to Truth or Consequences (Degenhardt et al., 1996).

The Texas lyre snake has been observed in rocky Chihuahuan Desert of the Franklin Mountains north of El Paso, Texas (Degenhardt et al., 1996). It has not been recorded during amphibian and reptile studies on Fort Bliss (U.S. Army, 1997h, k, m). However, this species has been observed on Castner Range in Texas.

4.8.4.4 Birds

Interior least tern. The interior least tern (*Sterna antillarum athalassos*) was listed as an endangered species in 1985 (USFWS, 1990) and is also endangered in New Mexico and Texas. The California *(S. A. brownii)* and eastern subspecies *(S. A. antillarum)* occur along the coasts of the U.S. and the interior least tern occurs principally along the Missouri and Mississippi river systems in the United States although some nest along the Rio Grande drainage in the western U.S. (Whitman, 1988). Historically, the interior least tern was abundant along the Missouri and Mississippi river systems; the estimated population in 1990 was 5,000 birds, which is much reduced from historic population levels (USFWS, 1990).

Whitman (1988) summarized the biology of the interior least tern, and factors that have led to the reduction of this species include habitat destruction caused by urbanization; construction of locks, dams, dikes, levees, and storage reservoirs; altered flow patterns in rivers resulting in the disappearance of sandbar nesting habitat; increased predation in disturbed habitats; human disturbance; and water pollution. The interior least tern has been eliminated from the Mississippi River and its tributaries north of the Missouri River junction due to habitat destruction (USFWS, 1990). In other areas where nesting habitat still exists along the river, predation can be the major cause in chick mortality (Kirsch, 1996).

Before human development, the interior least tern nested on sandbars along low gradient portions of major rivers such as the Mississippi and the Missouri. With the disappearance of this habitat, this species now also nests on manmade areas such as dikes, dredge material islands, sand pit mines, construction fill sites, and on roofs of buildings (Gore and Kinnison, 1991; Whitman, 1988). Kirsch (1996) studied nesting least terns on sandbar and sandpit sites along the lower Platte River in Nebraska and determined that the proportion of terns using each habitat was similar to the proportion of bare sand in each habitat. In addition, productivity did not differ between the natural sandbars and the sandpit areas. However, Kirsch (1996) determined that the estimated productivity during the four-year study was insufficient to support the local population and that high chick mortality was the reason why. Smith and Renken (1991) studied nesting interior least terns along the Mississippi River where this species nests on sandbars. There was no difference between used and unused sandbars except that most terns nested on sandbars that were continuously exposed for at least 100 days during the breeding season.

In New Mexico, the interior least tern nests at Bitter Lake National Wildlife Refuge on the Pecos River Drainage in Chaves County (Whitman, 1988). In the 1960s, the breeding tern population was about 60; this number declined to only three nesting pairs per year from 1987 through 1990. There has been a slight increase of four to seven pairs per year from 1991 through 1995. Productivity has been poor during the last ten years (NMDGF, 1997). The interior least tern has not been observed on Fort Bliss. If it did occur, it would likely be only be during migration.

Peregrine falcon. The peregrine falcon (*Falco peregrinus anatum*) is a federal, and State of Texas endangered species; it is threatened in New Mexico. Nesting peregrine falcons have been monitored extensively in New Mexico from 1979 through 1996 and less extensive monitoring data are available from 1960 to 1979 (Johnson, 1996). Long-term data indicate that adult pairs of peregrine falcons occupied about 85 percent of known territories in the early 1960s; this number decreased to below 40 percent beginning in the late 1960s. The number of adult pairs at known territories fluctuated around 40 percent until about 1985. Since 1985, the number of adult pairs on territory has steadily increased and has averaged 70 percent from 1992 through 1996. The increase in number of adult pairs occupying territories since 1985 is the result of increased productivity in the early 1980s. However, productivity has decreased 29 percent in the last 10 years and if this trend continues the peregrine falcon population in New Mexico may start to decrease.

The peregrine falcon has not been recorded as a breeding species at Fort Bliss although an unconfirmed peregrine/prairie falcon hybrid and a prairie falcon made a nesting attempt on the Otero Mesa escarpment in 1997 (USAF, 1997c, d). A survey for potential peregrine falcon nesting habitat was conducted during the fall of 1979. It was determined that the large cliffs, intermittent stream flow, and the mosaic of conifer forest and mountain shrub habitat that occurred in some of the canyons of the Organ Mountains represented the best potential habitat for this species on Fort Bliss. This survey also included the Sacramento Mountains foothills on Fort Bliss and it was determined that the potential habitat in this area was inferior to the Organ Mountains because of the lack of perennial water and the much drier nature of this area (U.S. Army, 1980a).

Ten canyons were intensively surveyed for peregrine falcons in the Organ Mountains in 1980. No peregrine falcons were observed during this study although four prairie falcon and three golden eagle nest sites were found. It is believed that the relatively high density of prairie falcons and golden eagles may preclude the use of these mountains for nesting peregrine falcons (U.S. Army, 1980a). A 6.2-mile section of cliffs in the Sacramento Mountains foothills was also searched for peregrine falcons and none were found. One prairie falcon nest site was found just north of the Fort Bliss boundary (U.S. Army, 1980a). A second survey for the peregrine falcon was conducted in the Organ Mountains between March 29 and April 13, 1996. One nonbreeding peregrine falcon was observed but no breeding pairs. Turkey vultures, golden eagles, red-tailed hawks, cooper hawks, and prairie falcons were commonly observed (U.S. Army, 1997p). The peregrine falcon is occasionally observed on Fort Bliss and it is assumed to be a migrant species on post. El Paso sewage ponds are likely locations for migrating falcons and they have been observed there in the past.

Northern aplomado falcon. The northern aplomado falcon (*Falco femoralis septentrionalis)* is a federal and states of New Mexico and Texas endangered species. It once inhabited the grasslands of southern Texas, New Mexico, and Arizona; historic records show that it was common until about 1940 (Hector, 1987). Historic records from New Mexico show that this species occupied open yucca grasslands in southern New Mexico (Ligon, 1961) which includes the grasslands of Otero Mesa on Fort Bliss. The reasons for this species' decline are unclear. Habitat loss (e.g., grassland habitat converted to shrubland due to livestock grazing) and pesticide contamination likely contributed to this decline (Hector, 1987). The USFWS is currently releasing aplomado falcons into the wild in south Texas in an attempt to re-establish a breeding population in the United States. The first nesting pair of aplomado falcons was recorded in Cameron County, Texas, in 1995, which represents the first nesting aplomado falcons in Texas in the last 54 years. The nesting pairs were observed in 1996 (Mora et al., 1997).

Sporadic observations of the northern aplomado falcon have been reported since 1991 in areas near Fort Bliss. An unconfirmed sighting of this species on Fort Bliss occurred in May 1997 when an immature bird was observed in the desert shrubland-grassland habitat in the Tularosa Basin (USAF, 1997d). In 1992, breeding populations were discovered south of the border in grassland habitat in the State of Chihuahua, Mexico. The nearest population to the United States is about 125 miles south of the New Mexico border (Montoya et al., 1997). Given the recent sighting of this species near Fort Bliss and the existence of potential grassland habitat on Otero Mesa, surveys for this species were conducted in 1994 and 1996 on Fort Bliss (U.S. Army, 1994c, 1997p). In 1994, 495 miles of survey routes were traversed over 23 days from 2 February through 21 April. No northern aplomado falcons were observed although 13 other species of raptors were noted and the location of 30 nest structures were mapped (U.S. Army, 1994c). Based on these surveys, potential habitat for the northern aplomado falcon was mapped on Otero Mesa and part of the Tularosa Basin below the mesa. Potential excellent habitat consists of areas with an interspersion of open grassland and tall yucca and shrubs such as mesquite and Mormon tea. As the cover of shrubs increases, the suitability of the habitat for northern aplomado falcon decreases. The best potential habitat occurs in the grassland habitat on Otero Mesa and in a portion of the Tularosa Basin.

In 1996, the northern aplomado falcon survey was expanded to include habitat evaluation and avian prey base studies on Fort Bliss (U.S. Army, 1997p). Results of this study were compared to similar habitat and prey base assessments conducted at occupied aplomado falcon territories in Chihuahua, Mexico (Montoya et al., 1997). Late February/March/April 1996 surveys for the northern aplomado falcon took place along six routes in marginal potential habitat in the Tularosa Basin and along six routes in marginal-to-good and good-to-excellent habitat on Otero Mesa; surveys followed the USFWS draft protocol (USFWS, 1996). No northern aplomado falcons were observed during these surveys (U.S. Army, 1997p).

Habitat and prey-base study results for Fort Bliss showed some similarities and differences when compared to equivalent studies in Chihuahua, Mexico. The grasslands on Otero Mesa with its scattered yuccas and shrubs resemble the open habitat considered necessary to support a breeding population of northern aplomado falcons. Scattered woody plants provide the necessary perch and nesting sites for this species and the density of woody species on more than one-half the sites sampled on some portions of Otero Mesa is similar to that found in occupied territories in Mexico. The eight sites sampled in the Tularosa Basin had shrub densities much higher than on Otero Mesa or in Mexico. The northern aplomado falcon does not construct its own nest but uses abandoned nests built by hawks and ravens. Adequate potential nest sites were observed during the northern aplomado falcon survey on Otero Mesa in 1996. It is believed, therefore, that the number of woody species and potential nest sites would be adequate to support northern aplomado falcons on Otero Mesa (U.S. Army, 1997p). The Otero Mesa-1 habitat group consists of seven locations on Otero Mesa that were most similar to data from Mexico, and the Otero Mesa-2 habitat group represents eight locations that were somewhat less similar to data from Mexico (Table 4.8-4). Comparison of percent grass cover and biomass of potential prey species showed that both were much less on Otero Mesa than in Mexico (Table 4.8-4). Mean basal grass cover in two areas on Otero Mesa that provide the best potential northern aplomado falcon habitat ranged from 16.0 to 20.1 percent; cover at occupied territories in Mexico averaged 46.3 percent (see Table 4.8-4) (U.S. Army, 1997p; Montoya et al., 1997). Although such factors as differences in precipitation patterns and soil type may contribute to the observed differences between Otero Mesa and Mexico, it is believed that livestock grazing has had a greater impact on the grasslands on Otero Mesa than in Mexico. The number of birds detected at sampling locations on Otero Mesa and in Mexico during the breeding season were similar but the bird biomass in Mexico was substantially greater than on Otero Mesa (see Table 4.8.4). Higher densities of meadowlarks in Mexico account for this difference and meadowlarks were the most common prey item in the diet of northern aplomado falcons in Mexico (Montoya et al., 1997). These results indicate that the grassland habitat on Otero Mesa may have a reduced capacity to support northern aplomado falcons compared to occupied territories in Mexico and that the principal reason for this may be livestock grazing. However, further study is necessary (U.S. Army, 1997p). Fort Bliss is currently monitoring wintering and migrating birds on Fort Bliss to compare with similar studies in aplomado falcon habitat in Mexico. In addition in 1996, BLM with WSMR and NMSU initiated a 5-year study to examine habitat characteristics of the aplomado falcon in Mexico.

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Table 4.8-4. Mean Percent of Grass Basal Cover and Mean Number of Birds and Bird Biomass per Site at Two Locations on Otero Mesa and at Occupied Aplomado Territories in Mexico

Habitat Group	*Number of Transects*	*Average Percent Grass Basal Cover*	*Potential Avian Prey*	
			Average Number of Birds	*Average Biomass of Birds (grams per site)*
Otero Mesa - 1	7	20.1 (± 2.11)[a]	13.0 (± 5.4)	507.8 (± 230.7)
Otero Mesa - 2	8	16.0 (± 2.42)	14.8 (± 5.5)	594.9 (± 222.5)
Mexico	10	46.3 (± 13.0)	12.1 (± 4.2)	816.8 (± 188.7)

[a] Numbers in parenthesis are standard deviations.
Source: U.S. Army, 1997p, 1996o; Montoya, 1995; Montoya et al., 1997.

Southwestern willow flycatcher. The southwestern willow flycatcher (*Empidonax traillii extimus)* is a federal and State of New Mexico endangered species. This flycatcher is a neotropical migrant that breeds in the southwestern United States and winters in Central and South America. The southwestern willow flycatcher breeds only in dense riparian vegetation near surface water or saturated soil in linear or irregularly shaped stands with patches of dense vegetation interspersed with small openings (Sferra et al., 1997; Sogge et al., 1997).

The southwestern willow flycatcher populations have experienced significant declines, and breeding populations are known from only about 75 locations and there are an estimated 300 to 500 pairs in existence (Sogge et al., 1997). The principal factors resulting in these declines are the extensive loss, modification, and fragmentation of riparian breeding habitat and brood parasitism by brown-headed cowbirds (Sogge et al., 1997). There are likely less then 200 breeding pairs of southwestern willow flycatchers in New Mexico based on recent surveys (Williams, 1997).

The willow flycatcher has been recorded occasionally on McGregor Range. Willow flycatchers were heard singing in an arroyo on McGregor Range in early June 1996. These birds were apparently migrants because they did not stay in the area (U.S. Army, 1997i). This species has also been recorded in arroyos during breeding bird surveys in 1996 and 1997 (U.S. Army, 1996n; 1997j). These birds are also assumed to be migrants. The subspecies of willow flycatchers observed on McGregor Range was not determined, so it is not known if these observations represent the endangered southwestern willow flycatcher. Appropriate nesting habitat for the southwestern willow flycatcher does not exist on Fort Bliss. There are stands of willows at some stock tanks, but these stands are likely too small to support nesting southwestern willow flycatchers. For example, a stand of willows exists at Mack Tanks in the Tularosa Basin. This tank typically holds water all year and the stand of willows covers about 0.4 acre (USAF, 1997e), which is assumed too small to support nesting willow flycatchers. Willow flycatcher surveys were conducted in some riparian areas in the Organ Mountains and it was not recorded; the habitat in the Organ Mountains is not considered suitable southwestern willow flycatcher habitat (U.S. Army, 1997q). Therefore, it is assumed that the willow flycatcher does not breed on Fort Bliss and birds observed on post were migrants.

Bald eagle. The bald eagle (*Haliaeetus leucocephalus*) is a federal and state threatened species. The bald eagle winters along lakes and rivers in large numbers (Spencer, 1976; Steenhof et al., 1980) and uses terrestrial habitat well away from aquatic habitat (Fischer et al., 1984; Grubb and Kennedy, 1982; and Grubb et al., 1989). A small population (5 to 30 individuals) of bald eagles winters in the Sacramento Mountains and one of the known roost sites is about 4 miles from the northern border of Fort Bliss (U.S. Army, 1995f). Given that bald eagles are known to travel up to about 22 miles from roost sites to feeding sites (Grubb et al., 1989), the northern portion of Fort Bliss is within the range of eagles roosting in the Sacramento Mountains.

Surveys for wintering bald eagles in the Sacramento Mountains foothills on Fort Bliss were conducted during the winters of 1994 to 1995 and 1995 to 1996 (U.S. Army, 1995g; 1996p). Two observation routes were surveyed in the wooded habitat of the foothills, one in the desert shrubland habitat, and one in the grassland habitat on Otero Mesa. During the winters of 1994 to 1995 and 1995 to 1996, bald eagles were observed 28 and 16 times respectively on Fort Bliss (U.S. Army, 1995g, 1996p). Based on plumage characteristics, it was estimated that a minimum of five different eagles were in the study area during the winter of 1994 to 1995. During both winters, most bald eagles were observed at the extreme northern boundary of the McGregor Range where high ridges and hills provide favorable perch sites and updrafts. Vegetation in this area is mainly grassland with varying amounts of shrubs (mountain mahogany and oak) and trees (pinyon pine and juniper) providing favorable foraging conditions (U.S. Army, 1995g). Only one bald eagle was observed over the grasslands of Otero Mesa. Most birds were in flight when first observed. In seven cases, bald and golden eagles were observed together; in three of these, golden eagles initiated aggressive interactions with bald eagles. There were no observations of eagles feeding or hunting. Food sources on Fort Bliss may include deer carrion and rabbits.

Piping plover. The piping plover (*Charadrius melodus)* is an endangered species in the Great Lakes region and threatened elsewhere in the United States. This species is considered endangered in New Mexico. The piping plover has experienced range-wide declines (Haig and Oring, 1985) and the principal factors are habitat deterioration (Haig and Oring, 1985), human disturbance (Flemming et al., 1988), and predation (Gaines and Ryan, 1988). The piping plover nests on beaches along the Atlantic coast and Great Lakes and along lakes and rivers in the Great Plains in Canada and the United States (Haig and Oring, 1985). The piping plover breeds in the Great Plains, and New Mexico is south of its breeding range. This species is a very rare migrant in New Mexico, having been observed six times (NMDGF, 1996).

The piping plover was observed once on Fort Bliss at sewage lagoons in 1987 (U.S. Army, 1997r) and is therefore considered a very rare migrant on Fort Bliss.

Mexican spotted owl. The Mexican spotted owl (*Strix occidentalis lucida)* is a federal threatened species, is not listed by New Mexico, and is considered a threatened species in Texas. Its range includes southern New Mexico where it occurs in suitable habitat in isolated mountain ranges (U.S. Army, 1996q). During the breeding season, the Mexican spotted owl inhabits mountain forests and canyons and the most commonly used habitat types for nesting and roosting are mixed conifer (Douglas fir, white fir [*Abies concolor*], southwestern white pine [*Pinus strobiformis*], and ponderosa pine) while pine and pinyon pine-juniper forests are used to a lesser degree (Skaggs and Raitt, 1988; Ganey and Balda, 1989; and Zwank et al., 1995). The Sacramento Mountains just to the north of Fort Bliss contains a breeding population of Mexican spotted owls and the closest known breeding pair is 10 miles from the Fort Bliss boundary (U.S. Army, 1996q).

The Mexican spotted owl has been observed in the past on or near Fort Bliss on two occasions. In June 1979 an adult spotted owl and young were photographed in the Organ Mountains on BLM land near the Fort Bliss boundary (New Mexico Ornithological Society, 1979 as cited in U.S. Army, 1991b); this represents the only known sighting of the spotted owl in the Organ Mountains (U.S. Army, 1991b). More recently, two spotted owls were observed on McGregor Range during the winter of 1989 to 1990 (U.S. Army, 1996q). Given that mixed conifer plant communities occur in the Organ Mountains and the spotted owl has been observed on Fort Bliss, a survey for this species was conducted on 5 square miles of land in the Organ Mountains in the spring and summer of 1991 (U.S. Army, 1991b). Three complete surveys of the area using nocturnal call counts were conducted. The spotted owl was neither heard nor observed during these surveys. Three daytime call surveys in the area of the 1979 sighting also failed to detect spotted owls. Searches for roost sites in the historic location also took place and no sign of spotted owl activity was observed. Some of the potential spotted owl habitat in the Organ Mountains experienced severe damage during a 1994 fire.

Since spotted owls had been observed on McGregor Range during the winter, surveys for this species were conducted in the Sacramento Mountains foothills on the McGregor Range from December 12, 1995, to February 21, 1996, and the Organ Mountains in March 1996. No spotted owls were heard or observed during these surveys (U.S. Army, 1996q). No mixed conifer habitat and only a few isolated ponderosa pine occur in the Sacramento Mountains foothills on McGregor Range. Studies elsewhere in New Mexico showed that the Mexican spotted owl rarely roosts and does not rest in pinyon pine-juniper habitat (Seamans and Gutierrez, 1995; Zwank et al., 1995). Based on the habitat in the foothills on Fort Bliss and the ecology of the spotted owl, it seems likely that the southern Sacramento Mountains are only used by spotted owls on an occasional basis during the winter or dispersal (U.S. Army, 1996q).

Skaggs (U.S. Army, 1991b) estimated that about 10 square miles of the Organ Mountains contain potential spotted owl habitat and within this area, suitable habitat is highly fragmented. Most of this habitat is outside Fort Bliss boundaries. Recent fires may have reduced the amount of available habitat. Based on work in the Sacramento Mountains (Skaggs and Raitt, 1988), it is estimated that the Organ Mountains could support a maximum of two or three spotted owl territories (U.S. Army, 1991b). The spotted owl may occasionally occur in the Organ Mountains given the existence of suitable habitat.

However, its occurrence will likely be sporadic given the small amount of potential habitat and the high potential for local extinction (U.S. Army, 1991b).

Mountain plover. The mountain plover (*Charadrius montanus)* is a federal proposed species and has declined by 63 percent since 1966 (Knopf, 1994). This species is generally considered an associate of the short grass prairie dominated by blue grama and buffalo grass (*Buchloe dactyloides)* (Knopf and Miller, 1994) although it is known to nest in Utah in habitat dominated by low growing shrubs such as sagebrush (*Artemesia* sp.) and rabbitbrush (*Chrysothamnus* sp.) (Day, 1994). Various observers have noted that the mountain plover nests and forages in areas of disturbed ground such as occur at prairie-dog towns and areas heavily grazed by livestock (Knopf and Miller, 1994; Miller and Knopf, 1993; Sager, 1996). One mountain plover was observed at Mesa Horse Camp on Otero Mesa on April 4, 1999. This bird was not observed during subsequent observations and was assumed to be a migrating bird (Locke, 1999). The bulk of the mountain plover population winters in the central valley of California and seems to have adapted to the conversion of much of the native habitat to agricultural fields in that area. The survival rate of mountain plovers on their wintering ground is high, so it appears that the declines noted for this species are attributable to factors on the breeding grounds (Knopf and Rupert, 1995).

In a recent statewide survey, the mountain plover was observed at 35 sites in 11 counties during the breeding season in New Mexico. This species was observed in a variety of habitats, but bare ground was a common feature at all the sites and livestock grazing had created most of the bare ground. The bulk of the observations were in the northeast part of the state and none were from Otero County although there are two historic records of this species from Otero County (Sager, 1996). Based on its habitat requirements, Otero Mesa on Fort Bliss provides the best potential habitat for this species especially in the overgrazed areas around stock tanks and troughs. The mountain plover was not recorded during field surveys for this species in a 5,000-acre proposed tactical target complex site in the grassland habitat on Otero Mesa and in grassland habitat in a second proposed tactical target complex site in the Tularosa Basin (USAF, 1997e, f). This species was also not recorded during surveys of other potential habitat in a 13,000-acre section of Otero Mesa such as along roads at heavily grazed stock tanks or prairie-dog (*Cynomys ludovicianus arizonensis)* towns (USAF, 1997e; f; U.S. Army, 1998j). One mountain plover was observed at Mesa Horse Camp on April 4, 1999. This bird was not seen during subsequent observations and was assumed to be a migratory bird (Locke, 1999).

Black tern. The black tern (*Chlidonias niger*) is a federal species of special concern and is not listed by the states of New Mexico or Texas. This species breeds in wetlands greater then 12 acres in size in the central and western United States. Breeding bird studies have shown that this species is declining rangewide at 8.1 percent per year; these declines include the populations in the central and western United States (Finch, 1992).

The black tern has been observed on Fort Bliss during migration at playas lakes, ponds, and man-made water resources in the Tularosa Basin and on Otero Mesa. This species is likely a regularly occurring migrant on Fort Bliss (U.S. Army, 1997r).

White-faced ibis. The white-faced ibis (*Plegadis chihi*) is a federal species of special concern and is not listed by the State of New Mexico. This species nests in colonies in large fresh water marshes from California east to Idaho and Wyoming. The current population is thought to be stable but warrants protection because there are a limited number of breeding colonies and their disappearing wetlands habitat could be exposed to fluctuating water levels and pesticide poisoning (Finch, 1992).

The white-faced ibis has been observed on Fort Bliss during spring and fall migrations at sewage ponds. It could also occur during migration at playa lakes, stock tanks, and other water sources elsewhere on Fort Bliss (U.S. Army, 1997r).

Northern goshawk. The northern goshawk (*Accipiter gentilis*) is a federal species of special concern and is not listed by New Mexico or Texas. This species is a rare migrant through Fort Bliss. In the west, this species nests in mature conifer forests such as those dominated by Douglas fir and ponderosa pine (Call, 1978; Moore and Henny, 1983). The only potential nesting habitat for this species occurs in the Organ Mountains on the Doña Ana Range–North Training Areas. The northern goshawk has not been recorded from the Organ Mountains during raptor and breeding bird surveys, and is assumed not to nest on Fort Bliss (U.S. Army, 1980a; 1991b; 1994b; 1997q).

Zone-tailed hawk. The zone-tailed hawk (*Buteo albonotatus*) is a threatened species in Texas and is not listed by the Federal Government or the State of New Mexico. This species occurs in southeastern Arizona, central New Mexico, and south-central Texas. This species has a preference for mountainous steep canyons and other areas of steep topography. It nests in riparian forests and woodlands, as well as montane conifer forests and to a lesser extent, in oak woods and on cliffs (Matteson and Riely, 1981). The zone-tailed hawk forages widely over open habitat such as desert shrublands and grasslands and open pinyon pine-juniper woods, woodlands along rivers, and in canyons. Fort Bliss is within the breeding range of this species; it has nested in the Guadalupe and Capital mountains, along the Gila River valley and as far north as Los Alamos (Palmer, 1988). This species does not nest on Fort Bliss, but migrant zone-tailed hawks have been observed on rare occasions over the Otero Mesa escarpment and the Sacramento Mountains foothills.

Ferruginous hawk. The ferruginous hawk (*Buteo regalis*) is a federal species of special concern and is not listed by the states of New Mexico or Texas. It breeds from the Canadian provinces south to Arizona and Oklahoma and nests on trees, bushes, large rocks, and hillsides. It is a grassland species and typically feeds on prairie dogs and ground squirrels (Finch, 1992). Observations on Fort Bliss confirm this because all but one ferruginous hawk observed during wintering bald eagle surveys were associated with the grassland habitat of Otero Mesa (U.S. Army, 1995f; 1996p). This hawk's decline in some areas is due to its intolerance to human disturbance and loss of habitat due to cultivation (White and Thurow, 1985; Houston and Bechard, 1984; Schmutz, 1984).

The ferruginous hawk has been observed on Fort Bliss during the fall, winter, and spring. Demarais et al. (U.S. Army, 1996u) observed this species at prairie-dog towns on Otero Mesa three times in March 1996 while Tafanelli and Montoya (U.S. Army, 1994c), Tafanelli and Meyer (U.S. Army, 1995f), and Tafanelli et al. (U.S. Army, 1996p) recorded this species on Otero Mesa during the winters of 1993 to 1994 through 1995 to 1996. During the winter of 1994 to 1995, this species was observed 21 times during 9 observations from early December to late February. Only two ferruginous hawks were observed during 18 surveys for wintering bald eagles during the winter of 1995 to 1996 (U.S. Army, 1995f; 1996p). Surveys for the ferruginous hawk were also conducted from late February to early March, and again in April 1997. Surveys took place on McGregor Range and Doña Ana Range–North Training Areas (U.S. Army, 1998j). Seven ferruginous hawk observations were made during the late February to early March survey, and no observation occurred in April. All observations took place on McGregor Range (U.S. Army, 1998j). These observations indicate that the ferruginous hawk winters at and migrates through Fort Bliss. This species is not known to nest on Fort Bliss and was not observed during intensive breeding-bird surveys during 1996 and 1997 (U.S. Army, 1996n; 1997i) or ferruginous hawk surveys in April 1997 (U.S. Army, 1998j).

Western Burrowing owl. The western burrowing owl is a federal species of concern and is not a State of New Mexico or Texas listed species. This species nests in desert grasslands such as occur on Otero Mesa and in desert shrublands as occur in Tularosa Basin. It also nests in prairie, mesquite coppice dune/sand scrubs, sagebrush, and pinyon/juniper habitat as well as disturbed areas such as prairie-dog towns, road cuts, airports, and other developed areas. Declines in this species are attributed to the loss of burrow nest sites resulting from the eradication of colonial burrowing rodents, particularly prairie dogs (Finch, 1992).

The burrowing owl nests on Otero Mesa where it was observed at 20 of the active and inactive prairie-dog towns observed on Otero Mesa by Demarais et al. (U.S. Army, 1996u). Burrowing owls were observed at 9 of 16 towns during the 1997 black-tailed prairie-dog surveys; young owls were observed at most of these towns. Field studies in 1997 showed that there were 18 to 22 pairs at 11 of 16 prairie-dog towns inspected on Otero Mesa on McGregor Range (U.S. Army, 1997s). All military facilities on McGregor Range were inspected in 1997, and 11 pairs of burrowing owls were observed nesting in concrete conduit boxes at radar tracking sites just east of McGregor Range Camp. Elsewhere in the Tularosa Basin, burrowing owls may occur occasionally in mesquite dunes habitat and along eroded arroyos. The extent of use of these habitat types in the desert shrublands habitat in the Tularosa Basin has not been determined (U.S. Army, 1997s). In 1997, one burrowing owl was repeatedly observed along a road in the Tularosa Basin between Shorad and Mack Tanks; it was living in some kangaroo rat holes (USAF, 1997f).

Costa's hummingbird. Costa's hummingbird (*Calypte costae*) is a threatened species in New Mexico; it is not listed by the Federal Government or the State of Texas. This species occurs in arid habitats in the southwestern U.S. and northwestern Mexico. It typically occurs in the extreme southwest of New Mexico. In New Mexico, it is considered a warm season migrant and occasional breeder, particularly in Guadalupe Canyon (NMDGF, 1996). This species has been observed in the Organ Mountains and is a nonbreeding migrant (U.S. Army, 1997t).

Loggerhead shrike. The loggerhead shrike (*Lanius ludovicianus)* is a federal species of concern that breeds throughout much of New Mexico including the Fort Bliss area. This species has declined over much of its range and is considered a threatened species in Canada and numerous states (Robert and Laporte, 1991). Breeding bird data from 1966 through 1995 show that this species has steadily declined throughout that period (Sauer et al., 1997). The reasons for the decline of this species in northern states are not clear. Robert and Laporte (1991) and Brooks and Temple (1990) have observed good nesting habitat in Canada and Minnesota that is currently not being used by this species. Brooks and Temple (1990) conclude that alteration of the shrikes' winter habitat in the Gulf Coast states may be partially responsible for the decline in this species.

The loggerhead shrike populations north of New Mexico migrate south to New Mexico, Texas, and Arizona to winter (Root, 1988). Loggerhead shrike presence on Fort Bliss consists of wintering and resident birds. This species is fairly common in the desert habitat on Fort Bliss during the breeding season; 53 were recorded from 12 breeding bird sampling locations in the grasslands on Otero Mesa and 50 from 24 sampling locations in 4 desert shrubland habitats in the Tularosa Basin (U.S. Army, 1996n). The loggerhead shrike has also been recorded during breeding bird surveys in 1993 and 1994 in arroyo-riparian and upland habitats (Kozma, 1995). These results indicate that the loggerhead shrike is fairly common on Fort Bliss although there is no historic data to determine long-term trends. The long-term trend for the period 1968 through 1996 for the breeding bird survey in New Mexico shows a decline throughout the period similar to that observed on a national scale (Sauer et al., 1997).

Baird's sparrow. Baird's sparrow (*Ammodramus bairdii)* is a threatened species in Canada and population declines in the United States have been documented; it is a federal species of special concern and a threatened species in New Mexico (NMDGF, 1996). This species was once one of the most abundant nesting species in the northern prairie states and Canada and has declined in abundance by about 90 percent with cultivation and conversion of much of its mixed-grass prairie nesting habitat (DeSmet and Conrad, 1989). This species winters and migrates through New Mexico and the declines on the nesting grounds are evident in New Mexico. It was once relatively numerous and widespread in New Mexico but in recent years is very rarely reported (NMDGF, 1996).

Baird's sparrow was observed on McGregor Range during migration and it is believed to winter on the post (Smartt, 1980; U.S. Army, 1997t). Surveys for this species were conducted at 28 sites on McGregor Range from late February to early April 1997 (U.S. Army, 1997t). It was observed 27 times and was most frequent in swales on Otero Mesa. It was observed in the winter and an influx was noted in April coinciding with spring migration. Preferred habitat on McGregor Range were swales on Otero Mesa with dense tall growth of tobosagrass along with black and blue grama grassland and low shrub density. Baird's sparrows were not observed along swales that had been heavily grazed or had dense growth of tall grass such as dropseed (*Sporobolus* sp.) (U.S. Army, 1997t).

Varied bunting. The varied bunting (*Passerina versicolor)* is a State of New Mexico threatened species and is primarily a Mexican species; it does occur in southern New Mexico in Hidalgo and Eddy counties and has been found breeding in Doña Ana County and has been observed in Otero County (NMDGF, 1996). This species is very rare on Fort Bliss and is not known to nest on post.

The varied bunting nests in dense vegetation in arid canyons and the loss of such habitat is the principal threat to this species in New Mexico. Cowbird parasitism may also be a threat to this species (NMDGF, 1996).

Bell's vireo. Bell's vireo (*Vireo bellii)* is a State of New Mexico threatened species. In New Mexico, this species summers primarily in the Gila Valley, Guadalupe Canyon, and the lower Rio Grande and Pecos valleys (NMDGF, 1996). It nests in dense riparian vegetation and winters in western and central Mexico.

Bell's vireo has shown a steady decline based on breeding bird survey results from 1966 through 1996 (Sauer et al., 1997). It has suffered significant declines especially in the lower Colorado River Valley and central and coastal California (Rosenberg et al., 1991; Franzreb, 1987 as cited in NMDGF, 1996). Loss and fragmentation of the dense riparian shrub-nesting habitat from various human activities and brown-headed cowbird parasitism appear to be the principal reasons for the decline of this species. Bell's vireo is occasional on Fort Bliss and is not known to nest on the post. Two singing males established territories on McGregor Range in 1995 but no nests were found. One bird was observed in the acacia habitat on McGregor Range in July 1997 (U.S. Army, 1997i). Breeding bird surveys in various habitats in and near the Organ Mountains in 1991 and 1992 failed to detect this species.

Gray vireo. The gray vireo (*Vireo vicinior)* is a State of New Mexico threatened species and nests in arid juniper woodlands on foothills and mesas usually in habitat with well-developed grass cover (NMDGF, 1996). This neotropical migrant winters in northwest Mexico. Data from the breeding-bird survey indicate that this species has steadily increased in abundance from 1969 through 1995 (Sauer et al., 1997).

The gray vireo was heard singing and was observed during breeding bird surveys in the South and Soledad canyons of the Organ Mountains on 27 and 28 May 1992 (U.S. Army, 1994b). One or two males were singing in oak habitat in South Canyon while up to four individuals were heard in oak-juniper habitat in Soledad Canyon. The gray vireo was recorded as a breeding species during 1996 surveys in the Organ Mountains (U.S. Army, 1997q). Potential habitat for this species also occurs in the Sacramento Mountains foothills. However, this species was not recorded from six intensively surveyed locations within the pinyon-juniper woods in the foothills in 1996 or 1997 (U.S. Army, 1996n; 1997i).

4.8.4.5 Mammals

Bats. Twelve species of bats that may occur on Fort Bliss are federal species of special concern including the small-footed myotis (*Myotis ciliolabrum)*, long-eared myotis (*M. eyotis)*, eastern small-footed bat (*M. leibii)*, occult little brown bat (*M. lucifugus occultus)*, fringed myotis, cave myotis (*M. velifera)*, long-legged myotis (*M. volans)*, Yuma myotis (*M. yumanensis)*, spotted bat (*Euderma maculatum)*, Townsend's pale big-eared bat (*Plecotus townsendii pallescens)*, big free-tailed bat (*Nyctinomops macrotis)*, and greater western mastiff bat (*Eumops perotis californicus)*. The spotted bat is also considered threatened by the states of Texas and New Mexico. There have been few surveys for bats on Fort Bliss so the status of these species of special concern is not known. Two maternity colonies of several hundred fringed myotis were observed in abandoned buildings in the Sacramento Mountains foothills in 1979 by Smartt (1980); the current status of these colonies is not known. Surveys for bats along the Otero Mesa took place during the late spring and summer of 1997 (see Section 4.8.3). No large roost sites were observed along the Otero Mesa and sensitive species that can be heard such as the spotted bat were not recorded. *Myotis* sp. were recorded and could have represented sensitive species but species determinations were not made (USAF, 1997g, h).

Gray-footed chipmunk. The gray-footed chipmunk (*Tamias canipes*) is a federal species of special concern and is not listed by the State of New Mexico. This species occurs in the woodland and forested habitats in the Sacramento Mountains foothills on McGregor Range. It has also been collected from the Otero Mesa and may be a resident of the canyons in the Otero Mesa escarpment (U.S. Army, 1997s).

Organ Mountain Colorado chipmunk. The Organ Mountain Colorado chipmunk (*Eutamias quadrivittatus australis)* is a federal species of special concern and a State of New Mexico threatened species. Based on morphological features, the Organ Mountain chipmunk was determined to be a new subspecies in 1980 (Patterson, 1980). The Colorado chipmunk (*E. quadrivittatus)* likely colonized the Organ Mountains during the last glacial period and due to small population size, total isolation, and the influence of the Chihuahua Desert climate, the rapid evolution of this subspecies occurred (Patterson, 1980). The Colorado chipmunk differs from other species in being smaller and more brown in color (Patterson, 1980).

This subspecies is known only from the Organ Mountains (Sullivan, 1996). Ninety-nine chipmunks were detected along transects sampled in 1996 in six habitat types in the Organ Mountains; chipmunks were detected most frequently in montane shrub (23 percent), oak woodlands (34 percent), and mixed conifer forest (12 percent) (U.S. Army, 1997q). Chipmunks were found in rocky areas with mean percent rock ranging from 34 to 49 percent. Vegetation canopy coverage was low, ranging from 9 to 24 percent. Chipmunks were found more often in habitat burned during the 1994 fire than in unburned plots. The Organ Mountain chipmunk may be selecting burned areas because fire opened up the canopy, creating preferred habitat for this species (U.S. Army, 1997q).

Arizona black-tailed prairie dog. The Arizona black-tailed prairie dog (*Cynomys ludovicianus arizonensis)* is a federal species of concern but is not listed by the states of New Mexico or Texas. This species is a unique resource on Otero Mesa and it provides habitat for sensitive species such as the burrowing owl, ferruginous hawk, and other wildlife.

A combination of survey techniques were used to study black-tailed prairie dogs on Otero Mesa including surveys on foot and vehicle, extended observations in some prairie dog towns, counts of burrows, and vegetation analysis (U.S. Army, 1996u). A total of 10 active and 12 inactive prairie dog towns were observed on Otero Mesa on Fort Bliss. Prairie dog density was low (less than 4 per acre); there was an estimated 399 black-tailed prairie dogs in 10 towns in 1996. In 1997, black-tailed prairie dog surveys were conducted on Otero Mesa and 16 towns were observed; 12 were active. The number of prairie dogs recorded in 1997 was 482, which is a 17 percent increase over 1996. Overall, there appeared to be population increases in all towns in 1997 compared to 1996. However, prairie dog densities on Otero Mesa are an order of magnitude less then densities reported elsewhere. The reasons for the low populations on the Otero Mesa are not clear (U.S. Army, 1998j). Sensitive species observed at the prairie dog towns on Otero Mesa were the burrowing owl and ferruginous hawk.

<u>Desert bighorn sheep.</u> The desert bighorn sheep (*Ovis canadensis mexicana*) is not listed by the Federal Government or the State of Texas; it is an endangered species in New Mexico. Historically, up to 16 areas in New Mexico may have been inhabited by the desert bighorn sheep; this species currently occupies seven areas, including one captive population and three recently reintroduced populations (NMDGF, 1996). This species previously existed in the Organ Mountains and these mountains are still considered potential habitat for the desert bighorn sheep.

Cultural Resources

4.9

4.9 CULTURAL RESOURCES

4.9.1 Definition of the Resource

The ROI for cultural resources consists of all areas within the boundaries of Fort Bliss including the Main Cantonment Area, Castner Range, South Training Areas, Doña Ana Range–North Training Areas, and McGregor Range.

Cultural resources on Fort Bliss are composed of Native American or Euroamerican districts, landscapes, sites, buildings, structures, artifacts, and other evidence of human use. These resources can be grouped into three major categories: archaeological resources, architectural and landscape resources, and traditional cultural properties (TCPs).

Native American and Euroamerican archaeological resources are locations where human activity measurably altered the earth or left deposits of physical remains (e.g., stone tools, projectile points, bottles). In this discussion, Native American archaeological resources pre-date the beginning of written records. In the El Paso area, they range from isolated stone tools to pueblo sites. Euroamerican resources are defined as those formed after the beginning of written records. Euroamerican archaeological resources on Fort Bliss include campsites, roads, fences, trails, dumps, and a variety of other features.

Architectural and cultural landscape resources include standing buildings, dams, canals, bridges, designed landscapes, rural landscapes, and other structures or landscapes of historic, aesthetic, or scientific significance. The structures are generally 50 years of age or older, although military buildings and structures from the Cold War era (1946 to 1989), for example, can be considered significant architectural resources if they were of exceptional importance to the nation's military history. In the McGregor Range area, architectural resources can include World War II and Cold War-era military facilities, buildings, and structures.

A cultural landscape is a geographic area that includes related cultural and natural resource features and the spatial relationships among those features. Historic cultural landscapes are generally 50 years or older and can include military installations with associated operations areas, as well as ranching landscapes, farming landscapes, industrial landscapes, and traditional landscapes. Historic vernacular landscapes are those modified by human activity to reflect certain traditions, customs, or values in the everyday lives of people. Ethnographic or traditional landscapes contain a variety of natural and cultural resources that an associated people define as heritage resources (e.g., contemporary settlements, religious sites, or geological structures).

Cultural landscapes often form layers representing changes in land use over time. A historic military landscape, for example, could overlay an earlier historic ranching landscape which, in turn, could overlay a traditional landscape; each forming a layer of history on the land. More recent historic landscape layers often affect or interact with earlier layers, sometimes using the same resources (e.g., water or rock), or features constructed during earlier periods (e.g., fences or buildings). All layers of the landscape can be historically important. Their importance depends on the historical context within which they were constructed and on the integrity retained by the individual landscape layer.

TCPs are considered cultural resources when they are associated with cultural practices and beliefs of a living community, are rooted in its history, and are important in maintaining the continuing cultural identity of the community. In the Fort Bliss area, these are usually associated with modern Native American groups. Native American TCPs may include archaeological sites, locations of significant events, sacred areas, sources of raw materials, and traditional hunting or gathering areas. Native Americans may consider these properties essential for the preservation of their culture.

144 Two Native American tribes who live near Fort Bliss today have been identified as having traditional
lands within the ROI. These tribes are the Mescalero Apache and the Tigua. The army has initiated
146 consultation with the Tigua and Mescalero Apache. One purpose of the consultation is for the Tigua and
Mescalero Apache to identify traditional cultural resources on Fort Bliss facilities. A project to survey
148 sacred sites is included in the ICRMP. The project includes ethnographic research. Two other modern
tribes, the Comanche and Kiowa, have been identified as possible occasional visitors to the area.

Under federal law, impacts to cultural resources may be considered by agencies to be adverse if the resources have been determined to be significant. Significant resources are generally those that are eligible for inclusion in the NRHP under the established criteria in 36 CFR 60.4 (*Parks, Forests, and Public Property—National Register of Historic Places Criteria For Evaluation*) or that are important to Native American or other traditional groups as outlined in the AIRFRA, NAGPRA, and EO 13007. A cultural resource that has been determined eligible for inclusion in the NRHP is called a historic property. A historic property must usually be more than 50 years old, although exceptions can occur. For example, more recent cultural resources on a military base may be considered significant if they are of exceptional importance in understanding the Cold War.

To be considered eligible for inclusion in the NRHP, Native American and Euroamerican archaeological resources, architectural resources, landscapes, and TCPs must meet one or more of the criteria outlined in 36 CFR 60.4. Significant resources are those:

a. that are associated with events that have made a significant contribution to the broad patterns of our history; or

b. that are associated with lives of persons significant in our past; or

c. that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

d. that have yielded, or may be likely to yield, information important in prehistory or history.

To be listed on or determined eligible for listing on the NRHP, a cultural resource must meet at least one of the above criteria and must also possess integrity. Integrity is defined as the authenticity of a resource's historic identity as evidenced by the survival of physical characteristics that existed during the resource's historic or prehistoric occupation or use. The NRHP recognizes seven aspects or qualities that, in various combinations, define integrity: location, design, setting, materials, workmanship, feeling, and association. Integrity of location means that the cultural resource has not been moved. Integrity of design, materials, and workmanship means that the resource's original building materials, plan, shape, and design elements remain intact. Integrity of setting means that the surrounding landscape remains largely as it was during the resource's period of significance. Integrity of feeling and association means that the resource retains a link to an earlier time and place and is able to evoke that era.

Cultural resources are first identified through field surveys and inventories. These surveys and inventories provide a description of the resource and recommendations as to its eligibility to the NRHP. The managing agencies, in this case the Army, Fort Bliss, and the BLM, review these recommendations and make an assessment of the resource's eligibility. These determinations are reviewed by the SHPO, who can either concur or not concur with the determinations. Disagreements are resolved by the final decision maker, the keeper of the National Register, who at the federal level, is the NPS. The NHPA and 36 CFR Part 60.4 provide detailed guidance on this process.

4.9.1.1 Archeological Significance Standards

As part of its continuing cultural resource management efforts, Fort Bliss has issued *Significance Standards for Prehistoric Archaeological Sites at Fort Bliss* (U.S. Army, 1996v). Similar standards are not available for other property types. This document provides a basis for more consistent evaluation of NRHP eligibility based on explicit local research domains and data needs. The document also presents a process for scoring the ability of a prehistoric resource to contribute to the research domains, although the scoring system is not complete for all the domains. The seven research domains for Native American (prehistoric) cultural resources are:

- **Chronometrics.** Chronometric data, such as radiocarbon dates, are used to determine the age of sites and to understand changes in settlement, subsistence, and other aspects of prehistoric human behavior.

- **Geoarchaeology.** Geoarchaeology at Fort Bliss involves five processes (aeolian, alluvial fan, arid lacustrine, slope formation, and soils) that affect how people used the environment and how archaeological sites are formed.

- **Paleoclimate.** This research domain is concerned with how the environment in southern New Mexico and West Texas has changed through time.

- **Technology.** The technology research domain is concerned with how prehistoric tools were made, used, and discarded.

- **Settlement Systems.** The study of settlement systems is concerned with where people lived and how mobile they were.

- **Subsistence.** This domain is concerned with how people obtained and processed plants and animals for food.

- **Cultural Interaction.** This domain asks how prehistoric people in the Fort Bliss area interacted with people in neighboring areas.

4.9.1.2 TCPs and Native American Consultation

TCPs are traditional cultural resources that are associated with cultural practices and beliefs rooted in the history of a community, and important to maintaining the continuity of that community's traditional beliefs and practices (Parker and King, 1992; Parker, 1993). Legislatively, TCPs were recognized in the 1992 amendments to the NHPA. These amendments themselves grew out of passage of the AIRFA and the NAGPRA.

Evaluation of a TCP's significance uses the standard NRHP evaluation criteria, with several key conditions. These are that the property: (1) must have been important to maintaining traditions for at least 50 years; (2) must be described and its significance documented; and (3) must have a boundary (Parker and King, 1992; Parker, 1993). It is important to note that some traditional cultural resources may not fulfill the criteria for significance under 36 CFR 60.4, but may still be of significance to Native American groups.

Consultation with interested tribal groups is required as part of any action that might affect TCPs. The April 29, 1994, *Memorandum on Government-to-Government Relations with Native American Tribal*

Governments issued by the President requires the development of effective day-to-day working relationships with sovereign tribal governments. The memorandum stipulates that:

- The head of each executive department and agency shall be responsible for ensuring that the department or agency operates within a government-to-government relationship with federally recognized tribal governments.
- Each executive department and agency shall consult, to the greatest extent practicable and to the extent permitted by law, with tribal governments prior to taking actions that affect federally recognized tribal governments. All such consultations are to be open and candid, so that all interested parties may evaluate for themselves the potential impact of relevant proposals.
- Each executive department and agency shall assess the impact of Federal Government plans, projects, programs, and activities on tribal trust resources and assure that tribal government rights and concerns are considered during their development of such plans, projects and activities.
- Each executive department and agency shall take appropriate steps to remove any procedural impediments to working directly and effectively with tribal governments on activities that affect the trust property and/or government rights of the tribes.

Several laws and regulations address the requirement of federal agencies to notify or consult with Native American groups, or otherwise consider their interests when planning and implementing federal undertakings. Legal mandates requiring consideration of Native American interests include:

- *NHPA of 1966*. The NHPA requires agencies to consult with Native American tribes if a proposed federal action may affect properties to which they attach religious and cultural significance.
- *AIRFA of 1978*. AIRFA sets the policy of the United States to "protect and preserve for Native Americans their inherent right of freedom to believe, express, and exercise the traditional religions of the American Indian . . . including but not limited to access to sites, use and possession of sacred objects, and the freedom to worship through ceremonies and traditional rites."
- *ARPA of 1979*. ARPA requires issuance of a permit to conduct archaeological excavation or collection on federal land. ARPA states, "If a permit issued under this section may result in harm to, or destruction of, any religious or cultural site, as determined by the Federal land manager, before issuing such permit, the Federal land manager shall notify any Indian tribe which may consider the site as having religious or cultural importance."
- *NAGPRA of 1990.* Among other things, NAGPRA requires federal agencies to consult with tribes concerning the discovery and disposition of Native American human remains and certain types of cultural items on federal land.
- *EO 13007, Indian Sacred Sites*. EO 13007, issued on May 24, 1996, requires that in managing federal lands, agencies must accommodate access and ceremonial use of sacred sites and must avoid adversely affecting the physical integrity of these sites.

4.9.1.3 Rural Historic Landscapes

Like other cultural resources, historic landscapes are evaluated for significance using NRHP criteria. On McGregor Range, rural historic landscapes and historic military landscapes are potentially present.

A rural historic landscape is a type of property that may qualify for listing on the NRHP as a historic site or district. It is defined as a geographical area that historically has been used by people, or shaped or modified by human activity, occupancy, or intervention; and that possesses a significant concentration, linkage, or continuity of areas of land use, vegetation, building and structures, roads and waterways, and natural features (McClelland and Keller, 1995).

Rural landscapes are not usually professionally designed. Rather they are the result of activities associated with agriculture, industry, transportation, migration, or conservation of resources. A rural area may contain one or more rural historic landscapes, as well as other historically significant properties.

Rural historic landscapes are identified through the tangible evidence they provide of the activities of the people who used and shaped the land to serve their needs. The physical evidence for rural historical processes includes circulation networks (e.g., stock trails, roads, railroads), boundary demarcations (e.g., fences, irrigation ditches, roads), vegetation related to land use (e.g., introduced vegetation), buildings, structures and objects, clusters (e.g., groups of buildings, fences, or other features), archaeological sites, and small-scale elements (e.g., cattle gates, abandoned machinery) (McClelland and Keller, 1995).

Vegetation and land use history are important characteristics in evaluating the integrity of agricultural landscapes. Introducing new vegetation, for example, may affect integrity of design in a rural property if there is a shift in land use from cattle grazing to extensive irrigation and planting of fruit trees. Other changes that may reduce the integrity of a landscape include widening and resurfacing roads; changes in land use and management; introduction of nonhistoric land uses like recreational areas, landfills, or utilities; deterioration and abandonment of historic buildings; replacement or alteration of bridges and barns; and the loss of fences and other boundary markers.

A historic military landscape reflects the cultural traditions and history of military activity in an area as it is: (1) expressed in the relationships among the buildings, structures, and grounds of an installation; (2) significantly associated with historically important persons or events; (3) an important indicator of the broad patterns of history; or (4) represents a significant example of design or construction. To be eligible for listing in the National Register, it must have sufficient integrity to convey its significance (Loechl et al., n.d.).

Military landscapes are identified by the evidence they provide of: (1) military mission in the siting and layout of installations and facilities; (2) military cultural values in the ranking hierarchy of building placement and landscape design; (3) a high degree of similarity of structure design within and among installations; (4) restricted access; and (5) clearly defined borders (Loechl et al., n.d.). These landscapes undergo regular change as the military mission changes.

Land use history and setting are used to evaluate the integrity of a military landscape. Integrity can be negatively affected by the relocation of buildings or roads; changes in landscape design; and the loss of important topographic features, vegetation, spatial relationships, original materials, or workmanship.

4.9.2 Existing Management Plans and Agreements

In 1982, Fort Bliss became the first DoD installation to develop an installation-specific HPP (U.S. Army, 1982b); it is still operating under this plan. However, a draft ICRMP for Fort Bliss, which updates the HPP, has been reviewed by the ACHP and by the New Mexico and Texas SHPOs (see Alternative 1 of this PEIS [Section 3.3.5.2]).

Fort Bliss has developed a SOP that provides for consistent, day-to-day management of the various undertakings that may affect cultural resources on the installation, *Standard Operating Procedure for Curation of Archeological, Associated Records, and Historic Photographic Collections, Ft. Bliss, TX*

(U.S. Army, 1996w). This SOP has been independently reviewed and accepted by the ACHP and the SHPOs.

Fort Bliss shares use of portions of McGregor Range with two other agencies: the USFS-Lincoln National Forest, and the BLM. The co-use lands shared with the USFS are in the Sacramento Mountains foothills on the northern part of McGregor Range. A 1974 MOU between Fort Bliss and the USFS specifies that the USFS is responsible for administering all archaeological and paleontological activities on the co-use lands.

A 1990 MOU with the BLM regarding the McGregor Range withdrawal specifies that the proponent of an undertaking, whether the BLM or Fort Bliss, is responsible for permitting and oversight of cultural resource investigations performed as part of compliance with Section 106 of the NHPA. The MOU further stipulates that both the BLM and Fort Bliss will consult on undertakings involving cultural resources on McGregor Range, they will share information on completed projects, and that the agencies will annually coordinate future projects.

4.9.2.1 Facilities

The Fort Bliss Curatorial Facility meets all standards as outlined in 36 CFR 79*, Curation of Federally-Owned and Administered Archaeological Collections*. The facility contains a fully functional artifact processing laboratory; a separate room for researchers and contractors; a cold collection room that contains project and site information, maps, photographs, and building plans; and a main collection room that houses artifacts, botanical samples, and NAGPRA-regulated objects and remains. The facility also has provisions for accepting materials through Deeds of Gift and through short-term loan agreements as required by 36 CFR 79. The SOP for the collection, available upon request, details the scope of the collections as well as procedures for ensuring its preservation and conservation as required by 36 CFR 79. The SOP also provides a guide to the accessioning and cataloging procedures for the collections (U.S. Army, 1996w).

4.9.3 Cultural Background

Cultural resource baseline conditions for this PEIS were assessed using the results of previous investigations.

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4.9.3.1 Native American History

The Fort Bliss area lies within the cultural region known as the Jornada Mogollon (Lehmer, 1948). The prehistoric cultural chronology of the region and of the Tularosa Basin has been previously outlined by a number of authors, most recently by Abbott et al. (U.S. Army, 1996v), which is used as a basis for this discussion. The chronology can be divided into three broad periods: Paleoindian (11,000 to 8,000 years ago), Archaic (8,000 to 1,700 years ago), and Formative (1,700 to 500 years ago).

Overall, Native American archaeological resources of southern New Mexico and west Texas are diverse, with many small, general purpose sites; plant-processing sites; rock middens; pueblos; specialized lithic procurement sites; and rock art sites. Prehistoric human burials, which are of particular concern to modern Native Americans and are considered under NAGPRA, also occur.

Paleoindian. The Paleoindian period (11,000 to 8,000 years ago) was characterized by small bands of highly mobile hunter-gatherers who followed herds of large animals such as bison and possibly mammoth. The oldest cultural complex of this period, Clovis, occurred at a time of rich but declining resources. The beginning of a drying climate reduced and then eliminated many lakes, and some large game animals became extinct. Based on controversial data from the site of Pendejo Cave on Otero Mesa, a few archeologists have claimed that human use of the area may have occurred as early as 35,000 years ago (U.S. Army, 1996v).

Paleoindian materials and those of the late Paleoindian period especially, have been found in the region around Fort Bliss and El Paso (Krone, 1975; Quimby and Brook, 1967). Sites of this period are rare and usually identified based solely on distinctive, highly crafted, fluted projectile points, and other tools, often made of high-quality stone. The Fort Bliss cultural resource database lists only 56 sites as having a Paleoindian component.

Archaic. The Archaic period began 8,000 years ago and continued to about 1,700 years ago. This period may correspond to the transition from a grassland environment to a drier, desert shrub environment. Use of the area by Native Americans during the Archaic period revolved around semi-permanent camps from which groups traveled into the desert, setting up short-term camps to exploit plants and animals (Whalen, 1986). Archaic period sites lack ceramics and therefore commonly consist of chipped stone and groundstone tools and debris. The large number of groundstone artifacts at Archaic sites suggests a growing reliance on plant resources and less use of game throughout this period. In the late Archaic period, there is evidence from the Fresnal rock shelter near Alamogordo of domesticated corn and beans from 2,000 and 3,000 years ago (Tagg, 1996).

Definite Archaic sites with diagnostic tools are relatively uncommon on Fort Bliss. The Fort Bliss cultural resource database contains approximately 300 sites with an Archaic component. However, many of the undated sites consisting only of nondiagnostic stone artifacts may date from this period. A recent survey on Otero Mesa identified 19 percent of the sites as Archaic (USAF, 1997i). Another 32 percent were undated Native American sites, which may or may not be assignable to the Archaic period.

Formative. The Formative period, lasting from about 1,700 years ago to AD 1500, can be divided into the Mesilla, Doña Ana, and El Paso phases. The Fort Bliss cultural resource database identifies 704 sites as Mesilla phase, nearly 150 sites as Doña Ana phase, and almost 900 sites as El Paso phase.

The Mesilla phase represents mobile, perhaps seasonal, use of the Tularosa Basin. Mesilla phase inhabitants practiced agriculture, lived in small huts, and used undecorated ceramics. The Doña Ana phase was a brief transitional period when decorated pottery was first used in the Fort Bliss area. The El Paso phase is marked by more permanent, substantial structures (pueblos), agriculture, and locally-produced undecorated ceramics (Whalen, 1981). Over time, and especially during the late Formative period, there was considerable and increasing interaction, such as trade, with Native American groups in northern New Mexico, western Arizona, Texas, and northern Mexico. Evidence from sites dating to the end of the Formative period suggest yet another transition, a general return to a mix of hunting, gathering, and agriculture by smaller groups.

Since the late 1600s, four Native American groups have lived in or near the area now included within the ROI. These were the Manso, the Suma, the Tigua, and the Mescalero Apache. Later, the Comanche and the Kiowa also traveled through and used the area.

While early accounts are confusing, at least two Native American groups occupied the region at the time of first Spanish contact. These were the Manso and the Suma. The Manso were present in the area around what are today El Paso and Las Cruces. They lived in huts made of branches and practiced a mix of farming and hunting. The Manso quickly joined the Tigua (see below) at missions set up by the Spanish at El Paso. Later, smallpox epidemics and inter-marriage with the Tigua effectively ended Manso culture.

The Suma are thought to have been related to the Jumano, who occupied lands further south along the Rio Grande and outside the ROI (Hickerson, 1994). They were hunter-gatherers and farmers. Their fields were along the Rio Grande or near arroyos where runoff provided sufficient moisture for growing crops (Newcomb, 1993). Weakened by Spanish slave raids, drought, and Apache raids, the Suma gradually disappeared.

Between 1680 and 1682, the Tigua Indians were brought to the El Paso area from pueblos in northern New Mexico by Spanish fleeing the Pueblo Revolt. Eight hundred Tigua were settled near the Mission Nuestra Senora de Guadalupe del Paso del Norte. Several years later, the Tigua were moved a short distance to Mission Corpus Christi de la Ysleta del Sur. The conditions of these settlements prompted at least two abortive uprisings in 1681 and 1684 (Gerald, 1974). The reconquest of the Pueblos ended in
150 1692 and soon there were Spanish settlements along the Rio Grande north of El Paso. A royal land grant in 1751 set aside lands for the Tigua Indians in what is now the El Paso area. The Tigua at Mission Ysleta were moved again after flooding of the Rio Grande damaged the buildings (Hauser, 1979). A later fire damaged the mission but it was rebuilt and exists today on the Tigua Reservation. The Tigua practiced agriculture along the Rio Grande, but also hunted and gathered in the nearby Hueco Mountains (Gerald, 1974).

The other Native American group present in the region in the 1600s was the Mescalero Apache. The Mescalero lived in the area east of the Rio Grande, from the Sacramento Mountains south into northern Mexico, and east onto the southern Plains. Unlike the sedentary Suma, Jumano and Tigua, the Mescalero Apache practiced a semi-nomadic life, moving from the mountains to the basins and plains in seasons when edible wild plants and game became available. Early Spanish contact generated a long-lived animosity between the two groups, and Apache raids on Spanish settlements were frequent. Finally, in 1810 a treaty was signed that promised the Mescalero a sizable portion of land (Thomas, 1974). The peace held until the Texas Revolution, when the Mescalero sided with the rebel Texans.

As a condition of joining the United States, all lands remained Texan; no lands were taken over by the Federal Government. Thus, any lands set aside for tribes fell under Texas, rather than U.S. jurisdiction. Texas, despite the help the Apache had provided during the rebellion, viewed the Mescalero as a potential problem and refused to set aside land for them. This attitude, the rapid population increase from settlers and military, and establishment of military roads and forts heightened tension among the Mescalero (Opler, 1983). After the Mexican-American war and the Gadsden Purchase when the U.S. acquired New Mexico and Arizona, the remainder of the Mescalero's traditional lands came under U.S. jurisdiction.

Again, the rapid influx of settlers and miners and the establishment of roads and forts soon brought the Mescalero into conflict with the Americans as well. After several years of hostilities, a reservation for the Mescalero was established in the Sacramento Mountains, New Mexico. Title of the lands comprising the reservation was not formally transferred to the Mescalero until 1922 (Opler, 1983).

The Comanche occupied the area briefly beginning in early 1700; by the mid-1800s they had displaced the Apache and controlled the territory south of the Arkansas River to the Rio Grande settlements (Hofman et al., 1989). The Kiowa made only sporadic forays into the El Paso region during the same time the Comanche were dominant (Hofman et al., 1989).

4.9.3.2 Euroamerican History

The Fort Bliss region has experienced more than 450 years of Euroamerican settlement and use, including ranching, mining, oil and gas exploration, and military activities. This era is represented on Fort Bliss by both archaeological and architectural resources, beginning with the establishment of the Salt Trail by Spanish explorers in the mid-17th century, and extending to 20th century Cold War military architecture.

Spanish Exploration and Settlement. The region that is now New Mexico and West Texas was first visited by Europeans in 1528. Spanish expansion into the northern reaches of New Spain was motivated by mining, ranching, conscription of labor, and missionary activity (Griffen, 1983). The first permanent Spanish settlements in New Mexico date to 1598. Spanish explorers established the Salt Trail through the Tularosa Basin in 1647 as a salt supply route connecting Lake Lucero (now on WSMR) with the Camino Real at El Paso (Bentley, 1991). The Spanish discovered salt deposits within the Tularosa Basin in 1691 and shipped large quantities of salt to the silver mines in Mexico (Bentley, 1991). After Mexican independence, the Mexican government encouraged extensive use of the trail and salt beds (U.S. Army, 1997d), and the resource was used well into the 19th century. The Salt Trail is now historical site LA97672 on Fort Bliss.

The Spanish also established a military presence in the Tularosa Basin in 1653 in response to Mescalero raids on Pecos Pueblo and the pueblos of the Tompiros (in what is now New Mexico) from range camps in the Sacramento Mountains (Schroeder, 1973). In 1682, a mission and presidio were established at El Paso del Norte. Repeated Apache raiding during the next century eventually resulted in a concerted effort by the Spanish military to fortify its northern frontier.

Mexico achieved independence from Spain in 1821, and El Paso area settlements were incorporated into the State of Chihuahua. However, no physical evidence of Mexican or Spanish use of grant lands for ranching has been identified on the installation (U.S. Army, 1997d).

Anglo-American Settlement. When the Texas Revolution began in 1835, Texas claimed all Mexican lands east and north of the Rio Grande, including the Fort Bliss area. These lands became part of the United States in 1848 when the Treaty of Guadalupe-Hidalgo fixed the boundary between the United States and Mexico at the Rio Grande.

In addition to the mission area, several small communities became part of the town of El Paso. These included Franklin, a settlement on property granted to the Ascarate family, Magoffinsville, and a settlement around Hart's Mill. Magoffinsville and Hart's Mill were two early locations of Fort Bliss. The El Paso area also served as an important stop on the Butterfield Overland Mail Route, established in 1857 as the first large-scale continental mail service (U.S. Army, 1997d). A 10-mile segment of the Butterfield route is historical site FBH150 on Fort Bliss.

Railroads. The SP Railroad reached El Paso from New Mexico in 1881 (U.S. Army, 1997d). Planning for a railroad line from El Paso, north through the Tularosa Basin, to White Oaks began in 1881, but the first 10 miles of track were not laid until 1888. Construction to Alamogordo was completed in 1898, and homesteaders immediately filed claims on 4,000 acres of public domain land (U.S. Army, 1997d).

A number of small communities, stations, and sidings grew up in association with the railway through the basin. These include locations that are now historical sites within Fort Bliss: Newman Section Camp (FBH089), Escondida (FBH178), Paxton Siding (FBH179), Desert station and siding (FBH188), Alvarado (FBH 189), and Elwood (FBH286). Turquoise (FBH141) was a large station and siding that later became the primary shipping point on the line for local ranchers.

Mining. Euroamerican mining may have begun in the Organ Mountains during the Spanish period. By the 1840s, silver mining achieved local importance and extensive mining took place in the mountains around the Tularosa Basin. The Refugio Silver Mine (1841), the Santa Susana Mine (1853), and the Las Cruces Mine (1854) are thought to have been located within what is now Fort Bliss. During the 1880s, new mining districts formed in the Organ Mountains and hundreds of claims were filed. The Soledad Mine (1883) and the Soledad 2 Mine (1886) were located in the Soledad Canyon area of Fort Bliss.

The Organ Mountain mines experienced renewed growth during the Great Depression of the 1930s. In the Fort Bliss area, these included magnesite mines in South Canyon and Target Range Canyon and a barite mine in Devil's Canyon.

Mining booms also took place in the Jarilla Mountains beginning in 1905. The town of Oro Grande grew to a population of between 2,000 and 2,500 by 1907 (Freeman, 1977). Oro Grande provided area ranchers, including those on what is now Fort Bliss, with medical care and schools and served as a supply station (U.S. Army, 1997d). Within Fort Bliss boundaries, 10 historical mining sites have been recorded in the Organ, Hueco, and Franklin mountains.

Ranching. Ranchers began moving into the southern Tularosa Basin during the late 1860s and early 1870s (Sanders, 1992). Although the basin was covered with thick grasses, the lack of surface water seriously affected land use. A series of wet years before 1885 resulted in ranchers overstocking area ranges. When conditions returned to normal, water became a problem. Ranchers turned their focus to developing the water resources, including building stock tanks, drilling wells, and piping water from the Sacramento River and Dog Canyon. Deep-well drilling and the use of windmills were important in the southern basin beginning in the 1880s (Sanders, 1992).

One of the earliest Anglo-American ranches in the area was the San Augustin Ranch, established in 1866 on the north slope of the Organ Mountains (Marshall, 1998). By 1879, this ranch supported 10,000 sheep and several herds of cattle (U.S. Army, 1997d).

In 1886, Oliver M. Lee established a ranch (Lee Well) at the base of the Sacramento Mountains west of Dog Canyon. Lee formed the Sacramento Cattle Company, in partnership with several other local ranchers, and immediately began working on local water systems. In 1889, owners of the Sacramento Cattle Company began to sell off their holdings and dissolved the company. Lee continued to work some properties and to expand his control of area water. In 1893, Lee established a ranch in Dog Canyon where he expanded the existing ditches and built several reservoirs. The following year, Lee and his partners began an 11-mile ditch to bring water from the Sacramento River onto the Tularosa Basin floor.

Lee continued to expand his ranching operations, with minor setbacks, throughout the late 1890s and early 1900s. He sold a large parcel of land to the El Paso and Northeastern Railroad for the townsite of Alamogordo. In 1905, he sold his ditch and reservoir rights to the Southwest Smelting and Refining Company, which needed the water for its mining operation in the Jarilla Mountains. The company built a pipeline, still in use today, along Lee's ditches to the town of Oro Grande. By 1916, Lee had an elaborate system extending from the Sacramento Mountains to Oro Grande and across Otero Mesa. He and two partners formed the Sacramento Valley Irrigation Company to encourage farmers to settle the basin. The company attempted to develop the community of Sacramento City (FBH203), an historical site on Fort Bliss, urging investors to buy town lots and turn the basin into farmland. Although the town had a few residents, it never attracted enough to survive, and the promised water pipeline was not built (U.S. Army, 1997d). Lee eventually owned or controlled 300,000 acres of Otero County (U.S. Army, 1997d). He died in 1941, but his sons continued to operate ranches in the area until the land was acquired by the military (U.S. Army, 1997d).

Historical ranching sites within Fort Bliss include tanks, wells, reservoirs, camps, homesteads, ranches, and a school. Many of Lee's holdings (pipelines, camps, ranches, reservoirs, tanks, and wells) have been identified as historical sites on Fort Bliss. These sites are components of a rural historic landscape potentially eligible for inclusion in the NRHP. The BLM recently completed a rural historic National Register evaluation for a landscape based upon Oliver Lee's historic sphere of influence (Hart, 1997). The potential boundary of the historic landscape encompasses McGregor Range on Fort Bliss.

Oil and Gas Exploration. Oil exploration ventures began in the area in 1919, following the discovery of Pennsylvanian-series fossils in the Sacramento Mountains and Tularosa Basin, and thick porous sands beneath the basin (U.S. Army, 1997d). Thousands of oil and gas claims were filed and a number of exploration companies were formed. However, the area did not become as rich an oil field as expected, and some individuals lost large sums of money on speculation.

Nearly 50 historical sites on Fort Bliss are known to represent the exploration activities of this era. They include drilling sites and numerous camps and trash scatters associated with the search for oil (U.S. Army, 1997d).

U.S. Military. Military activities in the El Paso area by the U.S. Government began in 1846. The succeeding 150 years of military presence can be divided into several phases.

1846 to 1899. The Army first entered the area in 1846 after defeating the Mexican Army at the Battle of Brazito in the Mesilla Valley. American military expeditions regularly crossed the area following the acquisition of the region by the United States in 1848.

The Army began active exploration of the Tularosa Basin and Otero Mesa in 1849 (Sanders, 1992). Troops were first stationed in the El Paso area near what is now San Jacinto Plaza in downtown El Paso (U.S. Army, 1993b). The post closed in 1851 and was reopened in 1854 when a permanent post, Fort Bliss, was established at the settlement of Magoffinsville. From 1849 to 1861, the post guarded the pass and local residents from Indian attack (U.S. Army, 1993b). Following Texas' secession from the Union in 1861, the fort served briefly as an outpost of the Confederate States Army. It was reclaimed by the Army in 1865. Encroachment by the Rio Grande forced the relocation of the fort to nearby Concordia Ranch (U.S. Army, 1993b).

The fort was again closed in 1876, this time as an economic measure (U.S. Army, 1993b). A new post was built near Hart's Mill in 1880. In 1891, construction was begun on another new fort east of El Paso on 1,000 acres provided by the city on La Noria Mesa, within present-day Fort Bliss. The new post was laid out using standard frontier post design with officers' quarters along the parade ground, and barracks, a mess hall, and a hospital opposite (U.S. Army, 1996x). Some of the buildings from this period are still present within the Fort Bliss cantonment. These include a hospital, quartermaster buildings, and officers' quarters.

1900 to 1919. Fort Bliss remained a minor post throughout the Spanish-American War era and later fell into disrepair. This changed with the Mexican Revolution in 1910, when the fort became a major horse cavalry post (U.S. Army, 1993c).

At the beginning of the Mexican Revolution, the U.S. Government increased troop commitments along the border, including at Fort Bliss. In 1913, more than 5,000 Mexican soldiers who had surrendered were held there (U.S. Army, 1993c). The fort served as a range camp and supply point for patrol operations that culminated in Brigadier General John J. Pershing's Punitive Expedition of 1916 to 1917 following an incursion of Mexican forces into New Mexico. In 1916, President Wilson assigned 112,000 National Guardsmen to border stations, including El Paso. By the end of the summer, more than 40,000 soldiers were stationed at Fort Bliss, making it temporarily one of the largest military installations in the United States (Metz, 1981; U.S. Army, 1993b). The Punitive Expedition was a turning point in American military history: airplanes were used for the first time in a field operation; trucks became an important transport mode; and new logistical systems were tested (U.S. Army, 1993b, c).

During World War I, Fort Bliss served as an enlistment post and mobilization point, and several training schools were established (U.S. Army, 1993c). Locally, the garrison saw action when Pancho Villa's forces assaulted Ciudad Juarez in 1919. U.S. forces routed Villa's troops—the last time a large U.S. military contingent was sent into Mexico (U.S. Army, 1993b).

New construction at Fort Bliss included a hospital, a post exchange, a telephone exchange, barracks, and officers' quarters (U.S. Army, 1996x). Many of the buildings from this period are still present in the cantonment area. The officers' residence that later became known as the Pershing House was built in 1910. It is listed on the NRHP.

1920 to 1929. Following World War I, Fort Bliss became headquarters for the 1st Bombardment Group, whose mission was to patrol the border by air (U.S. Army, 1993b). In 1925 and 1926, more than 4,000 acres were added to Fort Bliss for Biggs Field, Castner Range, and William Beaumont General Hospital (U.S. Army, 1993c).

1930 to 1939. Fort Bliss purchased 2,700 acres surrounding the main cantonment in 1931 (Land Acquisition, Volume I, 1948 cited in U.S. Army, 1997d). Construction of more than 100 NCO's family quarters was also undertaken (U.S. Army, 1993c). The Civilian Conservation Corps (CCC) worked from their camp at Fort Bliss on water control and erosion prevention systems across the Tularosa Basin (U.S. Army, 1997u), as well as post beautification and repair projects (U.S. Army, 1996x).

1940 to 1945. During World War II, Fort Bliss served as a troop reception center. The last remaining U.S. horse cavalry unit was disbanded at Fort Bliss in 1943 and the fort became the national center for AAA (U.S. Army, 1993c). Fort Bliss administered World War II prisoners of war camps at Sunland Park and Logan Heights.

Fort Bliss grew quickly as the need for large parcels of training land became evident. The Doña Ana Range–North Training Areas and the Texas Maneuver Areas (now South Training Areas) were acquired during this period. Part of the Doña Ana Range was condemned as early as 1915 by Executive Order (Marshall, 1998). In 1940, the Army leased more than 421,000 acres in Otero County, New Mexico, now part of the Doña Ana Range–North Training Areas, for an antiaircraft training range (U.S. Army, 1997d). Seventy-five percent of the land was public domain, 20 percent was state-owned, and 5 percent was rancher-owned. The DoD approved purchase of the land after the co-use lease with area ranchers ran out in 1946 (U.S. Army, 1997d).

The South Training Areas consisted of 118,667 acres northeast of the main post to be used for training the 1st Cavalry Division and other mechanized units. In the South Training Areas, the 1st Cavalry Division conducted infantry training at a complex known as Little Tokyo, a mock Japanese village (U.S. Army, 1994d).

Military acquisitions during the early 1940s also included lands west of Biggs AAF, including the Tobin Well site, a ranch location that once included the community of Tobin (ca. 1907 to 1914).

1946 to 1959. During the early Cold War era, Fort Bliss provided research facilities for the strategic missile program and was designated the nation's Army Air Defense Center in 1957 (U.S. Army, 1993c). The post played an important role in the development of the American missile program, including the V-2 rocket development headed by Werner von Braun and the Anti-aircraft Artillery Replacement Training Center (AAARTC). In 1948, the 1st Guided Missile Regiment (later Brigade) was created at Fort Bliss to participate in missile launchings at WSMR. The Anti-aircraft Artillery and Guided Missile Center was activated at Fort Bliss in 1946 to train units (U.S. Army, 1993c).

In 1950, the Army formed the Army Anti-aircraft Command (ARAACOM) and reactivated the AAARTC at Fort Bliss to train anti-aircraft Nike-Ajax missile batteries and to train soldiers for assignments in atomic weapons, heavy AAA guns, computers and radar (U.S. Army, 1993c). The Nike Air Defense missile system training program for North Atlantic Treaty Organization (NATO) allies began at Fort Bliss in 1956.

Planning for the McGregor Guided Missile Range, AAA firing range, began in 1948. Proposed lands covered 374,000 acres in Otero County. In 1949, the Army and most area landholders agreed to a 5-year exclusive-use lease on the range (U.S. Army, 1997d). Part of the range, the McGregor South Firing Corridor, was expanded in 1950. In 1952, expansion was proposed to meet training needs for the Nike missile program at WSMR. Plans were also made to purchase the McGregor Range lands when the leases ran out in 1954. Over the next 2 years, the range was gradually extended, and by 1954 all remaining privately owned land within the original lease had been purchased. Lands on Otero Mesa were purchased from local ranchers beginning in 1956 to provide additional space for missile testing and training.

Prior to 1957, the Army acquired patented land and the BLM exchanged state and federal public domain land in Otero County to be used as McGregor Range. On August 21, 1957, public land was withdrawn in Otero County for use as a missile range for 10 years, with provisions for a subsequent 10 years at the Army's request (PLO 1470).

1960 to 1989. Military defense strategy changed in the 1960s as analysts pushed for a defense based on a strong offense (U.S. Army, 1996x) using surface-to-air missiles. Fort Bliss soon worked on these missiles. The Basic Combat Training Center was established at Fort Bliss in 1965 to meet the needs of the Vietnam War. AAA air defense battalions were also trained at Fort Bliss. Training began on the Redeye missile, the first portable, shoulder-fired air defense weapon, in 1967 (U.S. Army, 1996x). The U.S. Army Air Defense School provided training in Nike-Hercules, Hawk, Chaparral, and Safeguard missile systems (U.S. Army, 1996x). The GAF Air Defense School that trained thousands of Germans during the 1970s and 1980s was established at Fort Bliss at this time.

The McGregor Range land withdrawal was renewed for 10 years in 1967. An application for renewal of the withdrawal was submitted in 1976 under the provisions of the FLPMA (PL 94-579) and the *Engle Act* (PL 85-337). Approximately 608,385 acres of McGregor Range land were later made available to the Army for training and weapons testing through the MLWA of 1986 (PL 99-606). Expiration of the MLWA withdrawal is to be 15 years after the enactment, in 2001 (U.S. Army, 1998c).

Toward the end of the Cold War, during the 1980s, the Patriot missile system, used during the Persian Gulf War, came online and the Stinger missile replaced the Redeye (U.S. Army, 1996x). Schools at Fort Bliss continued to provide training on a range of air defense weapons including the Patriot, Stinger, and Hawk.

4.9.4 Cultural Resource Inventories

Since the 1920s, there have been hundreds of cultural resource studies conducted on Fort Bliss and in the El Paso area. To date, over 300,000 acres (27 percent) of the 1.12 million acres comprising Fort Bliss have been surveyed for cultural resources. Investigators have identified 15,781 cultural resource sites in the ROI, the vast majority being Native American archaeological sites. Most of these cultural resources have undetermined NRHP eligibility. Of those that have been evaluated, the majority have been determined to be not eligible for the NRHP. Table 4.9-1 summarizes a 1998 review of the cultural resources database for Fort Bliss. At least 405 historic buildings and structures, and 12 historic landscapes have been determined to be eligible.

Table 4.9-1. Fort Bliss Cultural Resource Database Summary

	South Training Areas	*Doña Ana Range–North Training Areas*	*McGregor Range*	*Castner Range*	*Main Cantonment Area*	*Fort Bliss Total*
Native American Archaeology						
Eligible	165	153	48	SI *	0	*366*
Not Eligible	1,481	158	58	SI	0	*1,697*
Require Testing	434	511	1,372	12	0	*2,329*
Not Evaluated	2,009	5,786	2,000	0	0	*9,795*
Total	*4,089*	*6,608*	*3,478*	*12*	*0*	*14,187*
Euroamerican Archaeology						
Eligible	38	26	54	SI	2	*120*
Not Eligible	42	52	135	SI	9	*238*
Require Testing	24	15	14	SI	6	*59*
Not Evaluated	21	0	9	0	0	*30*
Total	*125*	*93*	*212*	*0*	*17*	*447*
Euroamerican Archaeology						
Eligible Buildings	SI	SI	SI	SI	405	*405*
Eligible Landscapes	SI	SI	SI	SI	12	*12*
Eligible Structures	SI	SI	SI	SI	5	*5*
Unevaluated Cold War Facilities	SI	SI	SI	SI	3,897	*3,897*
Unevaluated Objects	SI	SI	SI	SI	2	*2*
Total	*SI*	*SI*	*SI*	*SI*	*4,321*	*4,321*
Installation Total	*4,214*	*6,701*	*3,690*	*12*	*4,338*	*18,955*

SI = Survey Incomplete.

The majority of the recent cultural resource surveys at Fort Bliss were undertaken either to provide baseline management information (under Section 110 of the NHPA, PL 89-665) or to assess the effects of specific undertakings on cultural resources (under Section 106 of the NHPA).

4.9.4.1 Archaeological Inventories

Archaeological investigations in the El Paso area began in the 1920s. During this period, several museum-sponsored projects were undertaken at the pueblos and caves of the region (e.g., Cosgrove, 1947). Shortly after World War II the La Cueva rockshelter, a pueblo, and a pithouse village site were excavated. No major archaeological work was undertaken in the 1950s, although local amateur archaeologists continued exploring the area.

During the 1960s and 1970s a substantial amount of the archaeological work was undertaken by the El Paso Archaeological Society (EPAS). This work consisted of excavations and surveys within South Fort Bliss, Doña Ana Range–North Training Areas, and McGregor Range. EPAS excavated portions of a number of pueblo sites, including the Sergeant Doyle and McGregor sites and the Escondido and Hot Well Pueblo. Much of the work before 1980 is not thoroughly documented by today's standards and provides less information than is usually required for NRHP evaluations.

Later work by professional archaeologists provided a foundation for understanding cultural resources on Fort Bliss. Much of this work was centered in the South Training Areas and Doña Ana Range–North Training Areas. McGregor Range received less attention. These surveys resulted in relatively reliable estimates of the density of cultural resources in different portions of Fort Bliss. These are summarized in Table 4.9-2.

Table 4.9-2. Summary of Selected Archaeological Resource Inventories at Fort Bliss

Portion of ROI	*Survey Acreage*	*Number of Archaeological Sites Recorded*	*Archaeological Site Density (sites per acre)*
McGregor Range	84,015	1,315	<.01–.08
Doña Ana Range–North Training Areas	275,385	6,283	<.01–.02
South Training Areas	130,795	2,204	.01–.12
Main Cantonment Area	1,280	53	.04

Source: USAF, 1997i; O'Leary et al., 1997; U.S. Army, 1995g; Lord, 1980; Beckes et al., 1977; U.S. Army, 1993d; U.S. Army, 1995h; Skelton et al., 1981; U.S. Army, 1986a; U.S. Army, 1995i; U.S. Army, 1996v; Whalen, 1977, 1978; U.S. Army, 1975.

Native American archaeological resources are uncommon within the cantonment area because of its built-up nature. However, undiscovered buried materials are likely to remain in some parts of the cantonment area (Bowman, 1997). Likewise, Euroamerican archaeological resources relating to early military use of the cantonment area are known and have been unearthed during construction activities. The installation maintains a map dividing the cantonment area into archaeological sensitivity zones ranging from low to high. The high-sensitivity zones are those likely, based on archival research, to contain subsurface archaeological materials. Before ground disturbance can occur within the main cantonment, project maps are reviewed by an Army archaeologist to determine the sensitivity of the project location. 149

4.9.4.2 Architectural Inventories

Fort Bliss has inventoried and evaluated all monuments and architectural resources that are 50 years of age or older (U.S. Army, 1996x). The evaluations identified 405 buildings, 12 landscapes, and 5 structures as eligible for inclusion in the NRHP either alone or as part of two NRHP-eligible historic districts (see Figure 4.9-1). One of these, Fort Bliss Main Post Historic District, which includes 346 buildings, sites, and structures that contribute to the significance of the district, has been entered onto the NRHP and will be managed along eight thematic groups. These are:

- Initial Construction Period Group, 1891 to 1899;
- Interim Period Group, 1900 to 1912;
- First Expansion Period Group, 1913 to 1917;
- 7th Cavalry Construction Period Group, 1919 to 1921;
- Second Expansion Period Group, 1919 to 1926;
- Depression Era Group, 1927 to 1939;
- World War II Build-up Period Group, 1940 to 1945; and
- Post-World War II Period Group, 1946 to 1950.

In all, these groups encompass 346 buildings, sites and structures that contribute to the Main Post Historic District. Seventy-two additional properties are inside the boundary of the Historic District but do not contribute to its significance.

Historic structures in the WBAMC area were evaluated separately (U.S. Army, 1996y). This hospital was constructed in 1920 and included a number of support buildings in addition to the 400-bed main hospital. Sixty-four historic resources were identified as contributing to the significance of the William Beaumont General Hospital Historic District, which is eligible for inclusion in the NRHP.

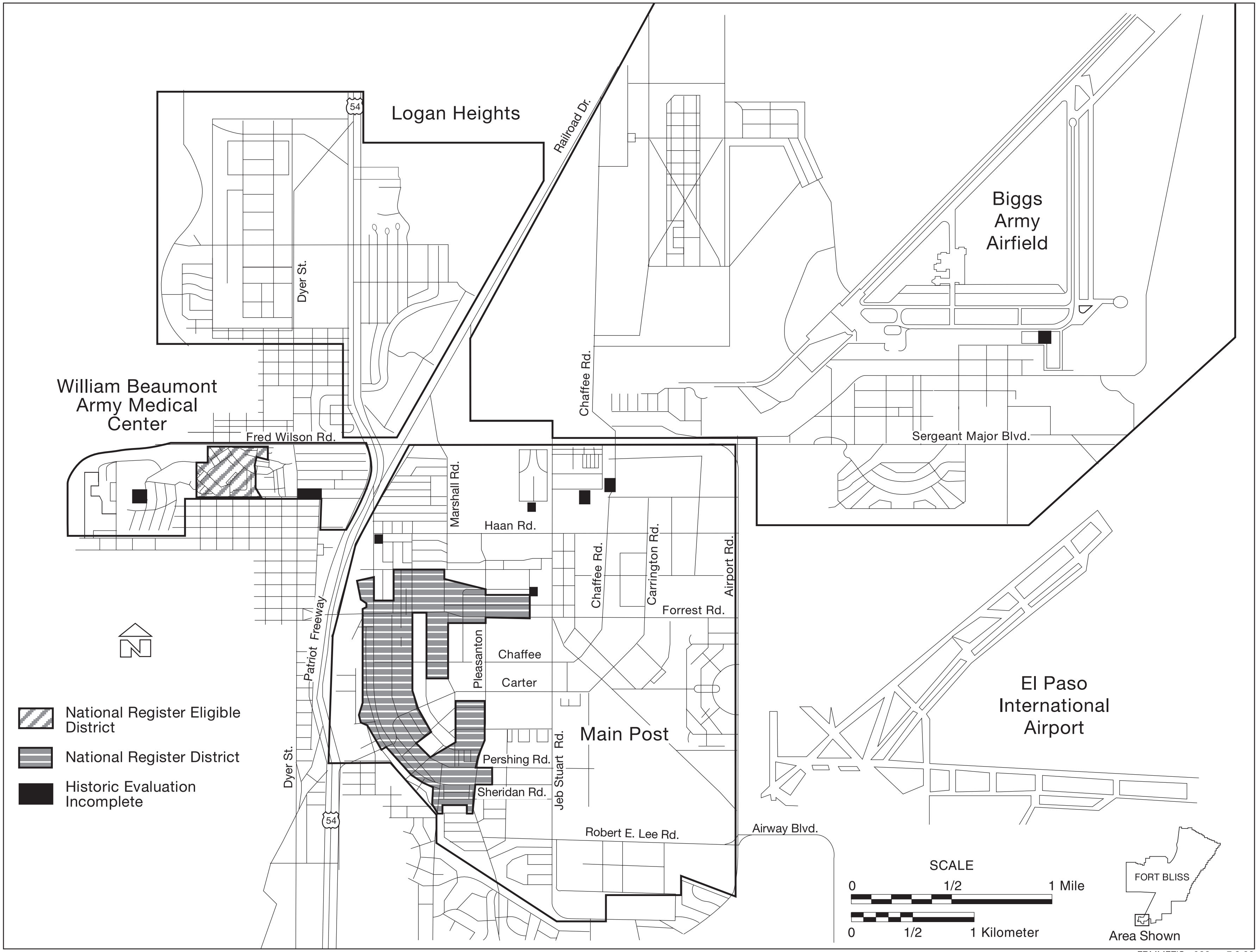

Figure 4.9-1. National Register District, Eligible District, and Incomplete Evaluation Sites.

4.9.4.3 NRHPs Listed and Eligible Properties

Information provided by Fort Bliss and supplemented with a search of the NPS listing of NRHP properties for El Paso County, Texas. There are six properties listed in the NRHP. These are:

- **Castner Range Archaeological District.** This district consists of 53 sites and 100 archaeological isolates dating from the Formative period through the Historic period.

- **Sergeant Doyle Site.** This site is a multi-room pueblo dating to the El Paso phase of the Formative period.

- **Hot Well Site.** This archaeological site is a late Formative period multi-room pueblo.

- **Fusselman Canyon Rock Art District.** This district includes Formative period rock art.

- **Escondido Pueblo Ruin.** This is an early Formative pueblo.

- **Fort Bliss Main Post Historic District.** This district includes buildings, monuments, and landscapes constructed between 1893 and 1948, as described in Section 4.9.4.2.

The Fort Bliss cultural resource database (as of November 1997) lists 179 Native American sites as being determined eligible to the NRHP. These include a number of sites that have not been formally evaluated for NRHP eligibility, but are considered by archaeologists in the area to be important. These include, among others, Pendejo, Ceremonial, Sandal, and Bishop's Cap caves; Pintada Rockshelter; Escondido and McGregor Pueblos; and the Sergeant Doyle site. 88

As part of early efforts to manage cultural resources on Fort Bliss, "Red" and "Green" zones were defined by Fort Bliss archaeologists. These are internal management units established under the installation's 1982 HPP. All military activity is prohibited in Red zones; limited military activity is allowed in Green zones. Both the Red and Green zones are relatively small parcels surrounded by unrestricted areas. Red zones tend to contain larger sites with buried materials and dense concentrations of surface artifacts. Green zones contain numerous archaeological sites, but these sites are generally smaller and more scattered than those found in Red zones. The South Training Areas contain 29 Red zones totaling approximately 13.3 square miles, and 30 Green zones totaling 21.9 square miles. The Doña Ana Range–North Training Areas contain five Red zones totaling 4.9 square miles. No Red or Green zones have been established on McGregor Range. Because the original boundaries of the zones were based only on surface remains and most of the resources within the zones have not been formally evaluated for NRHP eligibility, Fort Bliss has undertaken resurvey and evaluation of the some of these zones. Based on these resurveys, the management status of these zones is being re-assessed. Until evaluation is complete, these areas are included as environmentally restricted areas and restrictions established for the Red and Green zones still apply.

In addition to the Red and Green zones, there are a number of other Fort Bliss properties that have either been determined eligible for inclusion in the NRHP or that need further evaluation to determine if they are eligible. Examples of eligible properties include the William Beaumont General Hospital Historic District and archeological properties throughout the installation.

4.9.4.4 TCP Inventories

Detailed information on traditional beliefs, values, customs, sacred sites, and use areas is often not available, as Native Americans are reluctant to share such information with outsiders. However, the NHPA and EO 13007 require consideration of Native American concerns in the management of cultural resources. Fort Bliss has therefore consulted with, and will continue to consult with, Native American groups with traditional ties to the area.

151 Fort Bliss has contacted the Tigua regarding their concerns about traditional cultural resources that may be present on the Fort Bliss Installation (Bowman, 1997). Although the Tigua have not yet specifically told Fort Bliss the location of sacred or important areas, consultation will continue.

152 The entire area surrounding Fort Bliss also falls within the traditional territory of the Mescalero Apache. Carmichael (1994) provides an overview of Mescalero Apache sacred features in the region. Generally, several types of topographic features have spiritual significance, including caves, springs, and certain mountain peaks. To a lesser extent, resource areas containing specific botanical and geological materials used in ceremonies are also considered important by the Mescalero. Consultation efforts related to other undertakings in the region have indicated that the Mescalero may have concerns of a general nature about resources on Fort Bliss.

As part of its responsibilities under the NAGPRA, Fort Bliss has completed an initial inventory of all cultural remains previously found on Fort Bliss lands that contain human remains or artifacts associated with these remains. A search of the site record at Fort Bliss, and records of the cultural materials collections housed at Fort Bliss and other facilities indicated that 16 recorded sites on Fort Bliss have or had either human remains or suspected human remains. In some cases, the human remains had been removed. As required by the NAGPRA, tribal groups with historic ties to the area (the Apache and Tigua) were notified by letter of the materials and asked for their comments. Fort Bliss is currently in consultation with the Tigua (Marshall, 1998).

4.9.5 Cultural Resources Affected by Existing Mission Activities

As of November 24, 1997, the Fort Bliss cultural resource database contained information on over 15,405 cultural resources. The number and management status of cultural resources in the different portions of the ROI are summarized in the database.

4.9.5.1 Fort Bliss Cantonment

The Fort Bliss cantonment contains a number of historic structures and both Native American and Euroamerican archaeological resources. The earliest of the historic structures date to 1893 and include Victorian buildings originally used for medical purposes; barracks, mess halls, and recreational activities, officer's residences, and stables, warehouses, and magazines. Many of these buildings are still used today, but for other purposes. A total of 346 buildings, sites, and structures contribute to the Main Post Historic District (Figure 4.9-1).

Native American archaeological resources are uncommon within the cantonment area because of the extensive construction. Whalen (1978) reports no Native American sites on the main post, Logan Heights, or WBAMC, but does note 30 small Native American sites on Biggs AAF. Seventeen Euroamerican archeological sites have been identified in the cantonment area. Most of these Euroamerican archaeological sites are related to occupation of the site by Fort Bliss. No traditional cultural properties have been identified to date on the Fort Bliss cantonment area.

4.9.5.2 South Training Areas

The South Training Areas contain portions of the Hueco Mountains. These limestone deposits are conducive to the formation of caves and rockshelters, many of which were used by prehistoric people. Almost 4,090 prehistoric archeological sites have been recorded from this area. The South Training Areas were also used historically. Inventories of historic archaeological sites in the South Training Areas have recorded 125 sites, including a portion of the Butterfield Overland mail route (U.S. Army, 1997d). No architectural resources or TCPs have been identified within the training areas, but both could potentially occur.

4.9.5.3 Doña Ana Range–North Training Areas

Portions of the Doña Ana Range–North Training Areas have been surveyed (Skelton et al., 1981; U.S. Army, 1995h; Stuart, 1997). These, and other surveys, have resulted in the identification of over 6,600 prehistoric sites, including Paleoindian (including a possible Clovis site), Archaic, and Formative period sites. Historic resources totaling 93 sites include ranching, CCC, and military sites; a portion of the Spanish Salt Trail; historic mines; and the 1920s campsite of early paleontologists. Camp Hueco once contained World War II and Cold War architecture, but only a well house remains (Landreth, 1998). No TCPs have been identified within the Doña Ana Range–North Training Areas, although they could potentially occur.

4.9.5.4 McGregor Range

The McGregor Range comprises the largest portion of the ROI under management of Fort Bliss. The 698,482 acres contain a variety of environmental zones and landforms. Its cultural resources are similarly diverse and include scatters of Paleoindian, Archaic, and Formative materials, rockshelters, rock art sites, historic ranching sites, the townsite of Turquoise, several of Oliver Lee's pipelines, two reservoirs, a number of railroad-related sites (U.S. Army, 1997d), and military sites, including Cold War-era Nike test sites. Five pueblos have been identified on McGregor Range. The almost 100,000 acres inventoried for cultural resources to date contain over 3,600 historic and prehistoric sites. No TCPs have been identified within the range, but they could potentially occur.

4.9.5.5 Castner Range

Castner Range occupies 7,040 acres of land on the eastern flank of the Franklin Mountains in El Paso. The range contains numerous prehistoric and historic resources ranging from pueblos to ranching-related sites, a Spanish Salt Trail, and military training locations including a theodolite station from the 1800s and Vietnam War-era simulated village sites. The area also contains significant amounts of ordnance and explosive hazards from its use as a firing range since World War I. No architectural resources or TCPs have been identified within Castner Range, but both could potentially occur.

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Noise

4.10

4.10 NOISE

Noise is any unwanted sound that interferes with normal activities or otherwise diminishes the quality of the environment. It may be intermittent or continuous, steady or impulsive, stationary or transient. Therefore, the ROI for noise includes the installation, the area immediately surrounding Biggs AAF, as identified by the L_{dn} 65 noise contour, as well as those areas associated with military training airspace and land areas used by the military services for other activities that could result in the exposure of specific land areas to elevated noise levels (Noise Zones II and III). These ROI criteria for noise are independent from receptor sensitivity or the ownership or control of land and/or property rights, because such variables are subject to change in the future.

The physical characteristics of noise, or sound, include its intensity, frequency, and duration. Because noise events have a range of characteristics, and the human ear does not respond to sounds of varying frequency and intensity in a linear fashion, various "weighting" factors are applied to noise measurements to produce measured values that correspond to human response. The most commonly used weighting scales are the "A" and "C" scales.

The normal human ear can usually detect sounds that range in frequency from about 20 hertz (Hz) to 20,000 Hz. However, all sounds throughout this range are not heard equally well. Therefore, some sound meters are calibrated to emphasize frequencies in the 1,000 to 4,000 Hz range. The human ear is most sensitive to these frequencies, and sounds measured with these instruments are termed "A-weighted." The "A-weighted" scale is normally used to describe noise arising from transportation and human activities. Values of A-weighted noise are shown in terms of A-weighted decibels (dBA).

In contrast, when describing large amplitude impulsive sounds such as explosions and weapons noise, the actual total amount of acoustic energy created by the event is an important consideration. Sounds of this nature are normally measured on the "C-weighted" scale, which gives nearly equal emphasis to all frequencies. Mid-range frequencies approximate the actual (unweighted) sound level, while the very low and very high frequency bands are significantly affected by "C-weighting." Values of C-weighted noise are shown in terms of C-weighted decibels (dBC).

The noise metrics (measurements) used to assess noise are the maximum sound level (L_{max}), the sound exposure level (SEL), the Day-Night Average Sound Level (ADNL [A-weighted]/CDNL [C-weighted]), and the Onset Rate-Adjusted Monthly Day-Night Average Sound Level (L_{dnmr}). Each of these metrics represents a "tier" for quantifying the noise environment. Further discussion of these metrics is presented in Appendix G, *Noise Analysis*.

The sound levels calculated for aircraft operations around Biggs AAF are all ADNL. Sound levels calculated for aviation activities in the special use airspace associated with the McGregor Range and the Doña Ana Range–North Training Areas are all L_{dnmr}. The noise levels associated with artillery firing and the detonation of high explosives are all in terms of CDNL. L_{dn} metrics are the preferred noise metrics of the HUD, the U.S. Department of Transportation (DOT), the FAA, the EPA, and the Veteran's Administration (American National Standards Institute [ANSI], 1980, 1988; EPA, 1974; FICUN, 1980; Federal Interagency Committee on Noise [FICON], 1992).

Ambient background noise is not considered in the noise calculations that are presented below. In the case of A-weighted noise, there are several reasons for this. First, ambient background noise, even in wilderness areas, varies widely, depending on location and other conditions. For example, studies conducted in an open pine forest in the Sierra National Forest in California have measured up to a 10 dBA variance in sound levels simply due to an increase in wind velocity (Harrison, 1973). Therefore, assigning a value to background noise would be arbitrary. Secondly, and probably most important, is that it is reasonable to assume that ambient background noise in the project's ROI would have little or no effect on the calculated ADNL. Since noise levels are calculated logarithmically, louder sounds dominate the calculations, and overall, aircraft noise would be expected to be the dominant noise source characterizing the acoustic conditions in the region. In the case of C-weighted noise, thunder would probably be the only naturally occurring exposure to this noise, and it would be impossible to predict or estimate values for such events.

To assess noise effects, the Army has defined three noise zones to be considered in land use planning. These zones are described by the noise levels to which they are exposed, and, based on sociological considerations, compatible land uses are recommended. These zones are summarized in Table 4.10-1. In general, within Zone I, where very few people will be bothered by noise levels, unrestricted land use is indicated. In Zone II, as outdoor noise levels increase, and more people become annoyed at the noise, restrictions or qualifications are placed on certain land uses, specifically regarding residential development. In Zone III, as noise levels escalate, fewer and fewer compatible land uses are indicated.

Table 4.10-1. Land Use Planning Guidelines

Noise Zone	*Population Highly Annoyed*	*Noise Limits*		
		Transportation ADNL	*Impulsive CDNL*	*Small Arms dBP*
I	<15%	<65 dBA	<62 dBC	<87 dBP
II	15–39%	65–75 dBA	62–70 dBC	87–104 dBP
III	>39%	>75 dBA	>70 dBC	>104 dBP

Notes: ADNL = A-weighted Day-Night Average Noise Level; CDNL = C-weighted Day-Night Average Noise Level; dBP = Peak unweighted sound pressure level.
Source: U.S. Army, 1994e.

Separate values are provided for A-weighted and C-weighted noise levels. Since these types of noise are measured on different scales, it is not appropriate to sum the noise levels. Therefore, each is measured and considered separately, applying its distinctive criteria for assessment.

At Fort Bliss, the Main Cantonment Area is subjected to noise from urban development. Additionally, Army and USAF aircraft conduct aviation activities at Biggs AAF and within regional military training airspace associated with training ranges. Noise also results from detonation of high explosives, and use of artillery and other ordnance on training ranges.

4.10.1 Current Noise Levels

The current noise levels for the Main Cantonment Area, Biggs AAF, military training areas, and impulsive noise on the ranges are discussed in this section.

4.10.1.1 Main Cantonment Area

Vehicular traffic is the primary urban noise source in El Paso. For Fort Bliss, which is surrounded by a network of major roadways, vehicular traffic creates elevated ambient noise levels. These higher noise levels are more noticeable at the perimeter boundaries of the installation than further inside the post. In addition to separation from the source of noise, structures on the post also attenuate noise, resulting in varied noise exposure throughout the installation. For example, a noise pollution study conducted by the Army's Environmental Hygiene Agency documented that the noise levels for 50 percent of the samples collected in the Van Horn housing area were greater than 64 dBA at one location, and greater than 40 dBA at another. The study concluded that "Fort Bliss residential areas generally meet the EPA long-range goal of outdoor ambient noise levels (L_{dn}) not exceeding 55 dB" (U.S. Army, 1976). This situation remains valid today. When traffic noise from Airport Road is considered, at a quarter mile away from the center of the roadway, noise levels are below 55 ADNL (DOT, 1982). Since the section of road considered is the most heavily used of all the perimeter highways, all others have less potential for noise impacts.

The same 1976 study also examined the potential for noise impacts resulting from helicopter medical evacuation (MEDEVAC) flights to and from the helipad at WBAMC. Flight paths avoid populated areas as much as possible, and with a minimum flight altitude of 1,000 feet agl, the study found that no military or civilian residences were located within the 65 ADNL contour (U.S. Army, 1976).

4.10.1.2 Biggs AAF

Noise exposure around Biggs AAF is created by military aviation activities. Calculations of noise exposure associated with operations at Biggs AAF are based on the ADNL metric. In 1996, more than 44,800 operations were conducted (U.S. Army, 1996h). Considering all types of flight activities, a scenario representing a “typical busy day’s operations” was developed. Operations considered included takeoffs, landings, and closed patterns around the airfield. Specific aircraft modeled were representative of current activities at Biggs AAF (Sepulveda, 1997). The operations considered in the scenario are shown in Table 4.10-2. Noise calculations consider the frequency of flight operations, runway utilization, and the flight tracks and flight profiles flown by each aircraft.

Table 4.10-2. Daily Operations at Biggs Army Airfield [1]

Aviation Category	*Operations*		
	Day	*Night*	*Total*
Military Fixed-wing	31.50	1.66	*33.16*
Military Rotary-wing	77.67	4.09	*81.76*
General Aviation/Other	33.14	0.37	*33.51*
Total Operations	*142.31*	*6.12*	*148.43*

Note: [1.] Daily operations are based on averages of annual operations; therefore, numbers do not round.
Source: U.S. Army, 1996h.

These levels and types of activity are then combined with information on climatology, maintenance activities, and aircraft flight parameters, and processed through the USAF’s BASEOPS/NOISEMAP computer models to calculate ADNL (USAF, 1990a, b). Once noise levels are calculated, they are plotted on a background map to depict noise Zone II (L_{dn} 65 to 75) and Zone III (>L_{dn} 75). Noise contours associated with current activities at Biggs AAF are shown in Figure 4.10-1. The land area associated with each zone is shown in Table 4.10-3.

Table 4.10-3. Sound Level Exposure

Noise Zone	*Sound Level*	*Acres of Land [1]*
II	ADNL 65–75	2,153.7
III	>ADNL 75	706.5

Note: [1.] Land areas exposed to indicated sound levels. Total area exposed to L_{dn} 65 or greater is 2,860.2 acres.
Source: NOISEMAP (USAF, 1990b).

Current noise contours were developed only for activities at Biggs AAF for this document to portray Biggs AAF’s contribution to aviation-related noise in the area. Flight operations at EPIA were not included in the modeling. Refer to Figure 4.1-5 for a depiction of the noise associated with combined operations at these two airfields. Biggs AAF operations in 1996 were modeled and the contours are based on use of the full facilities

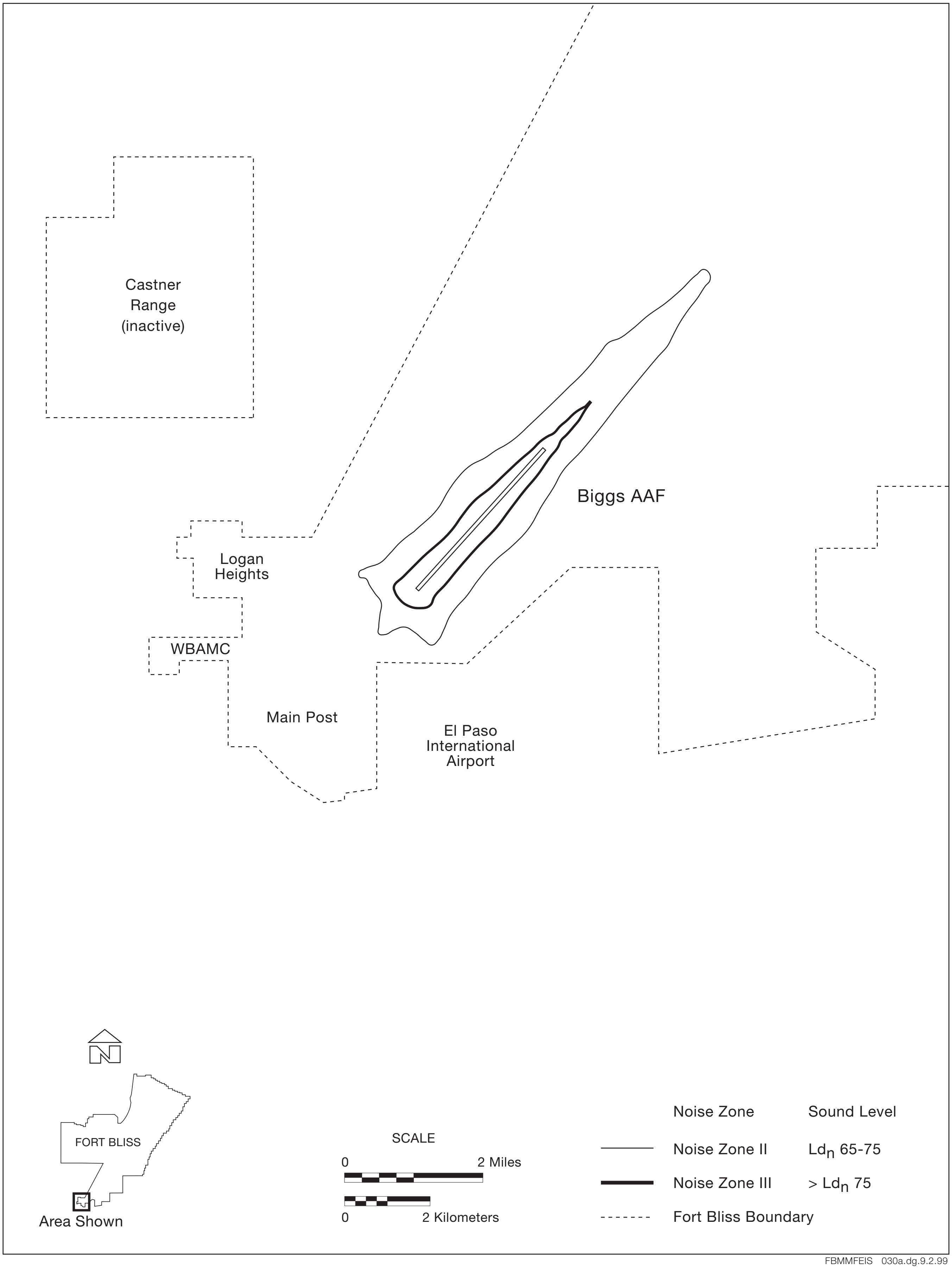


Figure 4.10-1. Noise Zones Associated with Biggs Army Airfield Operations.

of the airfield. During some previous studies assessing aircraft noise at Biggs AAF, major maintenance was being performed on the airfield's main runway, resulting in a displaced threshold. This modification to flight operations would have the result of shifting the outer boundaries of the noise contours reflecting the reduced length of runway available for use. The interrelation of noise with human activity is discussed in detail in Section 4.1.1.3, *Land Use Compatibility*.

4.10.1.3 Military Training Airspace

Aviation activities associated with Fort Bliss operations occur primarily over the areas designated as McGregor Range and Doña Ana Range–North Training Areas. These operations involve Army and USAF rotary- and fixed-wing aircraft. These areas correspond to restricted airspace designated R-5103B/C, R-5103A/D, and R-5107A, respectively. USAF fixed-wing fighter aircraft, operating primarily out of HAFB, also perform training in R-5103B, using the air-to-ground bombing range in the northern portion of McGregor Range. Around airports, flight activities follow well-defined patterns. In military training airspace, however, flight activities are more apt to be intentionally random and dispersed, reflecting typical combat maneuvers. As a result of these random flight paths, sound levels in this type of airspace have been found to be uniformly distributed throughout the airspace. Therefore, sound levels in these regions consider not only the speeds, altitudes, and engine power settings of aircraft, but the overall size of the airspace and the time spent in the airspace as well. Although some aircraft may adhere to specific tracks on a specific mission (e.g., a C-130 at a DZ or a helicopter flying an NOE training mission), over time, aircraft flight routes approach random distributions throughout the airspace.

Using the USAF's MOA/Range NOISEMAP (MRNMAP), which is specifically designed to consider these unique aspects of flight within these areas, the uniform distributed sound level in terms of L_{dnmr} was calculated for each airspace element (Lucas and Calamia, 1994). These values under current operations are shown in Table 4.10-4.

Table 4.10-4. Uniformly Distributed Noise Levels in Restricted Areas under Current Operations

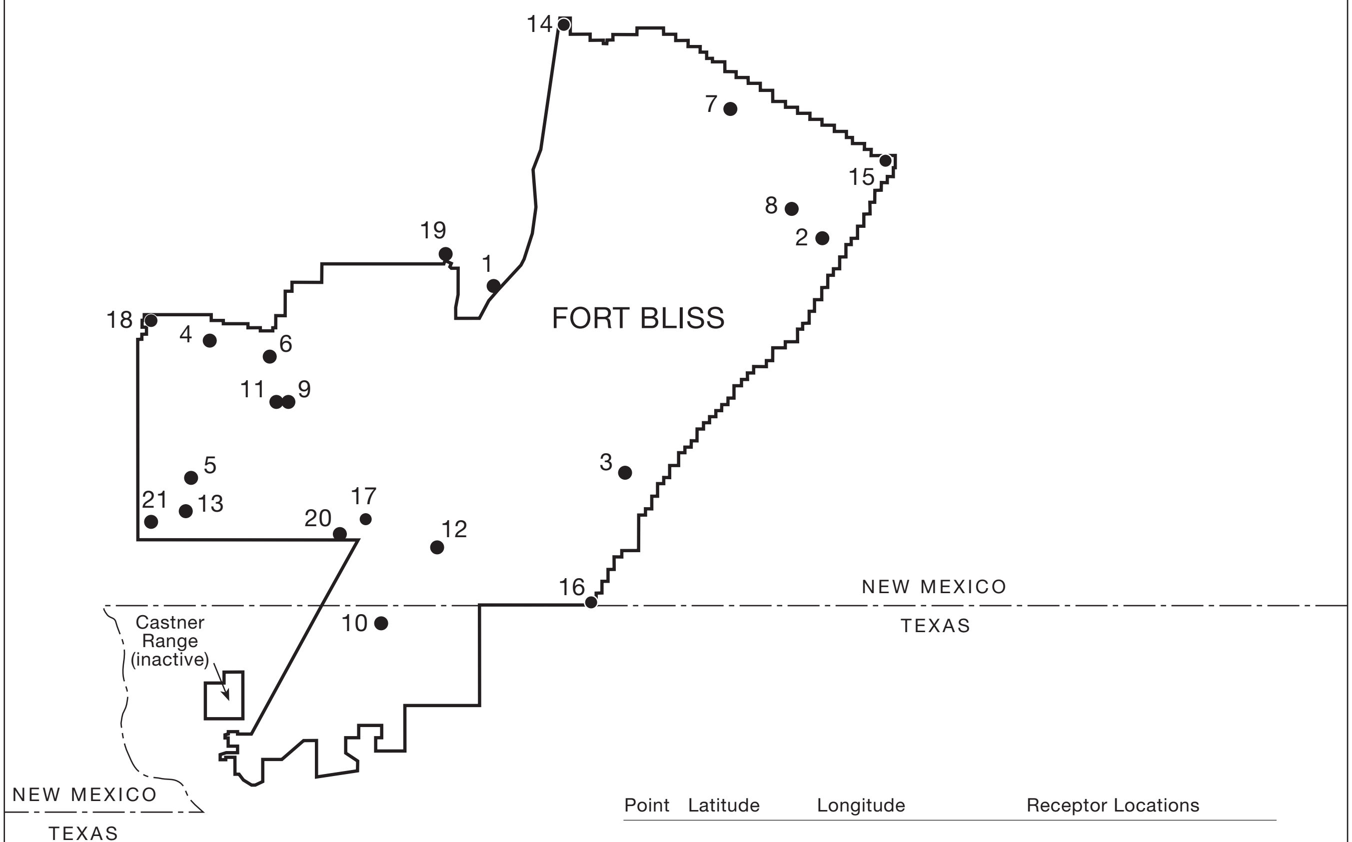
Airspace	*Current Noise Level (in L_{dnmr})*
R-5103B/C (northern McGregor Range)	43
R-5103A/D (southern McGregor Range)	40
R-5103 (Combined)	44
R-5107A (Doña Ana Range–North Training Areas)	49

Source: Aircraft Operations (U.S. Army, 1996h); Noise Levels (Lucas and Calamia, 1994).

To further assess the noise levels occurring throughout the military training airspace, 21 representative ground locations were selected for specific analysis. These specific ground locations represent potential noise receptors in the area, as well as locations where cumulative or concentrated military flight training may occur. These locations are illustrated in Figure 4.10-2. Table 4.10-5 identifies the specific noise levels experienced at that point.

4.10.1.4 Impulsive Noise on Ranges

Artillery fired on the Doña Ana Range–North Training Areas, and impacting in the Organ Mountains, is the prime source of impulsive noise generated by Fort Bliss activities. In 1994, the Army Center for Health Promotion and Preventive Medicine performed an environmental noise consultation and provided terrain-



Point	Latitude	Longitude	Receptor Locations
1	32°22'45"N	106°05'00"W	Oro Grande
2	32°25'50"N	105°37'30"W	Ranch East-Central North McGregor
3	32°09'15"N	105°54'00"W	Ranch East-Central South McGregor
4	32°18'45"N	106°28'45"W	Ranch East Slope Organ Mountains
5	32°09'15"N	106°30'30"W	Camp DA Training Areas
6	32°17'45"N	106°23'50"W	Center of DA Training Areas
7	32°35'00"N	105°45'00"W	McGregor Bomb Circle
8	32°27'54"N	105°39'48"W	McGregor + R-134/195 + IR-192/194
9	32°14'29"N	106°22'21"W	Desperation DZ
10	31°58'49"N	106°14'42"W	Grange DZ
11	32°14'28"N	106°23'03"W	Monroe DZ
12	32°03'56"N	106°09'50"W	Ranger DZ
13	32°06'53"N	106°30'43"W	Stewart DZ
14	32°45'00"N	105°59'00"W	Northwest Corner - R5103 B/C
15	32°33'00"N	105°30'00"W	Northeast Corner - R5103 B/C
16	32°00'00"N	105°57'00"W	McGregor Southeast Corner - R5103 A/D
17	32°06'00"N	106°16'00"W	McGregor Southwest Corner - R5103 A/D
18	32°20'00"N	106°40'00"W	DA Training Northwest Corner - R5107A
19	32°25'00"N	106°09'00"W	DA Training Northeast Corner - R5107A
20	32°05'00"N	106°18'00"W	DA Training Southeast Corner - R5107A
21	32°06'00"N	106°34'00"W	DA Training Southwest Corner - R5107A

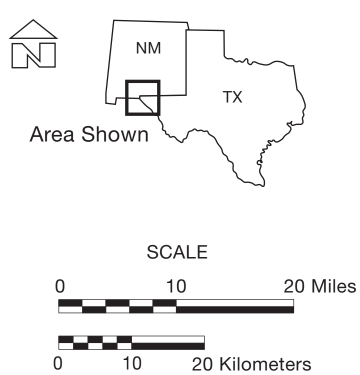


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Figure 4.10-2. Location of Noise Receptors.

Table 4.10-5. Noise Levels at Specific Points under Current Conditions

Specific Point	*Noise Level (in L_{dnmr})*	*Specific Point*	*Noise Level (in L_{dnmr})*
1	39	12	35
2	47	13	39
3	46	14	35
4	50	15	47
5	47	16	35
6	50	17	36
7	51	18	35
8	52	19	44
9	50	20	35
10	35	21	35
11	50		

Source: Lucas and Calamia, 1994.

corrected noise contours for this area. The study modeled operations involving high explosives with the potential to significantly contribute to unacceptable levels of impulsive noise. The calculated CDNL values, from which Zone II and Zone III noise contours were developed, are shown in Figure 4.10-3 (U.S. Army, 1994f). As shown, no noise levels that would contribute to incompatible land uses extend beyond the installation boundaries.

Since the land area within the installation boundaries is designated as a firing impact area, elevated noise levels would be expected, and such levels are not incompatible with this type of land use. Similarly, impulsive noise also occurs on several areas of McGregor Range, such as at ordnance firing points and the small arms ranges, but has not been modeled to determine the extent of noise zones. However, this noise is sporadic, and relatively localized to specific areas of the range. Since the range area is designated for ordnance firing and impact, elevated noise levels are expected and are fully compatible with this type of land use.

4.10.2 Noise Complaints

The installation point of contact for noise complaints is the Fort Bliss Public Affairs Office (PAO). The PAO has received noise complaints from the general public for several years. Complaints received were not well-documented until December 1994. Complaints in 1994 and 1995 concerned low-flying military aircraft and tank gunnery. Three similar complaints were received in 1994 and six complaints were received in 1996. Complaints received during exercises (Roving Sands, Border Star) or events (Amigo Airshow) that were specific to the exercise or event, were referred to the organizers for documentation and resolution.

During 1997, 30 noise complaints were received during Roving Sands 97. Of the 30, 25 were received on April 22, 1997, when the SR-71 Blackbird reconnaissance aircraft broke the sound barrier. The other five were received from areas near HAFB, New Mexico, north of Fort Bliss. Although there are no records of noise complaints for previous Roving Sands exercises, the number of complaints is typical for this exercise.

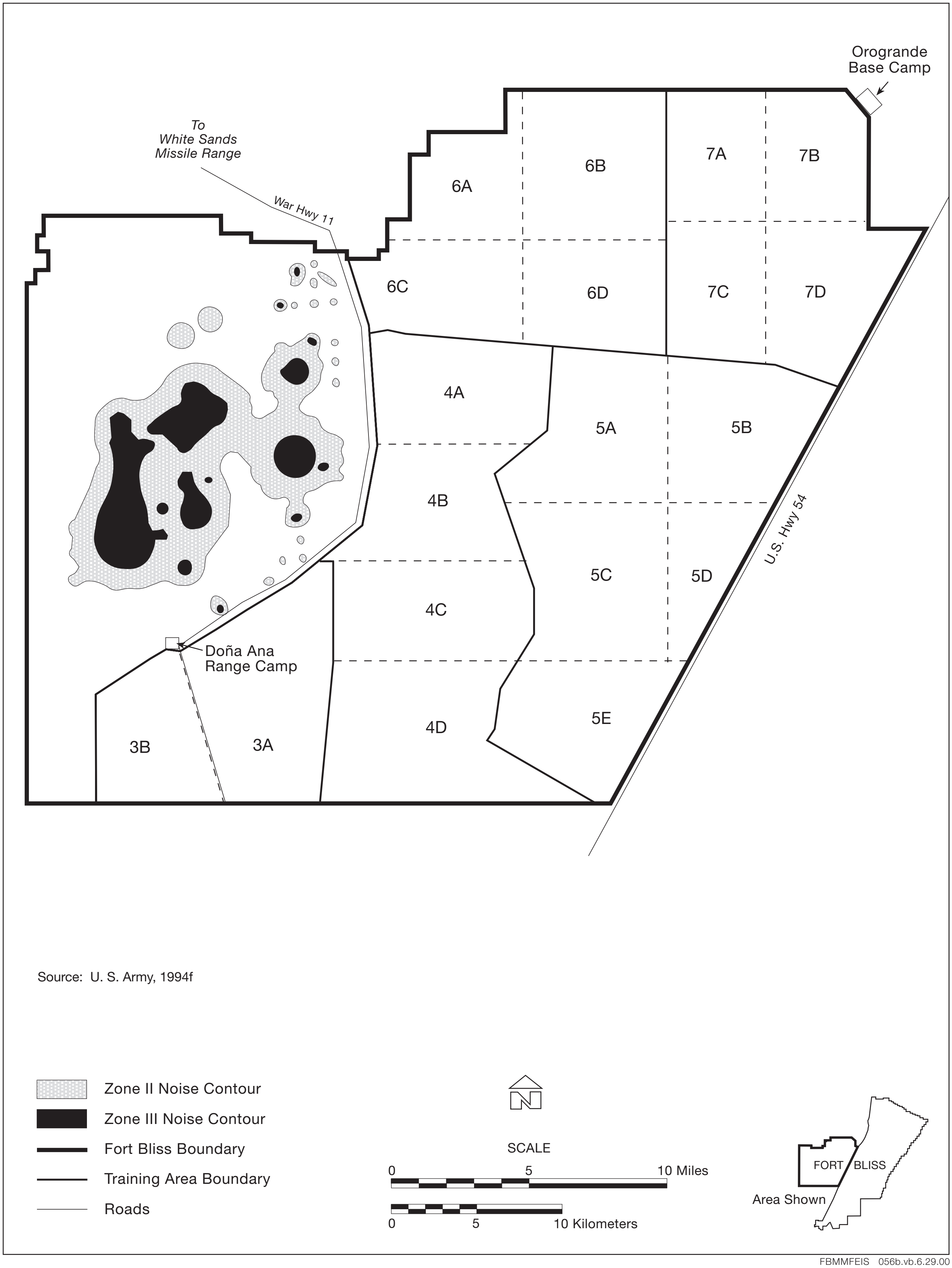

Figure 4.10-3. Noise Contours on Doña Ana Firing Range Area.

Safety

4.11

4.11 SAFETY

Safety issues addressed in this section include ground, flight, and explosive safety considerations. The ROI on safety includes the Main Cantonment Area of Fort Bliss; Biggs AAF; McGregor, Meyer, and Castner ranges; Doña Ana Range–North Training Areas; and the South Training Areas. Fire safety is generally included as part of ground safety, but is also considered in other categories as well. Ground safety concerns activities associated with ongoing operations and maintenance, as well as those activities that would be associated with demolition and construction. Ground safety also considers potential hazards associated with delivery of ordnance on weapons ranges. Aircraft flight safety will be discussed from the stand point of the risk of aircraft mishaps, and will address rotary- and fixed-wing aircraft activities. Explosive safety considerations involve the use, storage, processing, and handling of ordnance used in support of the Fort Bliss mission.

4.11.1 Ground Safety

This section discusses ground safety at Fort Bliss, Biggs AAF, Doña Ana Range–North Training Areas, McGregor Range, and the Castner Range.

4.11.1.1 Fort Bliss

All day-to-day operations and maintenance activities are performed by trained, qualified personnel, and are conducted in accordance with applicable equipment technical directives, approved occupational safety and health standards, and sound maintenance practices. The handling, processing, storage, and disposal of hazardous by-products resulting from demolition, construction, operations, or maintenance are accomplished in accordance with all federal and state requirements applicable to that substance.

Fire suppression on Fort Bliss is the responsibility of the Fort Bliss Fire Department. This Army Fire Department is staffed by trained firefighters, and is equipped and capable of responding to fires that may occur within the Main Cantonment Area. In the majority of cases, those Fort Bliss facilities that require them are equipped with automatic fire suppression and remote annunciator capabilities. As a result of mission changes and Army realignments, the use of some facilities has changed. In some cases, these changes have resulted in additional facilities requiring automatic suppression capability (sprinklers) that are not presently so equipped. However, all new requirements are programmed for installation and are funded under military construction programs. The Fire Department has one less pumper than authorized, and is currently using an inadequate substitute unit.

The Fort Bliss Fire Department is party to a Mutual Support Agreement (MSA) with the City of El Paso. If required, augmented support for fire suppression would be available from that source (Kern, 1997).

Biggs AAF is located immediately adjacent to the Fort Bliss main post. Day-to-day operations and maintenance activities performed at Biggs AAF are generally similar to those described for Fort Bliss in the preceding section. Only limited maintenance capability is provided by the facility. Detailed safety processes and procedures for ramp access, aircraft movement, and fueling and defueling are in place. Two parking areas are designated for loading and unloading of hazardous cargo, which includes munitions (USAADACENFB Regulation 95-1).

To minimize the results of a potential accident involving aircraft operating from Biggs AAF, CZs, APZs, and safety zones have been established around the airfield. These zones are shown in Figure 4.1-4. Within clear and safety zones, construction is either prohibited (CZs) or limited in terms of placement and height (safety zones). Areas around the airfield where experience has shown most aircraft accidents occur are designated as APZs.

Beyond the CZ is APZ I, an area that has a significant potential for accidents. Land uses in this zone are usually limited to light industrial, manufacturing, transportation, communications, utilities, wholesale trade, open space, and agricultural uses. Uses that concentrate people in small areas are not considered acceptable practice in this zone.

Beyond APZ I is APZ II. APZ II includes land uses considered compatible with APZ I, as well as low-density residential, service, and retail trade. However, uses that concentrate high densities of people in small areas are not considered appropriate. Potential land use incompatibilities are discussed in Section 4.1.

The Fort Bliss Fire Department is located on Biggs AAF. For day-to-day operations, the Fire Department is fully equipped to handle crash response. All facilities and equipment associated with airfield operations meet requirements. No safety waivers exist (Kern, 1997).

During mobilization operations, when increased numbers of aircraft are operating from Biggs AAF, levels of crash response equipment and personnel are increased by augmentation from other military agencies. For example, during the Roving Sands 97 exercise, two additional crash trucks and 12 firefighters were provided by the USAF to satisfy added requirements (Kern, 1997).

Fire and crash response at EPIA is provided by the City of El Paso. Therefore, under the MSA discussed above, added response capability would be available from that source, if required.

4.11.1.2 Doña Ana Range–North Training Areas

A good deal of the land encompassed by the Doña Ana Range–North Training Areas and McGregor Range, must provide safety buffers for the expenditure of ordnance. These safety zones include areas where ordnance, or fragments of ordnance, are expected to impact. As a result of years of use, Fort Bliss impact areas have been categorized for management purposes as either permanent or temporary.

Permanent impact areas are considered to have a high probability of unexploded ordnance. These areas are not available for training operations. However, this is not the case with the remainder of each impact area, which includes SDZs that have been designated as temporary impact areas. During firing operations, these areas would include the firing points, the safety zone on the ground under the path of the projectile, and the impact and potential fragmentation area around the target. When active firing is taking place, these areas are closed to any other activities for safety purposes. Therefore, when not being used for firing, these areas are available for other training activities.

Doña Ana Range–North Training Areas are used for small arms, heavy and light automatic weapons, mortars, artillery, rockets, armor, mechanized infantry, and aerial gunnery. Impact areas are on the ranges themselves, or in the Organ Mountains. All activity on the Fort Bliss ranges is governed by detailed safety standards documented in SOPs. For each weapon or weapon system used, SDZs are projected onto the ground around the firing area, under the projectile's flight path, and around the impact area. These zones account for the flight, impact, fragmentation pattern, and possible ricochet of the projectile after it impacts the ground, as well as any debris patterns that would be associated with the projectile or its target. SDZs are unique to each specific type of ordnance, and vary in size and shape depending on the weapon used. Additional specific data on SDZs are contained in the TADC (U.S. Army, 1998a). Graphic depictions of MLRS and tank cannon SDZs are shown on Figure 3.6-2.

Prior to launch or firing, these areas are subjected to an aerial sweep to ensure that they are clear of any unauthorized personnel and equipment. Once cleared, access points are monitored to ensure no personnel inadvertently enter the hazardous area. Access is barred until the range is declared safe (U.S. Army, 1996f).

SOPs also provide detailed guidance for the safe conduct of the firing. Potential malfunctions (e.g., misfires, hangfires, etc.) are considered, and safety procedures are prescribed to ensure a safe recovery and disposition of the malfunctioning munition.

Fourteen ranges support delivery of a wide range of ordnance. Ordnance used, and the total amount of each type expended on these ranges in 1996 are summarized in Table 4.11-1.

Table 4.11-1. Ordnance Expenditure on Doña Ana Range–North Training Areas

Ordnance	*Amount*	*Ordnance*	*Amount*
5.56mm	95,406	7.62mm	227,257
9mm	2,708	.50 Cal	115,101
12 Gauge Shotgun	240	20mm	1,440
40mm	13,414	M203	2,370
MK19	5,290	TOW	38
M1200	10	M2	4,930
M198	3,928	M249	900
M60	13,050	STONER	600
AT-4	2,549	155mm	602
STLS	8	120mm	10
M270	159	M28	25
M26	162	M27	41
Claymore Mine	9	2.75mm	19
M3	10	Mark 107	8

Note: mm = millimeter, Cal = Caliber.
Source: U.S. Army, 1996z.

4.11.1.3 McGregor Range

McGregor Range supports delivery of a wide variety of ground-to-ground, ground-to-air, and air-to-ground ordnance. This range is the major range supporting air defense weapons systems. Graphic depictions of Patriot SDZs are shown on Figure 3.6-1. As with the Doña Ana Range–North Training Areas, detailed SOPs prescribe safety procedures governing all range activities in the McGregor Range Complex. The various ranges supported by the McGregor Range Camp are involved in ground-based activity, and the ordnance they support are shown in Table 4.11-2.

The Orogrande Range and the SHORAD are part of the McGregor Range Complex. The Orogrande Range is used primarily by the TEXCOM's ADA Test Directorate for weapons system testing. The range can support use of Chaparral, Stinger, and Avenger missiles, 81mm mortars (illumination only), and laser operations. Weapons supported by the SHORAD Range include Stinger, Avenger, and Chaparral missiles; and 25mm, 7.62mm, and .50 Cal ammunition (U.S. Army 1996f).

The Meyer Range Complex is located approximately 6 miles southeast of the McGregor Range Camp. The range supports small arms; hand grenades; M-60 machine guns; Claymore mines; and M249, M203, AT-4, and M79 grenade launchers (U.S. Army 1996f).

Table 4.11-3 summarizes ordnance expended on the McGregor ground ranges in 1996.

Table 4.11-2. Activities Conducted on Ranges Supported by the McGregor Range Camp

Range Designation	*Ordnance Supported*
TAC 0, TAC 1, TAC 7, TAC 12, TAC 18, TAC 24	Patriot Missile
Hawk Sites 1 through 8	Hawk
Field Firing Sites A, C, E, G	Hawk, MLRS
FAW Site 10	Stinger, Chaparral, Avenger, Roland, M60, .50 Cal, 81mm mortar (illumination only)
FAW Site 4	81mm mortar (illumination only), M3, M60, .50 Cal, M16
Aerial Gunnery Range, Cane Cholla	2.75-inch rockets, 7.62mm, 40mm, 20mm, light assault weapon (LAW), 81mm mortar, 4.2-inch mortar (mortars used for illumination only)
ATACMS	ATACMS Missile
Demolition Site 2	Explosive ordnance disposal (EOD), Demolition training (Maximum net explosive weight 5,000 pounds)

Note: Demolition Site 2 is not on Meyer Range 23.
Source: U.S. Army 1996f.

Table 4.11-3. Ordnance Expended on McGregor Ground Ranges

Ordnance	*Range*						
	TAC Sites	*Hawk Sites*	*Field Firing Sites*	*FAW Sites*	*ATACMS*	*SHORAD*	*Meyer*
ATACMS					6		
Roland				4			
Avenger				2		13	
Chaparral				90		2	
Stinger				315		63	
Hawk		34					
MLRS			130				
BAT				453		78	
STLS				35		48	
ADATS				14			
Patriot	38						
.50 Cal				4,200		59,190	
5.56mm							620,170
7.62mm						58,060	34,049
9mm							53,431
25mm						7,410	
M3P						4,000	
M249							7,100
40mm							250
M203							430
Pellets							3350
NBC							21
Grenades							83
M60							300
M64							10
M67							100
BGM71E							9

Table 4.11-3. Ordnance Expended on McGregor Ground Ranges (Continued)

Ordnance	*Range*						
	TAC Sites	*Hawk Sites*	*Field Firing Sites*	*FAW Sites*	*ATACMS*	*SHORAD*	*Meyer*
MK19							425
12 Gauge							300
AR15							200

Note: BAT = Brilliant anti-tank; ADATS = Air defense anti-tank system; NBC = Nuclear, Biological, Chemical; and STLS = Stinger Launch System.
Source: U.S. Army, 1996z.

There is one fire truck stationed at the McGregor Range Camp. However, this truck is limited in response to the cantonment area of the range camp and a 5-mile radius around that area (Kern, 1997). As with the Doña Ana Range–North Training Areas, troops using the range have the primary responsibility for fire response (U.S. Army, 1996f). If required, augmented response support would be provided by the Fort Bliss Fire Department. The Army and the BLM respond to fires in the grazing units on McGregor Range. 91
Should fires become extensive, the USACASB Fire Management Plan provides for coordination between all responding agencies, and affected training would be suspended until safe conditions return.

4.11.1.4 Castner Range

The Castner Range is no longer used as an active training area. However, effects from previous use are discussed in Section 4.11.3.

4.11.2 Flight Safety

The military services define four categories of aircraft mishaps: Classes A, B, C, and High Accident Potential (HAP). Class A mishaps result in a loss of life, permanent total disability, a total cost in excess of $1 million, destruction of an aircraft, or damage to an aircraft beyond economical repair. Classes B and C mishaps and HAPs are less serious, resulting in lower costs, and cause less serious injuries. This PEIS focuses on Class A mishaps because of their potentially catastrophic results.

While it is impossible to predict the precise location of an aircraft accident, in considering potential impact to persons and private property, several factors are relevant: the ROI and immediate surrounding areas have relatively low population densities; pilots of aircraft are instructed to avoid direct overflight of population centers at very low altitudes; and the limited amount of time the aircraft is over any specific geographic area limits the probability that impact of a disabled aircraft in a populated area would occur.

Other effects of an aircraft crash include the potential for fire and environmental contamination. Weather and surface conditions (topography, vegetation, etc.) will determine the extent of fire. When an aircraft crashes, it may release hydrocarbons. Those petroleum, oils and lubricants (POLs) not consumed in a fire could contaminate soil and water, depending on the physical characteristics of the area where the crash occurred.

F-16 aircraft carry a small quantity of hydrazine in a sealed canister that is designed to withstand crash impact damage. Hydrazine is a highly volatile toxic propellant. It is carried on the F-16 as part of the power unit system. When used for this purpose, hydrazine is completely consumed, and poses no safety hazard. In a crash that is severe enough to rupture the canister, it is likely that fire will be involved. In this case, the hydrazine will burn and be completely decomposed. In the event that the hydrazine should be released, but not consumed by fire, impacts on soils and groundwater are possible.

Based on historical data of mishaps at all U.S. installations worldwide, and under all conditions of flight, the military services calculate Class A mishap rates per 100,000 flying hours for each type of aircraft in the inventory. Combat losses due to enemy action are excluded from these statistics. Based on scheduled use of airspace regions, the annual amount of flight time for each aircraft using the airspace can be estimated. The Class A mishap rate per 100,000 flying hours can be used to compute a statistical projection of anticipated time between Class A mishaps in each applicable element of airspace. These data are only statistically predictive. Class A mishaps result from many factors, not simply the amount of flying time of the aircraft.

4.11.2.1 Biggs AAF

Overall, aircraft spend very little flight time at the airport. Nevertheless, operations in the airport environment create flight risks, since critical phases of flight occur here. As discussed, to minimize risks associated with these operations, CZs and safety zones have been established around Biggs AAF. All flight operations at Biggs AAF are conducted under positive control provided by control tower personnel. When Biggs' tower is closed, control reverts to the tower at EPIA. Furthermore, detailed operating procedures are documented to guide aviation activities around the airfield (USAADACENFB Regulation 95-1). There have been no aircraft accidents at Biggs AAF in the last 5 years (Pino, 1997). In 1996, more than 44,800 airborne operations were conducted at Biggs AAF (U.S. Army 1996h).

There are several rotary-wing alternate landing areas within the Fort Bliss cantonment area. These are fully described in local regulations, and hazards to flight existing in the immediate vicinity of the landing areas are clearly delineated (USAADACENFB Regulation 95-1).

Fort Bliss aviation activities also occur in portions of restricted airspace located north of the Main Cantonment Area. This includes R-5103, which extends over McGregor Range, and portions of R-5107A, which extend over the Doña Ana Range–North Training Areas.

4.11.2.2 Doña Ana Range–North Training Areas

Helicopter operations occur throughout the Doña Ana Range–North Training Areas. There are several landing areas, and terrain flying areas that support low-altitude flight operations. Detailed safety procedures govern the use of these facilities (U.S. Army, 1996f), and hazards to flight associated with the use of these areas are detailed (USAADACENFB Regulation 95-1).

In 1996, 384 aviation operations occurred in the Doña Ana Range–North Training Areas airspace that were directly associated with Fort Bliss operations. Table 4.11-4 summarizes statistically calculated risks of Class A mishaps associated with the use of this airspace by the primary aircraft involved. Shown are the specific aircraft, the Class A mishap rate per 100,000 flying hours associated with that aircraft, the time spent in the airspace, and the statistically calculated estimated interval between Class A mishaps that could be expected with that level of flight activity.

During the last 4 years, there has been one aircraft accident on the Doña Ana Range–North Training Areas. In 1995, an A-10 aircraft crashed just east of the War Highway.

4.11.2.3 McGregor Range

Rotary-wing operations occur throughout the McGregor Range area. There are several landing areas and terrain flying areas that support low-altitude flight operations. Detailed safety procedures govern the use of these facilities (U.S. Army, 1996f), and hazards to flight associated with the use of these areas are detailed (USAADACENFB Regulation 95-1).

Table 4.11-4. Projected Class A Mishaps–Doña Ana Range

Aircraft	*Class A Mishap Rate per 100,000 Flying Hours*	*Flight Hours per Year*	*Projected Time Between Class A Mishaps (in Years)*
A-10	2.56	2	19,531.2
C-12	0.00	5	N/A
C-130	0.99	11	9,182.7
C-135	0.69	16	9,058.0
C-141	0.32	5	62,500.0
E-2	1.09	1	91,743.1
F-14	5.76	25	694.4
F-16	4.57	61	358.7
F-117	1.69	15	3,944.8
T-33	N/A	10	N/A
T-38	1.60	3	20,833.3
H-1	3.43	52	560.7
H-47	2.94	28	1,214.8
H-53	6.79	63	233.8
H-58	0.51	353	555.5
H-60	0.47	23	9,250.7
H-64	2.89	17	2,035.4

Note: N/A = Not available/not applicable.
Source: U.S. Army, 1996aa.

In 1996, 842 aviation operations occurred in the McGregor Range airspace that were directly associated with Fort Bliss operations. Additionally, an unscored, air-to-ground bombing range (bomb circle), that is used by the USAF for training originating from HAFB is located in the northern portion of the McGregor Range. In 1997, 1,151 aircraft delivered training ordnance on that target.

Table 4.11-5 summarizes risks of Class A mishaps associated with use of this airspace by the primary aircraft involved with Fort Bliss operations over McGregor Range. Shown are the specific aircraft, the Class A mishap rate per 100,000 flying hours associated with that aircraft, the time spent in the airspace, and the estimated interval between Class A mishaps that could be expected with that level of flight activity. When airspace use by all fixed- and rotary-wing aircraft using McGregor Range is considered, there is little overall risk associated with aviation activities on McGregor Range. For all aircraft involved, the minimum statistically estimated time between Class A mishaps is more than 95 years. This involved F-16 aircraft flying 235 sorties. If this level of flight activity is considered to remain constant, it equates to one chance in 22,466 of an accident, or a risk probability of 0.00004. All other aircraft using the airspace have significantly lower risk.

During the last 5 years, one incident where two helicopters collided in mid-air occurred on McGregor Range. Both aircraft were destroyed (Pino, 1997).

4.11.3 Explosive Safety

4.11.3.1 Main Cantonment Area

All explosives stored on Fort Bliss are stored in fully licensed and approved storage areas and facilities. All quantity-distance criteria are satisfied. No explosive safety waivers are currently in effect (Tressler, 1997).

Table 4.11-5. Projected Class A Mishaps–McGregor Range

Aircraft	*Class A Mishap Rate per 100,000 Flying Hours*	*Flight Hours per Year*	*Projected Time Between Class A Mishaps (in Years)*
A-6	3.33	5	6,006.0
A-10	2.56	11	3,551.1
C-130	0.99	257	393.0
C-135	0.69	9	16,103.1
C-141	0.32	60	5,208.3
E-2	1.09	13	7,057.2
F-4	5.80	172	100.2
F-14	5.76	39	445.2
F-15	2.62	4	9,542.0
F-16	4.57	229	95.6
F-18	2.07	9	5,367.7
T-33	N/A	10	N/A
T-38	1.60	411	152.1
H-1	3.43	58	502.7
H-47	2.94	98	347.1
H-53	6.79	73	201.7
H-58	0.51	79	2,482.0
H-60	0.47	59	3,606.2
H-64	2.89	1	34,602.1

Sources: U.S. Army, 1996aa; USAF, 1998.

Fort Bliss is in the process of applying for a compatibility waiver from TRADOC. If approved, this waiver would allow for the comingling and adjacent storage of some explosives. Although this waiver would allow for this mixed storage, no quantity-distance criteria would be compromised. All inhabited facilities would remain outside of any separation safety zones (Tressler, 1997).

4.11.3.2 Biggs AAF

As indicated in Section 4.11.1, Biggs AAF has two approved “Hot Pads” that support trans-shipment of hazardous cargo. These locations satisfy all requirements for the temporary processing of explosive material. No explosive safety waivers are in effect (Pino, 1997).

4.11.3.3 South Training Areas

The South Training Areas contain no explosive storage facilities. This area has been widely used for ORV training, and while no archive search report has been done for these areas, the training experience makes the probability of explosive ordnance hazards low.

4.11.3.4 Doña Ana Range–North Training Areas

During use of the ranges, temporary storage for ordnance is available at the range camp. The unit using the range is responsible for ordnance safety and security during transport, storage, and use. During training, SOPs provide detailed guidance to ensure safe operations. The major impact area for ordnance used on the Doña Ana Range–North Training Areas is the Organ Mountains. The potential for ordnance or explosive hazards is high in these areas. The Army completed an archive search report for ordnance and explosive usage on the Doña Ana Range–North Training Areas in April 1999 (U.S. Army, 1999).

The following locations on the Doña Ana Range Complex is possible represent some of the areas with the highest potential for ordnance or explosive debris contamination. Historical documentation indicates that almost the entire present Doña Ana Range Complex has been used for ordnance-related activities. Many areas, especially those ranges to the west of War Highway 11, have received multiple uses from various weapons systems. Besides the intense use of specific locations, the overall range has been subjected to possible contamination from AAA activities.

TAs 3 through 7

All impact areas within the former AAA range fans may contain unexploded ordnance contamination. All weapons fired on the ranges, other than smaller caliber weapons, were high dud producers. A surface clearance of the former AAA range impact areas was accomplished prior to the establishment of the training areas, however, the sweep did not include any magnetometer or subsurface work. Climatic changes and shifting sands over the years may have resulted in the uncovering of ordnance contamination, as evidenced by the fact that duds and spent rounds are routinely discovered on the maneuver areas.

McNew Surplus Area

90mm guns positioned near U.S. Highway 54 were fired toward two impact areas—one to the north and one to the west. Both impact areas extended onto land declared surplus in 1946. A bomb and shell disposal team conducted a surface sweep of the impact areas, but again, no magnetometer or subsurface work was accomplished. The certificate of clearance for the land did not contain a guarantee of absolute clearance, due the density of the brush and drifting sand conditions.

Old Coe Lake

It was documented on several occasions that live bombs were dropped from aircraft onto unspecified areas of the Fort Bliss AAA Range. It is possible that the Old Coe Lake, often a dry lakebed, may have been used as a bomb target. The lakebed is readily identifiable from the air and during the 1940s was far from organized activity on the range. Aerial photos of the vicinity in 1944 depict numerous circular pattern scars in and around the lakebed. These scars may be impact craters from aerial bombing operations.

Doña Ana Dry Lake

It was documented on several occasions that live bombs were dropped from aircraft onto specific areas of the Fort Bliss AAA Range. In 1954, 32 500-pound bombs were dropped from a B-26 bomber onto to Doña Ana Dry Lake—an intermittent lake south of the Doña Ana Base Camp. This area may have been bombed on other occasions as well.

Organ Mountains Impact Area

This area, defined as all land west of War Highway 11 and north of the Doña Ana Base Camp, has served as an impact area since its acquisition. There is no evidence that the impact area has ever been cleared of ordnance contamination, other than select areas leading to the MPRC and established firing portions and ranges along the highway. The entire impact area has been utilized for the firing of high dud-producing ammunition ranging from 20mm and 40mm air defense artillery; 75mm, 90mm and 120mm AAA; 105, 155 and 8-inch howitzers; LAW, AT-4, 2.74-inch and 3.5-inch rockets; and 60mm, 80mm, and 4.2-inch mortars.

Various missiles, including Redeye, Dragon, TOW, aerial TOW, and Shillelagh, as well as 40mm grenade-launched ammunition have also been fired into the impact area.

4.11.3.5 McGregor Range

Ordnance and explosives are stored on McGregor Range in approved and licensed storage facilities. No explosive safety waivers are in effect (Tressler, 1997).

During training, use of ordnance on the range is guided by SOPs that provide detailed direction on the handling of explosives and explosive safety (U.S. Army, 1996f). When feasible, after an exercise, the area used is groomed to ensure proper disposal and disposition of all ordnance, including that which is considered an ordnance or explosive hazard. Impact areas are not sanitized on a regular basis. Therefore, ordnance or explosive hazards may be encountered in those areas. Detailed instructions in SOPs provide designating and marking of ordnance or explosive hazards if it is encountered. When necessary, EOD specialists are available to render the ordnance safe. It is either destroyed in-place, or removed for demolition on an EOD range (U.S. Army 1996f).

During 1996, an archive search report of potential ordnance and explosive hazards was prepared, addressing McGregor Range (U.S. Army, 1996bb).

The following locations on McGregor Range represent some of the areas with the highest potential for ordnance or explosive debris contamination. Review of historical documents indicates that almost all sections of McGregor Range have been used for ordnance-related activities. Many areas have received multiple uses from various weapons systems. Besides the intense use of specific locations, the overall range has been subjected to possible ordnance and explosive hazards from the high- and medium-altitude missiles. The report describes areas with potential ordnance and explosive hazards from both historical and current activities. Discussed are AAA ranges, and missile debris firing areas, MLRS areas, and missile debris areas.
292 These range areas have been in constant use as impact areas for years, and they will continue to serve this purpose. Access to these areas is not permitted due to the potential hazard of unexploded ordnance.

<u>AAA Ranges.</u> All impact areas within the AAA range fans may contain duds. All weapons fired on the ranges, other than the smaller caliber weapons, were high dud producers. Ordnance debris found in 1980 indicated that much debris was found outside the fan areas.

<u>Missile and Rocket Firing Areas.</u> The range fans and subsequent impact areas of the following locations should be considered as possible remaining ordnance areas.

FAW 4 & Appropriate Fans. The 20mm, 25mm, and 40mm ammunition fired on the range have been known in the past to be dud producers. Also, 81mm mortars were used on the range; these mortars were illuminating, not High Explosive (HE), but may still pose a hazard.

FAW 10 & Appropriate Fans. The 20mm, 25mm, and 40mm ammunition fired on the range have been known in the past to be dud producers. It has been documented that High Explosive Incendiary (HEI) 20mm Vulcan rounds were fired here. The 81mm mortar was present at this range as well.

<u>Cane Cholla.</u> This range may be very contaminated, depending on whether or not HE ammunition was fired. The 20mm, 25mm, and 40mm ammunition fired on the range have been known in the past to be dud producers. The 40mm ammunition included grenade-launched rounds. Illuminating 4.2-inch and 81mm mortars were also used on this range and may pose a hazard. The 2.75-inch Folding-fin aerial rockets (FFARs), AT-4s and LAW rockets fired on the range may pose the greatest threat.

SHORAD and TEXCOM Ranges. These ranges are kept relatively clean of surface debris because both are laser-certified. Human health and safety concerns are prime considerations when a range or target area is certified for laser use. This is due to the potential for eye damage from exposure to the laser beam. Therefore, target areas are cleared of any foreign or natural reflective surfaces before being certified for laser use. However, duds from the 40mm Sergeant York may still be present in the areas. At SHORAD, 2.75-inch HYDRA rockets, TOW missiles, and 25mm ammunition Dynamics Division Air Defense (DIVAD) gun test and various forms of the Gun Low-altitude Air Defense System (GLAADS) ammunition were fired. These may all be high dud producers. The 81mm illuminating mortars were also present at TEXCOM.

Field Firing Site A and Related Fans. Vulcan Army Training and Evaluation Program (ARTEP) firings of 20mm rounds took place on this range.

Duster and Small Arms Air Defense (SAAD) Range. Both 20mm and 40mm ammunition were fired on these ranges. Duds may be present.

MLRS Areas. Interviews with personnel familiar with the site indicate that HE submunitions may have been used in these areas, in addition to the inert metal rod submunitions.

Missile Debris. Documents from 1980 indicate that a considerable amount of missile debris was present in the northernmost part of the range, both within and beyond the established safety and scatter limits. Besides the high explosives in the missiles, many other potentially hazardous components and compounds are present in the units. These include rocket motors, their subsystems, and various fluids.

Meyer Range Complex

Range 4. This range has always functioned as a live fragmentation grenade course. Although supervision of the range was strict, the nature of the ammunition warrants a closer look.

Ranges 14, 15, and 16. These ranges, at one time or another, have functioned as U.S./Foreign Weapons Ranges. LAW rockets, AT-4s, Claymore mines, and 40mm grenade-launched ammunition have been used on the ranges, not to mention various undocumented foreign weapons. The 1996 SOP for the range indicated that no HE is allowed on Range 16. However, past SOPs did not have this restriction and HE ammunition was previously used on all these ranges.

Range 22. The NBC/Chemical, Biological, Radiological (CBR) range warrants some scrutiny due to the nature of the range.

4.11.3.6 Castner Range

Although Castner Range is officially inactive, incidents involving ordnance remaining on the range have continued over the years.

Ordnance and explosive hazards are present on the ground surface and possible in the subsurface soil of Castner Range. While the potential for these items is greatest on the desert floor and low foothills, these items have also been found in the steeper canyons. Undetonated ordnance poses a safety hazard because of the continuing potential for detonation and the decreasing stability of the explosive compounds and initiating mechanisms after firing and exposure to the weather. People trespassing on Castner Range are at an increased risk because of the potential for stepping on, or unknowingly handling an explosive ordnance item. Some ordnance and explosive hazards may be detonated without direct physical contact. While it is a safety concern, ordnance and explosive hazards generally pose less of a threat to the environment because the explosive materials are most often contained within the device.

Brush fires have occurred naturally on the range in the last few years and demonstrate another form of ordnance and explosive hazards. Emergency response personnel responding to brush fires in the summer of 1994 reported explosions within some areas of active burning. These were attributed to the detonation of ordnance as a result of the heat of the fires. Fire fighting crews were unable to directly extinguish fires where ordnance was present.

Exploded ordnance debris is less hazardous then unexploded ordnance, but there is a potential that incomplete detonation may result in exposed explosive compounds or initiating mechanisms. A further safety hazard is created by fragmented, jagged metal pieces that may be present on, and below the ground surface at Castner Range. The environmental hazard resulting from exploded ordnance is low, as the explosive compounds are normally consumed during detonation and are not widely available to environmental media such as the soil or surface water runoff.

"The Archives Search Report, Fort Bliss Castner Range" was prepared in 1994 (U.S. Army, 1994g). The first ordnance surface removal was conducted on 480 acres of land that appeared to pose the greatest risk to the public, as determined by the Archive Search Report and site reconnaissance work. These areas were known impact areas and ordnance disposal sites. Hazards included a variety of live and inert ordnance and ordnance fragments. An additional parcel of land (58 acres), known as the Castner Recreation Area, was also surveyed because local interest for acquisition of the parcel and use by the public was high. The Castner Recreation Area was found not to contain ordnance and the area is now in the process of being leased for nonmilitary use. This first phase of Castner Range cleanup required funding of $1.15 million.

A second phase of work began in June 1996, as a result of a second block of congressional funding of $1.0 million. A work plan was prepared and field work began in November 1996. The work plan divides the range into eleven investigation zones based on terrain features, probable hazards, and ease of access to the public. These zones were then evaluated and ranked in terms of the likelihood of ordnance occurrence and potential for contact with the public. The number of acres to be surveyed in each zone was then determined based on the results of previous work and zone accessibility. The surface sampling began in November 1996 and is expected to conclude in the Spring of 1997. The sampling action is accomplished by visually inspecting a predetermined amount of surveyed grids measuring 100 by 100 feet. These grids are located in areas that have high public access potential and have not been previously cleared in prior years' work. This survey effort is performed using trained personnel walking abreast in a line, spaced approximately 5 feet apart, visually inspecting the ground for ordnance items. This visual sweep-line methodology is identical to that used in the survey of the 538 acres in the first phase effort, and is a standard procedure. Items suspected of being ordnance or ordnance fragments are identified and removed, or if the ordnance is found to have a potential to detonate, it is destroyed in place by means of a controlled explosive charge. All scrap metal, including inert ordnance fragments, is inspected, collected, and moved to collection points for later turn-in for metal recycling. The cost of the ordnance survey is high because of the expertise and extensive safety precautions required.

At the completion of the field sampling effort, all data and information collected to date will be used to generate a report entitled, *"Engineering Evaluation/Cost Analysis"* (EE/CA). The EE/CA will document the extent of ordnance throughout the range, present clean-up alternatives based on future land use, the amount of risk reduction to the public afforded by each clean-up alternative, and the estimated costs.

A third phase of work subsequent to the EE/CA will require funding from congressional or other sources. Fort Bliss is actively pursuing funding in addition to a recently appropriated $1.0 million, to ensure continued progress.

Hazardous Materials and Items of Special Concern

4.12

4.12 HAZARDOUS MATERIALS AND ITEMS OF SPECIAL CONCERN

This section provides a description of the hazardous materials, items of concern, and related management programs at Fort Bliss. The ROI for hazardous materials and environmental media management programs includes the Main Cantonment Area, including Biggs AAF, and the Fort Bliss Training Complex.

4.12.1 Hazardous Materials

4.12.1.1 Hazardous Chemicals

Training exercises and installation maintenance require the use of many types of hazardous chemicals. Fort Bliss stores and uses hazardous chemicals, including a variety of flammable and combustible liquids. Types of hazardous chemicals used by the installation include acids, corrosives, caustics, glycols, compressed gases, aerosols, batteries, hydraulic fluids, solvents, paints, cleaning agents, pesticides, herbicides, lubricants, fire retardants, photographic chemicals, alcohols, insecticides, sealants, and ordnance.

Fort Bliss prepares a yearly chemical storage report in accordance with the *Emergency Planning and Community Right-to-Know Act* Section 312. The report identifies the hazardous chemicals stored on Fort Bliss in excess of 10,000 pounds and generally includes the chemical name, physical state of the chemical, associated hazards, type of storage container, amount stored, and storage locations. Twenty chemicals were identified in the 1996 report, to include: aqueous film-forming foam, ethylene glycol, hydraulic fluid, lube oil, oil-based paints, phosphorus, propane, thinner, diesel fuel, gasoline, JP-8, chlorine gas, methanol-based cleaner, sulfuric acid electrolite, latex paints, chlorofluorocarbons (CFCs), diphacione, isophorone diisocyanate, vinyl acetate, and SO_2.

In addition to the EPCRA Section 312 chemical storage report, Fort Bliss also prepares a yearly Section 313 chemical use data package. The data package is used to determine if Fort Bliss is required to submit Toxics Release Inventory (TRI) Form R Reports under EPCRA Section 313. Form R Reports must be submitted for each TRI chemical that is processed, manufactured, or otherwise used in excess of the reporting threshold quantity. The chemicals on Fort Bliss are categorized as “otherwise used” and the reporting threshold is 10,000 pounds per TRI chemical. In 1996, 13 Fort Bliss TRI chemicals exceeded the 10,000-pound threshold: 1,2,4-trimethyl benzene, benzene, chlorine gas, cumene, ethylbenzene, ethylene glycol, methanol, toluene, xylene, hexane, tert-butyl alcohol, naphtalene, methyl tert-butyl ether, and methyl ethyl ketone. Sufficient quantities of these chemicals fell under EPCRA activity exemptions listed in 40 CFR 372.38. As a result, Fort Bliss had no TRI chemicals to report in the 1996 reporting year.

4.12.1.2 Hazardous Waste

The use of some hazardous chemicals on Fort Bliss results in the generation of hazardous waste. The transportation, storage, and disposal of hazardous wastes are regulated by the DOT, the Occupational Safety and Health Administration (OSHA), EPA, the TNRCC, and the NMED. Hazardous waste generated at the Fort Bliss cantonment area, Castner Range, and South Training Areas is regulated by the TNRCC and hazardous waste generated at the McGregor and Orogrande ranges, and the Doña Ana Range–North Training Areas, in New Mexico is regulated by the NMED. Fort Bliss is categorized as a large quantity generator and produces an average of more than 1,000 kilograms of hazardous waste each month in both Texas and New Mexico locations. Commonly generated hazardous wastes may include used POL products, waste paint, solvents, used batteries, fuel filters, and explosive ordnance destruction wastes. In general, these wastes are generated from aircraft, vehicle, and ground support equipment maintenance, infrastructure maintenance, and training exercises (U.S. Army, 1997u).

The Fort Bliss hazardous waste program includes an *Installation Hazardous Waste Management Plan* and SOPs for the disposal of hazardous waste and POL products, waste accumulation points (WAPs), and "less-than-90-day" storage areas. These documents provide information on training; hazardous waste management roles and responsibilities; hazardous waste identification, accumulation, transportation, storage, and disposal; and spill control, consistent with federal and state regulations. In addition, a *Spill Prevention Control and Countermeasure Plan* (SPCCP) has been developed for the USAADACENFB, WBAMC, Biggs AAF, and the Fort Bliss Range Command to prevent discharges of oil and other hazardous chemicals into or upon navigable waters.

Initially, hazardous waste is managed by a generator (i.e., unit leader or manager, shop supervisor or foremen, or motor pool officer) who has received training in Hazard Communication and Hazardous Waste Site Operations. The waste is accumulated as it is generated in designated WAPs. Each WAP is designated, labeled, operated, and inspected in accordance with the SOP. Up to 55 gallons of a single hazardous waste stream or 1 quart of acutely hazardous waste may be accumulated in a WAP. There are approximately 60 WAPs at Fort Bliss, of which, approximately seven are located on the Doña Ana Range–North Training Areas, two on the Orogrande Range, and six on the McGregor Range.

Once a WAP container becomes 80 percent full, appropriate DOT labels are affixed; it is inspected by the Defense Reutilization and Marketing Office (DRMO)**,** and transported within 72 hours to a designated hazardous waste storage location. It is Fort Bliss policy that all waste be transported using on-site roads. On-site transportation does not require travel on public highways, therefore, manifests and placards are not required. Drivers are certified in accordance with DoD requirements (U.S. Army, 1996cc; McKernan, 1997).

There are nine "less-than-90-day" (no permit required) hazardous waste storage locations, one on each range and six within the cantonment area, and a newly upgraded *Resource Conservation and Recovery Act* Part B permitted hazardous waste storage location at Biggs AAF, Building 11614, for storing solid and liquid hazardous wastes for up to 1 year (McKernan, 1997). The facility at Building 11614 is permitted by the TNRCC for storage of RCRA hazardous waste as well as non-RCRA wastes classified by the TNRCC as Class 1. The TNRCC Class 1 waste is defined as any industrial solid waste or mixture of industrial solid wastes which, because of its concentration, or physical or chemical characteristics, is toxic; corrosive; flammable; a strong sensitizer or irritant; a generator of sudden pressure by decomposition, heat, or other means; or may pose a substantial present or potential danger to human health or the environment when improperly processed, stored, transported, disposed of, or otherwise managed.

A RCRA Part B Permit, Hazardous Waste 50296, was issued to Fort Bliss in January 1991 and is valid until January 2001. The facility includes seven permitted units that are divided into two areas: (1) the processing area, which includes a metal building (Unit 1) with a storage capacity of 8,800 gallons, a concrete pad (Unit 2) with a storage capacity of 31,900 gallons with no free-liquids, and a canopy facility (Units 3A and 3B) with a storage capacity of 16,720 gallons with no free liquids; and (2) the conforming storage area, which includes three modular buildings (Units 4, 5, and 6) for storing liquid wastes with a storage capacity of 19,800 gallons, and a concrete pad (Unit 7) with a storage capacity of 47,520 gallons with no free liquids. General information, facility siting, facility management, waste analysis, engineering reports, geology reports, closure and post-closure plans, financial assurance releases from solid waste units and corrective action, air quality, fees, and confidential information requirements for the RCRA Part B Permit and applicable modifications have been completed in compliance with TNRCC regulations (U.S. Army, 1994h).

Fort Bliss submits an Annual Waste Summary to the TNRCC in January of each year, detailing the management of each hazardous waste and Class 1 waste generated on site during the previous calendar year. A site activity report and a waste minimization report are also submitted to the TNRCC in accordance with the installation's hazardous waste permit. In addition, a Biennial Report is submitted to the TNRCC and EPA prior to March 1 in every even-numbered year and covers the activities for the previous odd-numbered years, per 40 CFR 262.41. This report details information on the hazardous wastes generated, including the DOT hazard class, EPA hazardous waste identification number, quantity of waste, the EPA Identification (ID) Number of each treatment, storage, and disposal facility the waste was sent to, and a description of the Fort Bliss waste minimization program. The amounts of hazardous waste generated by Fort Bliss operations in 1996 are provided in Table 4.12-1.

Table 4.12-1. Fort Bliss Hazardous Waste Generation Rates, 1996

Site	*Number of Pounds Recycled*	*Number of Pounds Shipped Off-site for Disposal*	*Number of Pounds Treated on Site*	*Total Pounds Generated*
New Mexico Locations				
Ranges: McGregor, Orogrande, and Doña Ana Range–North Training Areas	3,003	10,241	0	*13,244*
McGregor Open Detonation (OD) Treatment Unit	0	0	69	*69*
Texas Locations				
Main Cantonment Area	38,781	129,145	0	*167,926*
Total	*41,784*	*139,386*	*69*	*118,170*

Off-specification or stockpiled ordnance may also be classified as hazardous waste under the provisions of RCRA. At Fort Bliss, ordnance is expended in a variety of small arms, grenades, mortars, howitzers, artillery, rockets, and missiles during training exercises and testing activities. Currently, ordnance and explosive hazards are either detonated in-place with explosives or removed for disposal.

The NMED issued RCRA Part B Permit NM4213720101-01 to the USAADACENFB in June 1995. The permit authorizes treatment of hazardous waste munitions by open detonation at the OD Treatment Unit until June 2005. The OD Treatment Unit is a man-made excavation approximately 500 by 200 feet by 20-feet deep, used for the destruction of explosives or munitions by detonation from a disposal discharge and comprises two pits. It is located on an active portion of the McGregor Range within the impact area for ballistic aerial targets, large-caliber munitions, and guided rockets. Operations at the OD Treatment Unit are only conducted when the McGregor Range is inactive.

The OD Treatment Unit has been in use since 1965 to thermally treat pyrotechnics, explosives, and propellants produced from demilitarization of existing stockpiles and off-specification material. The EOD team conducts explosive treatment at the unit approximately three to four times per year, or generally, every quarter. Up to 2,500 pounds of explosives are currently permitted for treatment per quarter. Only 69 pounds were treated in calendar year 1996 as shown in Table 4.12-1 (U.S. Army, 1997v).

As part of the permit requirements, Fort Bliss submits a Biennial Report to the NMED that details the hazardous waste management activities for the OD Treatment Unit. The permit also requires semi-annual reporting of soil sampling in and around the OD Treatment Unit. The OD Treatment Unit has been sampled four times since the permit was issued. The sampling and analysis plan is provided in Attachment J of the permit. Samples are collected at the following locations at a depth of between 6 inches and 1 foot: one sample from the bottom of each of the two OD pits, three samples from the sides of each pit, four samples around the perimeter of each pit to evaluate the effect of kickout, and three background samples from an area of the site that has not been impacted by operations. Samples are collected from the following locations at a depth of surface to 6 inches, and 6 inches to 1 foot: eight random samples from the bottom of the treatment unit (flat excavated area surrounding the pits) and eight samples from the perimeter outside the treatment unit. In addition, samples are taken at 5-foot intervals from a 50-foot boring placed approximately in the middle of the treatment unit. The samples are analyzed for explosives, inorganics (including nitrate-nitrite constituents), metals, PCBs, and dioxins/furans. Metals and nitrate-nitrite concentrations are compared to established background levels and the explosives results are compared directly to the laboratory reporting limits. The results for the four compliance sampling events were not found to significantly differ from those of the initial unit characterization. However, the presence of Trinitrotrimethylenetriamine (RDX) and high-melting explosive or octogen (HMX), and the conditions at the outer station (001), will be investigated further during the next compliance sampling event.

A permit modification request for a revised sampling scope to reduce the level of sampling has been prepared and submitted to the NMED for review and consideration, due to the relative consistency in conditions at the OD Treatment Unit with ongoing activities. The compliance sampling scope and schedule will be revised as appropriate in accordance with NMED recommendations.

4.12.2 Items of Special Concern

4.12.2.1 Medical and Biohazardous Waste

Medical wastes include wastes generated by hospitals, clinics, physicians' offices, dental offices, veterinary facilities, and other medical laboratories and research facilities. Biohazardous waste can typically include human blood and blood products, cultures and stocks of infectious agents and associated biologicals, isolation wastes, contaminated and unused sharps, animal carcasses, contaminated bedding material, and pathological wastes. Radioisotopes used for medical purposes are discussed in Section 4.12.2-2.

Fort Bliss generates approximately 13,000 pounds of medical and biohazardous waste per month at the Dental Clinic, two Blood Banks, the Veterinary Clinic, the Troop Clinic, and WBAMC. Large-scale training exercises, such as Roving Sands, may add several thousand pounds of waste per month during the exercise. Waste is collected and stored at the generating locations. These wastes are picked up by a licensed medical waste contractor about every other day, and removed from the post. The waste is shipped to Dacona, Colorado, for disposal by Browning-Ferris Industries, Inc. (BFI) in their permitted facility (Sims, 1997).

4.12.2.2 Low-level Radioactive Waste

Various Fort Bliss commands and WBAMC generate small amounts of low-level radioactive waste. The William Beaumont Nuclear Medicine group has been granted a U.S. Nuclear Regulatory Commission (NRC) broadscope license for conducting research projects. These projects, in addition to use of radioisotopes for medical purposes, generate low-level waste. Fort Bliss commands also generate low-level radioactive waste such as unusable compasses, dials, targeting devices, gauges, and rocket sights. These wastes include tritium, radium, and promethium. Other radioactive materials, such as chemical warfare alarms and monitors are shipped back to the Anniston Army Depot for proper management and are not considered Fort Bliss wastes.

Radiological waste generated by WBAMC is managed by the hospital Radiation Protection Officer. All other low-level waste is managed by the Director of Health Services Radiation Protection Officer. Low-level waste is segregated at a turn-in point and is stored within a double-fenced, locked area on the

Main Cantonment Area. The waste is stored in 55-gallon drums. Fort Bliss generated approximately three 55-gallon drums of low-level radioactive waste from 1995 through 1996.

The Director of Health Services Radiation Protection Officer coordinates all radiological waste shipments with the Army Material Command, who in turn coordinates with the Barnwell, South Carolina, low-level waste disposal contractor. The disposal contractor completes the proper manifests and labels for the shipment and transports the waste from Fort Bliss to Barnwell, South Carolina.

4.12.2.3 Radon

Radon is found in high concentrations in rocks containing uranium, granite, shale, phosphate, and pitchblade. In outside air, radon is diluted to insignificant concentrations. If radon is present in soils surrounding a building, it could potentially enter the building through small openings and accumulate in enclosed areas such as basements.

The Fort Bliss radon monitoring program was discontinued in 1995 at the direction of the Director of Health Services, Preventive Medicine Department. The program was canceled based on the geological location of the Fort Bliss community, and the results of more than 500 completed radon tests, which showed radon not to be a public health threat. All analytical results for radon were below the regulatory threshold (Shahriyar, 1998).

4.12.2.4 Asbestos

Asbestos-containing materials (ACMs) are those materials that contain greater than 1 percent asbestos. Friable, finely divided, and powdered wastes containing greater than 1 percent asbestos are defined as wastes and are subject to regulation. A “friable” waste is one which can be reduced to a powder or dust under hand pressure when dry. Nonfriable, asbestos-containing wastes, such as floor tiles, are considered nonhazardous, regardless of their asbestos content, and are not subject to regulation.

Approximately 80 percent of all buildings on Fort Bliss contain some form of asbestos. Many of the buildings at Fort Bliss were built or renovated between 1940 and 1975, when the use of asbestos was common in the industry. The majority of the asbestos was in the form of pipe insulation, most of which has been removed and replaced with nonhazardous material. Several other types of ACMs, such as floor tiles, cement siding, and wall/ceiling coverings remain in place throughout Fort Bliss facilities. So long as these ACMs remain nonfriable, they are not a health risk.

To date, asbestos has been confirmed in approximately 800 buildings on post. Surveys are presently being conducted in buildings that have been identified for renovation or demolition. Asbestos abatement is done before renovation or demolition (Felix, 1997).

Fort Bliss has a *Draft Asbestos Management Plan* for the identification and removal of friable asbestos. Asbestos-containing waste materials resulting from demolition projects are disposed of in the Fort Bliss Municipal Solid Waste Landfill. The landfill permit from the Texas Department of Health allows disposal of ACM in the landfill. The material is disposed of at the bottom of the working cell and is covered by 1 foot of dirt or 3 feet of solid waste. The Fort Bliss DOE has an Asbestos Program Manager (APM) who is the primary contact for all asbestos-related projects at Fort Bliss. The APM has distributed a Command Policy Letter to all personnel regarding command responsibilities, personnel responsibilities, and procedures for accomplishing asbestos-related projects.

4.12.2.5 Lead-based Paint

For a number of years, the Federal Government has been working to reduce the health risk from lead-based paint in residences and other buildings where children are present. The use of lead-based paints for residential and consumer use was banned by the federal government in 1978. The EPA and HUD are in the process of developing a rule to implement the *Residential Lead-Based Paint Hazard Reduction Act of 1992 (*Federal Register, Vol. 63, No. 106, June 3, 1998, pages 3030 – 30355, "Proposed Rule, Identification of Dangerous Levels of Lead" seeking to promulgate vegetations consistent with Section 403 of the *Toxic Substances Control Act*, as amended by the *Residential Lead-Based Paint Reduction Act of 1992*). This rule specifically targets housing constructed before 1978.

As a means to control and minimize public exposure to lead, Fort Bliss has developed a draft *Lead Hazard Management Plan* that follows the provisions of the Texas Environmental Lead Reduction Rules. A Lead-based Paint Management Team is also in place at Fort Bliss that includes representatives from Family Housing, Preventive Medicine, the PAO, and the Staff Judge Advocate.

Many of the houses and facilities at Fort Bliss were constructed before 1978 and are likely to contain lead-based paints. A risk-based assessment has been completed on all family housing. A project for encapsulating or abatement of lead-contaminated surfaces on the exterior porches of family housing units has been implemented, and 100 houses have been completed.

Lead waste generated from the building demolition is characterized to determine if it is a hazardous waste. To date, all lead wastes have been determined to be nonhazardous and were disposed of in the Fort Bliss landfill. If the lead wastes were found to be hazardous, they would be stored in a less-than-90-day facility or the on-post permitted hazardous waste storage facility to await treatment or disposal at a permitted off-post facility (Felix, 1997). The on-post hazardous waste storage facility has a permit from the TNRCC. The permit was granted subject to the TNRCC rules.

4.12.2.6 Pesticides

It is DoD policy to reduce the use of pesticides and Fort Bliss has developed a *Pest Management Plan*, approved in December 1997, to meet this policy. The plan describes the installation's pest management requirements; outlines the resources necessary for surveillance and control of pests; and describes administrative, safety, and environmental requirements.

The Preventive Maintenance Section, Land Management Section, Underwood Golf Course, and Veterinary Clinic are responsible for pesticide and herbicide storage and/or application. Pesticides and herbicides are stored in their original containers at the following designated areas within the Fort Bliss cantonment area: the pesticide mixing/storage facility, Building 2509; the Underwood Golf Course; and the Veterinary Clinic. The containers are segregated by type and are positioned so the labels are visible. Consumer pesticide and herbicide products are stored and sold at the Commissary, PX Garden Shop, Family Housing Self-help Center, and the Self-service Supply Center. Consumer-purchased pesticides and pesticide containers are disposed as household hazardous waste through the Fort Bliss semi-annual household hazardous waste collection days, and excess or canceled pesticide containers managed by Fort Bliss are disposed by the DRMO. A sample inventory, from the *Pest Management Plan*, of the types and amounts of pesticides/herbicides maintained on Fort Bliss is provided in Table 4.12-2.

The Preventive Medicine Section conducts surveys throughout the year to determine what pests are present. This information is provided to the Preventive Maintenance Section to obtain the required pesticides for application. In accordance with EPA and DoD requirements, the program utilizes four

Table 4.12-2. Fort Bliss Pesticide Sample Inventory

Rodenticides	
Anticoagulant	0.5 lb. block
Rat and Mice Bait	5 lb. cans
Insecticides	
Apache Fly Bait	5 lb. (1 unit)
Carbaryl (Sevin)	60 lb. (6 units)
Combat Bait	252 packs (22 units)
Dipel Dust	224 oz. (14 units)
d-Phenothrin	1,560 oz. (130 units)
Dursban	15 lb.
Dursban-4E	13 gal. (13 units)
Ficam	3 lb. (3 units)
Malathion	220 gal. (44 units)
Perma-Dust	31 lb. (31 units)
Roach Motels	2 units
Safrotrin	87.5 fl. oz. (70 units)
Sevimol	5 gal.
Temp-20%	1,152 packs (48 units)
Torpedo TC	5 gal. (5 units)
ULD-B100	510 oz. (15 units)
ULD-B300	374 oz. (11 units)
Herbicides	
Atrex	8,250 lb.
Chipco 26019	16 gal.
CU2SO4	400 lb.
Dalapon	167 lb.
Hyvar	1,900 lb.
Krovar	1,026 lb.
Pramitol	250 lb.
Roundup	224 lb. (28 gal.)
Tordon	200 lb.
Miscellaneous	
Bird Repellent (liquid)	2 gal. (2 units)
Bird Repellent Roost-No-More	199.5 oz. (19 units)
Mildew Control	304 fl. oz. (19 units)
MSMA	29 gal.

Note: lb. = pound; oz. = ounce; l. = liter; gal. = gallon; fl. = fluid.
Source: U.S. Army, 1997w.

Certified Pest Controllers, five in-house DoD-Certified applicators, and the Underwood Golf Course employs one DoD-certified pest applicator. The primary application of pesticides on Fort Bliss is for the control of roaches, ants, and spiders. From January through August of CY 97, approximately 170 applications were provided to control these pests. The pesticides most commonly used for pest control and their approximate use amounts for 1997 include: Diazinon (201 ounces), Dursban (971 ounces), Ficam (23 ounces), Tempo 2 (8369 milliliters), Tempo 20 (3666 grams), Safrotrin (6 ounces), and Sevin

(10.51 pounds) (Jimenez, 1998). In addition, the Preventive Maintenance Section Roads and Grounds crew applies required herbicides such as Hyvar (Table 4.12-2). Pesticides and herbicides are only transported in assigned vehicles with lockable storage compartments and each vehicle is equipped with spill-control equipment.

Pesticide and herbicide management is tracked by the organizations that apply, store, or sell pesticides and herbicides to include the Preventive Maintenance Section, Land Management Section, Underwood Golf Course, Veterinary Clinic, and Self-help Center. The data tracked by these organizations includes the name of the target pest, type of operation, total units treated, unit, site, name of the pesticide/herbicide applied, amount, final concentration, and hours spent. This information is provided to the Preventive Maintenance Section on a monthly basis and is then recorded on Form 1532; monthly data is summarized and sent to Command Headquarters, TRADOC, Entomology in Fort Monroe, Virginia, at the end of each calendar year (McKernan, 1997; U.S. Army, 1997w). Data are converted from units of application (gallons, etc.) to “pounds of active ingredients” (PAI) applied. Preventive Maintenance personnel have been trained in the use of a DoD database that automatically calculates the PAI.

4.12.2.7 Polychlorinated Biphenyls

Due to the complex language associated with PCB management, the following definitions from 40 CFR 761.3 are included for reference:

- PCB and PCBs mean any chemical substance that is limited to the biphenyl molecule that has been chlorinated to varying degrees or any combination of substances that contains such substance.
- PCB Article means any manufactured article, other than a PCB Container, that contains PCBs and whose surface(s) has been in direct contact with PCBs. “PCB Article” includes capacitors, transformers, electric motors, pumps, and pipes.
- PCB Article Container means any package, can, bottle, bag, barrel, drum, tank, or other device used to contain PCB Articles or PCB Equipment, and whose surface(s) has not been in direct contact with PCBs.
- PCB Container means any package, can, bottle, bag, barrel, drum, tank, or other device that contains PCBs or PCB Articles and whose surface(s) has been in direct contact with PCBs.
- PCB-contaminated Electrical Equipment means any electrical equipment, including but not limited to transformers, capacitors, circuit breakers, reclosers, voltage regulators, switches (including sectionalizers and motor starters), electromagnets, and cable, that contain 50 ppm or greater PCB, but less than 500 ppm PCB. Oil-filled electrical equipment other than circuit breakers, reclosers, and cable whose PCB concentration is unknown must be assumed to be PCB-contaminated Electrical Equipment.
- PCB Equipment means any manufactured item, other than a PCB Container or a PCB Article Container, which contains a PCB Article or other PCB Equipment, and includes microwave ovens, electronic equipment, and fluorescent light ballasts and fixtures.
- PCB Item is defined as any PCB Article, PCB Article Container, PCB Container, or PCB Equipment, that deliberately or unintentionally contains or has a part of any PCB or PCBs.
- PCB Transformer means any transformer that contains 500 ppm PCB or greater.

- PCB waste(s) means those PCBs and PCB Items that are subject to the disposal requirements of 40 CFR 761.60.

The Fort Bliss PCB management program is comprised of a *PCB Management Plan*, updated SOPs, and a new PCB Compliance Tracking System database which includes:

- An inventory of all tested electrical and hydraulic equipment with data plate information;
- An updated inventory of new electrical equipment; and
- Tracking of "out of service" electrical equipment from "cradle-to-grave."

Fort Bliss has completed three PCB survey, testing, and labeling projects since 1990. The identified PCB transformers, capacitors, and other PCB items have been removed from service and disposed of properly through DRMO-Fort Bliss. There are approximately 300 PCB-contaminated transformers (equal to or greater than 50 ppm and less than 500 ppm of PCBs) in service. There are no regulatory requirements to replace these transformers.

In FY 98, TRADOC approved a $343,000 Bold Grant to replace these transformers with non-PCB transformers and dispose of them properly. Some of the advantages of this project are:

- Elimination of the risk due to leaks from the old transformers;
- Elimination of PCB spills;
- Elimination of the cost of disposal of contaminated soil; and
- Elimination of the potential for human exposure to PCBs.

In 1996, the DOE completed another project for testing hydraulic equipment, tactical vehicles, etc., for possible PCB contamination. The primary objective of this project was to comply with *Toxic Substances Control Act* (TSCA) regulations by surveying and testing for PCB content and labeling in accordance with 40 CFR 761. Phase I of the project identified a preliminary list of 436 facilities as candidate sites for PCB-contaminated equipment. Investigation of the 436 facilities in Phase II resulted in an inventory of 2,223 pieces of equipment that could be contaminated with PCBs. The majority of this equipment was eliminated from further consideration based on equipment management practices, schedules, date of manufacture, and communications with the EPA during the second and third phases of work.

Phase II activities involved initial field screening and confirmatory sampling of 107 pieces of equipment. All pieces tested negative for PCBs. Phase III, the final phase of work, resulted in the sampling and testing of 38 pieces of hydraulic equipment. All 38 samples were negative for PCBs. All 145 pieces of equipment sampled in Phases II and III were labeled with a blue, EPA-approved "non-PCB" label.

In January 1998, the DOE completed the construction of a PCB storage building at Biggs AAF. Fort Bliss is currently in compliance with all federal and state regulations regarding PCBs (Shahriyar, 1998; U.S. Army, 1997x).

Waste PCBs and PCB items are managed through the DRMO and sent to a designated off-site facility for disposal in accordance with TSCA regulations. PCB wastes are stored at a TSCA facility, separate from the RCRA Part B facility, before disposal. The PCB waste generation and disposal rates for CY 96 are provided in Table 4.12-3 (U.S. Army, 1997y).

4.12.2.8 Petroleum Storage Tanks

The Underground Storage Tanks (UST) regulations are the responsibility of the EPA and are regulated within RCRA as amended by the *Hazardous and Solid Waste Amendments (HSWA) of 1984*. The states

Table 4.12-3. Fort Bliss Polychlorinated Biphenyls Waste Generation and Disposal Rates for Calendar Year 96

Type	*Total Number Stored*	*Weight (lb.) of PCBs*	*Total Number Disposed*	*Weight (lb.) of PCBs*
Transformers	*14*	2,515	*14*	2,515
Capacitors	*14*	1,288	*14*	1,288
Light Ballasts	*240*	1,383	*240*	1,383
Oil Switches	*2*	252	*2*	252
PCB Article Containers (metal drums)	*7*	1,998	*7*	1,998
PCB Containers (polyurethane drums)	*2*	27	*2*	27

Source: U.S. Army, 1997y.

of Texas and New Mexico have adopted their own regulations and have been delegated the federal UST program. The Uniform Fire Code and National Fire Protection Association requirements that address USTs and Above Ground Storage Tanks (ASTs) may be enforced by state Fire Marshals.

Fort Bliss has completed a four-phase project to upgrade their existing USTs to meet federal and state requirements and reduce their total number of USTs to less than 150. By 1996, Fort Bliss had identified approximately 366 historical petroleum storage tanks. Records indicate that 136 USTs and 48 ASTs are currently in use for storing diesel fuel, leaded and unleaded gasoline, used oil, antifreeze, JP-8 jet fuel, and heating oil. These tanks range in size from 300 to 250,000 gallons. Of the 136 USTs and 48 ASTs, 3 USTs are located on the Doña Ana Range–North Training Areas; 4 USTs and 1 AST are located on the Orogrande Range; and 10 USTs and 1 AST are located on the McGregor Range. The remainder of the 366 tanks have been removed or remediated in place (Lenhart, 1997).

Fort Bliss had identified 33 sites that formerly had leaking petroleum storage tanks; of which, three were ASTs. The sites were reported to the TNRCC and NMED, as appropriate, and remedial actions were performed in consultation with the respective agency. The TNRCC has assigned leaking petroleum storage tank numbers to 26 of the sites. The NMED does not assign leaking petroleum storage tank (LPST) numbers; therefore, the site at Building B-8172 on the Doña Ana Range–North Training Areas, does not have an LPST number. Six other sites are under investigation and will go directly to closure requests without assigning LPST numbers at the request of the TNRCC. A list of the sites is provided in Table 4.12-4. The table includes the TNRCC LPST identification number, tank location, type of tank, and the remediation status (TNRCC, 1997b; Lenhart, 1997).

4.12.3 Related Management Programs

4.12.3.1 Installation Restoration Program

The Installation Restoration Program (IRP) is the DoD program designed to identify, characterize, and remediate the environmental contamination on military installations. The program was implemented in response to the *Comprehensive, Environmental Response, Compensation, and Liability Act (CERCLA)* requirements to remediate sites that posed a health threat. Section 211 of the *Superfund Amendments Reauthorization Act (SARA)* amended CERCLA and established the Defense Environmental Restoration Program (DERP) that ensures that DoD agencies have the right to conduct their environmental restoration programs.

Table 4.12-4. Leaking Petroleum Storage Tank Sites

LPST ID	*Location*	*Tank Type*	*Remediation Status*
TNRCC 092568	Fort Bliss, Building 11106	UST	Initial directives issued.
TNRCC 092812	Fort Bliss, Building 199	UST	Initial directives issued.
TNRCC 092865	Fort Bliss, Building 1742	UST	Initial directives issued.
TNRCC 097287	Fort Bliss, Building 1063	UST	Initial directives issued.
TNRCC 098508	Fort Bliss, Building 675	AST	Initial directives issued.
TNRCC 099908	Fort Bliss, Building 11024	UST	Initial directives issued.
TNRCC 100637	Fort Bliss, Building 2491	UST	Initial directives issued.
TNRCC 100638	Fort Bliss, Building 2469	UST	Initial directives issued.
TNRCC 100639	Fort Bliss, Building 5899	UST	Initial directives issued.
TNRCC 109907	Fort Bliss, Building 2549	UST	Initial directives issued.
TNRCC 109908	Fort Bliss, Building 11041	UST	Initial directives issued.
TNRCC 109909	Fort Bliss, Building 5898	UST	Initial directives issued.
TNRCC 109912	Fort Bliss, Building 5	UST	Phase 2 in progress.
TNRCC 109913	Fort Bliss, Building 1378	UST	Initial directives issued.
TNRCC 109915	Fort Bliss, Building 3689	UST	Initial directives issued.
TNRCC 109916	Fort Bliss, Building 11198	UST	Initial directives issued.
TNRCC 109924	Fort Bliss, Building 675	UST	Initial directives issued.
TNRCC 111014	Biggs Field Tank Farm	UST	Initial directives not yet issued.
TNRCC 111847	Fort Bliss, Building 11626	UST	Initial directives not yet issued.
TNRCC 111848	Fort Bliss, Building 2945	UST	Initial directives not yet issued.
TNRCC 111852	Fort Bliss, Building 56	UST	Initial directives not yet issued.
TNRCC 111854	Fort Bliss, Building 2921	UST	Initial directives not yet issued.
TNRCC 112035	Fort Bliss, Building 2033	AST	Initial directives not yet issued.
TNRCC 112175	Fort Bliss, Building 4115	UST	Initial directives not yet issued.
TNRCC 112176	Fort Bliss, Building 1326	UST	Initial directives not yet issued.
Not Assigned	Fort Bliss, Building 1780	UST	Investigation, direct to closure request.
Not Assigned	Fort Bliss, Building 2965	UST	Investigation, direct to closure request.
Not Assigned	Fort Bliss, Building 2972	AST	Investigation, direct to closure request.
Not Assigned	Fort Bliss, Building 7145	UST	Investigation, direct to closure request.
Not Assigned	Fort Bliss, Building 11283	UST	Investigation, direct to closure request.
Not Assigned	Fort Bliss, Building 11603	UST	Investigation, direct to closure request.
Not Assigned	Doña Ana Range, Building B-8172	UST	Investigation, direct to closure request.

Source: TNRCC, 1997b; Lenhart, 1997.

Historically, the materials that have been identified during DoD IRP activities have resulted from fuel management and spills, fire protection training, landfills, pesticide application, and industrial operations associated with vehicle operations and maintenance.

The NMED subpart X permit HSWA module listed 11 Solid Waste Management Units (SWMUs) that required RCRA Facility Investigations (RFIs). RFIs have been completed for the following nine sites and are awaiting review by the NMED Hazardous and Radioactive Materials Bureau: FTBL-021 McGregor Range Oxidation Pond SWMU 19; FTBL-022 Orogrande Oxidation Pond SWMU 25B; FTBL-023 Doña 170 233

Ana Oxidation Pond SWMU 27B; FTBL-051Meyer Range Oxidation Pond SWMU 76; FTBL-013 McGregor Range Rubble Pit/Landfill SWMU 18; FTBL-015 McGregor Range Open Detonation Area SWMU 20; FTBL-014 Orogrande Range Rubble Pit/Landfill SWMU 25; FTBL-027; Doña Ana Range Rubble Pit/Landfill SWMU 27; and FTBL-011 Doña Ana Range Sanitary Landfill SWMU 29. RFIs for the following two sites were completed in 1990 and reviewed by the NMED: FTBL-045 Waste Drum Storage Area (McGregor) SWMU 22, and FTBL-032 McGregor Former Fire Training Area SWMU 21. Field work to address data gaps identified by NMED was completed in October 1998.

The Fort Bliss IRP began in 1983 in response to an installation assessment. The primary contaminant of concern at Fort Bliss is POL. No off-post contamination has occurred and the post is not on the National Priorities List (NPL). A cooperative working relationship has been established between regulatory agencies and the IRP program managers. Citizens have participated in public meetings held before and during major restoration projects.

By 1996, a total of 75 IRP sites have been identified and entered into the Defense Site Environmental Restoration Tracking System (DSERTS). Forty-eight of these sites are SWMUs. In summary, 29 sites do not require further action; closure is underway on 7 sites; remedial design is anticipated for 16 sites; and 23 sites require site investigations, including the 11 sites investigated for the subpart X permit HSWA module (Blough, 1997, 1999).

4.12.3.2 Pollution Prevention

The HSWA of 1984 requires RCRA large-quantity generators to certify that a program is in place to reduce the amount and toxicity of hazardous waste. RCRA permits for treatment, storage, or disposal of hazardous waste must also contain this certification. As a RCRA large quantity generator and permitted storage and treatment facility, Fort Bliss has made this certification.

Regulations under TNRCC also require the development of a *Source Reduction/Waste Minimization Plan* by facilities that either generate large quantities of hazardous waste or release toxic chemicals. Army policy, set forth in AR 200-1, is to reduce the quantity or volume and toxicity of hazardous wastes generated by Army operations and activities wherever economically practicable or environmentally necessary. To meet these requirements, Fort Bliss developed a hazardous substance minimization (HAZMIN) plan. The HAZMIN plan, dated January 1996, only addresses the source reduction and waste minimization aspects of pollution prevention. In addition, Fort Bliss will adopt the IPPP being developed by the Air Force Center for Environmental Excellence to address other pollution prevention and waste minimization issues. These issues include water and air pollution, PCB management, reduction of ozone depleting substances, UST and POL management, energy conservation, EPCRA requirements, pesticide management, and solid waste management. The IPPP is scheduled for completion and implementation in July 1998.

In 1995, Fort Bliss was selected by TRADOC as one of six pilot installations for the implementation of the Hazardous Substance Management System (HSMS). The HSMS is the DoD-wide automated system for the “cradle-to-grave” tracking of hazardous materials purchased and used on post and of the hazardous wastes generated and disposed of as a result of using the hazardous materials. By February 3, 1998, Fort Bliss had achieved HSMS initial operational capability and limited hazardous material pharmacy (HazMart) operations had begun. The HazMart is composed of 11 pre-engineered hazardous material storage units, one 30-foot by 60-foot double-chambered cinder-block structure for the segregated storage of combustible and flammable products, and an administrative modular unit. The HazMart serves as the centralized location on post for the physical management or the requisitioning, receipt, storage, issue, usage, and eventual coordination for the disposal of hazardous material and hazardous waste.

Fort Bliss has a central recycling center and one drop-off point that has containers for cardboard, paper, glass, and plastics. Mandatory workplace recycling was implemented in November 1996 and a household recycling pickup program is underway. The recycling center currently recycles about 200 tons of material a month. Fort Bliss also has recycling programs for used antifreeze, wet lead acid batteries, used tires, used oil, scrap metal, aluminum cans, and solvents. A fluorescent tube-crushing operation is also being implemented to save valuable space at the landfill and to control the disposal of mercuric compounds contained in the tubes.

EO 13101, "Greening the Government Through Waste Prevention, Recycling and Federal Acquisition" (September 14, 1998), encourages the Federal Government to take a leadership role in the use of recycled products and recycling technology. EPA and DoD are implementing guidance for EO 13101.

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Socioeconomics

4.13

4.13 SOCIOECONOMICS

Socioeconomic resources include: population, economic development (employment and earnings), housing, education (public schools), law enforcement, fire protection, public finance, governmental structure, medical facilities, and quality of life. The ROI is defined as the geographical area within which the principal direct and secondary socioeconomic effects of actions associated with activities at Fort Bliss are likely to occur and where most consequences for local jurisdictions are expected. The ROI is resource-specific (employment, law enforcement, housing, etc.) and, thus, the geographic extent may vary from one socioeconomic resource to another.

Two major factors were important in determining the ROI used in the socioeconomic analysis. The first was the residential distribution pattern of current civilian personnel employed at Fort Bliss. This residential distribution is an aid in determining where the greatest effects would occur, because it reflects the revealed residential preferences of those currently employed at the installation. It also defines the area within which a high proportion of payroll expenditures (of both civilian and military personnel) can be expected to occur. Similar information is not available on the location of active duty personnel and their dependents who reside off the post. However, experience from other military installations suggests strongly that the geographical area containing the vast majority of military personnel is less extensive than that of the civilian personnel.

The second factor in determining the extent of the socioeconomic effects is the degree of linkage among the economies of the various communities in the region. This linkage, based on trade among sectors within the region, determines the nature and magnitude of multiplier effects of actions at the installation.

Utilizing data obtained from the Civilian Personnel Office (CPO) at Fort Bliss, it is possible to determine the place of residence of civilian personnel assigned to the post by ZIP Code area.

The database utilized for this task contained a total of 2,804 records, of which 2,631 were applicable to the task of identifying, at the aggregate level, the residential distribution of civilian personnel working at Fort Bliss. This distribution by ZIP Code area is presented in Table 4.13-1. Forty-eight ZIP Code areas in the State of Texas contain at least one civilian employee, as well as 16 areas in the State of New Mexico. Of the total number of entries, over 96 percent reported residence addresses in the State of Texas, with the remaining reporting a place of residence in neighboring New Mexico. Of the total 64 ZIP Code areas, only five (all located in El Paso County, Texas) contain in excess of 5 percent of the total number of personnel contained in the database. These five areas contain 61 percent of the total personnel. An additional 11 ZIP Code areas (10 in Texas and 1 in New Mexico) contain between 1 and 5 percent of the total civilian personnel. These latter areas contain, in aggregate, 33.2 percent of the entries contained in the database. Thus, 16 ZIP Code areas contain over 93 percent of the civilian personnel employed at Fort Bliss.

All of these ZIP Code areas are within approximately 15 miles of the Main Post. It is estimated that 2,528 (96.1 percent) of the civilian personnel reside within El Paso County, Texas; another 82 (3.1 percent) reside in Doña Ana County, New Mexico; and an additional 6 persons (0.2 percent) reside in Otero County, New Mexico. The three-county area contains 99.4 percent of the civilian personnel.

The economic impact that Fort Bliss has on surrounding communities includes, in addition to the influence of personnel directly associated with the installation, the effects of military retirees and their dependents, and the benefits they derive from the Federal Government. To a large extent, these retirees locate close to large military installations, such as Fort Bliss, to avail themselves of the services located there. This is especially the case where the installation in question houses a major medical facility, such as the WBAMC at Fort Bliss.

Table 4.13-1. ZIP Code Area Distribution of Civilian Personnel in Texas and New Mexico

Location	*ZIP Code Area*	*Number of Civilian Personnel*	*Percent of Total*	*Cumulative Percent*
El Paso County, Texas	79821	2	0.08%	
	79835	8	0.30%	0.38%
	79836	8	0.30%	0.68%
	79838	1	0.04%	0.72%
	79849	5	0.19%	0.91%
	79901	4	0.15%	1.06%
	79902	43	1.63%	2.70%
	79903	59	2.24%	4.94%
	79904	205	7.79%	12.73%
	79905	60	2.28%	15.01%
	79906	49	1.86%	16.88%
	79907	118	4.48%	21.36%
	79908	12	0.46%	21.82%
	79909	1	0.04%	21.85%
	79912	134	5.09%	26.95%
	79913	1	0.04%	26.99%
	79914	7	0.27%	27.25%
	79915	79	3.00%	30.25%
	79916	10	0.38%	30.63%
	79917	2	0.08%	30.71%
	79920	4	0.15%	30.86%
	79922	14	0.53%	31.39%
	79923	3	0.11%	31.51%
	79924	754	28.66%	60.17%
	79925	204	7.75%	67.92%
	79926	1	0.04%	67.96%
	79927	43	1.63%	69.59%
	79929	1	0.04%	69.63%
	79930	110	4.18%	73.81%
	79931	7	0.27%	74.08%
	79932	18	0.68%	74.76%
	79934	109	4.14%	78.91%
	79935	124	4.71%	83.62%
	79936	308	11.71%	95.32%
	79937	4	0.15%	95.48%
	79938	11	0.42%	95.90%
	79939	1	0.04%	95.93%
	79940	1	0.04%	95.97%
	79941	1	0.04%	96.01%
	79993	1	0.04%	96.05%
	79996	1	0.04%	96.09%
Other Areas of Texas	75090	1	0.04%	96.12%
	76017	1	0.04%	96.16%
	76905	1	0.04%	96.20%
	77034	1	0.04%	96.24%
	78239	1	0.04%	96.28%

Table 4.13-1. ZIP Code Area Distribution of Civilian Personnel in Texas and New Mexico (Continued)

Location	*ZIP Code Area*	*Number of Civilian Personnel*	*Percent of Total*	*Cumulative Percent*
Other Areas of Texas (Continued)	78745	1	0.04%	96.31%
	79790	1	0.04%	96.35%
Doña Ana County, New Mexico	88001	8	0.30%	96.66%
	88002	2	0.08%	96.73%
	88005	6	0.23%	96.96%
	88008	7	0.27%	97.23%
	88011	4	0.15%	97.38%
	88012	1	0.04%	97.42%
	88021	54	2.05%	99.47%
Otero County, New Mexico	88310	3	0.11%	99.58%
	88311	1	0.04%	99.62%
	88337	1	0.04%	99.66%
	88352	1	0.04%	99.70%
	88024	1	0.04%	99.73%
	88029	1	0.04%	99.77%
	88047	1	0.04%	99.81%
	88052	1	0.04%	99.85%
	88063	4	0.15%	100.00%
Total		*2,631*	*100.00%*	

The Directorate of Resource Management at Fort Bliss reports, on a consistent basis, payments made to military retirees and annuitants within the area falling within 100 miles of the post. This area includes the following counties in Texas: El Paso, Brewster, Culberson, Hudspeth, Jeff Davis (part), Presidio, and Terrell. It also includes the following counties in neighboring New Mexico: Doña Ana, Grant, Hidalgo, Lincoln, Luna, Otero, and Sierra. Of those retirees resident within this area, the largest proportion (68.7 percent) are Army retirees, with the USAF contributing an additional 22.5 percent. Within the part of this area contained in Texas, the proportion of Army retirees rises to 82.7 percent, yet comprises only 35.3 percent of the total in the New Mexico portion of the area. The majority (50.3 percent) of the retirees in the New Mexico part are USAF retirees, which is probably related to the presence of HAFB in Otero County, New Mexico (Table 4.13-2).

Table 4.13-2. Distribution of U.S. Department of Defense Retirees by Service and Area

Service	*Economic Impact Area*	*Texas Part*	*New Mexico Part*
Army	68.7%	82.7%	35.3%
Navy	6.7%	4.4%	12.0%
Marine Corps	2.1%	2.0%	2.4%
Air Force	22.5%	10.9%	50.3%
Total	100.0%	100.0%	100.0%

Source: DoD, 1993.

The major real property assets of Fort Bliss are located in three conterminous counties: El Paso County, Texas; and Doña Ana and Otero counties in New Mexico. The main post and Biggs AAF are located in El Paso County, the Doña Ana Range–North Training Areas are in Doña Ana County, and McGregor Range is in Otero County.

The ROI for each of the resource areas is based on (1) the place of residence (and implied patterns of purchases) of civilian employees of Fort Bliss, (2) the location of military retirees, (3) the location of facilities and real property associated with the post, and (4) the location of major settlements and concentrations of economic activity. The ROI for each of the resource areas utilized in this study is defined as follows:

- The three-county region comprised of El Paso County, Texas, and Doña Ana and Otero counties in New Mexico for demographics, economic development, and housing;
- El Paso ISD and Ysleta ISD (both in El Paso County, Texas) for education (public schools);
- Fort Bliss Law Enforcement Battalion, City of El Paso Police Department, and El Paso County Sheriff's Department for law enforcement;
- Fort Bliss Fire Department and City of El Paso Fire Department for fire protection;
- The City of El Paso and County of El Paso for public finance and government structure;
- The WBAMC at Fort Bliss and El Paso County for medical facilities; and
- Fort Bliss and the three counties of El Paso, Doña Ana, and Otero for quality of life.

4.13.1 Demographics

The ROI for population is the three-county area comprised of the counties of El Paso, Texas, and Doña Ana and Otero, New Mexico. The largest communities within this geographical area are the cities of El Paso, Texas; Las Cruces, New Mexico; and Alamogordo, New Mexico.

Although not included in the ROI, it is important to mention the strong cultural and economic links that exist between El Paso County, Texas, and Ciudad Juarez, located in Mexico, immediately adjacent across the Rio Grande, the fourth largest city in Mexico and largest city in the State of Chihuahua. The combined population of this international metroplex stood at 1,309,109 in 1990, with the largest contribution of 798,499 made by Ciudad Juarez and the remaining 591,610 residing in El Paso County, Texas. The population of the metroplex grew to 1,582,387 by 1995, at an average annual rate of 2.6 percent over 1990 to 1995. The population of Ciudad Juarez over this time period grew at an average annual rate of 2.8 percent, while that of El Paso County grew at 2.4 percent.

4.13.1.1 Fort Bliss

As of the end of FY 96, active duty personnel present on post numbered 11,530. This number showed a marked decline (of 25.9 percent) from the previous year (15,562 personnel) and a decline of 41.3 percent from the number present in FY 91 (19,648 persons). Over the period FY 90 through FY 96, the number of active duty personnel on post has declined at an average annual rate of 8.8 percent per year. The number of active duty family members living on the post has fallen only moderately over the same time period, from 9,079 in FY 90 to 8,069 in FY 96. This small decline is attributable to the Army policy of maintaining high occupancy rates for military family housing. By comparison, the number of active duty military family members residing off the post has declined from 15,316 to 8,371 over the same time period, at an average annual rate of decline of 9.6 percent. Between FY 90 and FY 96, the total number of military personnel and dependents assigned to Fort Bliss fell from 44,399 persons to 27,970 persons, exhibiting an average annual decline of 7.4 percent, as shown in Table 4.13-3 and Figure 4.13-1.

Table 4.13-3. Fort Bliss Personnel (Active Duty and Civilian) and Dependents, Fiscal Year 90 to Fiscal Year 96

FY	*Active Duty Personnel (On Post)*	*Active Duty Family Members (On Post)*	*Active Duty Family Members (Off Post)*	*Military Retirees*	*Military Retiree Family Members*	*Total Military & Family Members*	*Civilian Personnel (On Post)*	*Civilian Personnel Family Members**	*On Post Employment*	*Total Population Supported (Including Retirees)*	*Total Population Supported (Excluding Retirees)*
1990	20,004	9,079	15,316	15,052	24,986	*84,437*	7,664	17,244	27,668	*109,345*	*69,307*
1991	19,648	9,781	16,630	15,034	24,984	*86,077*	7,797	17,543	27,445	*111,417*	*71,399*
1992	19,788	9,678	16,606	15,072	24,666	*85,810*	7,765	17,471	27,553	*111,046*	*71,308*
1993	19,431	8,951	14,667	15,241	27,421	*85,711*	7,608	17,118	27,039	*110,437*	*67,775*
1994	17,149	9,026	14,615	23,552	35,324	*99,666*	7,579	17,053	24,728	*124,298*	*65,422*
1995	15,562	8,522	10,582	24,492	36,738	*95,896*	7,524	16,929	23,086	*120,349*	*59,119*
1996	11,530	8,069	8,371	14,299	21,900	*64,169*	7,140	16,065	18,670	*87,374*	*51,175*

* Average family size for El Paso County in 1990 of 3.25 persons is assumed.

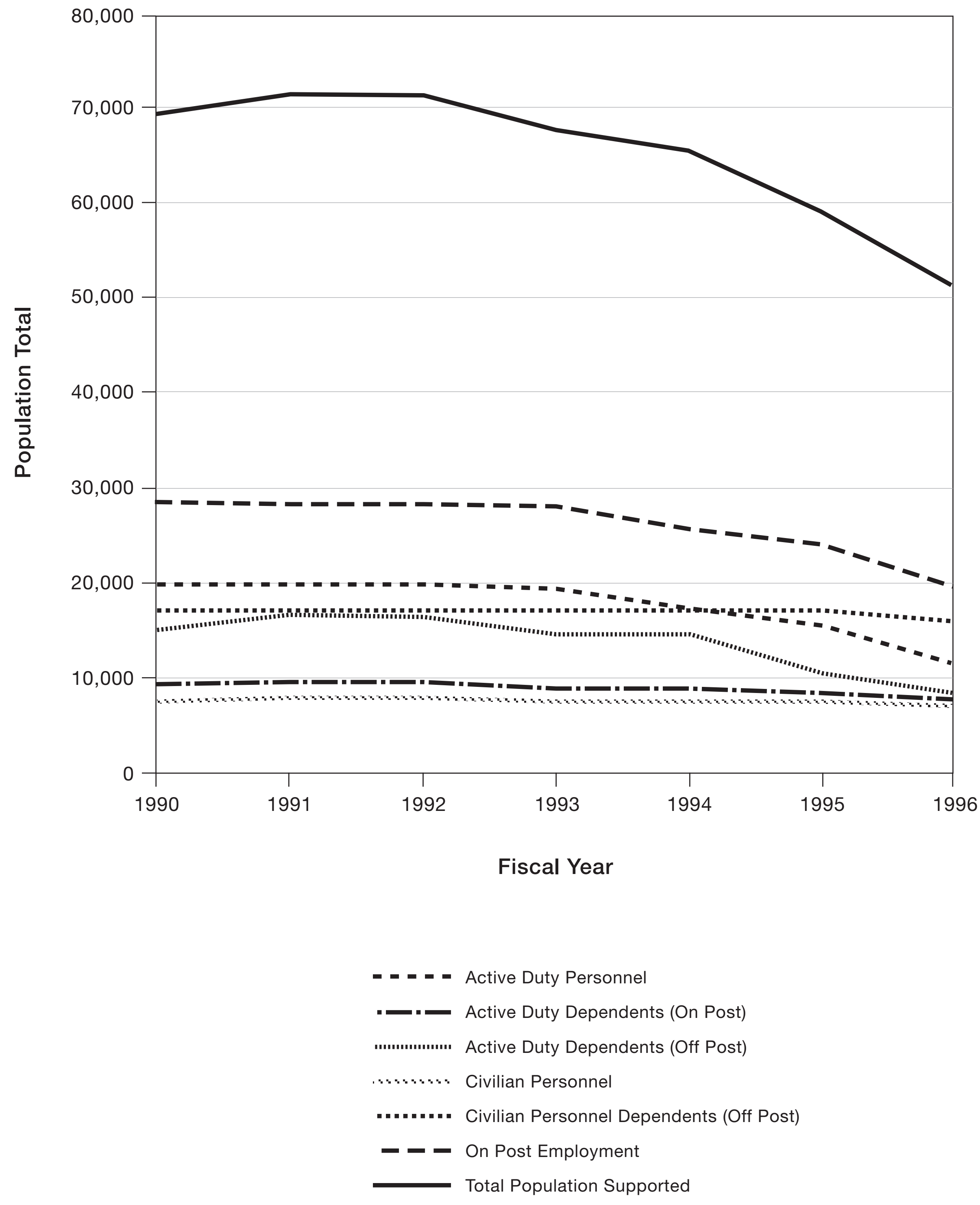

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Figure 4.13-1. Fort Bliss Population, Fiscal Year 1990 to Fiscal Year 1996.

The estimated total population supported by Fort Bliss (defined as the number of active duty military personnel and civilian employees, and each of their respective dependents) has ranged from a high of 71,399 persons in FY 91, to a low in FY 96 of 51,175, a reduction of 28.3 percent over a 5-year period, as shown in Figure 4.13-1. This population was estimated to number 69,307 in FY 90, which represents 8.9 percent of the total population contained in the three-county ROI, and 11.7 percent of the El Paso County population. By FY 95, this Fort Bliss population contingent had fallen to 59,119, which comprised 6.7 percent and 8.9 percent, respectively, of the population of the ROI and El Paso County.

4.13.1.2 Counties and Communities

Historic and Current. The population in the ROI, i.e., the three-county region (comprised of El Paso County, Texas, and Doña Ana and Otero counties, New Mexico) increased over the period 1970 to 1995 from 470,161 persons to 880,883 persons, at an average annual rate of 2.54 percent. The highest growth rate occurred in the 1970s (at an average annual rate of 2.82 percent), followed by the 1990s (at 2.49 percent), and the 1980s (at 2.29 percent), as shown in Table 4.13-4**.** This growth, in all time periods, exceeded that of both the states of New Mexico and Texas, as well as the nation.

Of the three counties, the most rapid growth was experienced in Doña Ana County, New Mexico, where the average annual rate of change registered 3.35 percent over the period 1970 to 1995. The population more than doubled from 69,773 in 1970 to 158,849 in 1995. The population of El Paso County, Texas, grew at an average annual rate of 2.51 percent over the 25-year period, with the population increasing from 359,291 in 1970 to 667,007 in 1995. The least rapid growth occurred in Otero County, New Mexico, where the number of residents increased from 41,097 in 1970 to 55,027 in 1995 (at an average annual rate of 1.17 percent) as shown in Table 4.13-4.

Of the total population in El Paso County, Texas, in 1990, the overwhelming proportion (87.1 percent) is contained within the City of El Paso. Five other incorporated places (Anthony, Clint Town, Horizon City, Socorro Town, and Vinton Village) contain an additional 5.1 percent of the total county population, leaving 7.8 percent of the population residing in unincorporated areas. In the case of Doña Ana County, New Mexico, almost half (45.8 percent) of the total county population reside in unincorporated portions of the county. The largest incorporated community (the City of Las Cruces) contained 45.9 percent of the county population, with other incorporated places contributing 8.3 percent. In Otero County, New Mexico, over half (53.1 percent) of the county population reside in the City of Alamogordo. An additional 6.3 percent of the county population reside in other smaller incorporated communities, with the remaining 40.6 percent of the population residing in unincorporated sections of the county. Each of the counties contains only one sizable community: City of El Paso in El Paso County; City of Las Cruces in Doña Ana County; and City of Alamogordo in Otero County.

Population Projections. Population projections for the years 2000, 2005, 2010, 2015, 2020, 2025, and 2030 are presented in Table 4.13-5 for the states of New Mexico and Texas; each of the three counties in the ROI; and the cities of Alamogordo, El Paso, and Las Cruces. The population of El Paso County is anticipated to increase well above the rate projected for the State of Texas. The average annual growth rate is projected to decline from 2.50 percent during the period 2000 to 2010, to 2.35 percent between 2010 and 2020, and to 2.22 percent over the period 2020 to 2030. Growth for the City of El Paso is projected to be less than that for the county, declining over each of the three time periods from 1.93 percent, to 1.87 percent, to 1.72 percent, on average, per year.

The projected population growth rate for the State of New Mexico is anticipated to average 1.68 percent per year over the period 2000 to 2010, and 1.6 percent over the periods 2010 to 2020 and 2020 to 2030. The rates of change for both Doña Ana and Otero counties are below those projected for the state.

Table 4.13-4. Population of Region of Influence, Counties, States, and Nation (1970 to 1995)

Geographical Area	*Population*				*Average Annual Percentage Growth Rate*			
	1970	*1980*	*1990*	*1995*	*1970–1980*	*1980–1990*	*1990–1995*	*1970–1995*
United States	203,302,020	226,542,204	248,718,291	262,755,270	1.09%	0.94%	1.10%	1.03%
State of New Mexico	1,017,055	1,303,302	1,515,069	1,685,401	2.51%	1.52%	2.15%	2.04%
Doña Ana County	69,773	96,340	135,510	158,849	3.28%	3.47%	3.23%	3.35%
Otero County	41,097	44,665	51,928	55,027	0.84%	1.52%	1.17%	1.17%
State of Texas	11,198,655	14,225,513	16,986,335	18,723,991	2.42%	1.79%	1.97%	2.08%
El Paso County	359,291	479,899	591,610	667,007	2.94%	2.11%	2.43%	2.51%
Three-county ROI	470,161	620,904	779,048	880,883	2.82%	2.29%	2.49%	2.54%

Source: U.S. Department of Commerce, 1993a.

Table 4.13-5. Population Projections, 2000 to 2030

Geographic Area	*Year*							*Rate of Change*		
	2000	*2005*	*2010*	*2015*	*2020*	*2025*	*2030*	*2000–2010*	*2010–2020*	*2020–2030*
Texas [1]	20,344,813	22,163,397	24,128,848	26,303,267	28,684,923	31,230,913	33,912,478	1.72%	1.74%	1.69%
El Paso County [2]	778,674	883,232	996,771	1,119,881	1,257,975	1,408,823	1,566,848	2.50%	2.35%	2.22%
City of El Paso [2]	661,095	727,424	800,407	878,124	963,386	1,049,209	1,142,678	1.93%	1.87%	1.72%
New Mexico [4]	1,851,916	2,017,558	2,188,443	2,368,643	2,563,681	2,774,779	3,003,259	1.68%	1.60%	1.60%
Doña Ana County [4]	173,677	188,566	203,412	218,368	234,424	251,660	270,163	1.59%	1.43%	1.43%
City of Las Cruces [3]	79,624	86,450	93,256	100,113	107,474	115,376	123,859	1.59%	1.43%	1.43%
Otero County [4]	56,740	59,473	62,683	66,232	69,982	73,944	78,131	1.00%	1.11%	1.11%
City of Alamogordo [3]	30,153	31,606	33,312	35,198	37,190	39,296	41,521	1.00%	1.11%	1.11%
Three-county ROI	1,009,091	1,131,271	1,262,866	1,404,481	1,562,381	1,734,427	1,915,142	2.27%	2.15%	2.06%

1. Scenario 1.0. Source: Texas A&M University et al., 1996.
2. Medium growth scenario. Source: Texas A&M University et al., 1996.
3. Assumes community has constant (1990) share of county population.
4. Projections past 2015 assume continuation of 2010–2015 growth rate.

4.13.2 Economic Development

The ROI for economic development is comprised of the three-county area of El Paso, Texas, and Doña Ana and Otero counties, New Mexico. Together, these counties supported 387,641 jobs in 1994, having increased from 195,275 jobs in 1970. The region experienced an average annual growth rate of 3.49 percent in the 1970s, 2.61 percent in the 1980s, and 2.15 percent in the 1990s. Employment at Fort Bliss declined over the period FY 90 to FY 96, from 27,668 (20,004 active duty military and 7,664 civilian personnel) to 18,670 (11,530 active duty and 7,140 civilian personnel).

4.13.2.1 Employment

Fort Bliss. As of the end of FY 96, active duty personnel present on post numbered 11,530. This number showed a marked decline (of 25.9 percent) from the previous year (15,562 personnel) and a decline of 41.3 percent from the number present in FY 91 (19,648 persons). Over the period FY 90 through FY 96, the number of active duty personnel on post has declined by an average of 8.7 percent per year. Over the same time period, the number of civilian personnel on the post has declined from 7,664 to 7,140 (at an average annual rate of 1.2 percent). Total employment (active duty military and civilian) on the post remained relatively stable over the period FY 90 through FY 93, at over 27,000 personnel. However, over the next 3 years, the number of personnel fell to 18,670; a decline of almost 25 percent, as shown in Table 4.13-3. It is estimated that in FY 90, total employment at Fort Bliss (active duty military and civilian personnel) numbered 27,668. This comprised 7.8 percent of the total full- and part-time employment in the three-county ROI. It contributed 10.2 percent of the employment in El Paso County. By FY 94, these shares had declined to 7.0 percent for the ROI and 9.1 for El Paso County.

Counties: Historic and Current. Total full- and part-time employment in the three-county ROI rose from 195,565 jobs in 1970 to 394,509 jobs in 1995. This increase exhibited the following average annual rates of change: 3.6 percent in the 1970s; 2.5 percent in the 1980s; and 2.1 percent in the 1990s, as shown in Table 4.13-6. The preponderance of this employment is concentrated in El Paso County, Texas, which contributed 76.3 percent of the total regional employment in 1970; 77.4 percent in 1980; 76.3 percent in 1990; and 75.9 percent in 1995, as shown in Table 4.13-7.

Table 4.13-6. Three-county Region of Influence: Full- and Part-time Employment by Type and Industry, 1970, 1980, 1990, and 1995

Three-county ROI	*Year*				*Average Annual Percentage Change*		
	1970	*1980*	*1990*	*1995*	*1970–1980*	*1980–1990*	*1990–1995*
Total full- and part-time employment	*195,565*	*277,615*	*355,152*	*394,509*	*3.57%*	*2.49%*	*2.12%*
By Type:							
Wage and salary employment	176,788	245,667	305,561	340,273	3.34%	2.21%	2.18%
Proprietors' employment	18,777	31,948	49,591	54,236	5.46%	4.50%	1.81%
Farm proprietors' employment	1,545	1,776	2,051	2,140	1.40%	1.45%	0.85%
Nonfarm proprietors' employment	17,232	30,172	47,540	52,096	5.76%	4.65%	1.85%
By Industry:							
Farm employment	4,780	4,600	4,129	4,490	-0.38%	-1.07%	1.69%
Nonfarm employment	190,785	273,015	351,023	390,019	3.65%	2.55%	2.13%
Private employment	124,827	191,739	261,021	296,364	4.39%	3.13%	2.57%

Table 4.13-6. Three-county Region of Influence: Full- and Part-time Employment by Type and Industry, 1970, 1980, 1990, and 1995 (Continued)

Three-county ROI	*Year*				*Average Annual Percentage Change*		
	1970	*1980*	*1990*	*1995*	*1970–1980*	*1980–1990*	*1990–1995*
Ag. serv., forestry, fishing, and other	823	1,950	3,670	5,093	9.01%	6.53%	6.77%
Mining	287	723	864	822	9.68%	1.80%	-0.99%
Construction	8,795	13,388	16,116	21,035	4.29%	1.87%	5.47%
Manufacturing	26,290	40,146	47,102	51,653	4.32%	1.61%	1.86%
Transportation and public utilities	10,638	13,630	15,259	17,774	2.51%	1.14%	3.10%
Wholesale trade	7,850	11,247	14,698	15,558	3.66%	2.71%	1.14%
Retail trade	28,881	43,627	60,195	67,829	4.21%	3.27%	2.42%
Finance, insurance, and real estate	10,234	19,129	21,481	21,616	6.45%	1.17%	0.13%
Services	31,029	47,899	81,636	94,984	4.44%	5.48%	3.08%
Government and government enterprises:	65,958	81,276	90,002	93,655	2.11%	1.03%	0.80%
Federal, civilian	16,862	15,630	16,580	14,652	-0.76%	0.59%	-2.44%
Military	27,524	28,876	24,215	19,897	0.48%	-1.74%	-3.85%
State and local	21,572	36,770	49,207	59,106	5.48%	2.96%	3.73%
Military as Percent of Total	14.07%	10.40%	6.82%	5.04%	NA	NA	NA

Note: NA = Not Applicable.
Source: U.S. Department of Commerce, 1996a.

Table 4.13-7. El Paso County, Texas: Full- and Part-time Employment by Type and Industry, 1970, 1980, 1990, and 1995

El Paso county, Texas	*Year*				*Average Annual Percentage Change*		
	1970	*1980*	*1990*	*1995*	*1970–1980*	*1980–1990*	*1990–1995*
Total full- and part-time employment	*149,255*	*214,839*	*270,799*	*299,508*	*3.71%*	*2.34%*	*2.04%*
Wage and salary employment	135,444	190,737	234,519	261,538	3.48%	2.09%	2.20%
By Type:							
Proprietors' employment	13,811	24,102	36,280	37,970	5.73%	4.17%	0.91%
Farm proprietors' employment	434	441	448	493	0.16%	0.16%	1.93%
By Industry:							
Nonfarm proprietors' employment	13,377	23,661	35,832	37,477	5.87%	4.24%	0.90%
Farm employment	1,937	1,151	1,028	1,101	-5.07%	-1.12%	1.38%
Nonfarm employment	147,318	213,688	269,771	298,407	3.79%	2.36%	2.04%
Private employment	102,391	157,499	208,519	234,325	4.40%	2.85%	2.36%
Ag. serv., forestry, fishing, and other	353	748	1,516	2,077	7.80%	7.32%	6.50%
Mining	172	679	693	603	14.72%	0.20%	-2.74%
Construction	7,205	10,332	12,258	15,054	3.67%	1.72%	4.19%
Manufacturing	23,895	36,422	41,783	47,621	4.31%	1.38%	2.65%
Transportation and public utilities	8,881	11,641	12,079	14,485	2.74%	0.37%	3.70%
Wholesale trade	7,385	10,133	13,289	13,803	3.21%	2.75%	0.76%
Retail trade	22,883	34,936	46,539	51,995	4.32%	2.91%	2.24%
Finance, insurance, and real estate	8,300	15,813	17,075	16,696	6.66%	0.77%	-0.45%
Services	23,317	36,795	61,252	71,991	4.67%	5.57%	2.61%
Government and government enterprises:	44,927	56,189		64,082	2.26%	0.87%	0.91%
Federal, civilian	8,879	8,547	9,508	8,659	-0.38%	1.07%	-1.85%
Military	20,773	21,378	17,487	13,810	0.29%	-1.99%	-4.61%
State and local	15,275	26,264	34,257	41,613	5.57%	2.69%	3.97%
Military as Percent of Total	13.92%	9.95%	6.46%	4.61%	NA	NA	NA

Note: NA = Not Applicable.
Source: U.S. Department of Commerce, 1996a.

Employment in the counties located in New Mexico also grew at considerable rates. In Doña Ana County, full- and part-time employment increased at an average annual rate of 3.9 percent in the 1970s; 3.9 percent in the 1980s; and 2.8 percent in the 1990s, as shown in Table 4.13-8. In the case of Otero County, the respective rates were much lower: 1.8 percent in the 1970s; 1.2 percent in the 1980s; and 1.5 percent in the 1990s, as shown in Table 4.13-9. By way of comparison, corresponding growth rates for the nation were 2.3 percent in the 1970s; 2.0 percent in the 1980s; and 1.3 percent in the 1990s. For the State of Texas, the respective rates were 4.1 percent, 2.2 percent, and 2.4 percent; while for the State of New Mexico they were 4.2 percent, 2.6 percent, and 3.2 percent, as shown in Tables 4.13-10, 4.13-11, and 4.13-12, respectively.

Table 4.13-8. Doña Ana County, New Mexico: Full- and Part-time Employment by Type and Industry, 1970, 1980, 1990, and 1995

Doña Ana County New Mexico	*Year*				*Average Annual Percentage Change*		
	1970	*1980*	*1990*	*1995*	*1970–1980*	*1980–1990*	*1990–1995*
Total full- and part-time employment	*27,087*	*39,758*	*58,419*	*67,126*	*3.91%*	*3.92%*	*2.82%*
By Type:							
Wage and salary employment	23,599	34,294	48,656	55,420	3.81%	3.56%	2.64%
Proprietors' employment	3,488	5,464	9,763	11,706	4.59%	5.98%	3.70%
Farm proprietors' employment	824	936	1,159	1,195	1.28%	2.16%	0.61%
Nonfarm proprietors' employment	2,664	4,528	8,604	10,511	5.45%	6.63%	4.09%
By Industry:							
Farm employment	2,458	2,937	2,548	2,798	1.80%	-1.41%	1.89%
Nonfarm employment	24,629	36,821	55,871	64,328	4.10%	4.26%	2.86%
Private employment	14,218	23,329	37,828	45,071	5.08%	4.95%	3.57%
Ag. serv., forestry, fishing, and other	436	1,106	1,992	2,774	9.76%	6.06%	6.85%
Mining	64	27	129	172	-8.27%	16.93%	5.92%
Construction	1,169	2,282	2,988	4,440	6.92%	2.73%	8.24%
Manufacturing	1,229	2,695	3,982	2,943	8.17%	3.98%	-5.87%
Transportation and public utilities	1,287	1,315	2,014	2,249	0.22%	4.36%	2.23%
Wholesale trade	340	934	1,105	1,443	10.63%	1.70%	5.48%
Retail trade	4,005	5,500	9,846	11,638	3.22%	6.00%	3.40%
Finance, insurance, and real estate	1,420	2,280	3,382	3,722	4.85%	4.02%	1.93%
Services	4,268	7,190	12,390	15,690	5.35%	5.59%	4.84%
Government and government enterprises:	10,411	13,492	18,043	19,257	2.63%	2.95%	1.31%
Federal, civilian	4,932	4,342	4,744	3,761	-1.27%	0.89%	-4.54%
Military	557	565	805	742	0.14%	3.60%	-1.62%
State and local	4,922	8,585	12,494	14,754	5.72%	3.82%	3.38%
Military as Percent of Total	2.06%	1.42%	1.38%	1.11%	NA	NA	NA

Note: NA = Not Applicable.
Source: U.S. Department of Commerce, 1996a.

Table 4.13-9. Otero County, New Mexico: Full- and Part-time Employment by Type and Industry, 1970, 1980, 1990, and 1995

Otero County, New Mexico	*Year*				*Average Annual Percentage Change*		
	1970	*1980*	*1990*	*1995*	*1970–1980*	*1980–1990*	*1990–1995*
Total full- and part-time employment	*19,223*	*23,018*	*25,934*	*27,875*	*1.82%*	*1.20%*	*1.45%*
By Type:							
Wage and salary employment	17,745	20,636	22,386	23,315	1.52%	0.82%	0.82%
Proprietors' employment	1,478	2,382	3,548	4,560	4.89%	4.06%	5.15%
Farm proprietors' employment	287	399	444	452	3.35%	1.07%	0.36%
Nonfarm proprietors' employment	1,191	1,983	3,104	4,108	5.23%	4.58%	5.76%
By Industry:							
Farm employment	385	512	553	591	2.89%	0.77%	1.34%
Nonfarm employment	18,838	22,506	25,381	27,284	1.79%	1.21%	1.46%
Private employment	8,218	10,911	14,674	16,968	2.87%	3.01%	2.95%
Ag. serv., forestry, fishing, and other	34	96	162	242	10.94%	5.37%	8.36%
Mining	51	17	42	47	-10.40%	9.47%	2.28%
Construction	421	774	870	1,541	6.28%	1.18%	12.11%
Manufacturing	1,166	1,029	1,337	1,089	-1.24%	2.65%	-4.02%
Transportation and public utilities	470	674	1,166	1,040	3.67%	5.63%	-2.26%
Wholesale trade	125	180	304	312	3.71%	5.38%	0.52%
Retail trade	1,993	3,191	3,810	4,196	4.82%	1.79%	1.95%
Finance, insurance, and real estate	514	1,036	1,024	1,198	7.26%	-0.12%	3.19%
Services	3,444	3,914	5,959	7,303	1.29%	4.29%	4.15%
Government and government enterprises:	10,620	11,595	10,707	10,316	0.88%	-0.79%	-0.74%
Federal, civilian	3,051	2,741	2,328	2,232	-1.07%	-1.62%	-0.84%
Military	6,194	6,933	5,923	5,345	1.13%	-1.56%	-2.03%
State and local	1,375	1,921	2,456	2,739	3.40%	2.49%	2.21%
Military as Percent of Total	32.22%	30.12%	22.84%	19.17%	NA	NA	NA

Note: NA = Not Applicable.
Source: U.S. Department of Commerce, 1996a.

The industrial sector contributing most to total employment in 1995 in the ROI was services, with a share of 24.1 percent; followed by the retail trade, which contributed 17.2 percent; state and local government with 15.0 percent; and manufacturing with 13.1 percent, as shown in Table 4.13-13. El Paso County dominated the regional employment; the aforementioned four sectors also contributed the greatest shares to total employment in the county, although in slightly different order. The major difference in the sector profile of Doña Ana County was the contribution made by the construction sector (6.6 percent), while the military sector contributed 19.2 percent in Otero County. This latter contribution is attributable to the presence of HAFB.

The dependence that the regional economy has on military activities can be described by comparing the level of military employment against total full- and part-time employment. For the three-county ROI, the share of total employment contributed by the military has fallen significantly over the period from 1970 to 1995. In 1970 the share stood at 14.1 percent, however, it declined to 10.4 percent by 1980, 6.8 percent

Table 4.13-10. United States: Full- and Part-time Employment by Type and Industry, 1970, 1980, 1990, and 1995

United States	*Year*				*Average Annual Percentage Change*		
	1970	*1980*	*1990*	*1995*	*1970–1980*	*1980–1990*	*1990–1995*
Total full- and part-time employment	*91,308,400*	*114,471,900*	*139,891,300*	*149,290,100*	*2.29%*	*2.03%*	*1.31%*
By Type:							
Wage and salary employment	78,797,000	97,922,000	117,131,000	124,853,000	2.20%	1.81%	1.29%
Proprietors' employment	12,511,400	16,549,900	22,760,300	24,437,100	2.84%	3.24%	1.43%
Farm proprietors' employment	2,717,000	2,495,000	2,227,000	2,117,000	-0.85%	-1.13%	-1.01%
Nonfarm proprietors' employment	9,794,400	14,054,900	20,533,300	22,320,100	3.68%	3.86%	1.68%
By Industry:							
Farm employment	3,961,000	3,798,000	3,147,000	2,984,000	-0.42%	-1.86%	-1.06%
Nonfarm employment	87,347,400	110,673,900	136,744,300	146,306,100	2.40%	2.14%	1.36%
Private employment	71,274,400	91,887,900	115,486,300	124,696,100	2.57%	2.31%	1.55%
Ag. serv., forestry, fishing, and other	525,300	909,000	1,452,400	1,821,900	5.64%	4.80%	4.64%
Mining	743,900	1,277,600	1,042,900	922,000	5.56%	-2.01%	-2.43%
Construction	4,398,800	5,654,200	7,264,000	7,649,600	2.54%	2.54%	1.04%
Manufacturing	19,687,300	20,780,900	19,634,600	19,225,900	0.54%	-0.57%	-0.42%
Transportation and public utilities	4,865,500	5,672,100	6,560,600	7,079,700	1.55%	1.47%	1.53%
Wholesale trade	4,172,700	5,741,700	6,651,900	6,953,500	3.24%	1.48%	0.89%
Retail trade	13,698,800	17,883,900	22,840,700	25,181,300	2.70%	2.48%	1.97%
Finance, insurance, and real estate	6,156,100	8,977,200	11,376,300	11,088,600	3.84%	2.40%	-0.51%
Services	17,026,000	24,991,300	38,662,900	44,773,600	3.91%	4.46%	2.98%
Government and government enterprises:	16,073,000	18,786,000	21,258,000	21,610,000	1.57%	1.24%	0.33%
Federal, civilian	2,902,000	3,022,000	3,263,000	2,976,000	0.41%	0.77%	-1.82%
Military	3,232,000	2,501,000	2,750,000	2,234,000	-2.53%	0.95%	-4.07%
State and local	9,939,000	13,263,000	15,245,000	16,400,000	2.93%	1.40%	1.47%
Military as Percent of Total				1.50%	NA	NA	NA

Note: NA = Not Applicable.
Source: U.S. Department of Commerce, 1996a.

Table 4.13-11. State of Texas: Full- and Part-time Employment by Type and Industry, 1970, 1980, 1990, and 1995

State of Texas	*Year*				*Average Annual Percentage Change*		
	1970	*1980*	*1990*	*1995*	*1970–1980*	*1980–1990*	*1990–1995*
Total full- and part-time employment	*5,046,401*	*7,531,887*	*9,353,646*	*10,511,661*	*4.09%*	*2.19%*	*2.36%*
By Type:							
Wage and salary employment	4,235,253	6,361,618	7,501,571	8,546,603	4.15%	1.66%	2.64%
Proprietors' employment	811,148	1,170,269	1,852,075	1,965,058	3.73%	4.70%	1.19%
Farm proprietors' employment	196,953	199,232	193,559	206,505	0.12%	-0.29%	1.30%
Nonfarm proprietors' employment	614,195	971,037	1,658,516	1,758,553	4.69%	5.50%	1.18%
By Industry:							
Farm employment	290,593	276,155	244,906	256,461	-0.51%	-1.19%	0.93%
Nonfarm employment	4,755,808	7,255,732	9,108,740	10,255,200	4.31%	2.30%	2.40%
Private employment	3,847,702	6,096,755	7,667,969	8,650,404	4.71%	2.32%	2.44%
Ag. serv., forestry, fishing, and other	34,092	58,860	99,861	129,408	5.61%	5.43%	5.32%
Mining	139,728	312,956	290,869	267,338	8.40%	-0.73%	-1.67%
Construction	297,059	528,627	497,670	605,760	5.93%	-0.60%	4.01%
Manufacturing	755,974	1,068,000	1,021,724	1,082,102	3.52%	-0.44%	1.15%
Transportation and public utilities	275,733	398,859	478,128	545,762	3.76%	1.83%	2.68%
Wholesale trade	277,969	436,614	466,759	511,604	4.62%	0.67%	1.85%
Retail trade	789,554	1,198,155	1,524,624	1,782,815	4.26%	2.44%	3.18%
Finance, insurance, and real estate	326,941	602,231	785,641	766,852	6.30%	2.69%	-0.48%
Services	950,652	1,492,453	2,502,693	2,958,763	4.61%	5.31%	3.40%
Government and government enterprises:	908,106	1,158,977	1,440,771	1,604,796	2.47%	2.20%	2.18%
Federal, civilian	162,460	167,016	203,163	188,226	0.28%	1.98%	-1.52%
Military	230,469	187,099	187,506	173,334	-2.06%	0.02%	-1.56%
State and local	515,177	804,862	1,050,102	1,243,236	4.56%	2.70%	3.43%
Military as Percent of Total	4.57%	2.48%	2.00%	1.65%	NA	NA	NA

Note: NA = Not Applicable.
Source: U.S. Department of Commerce, 1996a.

Table 4.13-12. State of New Mexico: Full- and Part-time Employment by Type and Industry, 1970, 1980, 1990, and 1995

State of New Mexico	*Year*				*Average Annual Percentage Change*		
	1970	*1980*	*1990*	*1995*	*1970-1980*	*1980-1990*	*1990-1995*
Total full- and part-time employment	*398,990*	*598,966*	*770,505*	*903,412*	*4.15%*	*2.55%*	*3.23%*
By Type:							
Wage and salary employment	339,598	513,563	633,161	744,202	4.22%	2.12%	3.28%
Proprietors' employment	59,392	85,403	137,344	159,210	3.70%	4.87%	3.00%
Farm proprietors' employment	12,716	13,400	13,598	13,304	0.53%	0.15%	-0.44%
Nonfarm proprietors' employment	46,676	72,003	123,746	145,906	4.43%	5.56%	3.35%
By Industry:							
Farm employment	20,122	22,191	19,764	20,465	0.98%	-1.15%	0.70%
Nonfarm employment	378,868	576,775	750,741	882,947	4.29%	2.67%	3.30%
Private employment	266,316	431,245	574,752	694,321	4.94%	2.91%	3.85%
Ag. Serv., forestry, fishing, and other	2,682	4,358	8,407	12,203	4.97%	6.79%	7.74%
Mining	18,956	31,152	20,452	21,539	5.09%	-4.12%	1.04%
Construction	20,097	38,873	40,836	59,763	6.82%	0.49%	7.91%
Manufacturing	21,940	35,962	48,101	52,058	5.07%	2.95%	1.59%
Transportation and public utilities	21,625	30,726	33,693	36,269	3.58%	0.93%	1.48%
Wholesale trade	12,414	22,733	27,622	31,468	6.24%	1.97%	2.64%
Retail trade	64,785	98,075	134,224	163,452	4.23%	3.19%	4.02%
Finance, insurance, and real estate	23,881	38,501	51,035	53,915	4.89%	2.86%	1.10%
Services	79,936	130,865	210,382	263,654	5.05%	4.86%	4.62%
Government and government enterprises:	112,552	145,530	175,989	188,626	2.60%	1.92%	1.40%
Federal, civilian	27,507	30,219	31,797	31,089	0.94%	0.51%	-0.45%
Military	22,723	21,794	22,776	21,616	-0.42%	0.44%	-1.04%
State and local	62,322	93,517	121,416	135,921	4.14%	2.65%	2.28%
Military as Percent of Total	5.70%	3.64%	2.96%	2.39%	NA	NA	NA

Note: A = Not Applicable.
Source: U.S. Department of Commerce, 1996a.

Table 4.13-13. Employment by Sector (1995)

Sector	*United States*	*Texas*	*New Mexico*	*Three-County ROI*	*El Paso County*	*Doña Ana County*	*Otero County*
Farm employment	2.00%	2.44%	2.27%	1.14%	0.37%	4.17%	2.12%
Ag. serv., forestry, fishing, and other	1.22%	1.23%	1.35%	1.29%	0.69%	4.13%	0.87%
Mining	0.62%	2.54%	2.38%	0.21%	0.20%	0.26%	0.17%
Construction	5.12%	5.76%	6.62%	5.33%	5.03%	6.61%	5.53%
Manufacturing	12.88%	10.29%	5.76%	13.09%	15.90%	4.38%	3.91%
Transportation and public utilities	4.74%	5.19%	4.01%	4.51%	4.84%	3.35%	3.73%
Wholesale trade	4.66%	4.87%	3.48%	3.94%	4.61%	2.15%	1.12%
Retail trade	16.87%	16.96%	18.09%	17.19%	17.36%	17.34%	15.05%
Finance, insurance, and real estate	7.43%	7.30%	5.97%	5.48%	5.57%	5.54%	4.30%
Services	29.99%	28.15%	29.18%	24.08%	24.04%	23.37%	26.20%
Federal, civilian	1.99%	1.79%	3.44%	3.71%	2.89%	5.60%	8.01%
Military	1.50%	1.65%	2.39%	5.04%	4.61%	1.11%	19.17%
State and local	10.99%	11.83%	15.05%	14.98%	13.89%	21.98%	9.83%

by 1990, and 5.0 percent by 1995. The vast majority of the military presence accounted for here is both the Army at Fort Bliss in El Paso County, Texas, and the USAF at HAFB in Otero County, New Mexico. The decline in the share of employment contributed by the military is attributable to two main trends: down-sizing of the military; and increasing economic diversification, as shown in Figure 4.13-2.

For the State of Texas, the contribution made by military employment to total employment was 4.6 percent in 1970, 2.5 percent in 1980, 2.0 percent in 1990, and 1.7 percent in 1995. The corresponding shares for the State of New Mexico were 5.7 percent in 1970, 3.6 percent in 1980, 3.0 percent in 1990, and 2.4 percent in 1995. For the nation as a whole, military employment contributed 3.5 percent of total employment in 1970, 2.2 percent in 1980, 2.0 percent in 1990, and 1.5 percent in 1995.

Employment Projections. Over the period 2000 through 2015, total employment in the three-county ROI is anticipated to increase from 450,384 jobs to 564,410 jobs. This represents an average annual increase of 1.3 percent. This rate of increase exceeds slightly, that projected for the State of Texas. The highest rate of change is expected to occur in Doña Ana County (annual average of 1.6 percent) and the lowest in Otero County (0.9 percent per year). The average annual rate of change for the State of New Mexico is expected to reach 1.4 percent.

4.13.2.2 Earnings

Fort Bliss. Over the period FY 91 through FY 96, Fort Bliss expenditures have exceeded one billion dollars annually. Table 4.13-14 presents expenditures for nine major categories for each year, FY 90 through FY 96. The categories are: military payroll, civilian payroll, local purchases and contracts, nonlocal purchases and contracts, utilities, military construction, retired military pensions, non-U.S. expenditures, and student impact aid to local school districts.

The consistently largest proportion of total expenditures has been military payrolls, which has fluctuated from a high of 44.6 percent ($608,583,148) in FY 94 to a low of 29.9 percent ($350,040,274) in FY 96. The second largest contribution to total expenditures is made by pension payments to retired military personnel and annuitants. This has varied between 18.6 percent and 26.4 percent over the 6-year time period. The third largest category of expenditures is for civilian payroll, which has varied between 10.9 percent and 15.8 percent. Other significant expenditure categories are local purchases and contracts that have ranged between 7.0 percent and 11.0 percent, and nonlocal purchases and contracts that have ranged between 7.8 percent and 13.3 percent. The proportion of total expenditures contributed by this latter category has consistently decreased annually between FY 90 and FY 95.

When payroll and expenditure figures are adjusted for the effects of inflation (expressed in 1996 constant year dollars), total expenditures were lower in 1996 ($1,171,799,197) than in any year since 1991. Local purchases and contracts were higher in 1996 ($128,465,805) than in any year except 1994 (over the period 1990 to 1996). Nonlocal purchases and contracts were at their lowest level in 1996, as were military payroll payments.

Fort Bliss is the single largest employer in the ROI and, thus, exerts a substantial direct influence on the local economy. The installation also contributes significantly to regional employment in an indirect manner through the goods and services that are purchased locally, and induces employment through the payroll expenditures of both military and civilian personnel located at Fort Bliss. The indirect and induced employment is referred to as secondary employment and is the result of the “multiplier effect.” Some of the expenditures made in the local economy do not result in increased secondary because of the “leakage effect,” whereby a certain proportion of goods and services consumed in the region are provided by firms and organizations located outside the region where the secondary employment effect will be experienced.

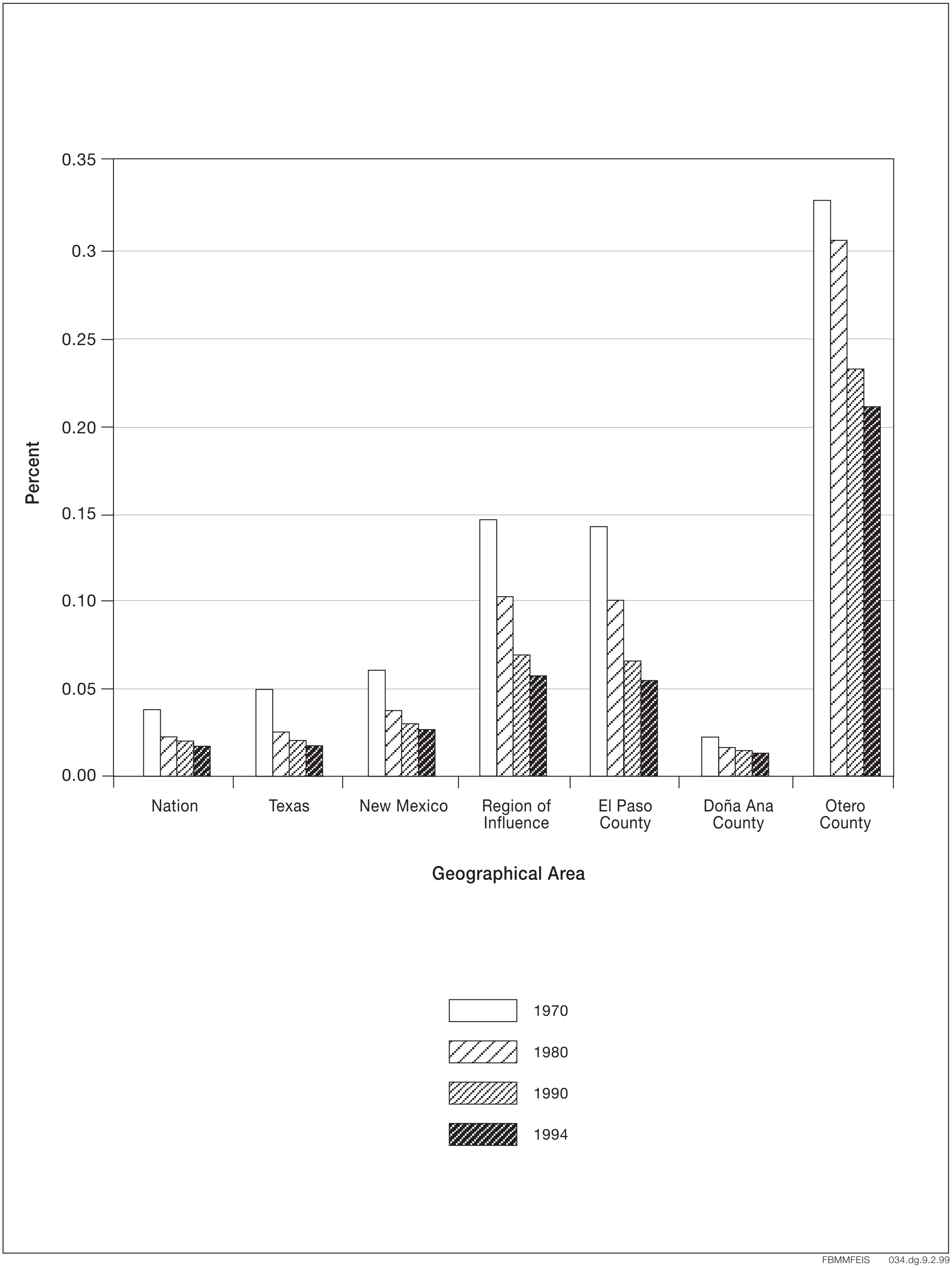

Figure 4.13-2. Military Employment, 1970, 1980, 1990, and 1994.

Table 4.13-14. Fort Bliss Payroll and Expenditures, Fiscal Year 90 to Fiscal Year 96 (Current Year Dollars)

FY	*Military Payroll*	*Civilian Payroll*	*Local Purchases Contracts*	*Nonlocal Purchases Contracts*	*Utilities*	*Military Construction*	*Retired Military Pensions*	*Non-U.S. Expenditures*	*Student Impact Aid*	*Total*
1990	337,385,232	149,662,897	82,348,380	126,359,528	13,312,869	17,714,439	198,351,021	21,342,386	2,336,388	*948,813,140*
1991	393,182,440	142,070,851	89,919,767	132,458,699	13,210,688	11,411,275	217,602,905	25,074,732	2,415,144	*1,027,346,501*
1992	446,086,008	147,572,446	87,829,180	132,449,459	14,435,616	15,458,166	212,952,551	26,406,660	2,596,920	*1,085,787,006*
1993	505,581,206	168,052,713	83,066,742	140,332,872	14,822,036	29,812,875	222,286,609	24,950,592	4,783,320	*1,193,688,965*
1994	608,583,148	148,757,113	127,172,779	112,860,349	14,024,601	44,673,948	278,532,091	25,950,046	2,904,720	*1,363,458,795*
1995	475,572,690	161,211,458	114,967,255	102,806,371	21,806,621	64,165,180	348,482,567	25,640,592	2,904,720	*1,317,557,454*
1996	350,040,274	168,429,090	128,465,805	105,520,385	12,724,342	72,306,938	299,773,543	32,073,720	2,465,100	*1,171,799,197*
Percentage Composition										
1990	35.6%	15.8%	8.7%	13.3%	1.4%	1.9%	20.9%	2.2%	0.2%	*100.0%*
1991	38.3%	13.8%	8.8%	12.9%	1.3%	1.1%	21.2%	2.4%	0.2%	*100.0%*
1992	41.1%	13.6%	8.1%	12.2%	1.3%	1.4%	19.6%	2.4%	0.2%	*100.0%*
1993	42.4%	14.1%	7.0%	11.8%	1.2%	2.5%	18.6%	2.1%	0.4%	*100.0%*
1994	44.6%	10.9%	9.3%	8.3%	1.0%	3.3%	20.4%	1.9%	0.2%	*100.0%*
1995	36.1%	12.2%	8.7%	7.8%	1.7%	4.9%	26.4%	1.9%	0.2%	*100.0%*
1996	29.9%	14.4%	11.0%	9.0%	1.1%	6.2%	25.6%	2.7%	0.2%	*100.0%*

Table 4.13-15 presents secondary employment levels in the three-county ROI associated with operations at Fort Bliss. Secondary employment has ranged from a high of 10,208 jobs in 1994, to a low of 7,230 jobs in 1990. After reaching a high point in 1994, the value has declined and stood at 8,267 in 1996. The majority (55 percent) of this secondary employment (4,546 jobs in 1996) is concentrated in the services sector of the economy; followed by retail trade (1,491 jobs and 18 percent); and construction, maintenance and repair (658 jobs and 8 percent).

Table 4.13-15. Secondary Employment in the Region of Influence, by Sector, Fiscal Year 90 to Fiscal Year 96

Industrial Sector	*FY 90*	*FY 91*	*FY 92*	*FY 93*	*FY 94*	*FY 95*	*FY 96*
Agriculture and Mining	138	144	155	171	192	165	138
Construction, Maintenance & Repair	262	206	244	368	506	629	658
Manufacturing	375	388	415	463	533	474	408
Transportation & Utilities	287	298	317	347	395	357	300
Wholesale Trade	342	352	377	404	452	389	346
Retail Trade	1,488	1,553	1,665	1,842	2,073	1,785	1,491
Finance, Insurance & Real Estate	377	394	421	463	524	453	380
Services	3,961	4,187	4,301	4,585	5,533	5,064	4,546
Total	*7,230*	*7,522*	*7,895*	*8,643*	*10,208*	*9,316*	*8,267*
Percent Contribution							
Industrial Sector	*FY 90*	*FY 91*	*FY 92*	*FY 93*	*FY 94*	*FY 95*	*FY 96*
Agriculture and Mining	1.91%	1.91%	1.96%	1.98%	1.88%	1.77%	1.67%
Construction, Maintenance & Repair	3.62%	2.74%	3.09%	4.26%	4.96%	6.75%	7.96%
Manufacturing	5.19%	5.16%	5.26%	5.36%	5.22%	5.09%	4.94%
Transportation & Utilities	3.97%	3.96%	4.02%	4.01%	3.87%	3.83%	3.63%
Wholesale Trade	4.73%	4.68%	4.78%	4.67%	4.43%	4.18%	4.19%
Retail Trade	20.58%	20.65%	21.09%	21.31%	20.31%	19.16%	18.04%
Finance, Insurance & Real Estate	5.21%	5.24%	5.33%	5.36%	5.13%	4.86%	4.60%
Services	54.79%	55.66%	54.48%	53.05%	54.20%	54.36%	54.99%
Total	*100.00%*	*100.00%*	*100.00%*	*100.00%*	*100.00%*	*100.00%*	*100.00%*

Counties: Historic and Current. Total nonfarm earnings paid to workers in the three-county ROI have increased from $1,172,288,000 in 1970 to $3,312,537,000 in 1980, $6,697,071,000 in 1990 and $8,798,891,000 in 1995, as shown in Table 4.13-16. The greatest contributions to the nonfarm earnings in 1995 were made by the following industrial sectors: services (22.5 percent); manufacturing (14.0 percent); and retail trade (11.5 percent). Earnings of military employees accounted for 6.0 percent of the nonfarm wages and salaries in 1995. The contribution to nonfarm regional earnings made by all military employees in the three-county ROI has decreased from 14.0 percent in 1970 to 6.0 percent in 1995, as shown in Table 4.13-17. Over this same time period, other sectors have increased their share: state and local government earnings has risen from 11.7 percent in 1970 to 17.0 in 1995; services have increased from 12.9 percent to 22.5 percent; and manufacturing from 13.9 percent to 14.0 percent.

Table 4.13-16. Region of Influence Earnings (in $000), 1970, 1980, 1990, and 1995

Three-county ROI	*1970*	*1980*	*1990*	*1995*
Wage and salary disbursements	$1,042,412	$2,824,818	$5,518,812	$7,142,141
Other labor income	$43,293	$229,880	$593,066	$789,939
Proprietors' income	$108,073	$281,335	$699,897	$954,758
Farm earnings	$21,490	$23,496	$114,704	$87,947
Nonfarm earnings	$1,172,288	$3,312,537	$6,697,071	$8,798,891
Private earnings	$714,118	$2,255,650	$4,588,077	$6,136,248
Ag. serv., forestry, fishing, and other	$3,517	$13,144	$39,744	$57,295
Mining	$1,353	$24,215	$5,813	$7,255
Construction	$61,417	$183,654	$282,091	$434,068
Manufacturing	$163,278	$514,932	$1,026,177	$1,229,043
Transportation and public utilities	$92,700	$300,200	$466,372	$635,054
Wholesale trade	$64,533	$190,861	$358,764	$464,115
Retail trade	$133,006	$391,528	$737,874	$1,008,660
Finance, insurance, and real estate	$43,223	$136,906	$226,971	$324,484
Services	$151,091	$500,210	$1,444,271	$1,976,274
Government and government enterprises:	$458,170	$1,056,887	$2,108,994	$2,662,643
Federal, civilian	$156,432	$298,770	$552,919	$638,968
Military	$164,546	$338,338	$525,666	$528,167
State and local	$137,192	$419,779	$1,030,409	$1,495,508

Source: U.S. Department of Commerce, 1996b.

Table 4.13-17. Region of Influence Earnings–Percent Contribution, 1970, 1980, 1990, and 1995

Three-county ROI	*1970*	*1980*	*1990*	*1995*
Nonfarm earnings	100.00%	100.00%	100.00%	100.00%
Private earnings	60.92%	68.09%	68.51%	69.74%
Ag. serv., forestry, fishing, and other	0.30%	0.40%	0.59%	0.65%
Mining	0.12%	0.73%	0.09%	0.08%
Construction	5.24%	5.54%	4.21%	4.93%
Manufacturing	13.93%	15.54%	15.32%	13.97%
Transportation and public utilities	7.91%	9.06%	6.96%	7.22%
Wholesale trade	5.50%	5.76%	5.36%	5.27%
Retail trade	11.35%	11.82%	11.02%	11.46%
Finance, insurance, and real estate	3.69%	4.13%	3.39%	3.69%
Services	12.89%	15.10%	21.57%	22.46%
Government and government enterprises:	39.08%	31.91%	31.49%	30.26%
Federal, civilian	13.34%	9.02%	8.26%	7.26%
Military	14.04%	10.21%	7.85%	6.00%
State and local	11.70%	12.67%	15.39%	17.00%

Source: U.S. Department of Commerce, 1996b.

4.13.3 Housing

This section addresses both military and civilian housing resources. The ROI is the three-county region previously defined. For military housing, the description distinguishes between on- and off-post housing units and, for the on-post housing, between family and unaccompanied housing (barracks).

4.13.3.1 Fort Bliss

Fort Bliss provides housing for active duty personnel permanently assigned to the installation (both with and without dependents) and personnel on TDY at the Fort.

Military Family Housing. Based on an inventory of military family housing under the control of Fort Bliss as of February 1997, there are a total of 3,311 military family housing units. The housing is located in five areas of the post: Main Post, WBAMC, Logan Heights, Biggs AAF, and an area of "801" leased housing to the north of the post. The geographical distribution and selected characteristics of the family housing are presented in Table 4.13-18.

The largest share (39 percent) of the family housing (1,285 units) are located on the Main Post, and of these, 22 percent are assigned to officer personnel and the remaining 78 percent are assigned to enlisted personnel. The large majority (90 percent) of total officer housing units are located here. The greatest proportion (73 percent) of the units on the Main Post have three bedrooms.

Table 4.13-18. Military Family Housing by Location and Grade Assignment

Housing Area	*Officer Personnel*			*Enlisted Personnel*			*Total Units*
	General & Flag	*Field Grade*	*Company Grade*	*Senior NCO*	*Junior NCO*	*E3 and Below*	
Main Post	4	139	213	0	529	400	*1,285*
WBAMC	0	27	12	0	32	0	*71*
Biggs AAF	0	0	0	255	545	0	*800*
Logan Heights	0	0	0	0	855	0	*855*
Leased (801)	0	0	0	300	0	0	*300*
Total	*4*	*166*	*225*	*555*	*1,961*	*400*	*3,311*

In 1996, the WBAMC had a total of 71 units co-located with it to the west of the Main Post, of which 55 percent are assigned to officer personnel and the remaining assigned to junior NCO personnel. Of the total units, 55 percent have three bedrooms and 38 percent have four bedrooms

Biggs AAF, located adjacent and to the east of the Main Post, contains 800 family housing units, all of which are assigned to enlisted personnel and their families. The majority (68 percent) of the units are occupied by junior NCO personnel, with the remaining 32 percent occupied by senior NCO personnel. The largest share of the units (48 percent) have two bedrooms and all are Wherry housing, constructed in the 1950s for the USAF at a time when Biggs AAF was an USAF installation.

To the west of the Main Post is an extensive housing area (containing both family and unaccompanied housing) known as Logan Heights. The area contains 855 family housing units, all of which are assigned to junior NCO personnel. The large majority of the units (74 percent) have three bedrooms while an additional 22 percent are two-bedroom units.

Located approximately 5 miles north of the Main Post is an area containing 300 family housing units that are leased on a long-term basis by the DA. These units were constructed under the "801" program whereby lease payments are guaranteed to the lessor. All the units are assigned to senior NCO personnel and their families.

Unaccompanied Housing. There are a total of 261 buildings designed to house unaccompanied personnel assigned on a permanent or temporary basis to Fort Bliss. Large numbers of personnel come to Fort Bliss for short periods of time to participate in field exercises such as Roving Sands, which are held annually. Of the buildings utilized to accommodate these permanent and TDY personnel, just under half (123) are located at the three range camps (McGregor and Orogrande camps on McGregor Range, and the Doña Ana Range Camp). At McGregor Range Camp there are 21 buildings designed to accommodate personnel taking part in exercises at the range. In aggregate, these buildings can accommodate 708 persons (152 in open bay configurations and the remaining in single and double occupancy rooms). There are 30 buildings at the Orogrande Camp, also located on McGregor Range. These buildings can accommodate 480 persons (all but 6 in open bay configurations). The number of personnel able to be accommodated in the camp buildings as stated above assumes 90 square feet per person and two persons per room where feasible. Under mobilization conditions, the capacity of the buildings could increase as the square footage per person decreases. Assuming 54 square feet per person, the capacity of the buildings at McGregor Range Camp rises from 708 persons (under normal conditions) to 1,232 (an increase of 74 percent). If the area allowance declines further to 40 square feet per person, the capacity rises to 1,604 persons (an increase of 127 percent over normal conditions). The Orogrande Camp capacity would rise, under identical space parameters, to 789 persons and 1,076 persons, respectively.

The Doña Ana Range Camp contains 72 buildings that can accommodate 580 persons, all in open bay configurations under normal space parameter conditions.

The greatest capacity (assuming 90 square feet per person and two persons per room), however, is in the cantonment area where the buildings can accommodate 9,410 persons housed in rooms, and an additional 1,973 persons in open bay configurations. Of the 1,973 persons accommodated in an open bay configuration, 1,924 would occupy buildings at Logan Heights. This compares to 1,768 persons that can be accommodated in rooms and 1,206 in open bay configurations at the camps. The cantonment area is defined here as the Main Post, Biggs AAF, and Logan Heights.

All of the buildings located at Logan Heights and the three range camps are classed as substandard and not able to be upgraded in a cost-effective manner. Additionally, many of them have an open bay configuration. This contrasts to the buildings located on the Main Post and at Biggs AAF that contain individual rooms, many with their own bath and which meet housing standards.

Under mobilization conditions, the capacity of the buildings could increase as the square footage per person (for those housed in rooms) decreases. Assuming 54 square feet per person, the capacity of the buildings rises from 11,178 persons (under normal conditions) to 20,623 persons (an increase of 84.5 percent). If the area allowance declines further to 40 square feet per person, the capacity rises to 27,821, or almost two and a half times the capacity under normal conditions. This added capacity is dependent, however, on the configuration of the rooms and their ability to accommodate an increase in the number of occupants. The typical barrack room currently has a size of 180 square feet and can accommodate two persons. However, under recent Army space regulations, policy is to have a single person per room. New barracks are under construction and will accommodate a single person per room. The space per person will be 220 square feet for those personnel in ranks E5 and above and 110 square feet for those in ranks E4 and below.

The most recent barracks construction project is the replacement of five substandard barracks located on the Main Post (buildings 2906, 2907, 2908, 2909, and 2443 with a total of 312 rooms) with a building designed to house 672 persons on a one-person-per-room basis. Future long-range plans call for the demolition of all barracks in the Logan Heights area, utilization of the area for additional military family housing, and the consolidation of personnel on the Main Post.

Transient Housing Facilities. There are a number of facilities on Fort Bliss designed to accommodate TDY personnel. These personnel included individuals attending the U.S. Army Sergeant Major Academy and the ADA School. They are comprised of the following: distinguished visitor quarters (4 facilities with a total of 12 rooms); visitor quarters (19 facilities with 710 rooms); and bachelor quarters (7 facilities with 32 rooms assigned to permanent party members). The monthly occupancy rate for these accommodations averaged 62 percent, ranging from a high of 81 percent in August to 41 percent in December.

In addition, the Fort Bliss Inn is a 154-room hotel that helps accommodate personnel and their families who are undergoing a permanent change of station (PCS) in and out of the installation. During the large exercises conducted at the ranges, such as Roving Sands, the vast majority of TDY personnel are housed in the range camps. Only about 100 rooms are set aside on the main cantonment for transient use during these exercises.

4.13.3.2 Counties and Communities: Historic and Current

The number of housing units in the three-county ROI increased from 133,140 in 1970 to 199,869 in 1980, and 259,798 in 1990, at an average annual rate of 3.4 percent over the 20-year period. The most rapid growth rate took place in Doña Ana County, New Mexico, where the 20-year rate was almost 4.7 percent annually. El Paso County, Texas, exhibited a 20-year growth rate of 3.1 percent and Otero County, New Mexico, experienced an annual rate of 3.3 percent, as shown in Table 4.13-19.

Table 4.13-19. Housing Units by County and Region of Influence, 1970, 1980, and 1990

	Total Housing Units			*Change (% per year)*			*% Owner Occupied*	
	1970	*1980*	*1990*	*1970–1980*	*1980–1990*	*1970–1990*	*1980*	*1990*
Doña Ana County, NM	19,818	33,944	49,148	5.53%	3.77%	4.65%	64.1	64.6
Otero County, NM	12,098	17,961	23,177	4.03%	2.58%	3.30%	60.9	62.3
El Paso, TX	101,224	147,964	187,473	3.87%	2.39%	3.13%	59.4	58.7
Total Three-county ROI	*133,140*	*199,869*	*259,798*	*4.15%*	*2.66%*	*3.40%*	*NA*	*NA*

Note: NA = Not Applicable.
Source: U.S. Department of Commerce, 1993b.

As of 1990, the large proportion (63.8 percent) of the housing stock was comprised of single family units as shown in Table 4.13-20. Multiple family units comprised 24.0 percent of the total units, with mobile homes contributing 11.1 percent. A small number (1.2 percent of the total units) are not categorized by housing type. There are a number of differences in terms of composition of the housing stock across the counties. The two smaller counties in New Mexico have a far higher proportion of mobile homes (over 25 percent in each case) than in El Paso County, Texas, which has only 5.6 percent. The proportion of multiple family units, especially the number of structures containing ten or more units, is significantly higher in El Paso County where such units comprise 14.8 percent of the entire housing stock, than in the other two counties (1.2 percent in Otero County and 7.3 percent in Doña Ana County). The proportion of

Table 4.13-20. Housing Units by Type, Counties, and Region of Influence

Total Housing Units	*Doña Ana County, NM*	*Otero County, NM*	*El Paso County, TX*	*Three-county ROI*
	49,148	*23,177*	*187,473*	*259,798*
Single Family Units	27,753	14,942	122,965	165,660
Detached	25,709	13,922	112,278	151,909
Attached	2,044	1,020	10,687	13,751
Percent	56.47%	64.47%	65.59%	63.76%
Multiple Family Units	8,645	2,090	51,513	62,248
2 Units	1,680	495	4,970	7,145
3 or 4 Units	2,170	665	7,556	10,391
5–9 Units	1,224	507	11,327	13,058
10 or more Units	3,571	423	27,660	31,654
Percent	17.59%	9.02%	27.485%	23.96%
Mobile Home or Trailer	12,403	5,971	10,465	28,839
Percent	25.24%	25.76%	5.58%	11.10%
Other	347	174	2,530	3,051
Occupied Housing Units	45,029	18,155	178,366	241,550
Owner-occupied	29,084	11,313	104,624	145,021
Renter-occupied	15,945	6,842	73,742	96,529
Percent	35.41%	37.69%	41.34%	39.96%
Median Value	$67,300	$58,000	$57,300	NA
Median Contract Rent	$290	$291	$301	NA

Note: NA = Not Applicable.
Source: U.S. Department of Commerce, 1993b.

occupied housing units occupied by renters is higher in El Paso County (41.3 percent) than in either Doña Ana County (35.4 percent) or Otero County (37.7 percent). The median value of owner-occupied units is highest in Doña Ana County ($67,300), followed by Otero County ($58,000) and El Paso County ($57,300).

Selected housing characteristics for the communities (both incorporated and unincorporated) within the three counties are presented in Table 4.13-21.

Housing Construction. An indication of the level of housing construction activity is provided by information concerning the number of permits issued for the construction of housing units on an annual basis. Between 1980 and 1994, the number of housing units authorized by building permits has averaged 4,368 in the three-county ROI, as shown in Table 4.13-22. The large proportion of these permits (73.2 percent) has been for single family dwelling units. The housing construction industry is highly cyclical, which is exhibited by the variability in construction levels. Over the 24-year period, the number of units constructed annually in the three-county ROI has ranged from a high of 8,081 (in 1983) to a low of 2,594 (in 1989). Of the units constructed, the proportion that are multiple family units also exhibits great variability; between about 35 percent and 50 percent were multiple family units in the years 1982 through 1986. For all other years, with the exception of 1994, the proportion has been below 20 percent, as shown in Figure 4.13-3.

Housing Projections. The total number of housing units is expected to increase as the population grows. Under the assumption that the relationship that existed in 1990 between number of residents and number of housing units remains constant, the number of housing units in the three-county ROI could grow to 335,066 units by 2000; 417,615 units by 2010; 514,893 units by 2020; and 629,370 units by 2030 as shown in Table 4.13-23.

Table 4.13-21. Population and Housing Characteristics, Communities in the Region of Influence, 1990

Community	*Total Population*	*Total Housing Units*	*Occupied Housing Units*	*Owner-occupied Housing Units*	*Percent Owner-occupied Units*	*Renter-occupied Housing Units*	*Percent Renter-occupied Units*	*Housing Units in Structure*				*Mobile & Trailer*	*Median Home Value*	*Median Contract Rent*
								1	*2–4*	*5–9*	*10 +*			
Doña Ana County, New Mexico														
Anthony CDP	*5,160*	*1,381*	1,304	908	69.63	396	30.37	792	68	55	2	464	$40,000	$189
Chaparral CDP	*2,962*	*1,020*	867	684	78.89	183	21.11	251	5	0	0	764	$55,300	$221
Doña Ana CDP	*1,202*	*382*	353	289	81.87	64	18.13	164	11	0	0	207	$50,300	$202
Hatch Village	*1,136*	*498*	406	282	69.46	124	30.54	297	23	40	7	131	$42,700	$186
Las Cruces City	*62,126*	*25,676*	23,797	13,382	56.23	10,415	43.77	15,104	3,169	866	3,492	3,045	$68,300	$301
Mesilla Town	*1,975*	*787*	727	516	70.98	211	29.02	676	69	19	1	22	$92,500	$265
Sunland Park	*8,179*	*1,959*	1,850	1,398	75.57	452	24.43	1,106	71	12	0	770	$35,300	$190
University Park CDP	*4,520*	*647*	636	1	0.16	635	99.84	334	134	125	47	7	$0	$320
White Sands CDP	*2,616*	*724*	702	22	3.13	680	96.87	683	29	0	0	12	$130,000	$427
Otero County, New Mexico														
Alamogordo City	*27,596*	*11,974*	10,482	6,681	63.74	3,801	36.26	7,907	861	249	337	2,620	$58,200	$296
Boles Acres CDP	*1,409*	*619*	529	428	80.91	101	19.09	240	2	0	0	377	$87,500	$260
Cloudcroft Village	*636*	*781*	244	158	64.75	86	35.25	697	18	11	21	34	$65,400	$259
HAFB CDP	*5,891*	*1,410*	1,375	13	0.95	1,362	99.05	978	186	185	44	17	$60,000	$390
La Luz CDP	*1,625*	*667*	584	454	77.74	130	22.26	376	5	4	0	282	$57,700	$259
Mescalero CDP	*1,159*	*337*	300	95	31.67	205	68.33	301	10	0	0	26	$27,500	$179
Tularosa Village	*2,615*	*1,162*	976	700	71.72	276	28.28	782	45	52	12	271	$41,500	$204
El Paso County, Texas														
Anthony Town	*3,328*	*658*	597	444	74.37	153	25.63	508	15	4	27	104	$43,500	$226
Canutillo CDP	*4,442*	*1,304*	1,217	972	79.87	245	20.13	575	34	33	9	653	$37,900	$189
Clint Town	*1,035*	*308*	294	225	76.53	69	23.47	252	13	7	1	35	$55,500	$193
El Paso City	*515,342*	*168,625*	160,545	92,507	57.62	68,038	42.38	111,273	11,309	11,177	27,432	7,434	$58,500	$303
Fabens CDP	*5,599*	*1,499*	1,425	979	68.70	446	31.30	930	64	26	130	349	$31,900	$167
Fort Bliss CDP	*13,915*	*2,807*	2,702	21	0.78	2,681	99.22	2,009	757	0	4	37	$46,900	$350
Homestead Meadows CDP	*4,978*	*1,312*	1,205	1,111	92.20	94	7.80	516	17	2	4	773	$37,800	$277
Horizon City	*2,308*	*911*	874	692	79.18	182	20.82	840	34	18	10	8	$68,900	$434
San Elizario CDP	*4,385*	*1,069*	1,004	830	82.67	174	17.33	651	19	2	1	396	$32,600	$173
Socorro Town	*22,995*	*5,449*	5,239	4,181	79.81	1,058	20.19	3,385	202	43	29	1,790	$38,800	$213

Table 4.13-21. Population and Housing Characteristics, Communities in the Region of Influence, 1990 (Continued)

Community	*Total Population*	*Total Housing Units*	*Occupied Housing Units*	*Owner-occupied Housing Units*	*Percent Owner-occupied Units*	*Renter-occupied Housing Units*	*Percent Renter-occupied Units*	*Housing Units in Structure*				*Mobile & Trailer*	*Median Home Value*	*Median Contract Rent*
								1	*2–4*	*5–9*	*10 +*			
El Paso County, Texas (Continued)														
Sparks CDP	*1,276*	*313*	286	249	87.06	37	12.94	201	1	0	1	110	$22,900	$144
Vinton Village	*605*	*208*	184	150	81.52	34	18.48	72	2	0	0	134	$45,000	$235
Westway CDP	*2,381*	*554*	525	460	87.62	65	12.38	396	10	6	0	142	$32,300	$183

Note: CDP is Census Designated Place, an unincorporated community.
Source: U.S. Department of Commerce, 1993c.

Table 4.13-22. New Private Housing Units Authorized by Building Permit, Counties and Region of Influence, 1980 to 1994

Year	*Doña Ana County, NM*			*Otero County, NM*			*El Paso County, TX*			*Three-county ROI*		
	Total	*Single Family Units*	*Percent Single Family Units*	*Total*	*Single Family Units*	*Percent Single Family Units*	*Total*	*Single Family Units*	*Percent Single Family Units*	*Total*	*Single Family Units*	*Percent Single Family Units*
1980	*722*	553	76.6	*99*	91	91.9	*3,148*	2,297	73.0	*3,969*	2,941	74.10
1981	*NA*	NA	NA	*NA*	NA	NA	*2,301*	1,099	47.8	*NA*	NA	NA
1982	*719*	512	71.2	*105*	99	94.3	*4,071*	1,937	47.6	*4,895*	2,548	52.05
1983	*1,319*	927	70.3	*295*	200	67.8	*6,467*	2,861	44.2	*8,081*	3,988	49.35
1984	*1,711*	1,003	58.6	*398*	264	66.3	*3,734*	2,046	54.8	*5,843*	3,313	56.70
1985	*1,152*	774	67.2	*250*	230	92.0	*3,966*	2,272	57.3	*5,368*	3,276	61.03
1986	*996*	823	82.6	*306*	255	83.3	*5,096*	2,935	57.6	*6,398*	4,013	62.72
1987	*1,055*	802	76.0	*246*	167	67.9	*2,361*	2,176	92.2	*3,662*	3,145	85.88
1988	*880*	722	82.0	*97*	88	90.7	*1,654*	1,557	94.1	*2,631*	2,367	89.97
1989	*813*	631	77.6	*75*	71	94.7	*1,706*	1,598	93.7	*2,594*	2,300	88.67
1990	*553*	433	78.3	*52*	52	100.0	*2,097*	1,837	87.6	*2,702*	2,322	85.94
1991	*685*	484	70.7	*57*	57	100.0	*1,870*	1,592	85.1	*2,612*	2,133	81.66
1992	*875*	710	81.1	*113*	113	100.0	*2,657*	2,174	81.8	*3,645*	2,997	82.22
1993	*1,008*	905	89.8	*132*	132	100.0	*2,578*	2,193	85.1	*3,718*	3,230	86.87
1994	*1105*	936	84.7	*138*	138	100.0	*3,797*	2,323	61.2	*5,040*	3,397	67.40
Annual Average	*971*	*730*	76.2	*169*	140	89.2	*3,167*	2,060	70.9	*4,368*	2,998	73.20

Note: NA = Not Available.
Source: U.S. Department of Commerce, 1993b.

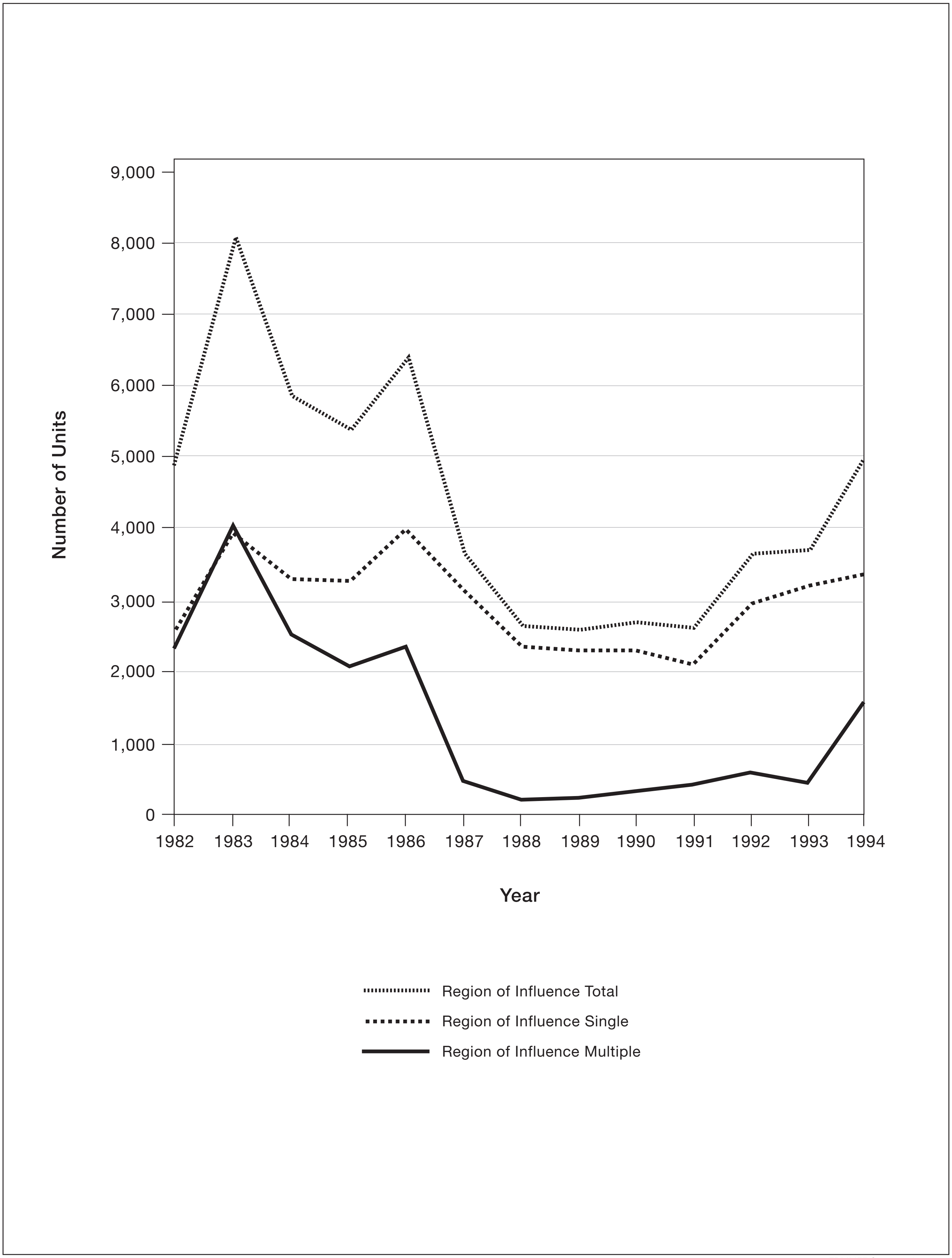

Figure 4.13-3. Housing Construction Trends within the Region of Influence.

Table 4.13-23. Housing Unit Projections, Counties and Region of Influence, 2000 to 2030

	2000	*2005*	*2010*	*2015*	*2020*	*2025*	*2030*
El Paso County							
Population	778,674	883,232	996,771	1,119,881	1,257,975	1,408,823	1,566,848
Total Housing Units	*246,751*	*279,884*	*315,863*	*354,875*	*398,635*	*446,436*	*496,512*
Single Family	161,844	183,576	207,174	232,762	261,465	292,818	325,662
Multiple Family	67,807	76,912	86,799	97,520	109,545	122,681	136,442
Mobile Homes	13,769	15,618	17,625	19,802	22,244	24,911	27,705
Doña Ana County							
Population	173,677	188,566	203,412	218,368	234,424	251,660	270,163
Total Housing Units	*62,991*	*68,391*	*73,775*	*79,200*	*85,023*	*91,274*	*97,985*
Single Family	35,571	38,620	41,661	44,724	48,013	51,543	55,332
Multiple Family	11,080	12,030	12,977	13,931	14,956	16,055	17,236
Mobile Homes	15,899	17,262	18,621	19,990	21,460	23,038	24,731
Otero County							
Population	56,740	59,473	62,683	66,232	69,982	73,944	78,131
Total Housing Units	*25,325*	*26,545*	*27,977*	*29,561*	*31,235*	*33,003*	*34,872*
Single Family	16,327	17,113	18,037	19,058	20,137	21,277	22,482
Multiple Family	2,284	2,394	2,524	2,666	2,817	2,977	3,145
Mobile Homes	6,524	6,838	7,207	7,615	8,046	8,502	8,983
Three-county ROI							
Population	1,009,091	1,131,271	1,262,866	1,404,481	1,562,381	1,734,427	1,915,142
Total Housing Units	*335,066*	*374,819*	*417,615*	*463,636*	*514,893*	*570,714*	*629,370*
Single Family	213,742	239,309	266,872	296,545	329,614	365,638	403,477
Multiple Family	81,172	91,336	102,300	114,117	127,318	141,713	156,823
Mobile Homes	36,191	39,717	43,453	47,407	51,750	56,450	61,420

4.13.4 Public Schools

There are four school districts in El Paso, where the majority of Fort Bliss military and civilian personnel reside. These are the El Paso ISD, Ysleta ISD, Soccoro ISD, and Clint ISD. The school districts most likely to be affected by actions at Fort Bliss are the El Paso ISD and the Ysleta ISD. School districts serving Fort Bliss employees in New Mexico include the Las Cruces and Gadsden school districts. Each is addressed in detail below.

4.13.4.1 El Paso ISD

The El Paso ISD serves students residing in the City of El Paso, including school-age dependents of military personnel residing on post. The district has a total of 80 schools: 13 high schools, 13 middle schools, and 54 elementary schools. Of these schools, the following (all elementary schools) are located on Fort Bliss: Bliss (on the Main Post), Milam (on Biggs AAF), and Logan (in the Logan Heights military family housing area). Although the schools are physically located on the installation, their catchment areas extend off the post and include civilian areas. A lease has been negotiated between the School District and the Army for a site in the Logan Heights area that will accommodate a new high school.

Over the period 1990/91 through 1996/97 school years, enrollments have remained virtually unchanged at approximately 64,700 students, on average, while the number of certified teachers has increased from 3,850 to 4,108. The student-teacher ratio has declined over this period from 16.73 to 15.72, as shown in Table 4.13-24. Enrollment is projected to increase at less than half of one percentage point per year over the next 5 years.

Table 4.13-24. School District Enrollment and Staffing, 1990/91 to 1996/97 School Years

School Year	*El Paso ISD*			*Ysleta ISD*		
	Enrollment	*Certified Teachers*	*Student-Teacher Ratio*	*Enrollment*	*Certified Teachers*	*Student-Teacher Ratio*
1990/91	64,426	3,850	16.73	49,095	3,082	15.93
1991/92	64,950	4,023	16.14	48,612	2,979	16.32
1992/93	64,658	3,961	16.32	48,656	2,918	16.67
1993/94	64,966	4,025	16.14	47,841	3,008	15.90
1994/95	65,194	4,066	16.03	46,913	2,994	15.67
1995/96	64,715	4,070	15.90	46,336	2,957	15.67
1996/97	64,568	4,108	15.72	47,172	2,957	15.95

Source: El Paso, 1997a, b.

The El Paso ISD accommodates a significant number of school-age dependents of military personnel assigned to Fort Bliss, residing both on and off post. As of school year 1994/95, the school district accommodated a total of 2,551 military children located on federal property (including 271 children with disabilities) and 4,134 military children not located on federal property (including 218 children with disabilities), for a total of 6,685 students. This number of military students has fallen from a value of 9,022 for school year 1988/89, as shown in Table 4.13-25.

Table 4.13-25. Federally Connected Students: Impact Aid
Fiscal Year 90 to Fiscal Year 96

FY	*El Paso ISD*	*Ysleta ISD*	*Total*
1990	$2,200,388	$136,000	*$2,336,388*
1991	$2,274,084	$141,060	*$2,415,144*
1992	$2,430,912	$166,008	*$2,596,920*
1993	$4,620,840	$162,480	*$4,783,320*
1994	$2,763,470	$141,250	*$2,904,720*
1995	$2,763,470	$141,250	*$2,904,720*
1996	$2,300,004	$165,076	*$2,465,080*

Source: El Paso, 1997a, b.

In addition to the elementary schools located on the post, a number of other schools accommodate sizable numbers of students whose parents are active duty military personnel not residing in military family housing. Following, are schools where 20 percent or more of the enrolled students have one or more active duty military parents: Austin and Andress high schools; Bassett, Charles, and Ross middle schools; and Hughey, Nixon, and Travis elementary schools.

4.13.4.2 Ysleta ISD

The Ysleta ISD serves students residing in the City of El Paso, including school-age dependents of military personnel residing off post. The district has the following number and type of schools: 7 conventional high schools, 9 special campuses, 11 middle schools, and 32 elementary schools (El Paso, 1998).

Over the period 1990/91 through 1996/97 school years, enrollments have declined slightly from 49,095 to 47,172, while the number of certified teachers has decreased from 3,082 to 2,957. The student-teacher ratio has remained virtually unchanged at 15.9 over this period, as shown in Table 4.13-24.

The Ysleta ISD accommodates a number of school-age dependents of military personnel assigned to Fort Bliss, all of whom reside off post. As of school year 1993/94, the school district accommodated 868 students of military parents. This number declined annually, however, and registered 313 in the 1996/97 school year. The largest concentrations of military-connected students attend the following schools: Parkland High School (43 students), Eastwood High School (33 students), Parkland Middle School (27 students), Desertaire Elementary School (26 students), Tierra Del Sol Elementary School (22 students), and Pebble Hills Elementary School (21 students), as shown in Table 4.13-24.

4.13.4.3 Socorro ISD

The Socorro ISD is located in the eastern and southeastern portion of El Paso County. The school district had a 1996/97 student membership of 21,235. The district has 13 elementary schools, four middle schools, three high schools, and one alternate school.

4.13.4.4 Clint ISD

The Clint ISD consists of 10 schools serving almost 7,000 students.

Of the civilian personnel working at Fort Bliss, just over 3 percent (82 persons) report their residence in New Mexico; of these, the majority (54 persons) reside in the communities of Anthony and Chaparral, just north of the El Paso County line. The remaining 28 persons reside in Las Cruces. School districts in the State of New Mexico, which could experience effects associated with activities at Fort Bliss, are Gadsden ISD (serving the communities of Anthony and Chaparral) and Las Cruces ISD.

4.13.4.5 Las Cruces ISD

The Las Cruces ISD is the second largest school district (after Albuquerque) in the State of New Mexico. It has a student membership of over 22,000 and overall student-teacher ratio of 16.3 (below the state average of 16.9). The student membership is predominantly Hispanic (60.6 percent) (see Table 4.13-26).

4.13-26. Selected New Mexico School Districts

School District	*Student Membership*	*Ethnic Composition of Student Membership (percent)*					*Student-Teacher Ratio*
		Anglo	*Hispanic*	*Native American*	*Black*	*Asian*	
Las Cruces ISD	22,169	34.3	60.6	1.7	2.3	1.1	16.3
Gadsden ISD	12,519	6.9	92.5	0.1	0.4	0.1	17.2
State of New Mexico	330,522	38.6	47.5	10.5	2.4	1.0	16.9

4.13.4.6 Gadsden ISD

The Gadsden ISD has a student membership of over 12,519 (fifth largest in the state) and overall student-teacher ratio of 17.2 (above the state average of 16.9) (see Table 4.13-26). The student membership is overwhelmingly Hispanic (92.5 percent). The individual schools within the school district that could be affected by actions at Fort Bliss include the following: Anthony Elementary School (760 students), La Union Elementary School (510 students), Chaparral Elementary School (832 students), Gadsden Middle School (1,300 students), Chaparral Middle School (450 students), Anthony Texas Junior/Senior High School (289 students), and Gadsden High School (2,200 students).

4.13.5 Law Enforcement

From the point of view of law enforcement at Fort Bliss, there are two types of jurisdiction: areas of exclusive or concurrent federal jurisdiction to enforce civilian law, and areas of proprietary jurisdiction. Proprietary jurisdiction refers to use of the land and differs from exclusive or concurrent federal 92
jurisdiction, which deals with law enforcement authority on the land.

Fort Bliss has exclusive federal jurisdiction within the Main Cantonment Area, South Training Areas, TA 2, and throughout Doña Ana Range–North Training Areas. In these areas the military police of the Provost Marshal's Office have complete police powers, including those of apprehension and detention. The military police do not, however, have the authority to incarcerate civilians apprehended in these areas. If the offense for which a person is apprehended is deemed serious enough to warrant immediate incarceration, appropriate civilian law enforcement agencies are contacted and the case is transferred to them for further processing.

Fort Bliss has exclusive use of certain geographical areas, for military purposes, but does not have exclusive or concurrent federal jurisdiction to enforce civilian law in these areas. These areas of proprietary jurisdiction include: (1) a portion of Logan Heights, which is government-owned, but within which the El Paso Policy Department retains normal police jurisdiction; (2) TA 2, which is government-owned (portions of which were, until recently, leased from the State of Texas); and (3) McGregor Range, which is government-owned, but within which New Mexico State Police and New Mexico county authorities retain normal police jurisdiction.

In these above-mentioned areas, although civilian law enforcement agencies retain primary jurisdiction to apprehend, cite, investigate, and prosecute violations of civilian law, Fort Bliss, as the entity having exclusive authority to control the use of the land, has a primary interest in discipline, law and order, and public safety. Fort Bliss has the inherent authority to ensure that health, safety, and security are protected in these areas of the installation. Fort Bliss authorities necessarily exercise proprietary jurisdiction by monitoring and controlling access and activity within these areas and ensuring that persons and property are protected, military operations are not interfered with, unsafe conditions are prevented or corrected, and the environment is protected from unwarranted damage.

The areas over which Fort Bliss has proprietary jurisdiction are patrolled by the military police, who will respond to reports of disorder, crime, or other danger. The military law enforcement personnel will take actions to maintain discipline and law and order, to protect persons and property, and to assist the public in the same manner as in exclusive or concurrent federal jurisdictional areas. After taking reasonable action to protect persons and property and to maintain discipline and order, and after persons have been identified and detained and preliminary investigation has been conducted to determine what has happened, if there has been a violation of local, state, or federal law which should be prosecuted in a civilian court, military police will detain suspects, protect the crime scene, notify the appropriate civilian law enforcement agency, and then assist the civilian authorities in their conduct of their investigation (if so requested). The military also has jurisdiction to prosecute military personnel who commit violations of the Uniform Code of Military Justice (UCMJ) in these or any other areas.

The law enforcement entities addressed include the Fort Bliss Law Enforcement BN; City of El Paso Police Department, El Paso County, Texas; as well as Doña Ana County and Otero County, New Mexico, Sheriff's Office.

4.13.5.1 Fort Bliss

The Fort Bliss Law Enforcement BN has law enforcement responsibility for the entire extent of the federal installation encompassing 1.12 million acres. Fort Bliss is responsible for enforcing laws pertaining to military activities, public safety, and security on the South Training Areas, Doña Ana Range–North Training Area s, and McGregor Range. Operations are housed at the facility located on the Main Post, and the number of personnel totaled 365 in FY 97. This complement of personnel is comprised of 350 sworn officers, 13 administrative personnel, and 2 support personnel. The BN is currently equipped with 29 marked patrol cars, 3 unmarked cars, and 2 vans. The number of personnel is estimated to be 20 percent short of the number needed. However, an acceptable LOS is provided, given current staffing levels. No plans exist to upgrade facilities, although approval has been received for the addition of 15 new police-packaged patrol vehicles needed to maintain the required fleet level. There are three military police officers stationed at McGregor Range on a permanent basis. All housing areas and WBAMC located off the Main Post are patrolled by military police. The area of leased military family housing located about 5 miles north of the Main Post is patrolled in association with the City of El Paso Police Department, the latter of whom have jurisdiction.

No formal mutual aid agreements with civilian agencies exist. However, K-9 and Task Force support is provided in accordance with applicable regulations. The post has a single detention center able to accommodate 2 persons for a maximum of 72 hours. The post does not operate a centralized dispatch system and law enforcement patrols are dispatched from the Military Police desk, which is staffed 24 hours a day.

The BLM is responsible for enforcement of the federal laws that pertain to the use, management, and development of withdrawn public land on McGregor Range. Law enforcement personnel may exercise their enforcement authority over nonmilitary activities within the range to the extent that such activities are consistent with BLM's 1989 *Proposed Resource Management Plan* (1989a). The BLM will exercise its enforcement authority over military personnel on the range in coordination with the Fort Bliss Provost Marshal's Office. After BLM takes enforcement action on the range, it notifies the Fort Bliss Provost Marshal's Office. In addition, BLM notifies the Fort Bliss Provost Marshal's Office if persons are found on McGregor Range with Fort Bliss authorizations, but not conducting authorized activities. Similarly, Fort Bliss notifies the BLM if persons not on a military mission are found causing resource damage.

93 The Fort Bliss Law enforcement BN interaction with the U.S. Border Patrol is limited to calling upon the latter entity when illegal immigrants are apprehended. The Border Patrol currently maintains a station in Alamogordo and a checkpoint on U.S. Highway 54 between New Mexico Highway 506 and Oro Grande. The Border Patrol has plans to relocate the checkpoint to the Highway 54/506 intersection, which will assist both in their mission and help reduce trespassing on Fort Bliss.

4.13.5.2 Sheriff's Departments

The El Paso County Sheriff's Department has jurisdiction within the limits of the County of El Paso and covers an area of 1,150 square miles. The department operates out of four facilities (Central, Detention Facility, Task Force facility, and Upper Valley facility) and has a staff (as of 1997) of 806, comprised of

234 deputies, 411 jailors, and 161 civilians. The staff has grown from 659 personnel in 1995. Sworn officers receive basic, intermediate, and advanced training in the areas of law enforcement, corrections, management, computers, and defensive driving. Training is accomplished at the Region VIII Training Facility in El Paso. The department is equipped with 72 marked cars, 62 unmarked cars, 8 vans, and 11 motorcycles. The Sheriff's Department operates the El Paso County Detention Facility (with a capacity for 1,024 inmates), and the County Juvenile Detention Center (with a capacity for 64 juveniles). An Annex to the County Detention Facility was completed in September of 1997 with a capacity for 879 inmates. There is a centralized dispatch system.

Law enforcement personnel operating in Otero County include 23 personnel from the Sheriff's Department and 13 state police.

The Doña Ana County Sheriff's Department includes approximately 100 officers and a number of sheriff reservists.

4.13.5.3 City Police Departments

The City of El Paso Police Department has jurisdiction within the limits of the City of El Paso and covers an area of 248 square miles. The department operates out of six facilities (Headquarters [HQ], North, Westside, Central, Valley, and Pebble Hills) and has a staff (as of 1997) of 1,451, comprised of 1,191 sworn officers and 260 administrative and support personnel. The staff has grown from 1,329 personnel in 1995. Sworn officers initially complete a 19-week training course at the police academy and an additional 40 hours of mandatory training bi-annually to maintain state certification. The department is equipped with 290 marked cars, 288 unmarked cars, 19 vans, 35 motorcycles, and 6 aircraft (3 helicopters and 3 fixed-wing). Detention centers used by the department are the El Paso County Jail, operated by the Sheriff's Office (with a capacity for 1,024 inmates), and the County Juvenile Detention Center (with a capacity for 64 juveniles). There is a centralized dispatch system.

The City of Las Cruces Police Department has 144 uniformed officers and 7 volunteers.

The Alamogordo community is served by a Department of Public Safety, which incorporates fire protection, law enforcement, and emergency medical services into one function. The City of Alamogordo currently has 73 officers who are cross-trained to handle both police and firefighting duties.

4.13.6 Fire Protection

Fire protection provided by the following organizations is addressed: Fort Bliss Fire Department and the City of El Paso Fire Department.

4.13.6.1 Fort Bliss

The Fort Bliss Fire Department is responsible for all cantonment areas and within 5 miles of the Main Post in the training areas. The USACASB is responsible for fires caused by military operations on the remainder of Fort Bliss. Operations are housed in four facilities: Fire Station No. 1 is housed in Building 54 on the Main Post, Station No. 2 is housed in Building 9539 at the McGregor Range Field Camp, Station No. 3 is located at Building 7311 close to the WBAMC, and Station No. 4 is housed in Building 11211 on the flight line at Biggs AAF. The number of personnel totaled 71 in FY 96 and were comprised of 53 civil service fire fighters, 8 Emergency Medical Technicians (EMTs) and 10 administrative personnel. There is a hazardous materials response team. The department is currently equipped with the following machinery: four active and one reserve engine (equipped with four structural pumpers having a capacity of 1,000 gpm and one with a capacity of 1,250 gpm), one supply tanker, three command vehicles, five small pumper vehicles, one 105-foot aerial ladder truck, two P-19 crash vehicles, one light rescue truck, one air support vehicle with cascade breathing system, two 4×4 support vehicles, one brush-fire truck, and one hazardous materials response vehicle. The Fire Department has a formal mutual aid agreement with the City of El Paso Fire Department, however, use of the agreement is rare. The department operates a 24-hour dispatch center.

With the revision of AR 420-90, *Fire and Emergency Services,* dated September 10, 1997, all fires must now be reported into the DoD Fire Information Reporting System (DFIRS). This requires microcomputer automation of all DoD Fires and No-loss Reports (Fires, hazardous material Aerospace, Deaths, and Injuries). The system allows reporting of wildland fires and all activity used to mitigate. The Fort Bliss Fire Department is currently using DFIRS by accomplishing the reports on file diskettes and mailing them. By the end of CY 98, Fort Bliss will be able to electronically transmit all DFIRS information. The information submitted becomes the property and control of the Naval Safety Center, 375 “A” Street, ATTN: Code 44, Norfolk, Virginia 23511-4399, on behalf of all agencies under the DoD.

Fire reports are only generated when the Fort Bliss Fire Department actually responds to a fire. For example, a report of a fire that does not extend outside a weapons impact area would not generate a fire report because the fire department does not normally respond to such fires.

4.13.6.2 El Paso City Fire Department

The City of El Paso fire department provides fire protection services to an area coincident with the city limits (248 square miles) and operates out of 27 fire stations plus a shop and Training Academy. In 1997, total personnel numbered 664, of which 562 were uniformed firefighters. Of the personnel, 358 are certified as EMTs and 6 as paramedics. The department possesses a wide range of equipment including the following: 39 pumpers, 8 ladder trucks, 8 rescue trucks, 3 quints (pumper/ladder trucks), 3 aircraft firefighting vehicles, and 4 hazardous materials trucks/trailers. The department maintains formal mutual aid agreements with Fort Bliss and El Paso County. No fire protection service is provided to areas outside the city under paid contract. Dispatching is accomplished through a 911 system.

4.13.7 Public Finance

The ROI for public finance comprises the following: El Paso County, and the City of El Paso.

4.13.7.1 El Paso County, Texas

Services provided by the county are funded principally through the county’s general fund, which is the source of 67.4 percent of all revenues, with additional support from special revenue funds. The most important special revenue funds are grants (mainly intergovernmental transfers), road and bridge, and tourist- and convention-related funds. In FY 96, revenues from all government fund types totaled $105,444,178. The principal revenue sources were taxes (61.3 percent of total revenues), charges for services (19.6 percent), and intergovernmental transfers (10.9 percent), as shown in Table 4.13-27.

Expenditures in FY 96 totaled $110,402,500, with the major expenditure categories comprised of the following: public safety (30.2 percent of total annual expenditures), administration of justice (16.7 percent), general government (14.5 percent), and capital outlays (10.1 percent). The combined fund balance stood at $53,900,357 as of September 30, 1996, or 48.8 percent of operating expenditures (see Table 4.13-27).

Table 4.13-27. El Paso County, Texas: Revenues and Expenditures, Fiscal Year 96

Revenue Source	*Amount*	*Percent of Total Revenues*	*Expenditure Category*	*Amount*	*Percent of Total Expenditures*
Taxes	$64,589,220	61.25%	Current:		
Licenses & Permits	$192,746	0.18%	General Government	$15,971,834	14.47%
Intergovernmental	$11,523,024	10.93%	Administration of Justice	$18,441,168	16.70%
Charges for Services	$20,714,370	19.64%	Public Safety	$33,351,814	30.21%
Fines & Forfeitures	$1,989,003	1.89%	Health & Welfare	$9,133,983	8.27%
Interest	$3,857,383	3.66%	Community Services	$1,624,482	1.47%
Miscellaneous	$2,578,432	2.45%	Resource Development	$1,809,643	1.64%
			Culture & Recreation	$2,203,349	2.00%
Total Revenues	*$105,444,178*	*100.00%*	Public Works	$2,948,350	2.67%
			Capital Outlays	$11,180,265	10.13%
			Debt Service:		
			Principal	$5,927,671	5.37%
			Interest	$7,809,941	7.07%
Fund Balance as of September 30, 1996	$53,900,357		*Total Expenditures*	*$110,402,500*	*100.00%*

Source: El Paso County, 1996.

4.13.7.2 City of El Paso

Services provided by the city are funded principally through the county's general fund, which is the source of 76.1 percent of all revenues, with additional support from special revenue funds, the most important of which are enterprise funds (airport and mass transit). In FY 96, revenues from all government fund types totaled $270,580,107. The principal revenue sources were taxes (51.8 percent of total revenues) and intergovernmental transfers (11.0 percent), as shown in Table 4.13-28.

Expenditures in FY 96 totaled $288,557,056, with the major expenditure categories comprised of the following: public safety (37.4 percent of total annual expenditures), and public works (13.6 percent). The combined fund balance stood at $137,136,665 as of August 31, 1996, or 47.5 percent of operating expenditures, as shown in Table 4.13-28.

4.13.8 Governmental Structure

For El Paso County and the City of El Paso, descriptions are provided of the governmental system and personnel levels of major departments.

4.13.8.1 El Paso County, Texas

The governmental system comprises a Commissioners' Court, which is, in turn, comprised of four County Commissioners and a single County Judge, all of whom are publicly elected officials. The County Judge is elected at large and serves a 4-year term, while County Commissioners are elected from each of four precincts and serve a 2-year term. Elections are staggered with three positions available at one election and two positions at the following election.

Table 4.13-28. City of El Paso, Texas: Revenues and Expenditures, Fiscal Year 96

Revenue Source	*Amount*	*Percent of Total Revenue*	*Expenditure Category*	*Amount*	*Percent of Total Expenditures*
Taxes	$140,127,605	51.79%	Current:		
Intergovernmental	$29,846,290	11.03%	General Government	$18,001,146	6.24%
Licenses	$1,361,466	0.50%	Public Safety	$107,928,757	37.40%
Rents, Interest, Other	$19,282,452	7.13%	Public Works	$39,086,341	13.55%
Franchise Fees	$13,480,331	4.98%	Public Health & Welfare	$7,609,531	2.64%
Charges for Services	$20,371,155	7.53%	Parks & Recreation	$10,103,301	3.50%
Bridge Revenues	$9,920,409	3.67%	Intergovernmental Services	$658,551	0.23%
Sanitation	$22,979,534	8.49%	Library	$4,812,272	1.67%
Municipal Court	$8,898,481	3.29%	Non-Departmental	$6,567,162	2.28%
Culture & Recreation	$4,312,384	1.59%	Cultural Enhancements	$8,099,497	2.81%
			Community Service Projects	$26,663,748	9.24%
Total Revenues	*$270,580,107*	*100.00%*	Capital Outlay:		
			General Government	$3,674,479	1.27%
			Public Safety	$820,081	0.28%
			Public Works	$21,108,946	7.32%
			Public Health & Welfare	$7,418	0.00%
			Parks & Recreation	$62,454	0.02%
			Non-Departmental	$17,911	0.01%
			Cultural Enhancements	$599,048	0.21%
			Community Service Projects	$3,708,061	1.29%
			Debt Service:		
			Principal	$15,120,000	5.24%
			Interest	$13,857,029	4.80%
			Paying Agent Fees	$51,323	0.02%
Fund Balance (as of August 31, 1996)	$137,136,665		*Total Expenditures*	*$288,557,056*	*100.00%*

Source: El Paso, 1996b.

The county employed 2,025 employees in 1996, having increased from 1,897 in 1990. The large majority of these employees assist in the court system administered by the county. Of the various departments of county government, the following employ the largest number of personnel: sheriff (593 persons), adult and juvenile probation (436 persons), district attorney (94 persons), and road and bridge (70 persons). The county has a real extent of 1,054 square miles.

4.13.8.2 City of El Paso

The City of El Paso has a mayor and city council form of government. The mayor is elected at large and each of the eight council members are elected by district. Elections are held every odd-numbered year for mayor and all council members. The city was incorporated in 1873 and covers an area of 247 square miles.

The city employed a total of 5,847 employees in 1996, of which 5,151 were of a full-time permanent status. Of the various departments of city government, the following employ the largest number of personnel: police (1,310 persons), water utilities (687 persons), fire (646 persons), mass transit (565 persons), and parks and recreation (362 persons).

4.13.9 Medical Facilities

Medical facilities at Fort Bliss and El Paso County are addressed below.

4.13.9.1 Fort Bliss

Located just west of the Main Post, WBAMC is one of eight U.S. Army Medical Centers. WBAMC is also a Federal Medical Center and one of two trauma centers in El Paso County, an Army Regional Command, a DoD Regional Lead Agent for the introduction and implementation of TRICARE (a healthcare system for active duty personnel), and a Federal Regional Facilitator. Currently, the hospital has a bed capacity for over 200 patients, but has the capability to expand to accommodate 550 patients when necessary. The largest teaching facility within a 350-mile radius, WBAMC offers a broad range of programs in almost all medical disciplines. There are approximately 110 physicians training throughout the hospital and an equal number of nursing personnel in training. There are over 1,850 professional staff members and over 400 volunteers. A full-service facility, WBAMC provides both inpatient and outpatient care. On average, almost 2,500 outpatient visits occur daily and over 35,000 lab tests are accomplished. Emergency ambulance service to all eligible beneficiaries on a 24-hour, 7-day-per-week basis is provided to military installations in the area and all eligible beneficiaries located within a 6-minute response zone. The healthcare needs of more than 400,000 beneficiaries throughout the states of Arizona, California (Southern), Nevada, New Mexico, and Texas (Western), is the responsibility of the WBAMC.

In addition to the WBAMC proper, health care is provided at the Consolidated Troop Medical Clinic (CTMC), located in building 2496, Dental Clinics, and Veterinary Activity on Fort Bliss, and a health clinic at WSMR.

4.13.9.2 El Paso County

Health care is provided by six major general medical and surgical hospitals in the El Paso area. The hospitals are as follows (listed in terms of the number of beds regularly maintained for use): Sierra Medical Center, Providence Memorial Hospital, Columbia Medical Center—East, R.E. Tomason General Hospital, Columbia Medical Center—West, and Southwestern General Hospital. Collectively, these hospitals have 1,627 beds set up and staffed for use. The overall occupancy rate in 1995 was 59 percent.

The Sierra Medical Center, a for-profit facility, has 365 beds set up and staffed for use. In 1995, the hospital admitted 11,580 patients for inpatient service and had an average of 159 patients receiving care each day, giving an average occupancy rate of 44 percent. The number of outpatient visits totaled 89,784 in 1995. The hospital employed 1,111 FTE employees and had a payroll of $35.4 million. Total annual expenditures (including payroll) were $112.5 million.

The Providence Memorial Hospital, a not-for-profit facility, has 349 beds set up and staffed for use. In 1995, the hospital admitted 13,078 patients for inpatient service and had an average of 254 patients receiving care each day, giving an average occupancy rate of 73 percent. The number of outpatient visits totaled 105,267 in 1995. The hospital employed 1,548 FTE employees and had a payroll of $45.2 million. Total annual expenditures (including payroll) were $128.3 million.

The Columbia Medical Center—East, a for-profit facility, has 328 beds set up and staffed for use. In 1995, the hospital admitted 11,669 patients for inpatient service and had an average of 194 patients receiving care each day, giving an average occupancy rate of 59 percent. The number of outpatient visits totaled 93,965 in 1995. The hospital employed 1,214 FTE employees and had a payroll of $33.5 million. Total annual expenditures (including payroll) were $99.2 million.

The R.E. Tomason General Hospital, a public facility, has 299 beds set up and staffed for use. In 1995, the hospital admitted 14,619 patients for inpatient service and had an average of 213 patients receiving care each day, giving an average occupancy rate of 71 percent. The number of outpatient visits totaled 289,536 in 1995. The hospital employed 1,360 FTE employees and had a payroll of $39.2 million. Total annual expenditures (including payroll) were $103 million.

The Columbia Medical Center—West, a for-profit facility, has 184 beds set up and staffed for use. In 1995, the hospital admitted 7,592 patients for inpatient service and had an average of 121 patients receiving care each day, giving an average occupancy rate of 66 percent. The number of outpatient visits totaled 62,536 in 1995. The hospital employed 852 FTE employees and had a payroll of $27 million. Total annual expenditures (including payroll) were $85.9 million.

The Southwestern General Hospital, a for-profit facility, has 102 beds set up and staffed for use. In 1995, the hospital admitted 2,113 patients for inpatient service and had an average of 22 patients receiving care each day, giving an average occupancy rate of 22 percent. The number of outpatient visits totaled 15,773 in 1995. The hospital employed 182 FTE employees and had a payroll of $5.6 million. Total annual expenditures (including payroll) were $13.1 million.

4.13.10 Quality of Life

It is possible to characterize the quality of life experienced by residents of geographical areas such as counties in terms of quantitative indicators. The indicators chosen describe conditions in the following quality of life areas: crime, health and healthcare, educational attainment, income and poverty, and unemployment.

4.13.10.1 Fort Bliss

As is the case with most major military installations, Fort Bliss provides a wide array of facilities and offers many services to active duty members and their dependents who reside both on and off post. In many respects, the Main Post operates as a community unto itself.

A wide range of specialized medical services are provided at WBAMC. Complete dental services are offered through five clinics (three located on Fort Bliss, one at WBAMC, and one at WSMR). The Family and Recreation Division maintains three well-equipped physical fitness centers (one located on the Main Post, one on Biggs AAF, and one at Logan Heights housing area), and a year-round indoor swimming pool. There are 2 18-hole golf courses and a 52-lane bowling center. The Youth Plex provides year-round activities that include youth sports and instructional classes. There is an on post movie theater, and an arts and craft center. The Main Post also houses a commissary, PX (with mini-mall), banking and credit union offices, child care center, three elementary schools, library, chapel, post office, and personnel clubs (officer and Centennial Club).

4.13.10.2 Counties And Communities

A number of such indicators are presented in Table 4.13-29 for the nation, the states of Texas and New Mexico, and the three counties of the ROI. The number of serious crimes per 100,000 resident population is less than the respective state averages in Otero and Doña Ana counties, New Mexico. El Paso County exhibits a rate well in excess of the nation and the State of Texas.

Death rates (from natural causes) are lower in each of the three counties than the nation and states of Texas and New Mexico. However, the death rate for infants in Otero County is higher than for the nation

Table 4.13-29. Quality of Life Indicators

	United States	*New Mexico*	*Texas*	*Doña Ana County, New Mexico*	*Otero County, New Mexico*	*El Paso County, Texas*
Serious Crimes per 100,000 Population	5,928	7,029	7,821	6,487	5,200	8,937
Deaths per 1,000 Population	8.9	7.0	7.4	5.5	5.7	5.3
Infant Deaths: Age 1 Yr. or Less per 1,000 Live Births	10.0	10.0	9.0	9.8	13.3	8.2
Active Non-federal Physicians per 100,000 Population	214	183	173	126	92	134
Community Hospital Beds per 100,000 Population	366	257	338	171	128	270
Percent of High School Graduates Age 25 and Over	75.2%	75.1%	72.1%	70.4%	81.6%	63.7%
Percent of College Graduates Age 25 and Over	20.3%	20.4%	20.3%	21.9%	15.0%	15.2%
Median Family Income	$35,225	$27,623	$31,553	$24,720	$25,409	$24,057
Per Capita Personal Income	$14,420	$11,246	$12,904	$9,374	$10,053	$9,150
Median Household Money Income	$30,056	$24,087	$27,016	$21,859	$22,624	$22,644
Percent of Families With Annual Incomes < $15,000	24.3%	31.2%	27.6%	35.7%	28.3%	32.8%
Percent of Families With Incomes Below Poverty Level	10.0%	16.5%	14.1%	20.7%	13.7%	22.4%
Percent of Single Parent (Female) Families	31.1%	40.9%	35.4%	45.8%	44.2%	41.5%
Percent of Persons Age 65 & Over Below Poverty Level	12.8%	16.5%	18.4%	15.8%	12.5%	21.3%
Percent of the Civilian Labor Force Unemployed	6.3%	8.0%	7.1%	9.4%	10.5%	10.7%

Source: U.S. Department of Commerce, 1993a.

and State of New Mexico. Indicators of healthcare are almost uniformly lower for each of the counties than for the nation and states. With the exception of Otero County, the proportion of persons 25 years of age and older who graduated high school is lower than the national and state levels, and both Otero and El Paso counties lag the nation and states in the proportion of persons with a bachelor's degree. Indicators for money income (family, per capita, and household) are consistently lower for the counties than the national and respective state levels. Both Doña Ana and El Paso counties have large proportions of their families with annual incomes below the poverty level. All three counties have a high percentage of families with female heads of household (no spouse present) and high unemployment rates.

Environmental Justice

4.14

4.14 ENVIRONMENTAL JUSTICE

EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations requires that Fort Bliss make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations. For the PEIS, census data were used to estimate the number of persons in minority populations and low-income populations living in areas that could potentially be affected by the project and alternatives. This information, which is included below, describes an aspect of the baseline conditions for the project area.

EO 13045, Protection of Children From Environmental Health Risks and Safety Risks requires that each federal agency identify and assess environmental health risks and safety risks that may disproportionately affect children, and address such risks in their policies, programs, activities and standards. Further, for regulatory sections subject to the EO, agencies must now conduct an evaluation of environmental heath and safety effects on children and include an explanation of why the planned regulation is preferable to other potentially effective and reasonably feasible alternatives considered by the agency. Neither the proposed action nor alternatives would have the potential to cause environmental health risks or safety risks that would disproportionately affect children.

For resource areas identifying potentially adverse impacts in Chapter 4, an analysis was done to identify whether there would be disproportionately high and adverse effects on minority populations and low-income populations.

In addition, an environmental justice outreach program is being conducted as part of the EIS process. The purpose of this program is to expand participation of potentially affected populations in the EIS process and to identify public concerns. Appendix H contains material that was used in the environmental justice outreach program, including the mailing list, and a letter and fact sheet provided to all recipients in English and Spanish.

The ROI for environmental justice is a three-county area consisting of El Paso County, Texas and Doña Ana and Otero counties in New Mexico. For purposes of this analysis, minority populations and low-income populations were defined as follows:

Minority populations—Persons of Hispanic origin of any race; plus Blacks; American Indians, Eskimos, and Aleuts; and Asian or Pacific Islanders (without double-counting persons of Hispanic origin who are also contained in the latter groups).

Low-income populations—Persons living below the poverty level, which is $12,674 for a family of four in 1989, as reported in the 1990 census.

Estimates of these two populations were then developed using data from the 1990 Census of Population and Housing, which estimates each of the separate categories contained in these definitions.

In 1990, the ROI contained 779,048 persons, of whom 538,423 persons (or 69.1 percent) were minorities and 198,378 persons (or 25.5 percent) were living below the poverty level.

El Paso County contained 591,610 persons, of whom 439,598 persons (or 74.3 percent) were minorities and 155,298 (or 26.3 percent) were living below the poverty level. Persons of Hispanic origin comprised 411,619 persons (or 69.6 percent) of the total population. A total of 22,110 persons (or 3.7 percent) of the population is Black; 6,485 persons (or 1.1 percent) Asian or Pacific Islander; and 2,590 persons (or

0.4 percent) American Indian, Eskimo, or Aleut. For each county, some persons in the latter categories are also included in the subtotal for persons of Hispanic origin. To avoid double-counting these persons, they are added in only once when the minority population total is calculated.

Doña Ana County contained a population of 135,510, of which 80,234 (or 59.2 percent) were minorities and 34,676 (or 25.6 percent) were living below the poverty level. A total of 76,448 persons (or 56.4 percent) were of Hispanic origin. In addition, 2,172 persons (or 1.6 percent) are Black; 1,164 persons (or 0.9 percent) are Asian or Pacific Islander; and 1,009 persons (or 0.7 percent) of the population are American Indian, Eskimo, or Aleut.

Otero County contained 51,928 persons of which 18,591 persons (or 35.8 percent) were minorities and 8,404 persons (or 16.2 percent) were living below the poverty level. Persons of Hispanic origin comprised 12,380 persons (or 23.8 percent). Blacks comprised 5.3 percent of the population (or 2,755 persons); and Asian or Pacific Islanders comprised 966 persons (or 1.9 percent). In addition, American Indians, Eskimos, or Aleuts comprised 2,984 persons (or 5.7 percent) of the population. The Mescalero Apache Reservation is located in northeastern Otero County, New Mexico, with small, unpopulated portions also located in Lincoln County, New Mexico. Approximately 2,664 persons lived on the reservation in 1990, of which 97.0 percent were minority and 48.4 percent were living below the poverty level.

There are 131 census tracts in the three-county ROI, including 95 in El Paso County, 23 in Doña Ana County, and 13 in Otero County. Table 4.14-1 presents data on minority populations and low-income populations in the ROI for each of the 131 census tracts. Figures 4.14-1a and b show the counties and census tracts. For the analysis of baseline conditions, individual census tracts are assumed to contain disproportionately high percentages of minority populations if either of two criteria are met: (1) if the percentage of persons in minority populations in the census tract exceeds the average for the general population in the ROI, which is 69.1 percent; or (2) if the minority population exceeds 50.0 percent, indicating that in that census tract, minorities constitute a majority of the persons who could potentially be affected by the project. Individual census tracts are assumed to contain disproportionately high percentages of low-income persons if the percentage of persons living below the poverty level in the census tract exceeds the ROI average, which is 25.5 percent for the three counties.

Figures 4.14-2a and b show disproportionately high low-income and minority census tracts in the ROI. Minorities comprise more than 50 percent of the total population in 93 out of 131 census tracts in the ROI, or 71.0 percent of all census tracts. The minority population percentage exceeds the ROI average of 69.1 percent in 68 of the 131 census tracts, or 51.9 percent of the time. The percentage of the population living below the poverty level exceeds the ROI total of 25.5 percent in 60 of the 131 census tracts, or 45.8 percent of the time.

Table 4.14-1. Minority and Low-income Populations by Census Tract

Geographical Area	*County*	*Percent Minority*	*Disproportionately High*[a]	*Percent Low-income*[b]	*Disproportionately High*[a]
ROI[c]	NA	69.1	—	25.5	—
El Paso County	NA	74.3	—	26.3	—
Doña Ana County	NA	59.2	—	25.6	—
Otero County	NA	35.8	—	16.2	—
Census Tracts in Texas					
000101	El Paso	44.9		10.1	
000102	El Paso	59.9	Y	27.5	Y
000104	El Paso	50.9	Y	14.0	
000106	El Paso	44.4		5.7	
000107	El Paso	59.7	Y	12.8	
000108	El Paso	49.8		19.3	
000201	El Paso	62.1	Y	28.4	Y
000203	El Paso	55.7	Y	15.1	
000204	El Paso	55.3	Y	14.7	
000301	El Paso	75.1	Y	39.1	Y
000302	El Paso	81.6	Y	32.7	Y
000401	El Paso	33.4		6.4	
000402	El Paso	77.5	Y	40.5	Y
0005	El Paso	48.1		4.2	
0006	El Paso	84.5	Y	32.2	Y
0007	El Paso	45.2		7.7	
0008	El Paso	81.7	Y	35.8	Y
0009	El Paso	83.8	Y	24.4	
0010	El Paso	89.0	Y	25.2	
001104	El Paso	49.4		12.8	
001105	El Paso	62.4	Y	27.0	Y
001106	El Paso	41.7		8.9	
001107	El Paso	33.5		3.0	
001108	El Paso	38.9		7.3	
001109	El Paso	28.9		5.1	
0012	El Paso	76.2	Y	30.0	Y
001301	El Paso	33.0		8.2	
001398	El Paso	33.9		6.2	
0014	El Paso	79.6	Y	37.0	Y
0015	El Paso	50.6	Y	14.8	
0016	El Paso	89.2	Y	51.6	Y
0017	El Paso	86.0	Y	33.1	Y
0018	El Paso	98.8	Y	63.6	Y
0019	El Paso	98.6	Y	69.2	Y
0020	El Paso	99.1	Y	72.9	Y

Table 4.14-1. Minority and Low-income Populations by Census Tract (Continued)

Census Tract	*County*	*Percent Minority*	*Disproportionately High*[a]	*Percent Low-income*[b]	*Disproportionately High*[a]
0021	El Paso	97.4	Y	77.2	Y
0022	El Paso	87.7	Y	43.1	Y
0023	El Paso	89.3	Y	25.1	
0024	El Paso	87.8	Y	32.1	Y
0025	El Paso	83.5	Y	25.7	Y
0026	El Paso	96.8	Y	40.8	Y
0027	El Paso	93.6	Y	33.7	Y
0028	El Paso	98.9	Y	59.3	Y
0029	El Paso	98.5	Y	77.6	Y
0030	El Paso	97.9	Y	50.9	Y
0031	El Paso	96.8	Y	37.1	Y
0032	El Paso	97.3	Y	42.0	Y
0033	El Paso	84.0	Y	27.7	Y
003401	El Paso	81.3	Y	20.1	
003403	El Paso	60.8	Y	7.3	
003404	El Paso	47.6		4.3	
0035	El Paso	91.3	Y	36.4	Y
0036	El Paso	95.5	Y	43.4	Y
003701	El Paso	95.5	Y	30.7	Y
003702	El Paso	95.1	Y	31.2	Y
003801	El Paso	95.8	Y	30.8	Y
003802	El Paso	93.4	Y	30.3	Y
003901	El Paso	93.0	Y	40.7	Y
003902	El Paso	96.9	Y	37.4	Y
003903	El Paso	97.8	Y	54.1	Y
004001	El Paso	96.2	Y	24.1	
004002	El Paso	96.0	Y	33.9	Y
004103	El Paso	90.1	Y	35.3	Y
004104	El Paso	93.2	Y	25.1	
004105	El Paso	96.0	Y	30.4	Y
004106	El Paso	94.4	Y	29.2	Y
004107	El Paso	84.4	Y	22.9	
004201	El Paso	95.6	Y	33.0	Y
004202	El Paso	95.0	Y	20.5	
004303	El Paso	57.5	Y	7.6	
004305	El Paso	58.2	Y	8.4	
004306	El Paso	57.0	Y	16.5	
004307	El Paso	52.6	Y	4.7	
004308	El Paso	79.4	Y	11.2	
004309	El Paso	63.6	Y	7.4	
004310	El Paso	65.3	Y	20.5	

Table 4.14-1. Minority and Low-income Populations by Census Tract (Continued)

Census Tract	*County*	*Percent Minority*	*Disproportionately High*[a]	*Percent Low-income*[b]	*Disproportionately High*[a]
004311	El Paso	58.0	Y	8.5	
0101	El Paso	48.0		13.2	
010202	El Paso	49.1		15.2	
010203	El Paso	80.2	Y	22.2	
010204	El Paso	45.7		18.9	
010205	El Paso	81.6	Y	34.4	Y
010303	El Paso	56.7	Y	11.4	
010304	El Paso	59.8	Y	7.7	
010305	El Paso	72.2	Y	10.9	
010306	El Paso	65.7	Y	12.7	
010307	El Paso	73.4	Y	21.2	
010308	El Paso	72.5	Y	30.8	Y
010309	El Paso	68.0	Y	30.6	Y
010310	El Paso	90.5	Y	39.9	Y
010401	El Paso	97.8	Y	46.7	Y
010402	El Paso	96.3	Y	44.0	Y
010403	El Paso	98.0	Y	45.5	Y
010404	El Paso	90.3	Y	26.0	Y
0105	El Paso	89.9	Y	47.4	Y
Census Tracts in New Mexico					
000101	Doña Ana	42.5		12.5	
000102	Doña Ana	43.9		11.7	
0002	Doña Ana	55.3	Y	25.2	
0003	Doña Ana	43.9		19.2	
000401	Doña Ana	92.9	Y	40.5	Y
000402	Doña Ana	65.9	Y	23.9	
0005	Doña Ana	65.5	Y	33.7	Y
0006	Doña Ana	73.9	Y	33.9	Y
0007	Doña Ana	58.1	Y	23.9	
0008	Doña Ana	35.6		17.7	
0009	Doña Ana	47.0		39.6	Y
0010	Doña Ana	43.3		29.3	Y
001101	Doña Ana	54.4	Y	19.4	
001102	Doña Ana	57.7	Y	13.8	
001201	Doña Ana	42.1		15.8	
001202	Doña Ana	25.8		11.6	
0013	Doña Ana	53.0	Y	20.1	
0014	Doña Ana	74.8	Y	43.8	Y
0015	Doña Ana	39.4		10.3	
0016	Doña Ana	88.6	Y	24.5	
0017	Doña Ana	85.5	Y	40.7	Y

Table 4.14-1. Minority and Low-income Populations by Census Tract (Continued)

Census Tract	*County*	*Percent Minority*	*Disproportionately High*[a]	*Percent Low-income*[b]	*Disproportionately High*[a]
0018	Doña Ana	80.8	Y	35.6	Y
0019	Doña Ana	33.9		4.0	
0001	Otero	79.4	Y	45.8	Y
0002	Otero	35.5		15.2	
000301	Otero	29.2		12.4	
000302	Otero	23.5		6.4	
000401	Otero	29.3		12.2	
000402	Otero	35.0		11.7	
0005	Otero	36.0		16.2	
000601	Otero	32.2		7.0	
000602	Otero	17.1		13.5	
000603	Otero	25.8		9.7	
0007	Otero	42.9		24.2	
0008	Otero	97.0	Y	48.2	Y
0009	Otero	28.7		22.2	

Notes:

[a] A census tract is deemed to have a disproportionately high percentage of persons in minority populations and/or low-income populations if the census tract percentage is higher than the percentage in the ROI or if the minority percentage is greater than 50 percent.

[b] Low-income is measured by identifying the number of persons below poverty level ($12,764 for a family of four in 1989, as reported in the 1990 Census of Population and Housing).

[c] The ROI is comprised of three counties: El Paso County, Texas, and Doña Ana and Otero counties in New Mexico.

Source: U.S. Department of Commerce, 1992a and 1992b.

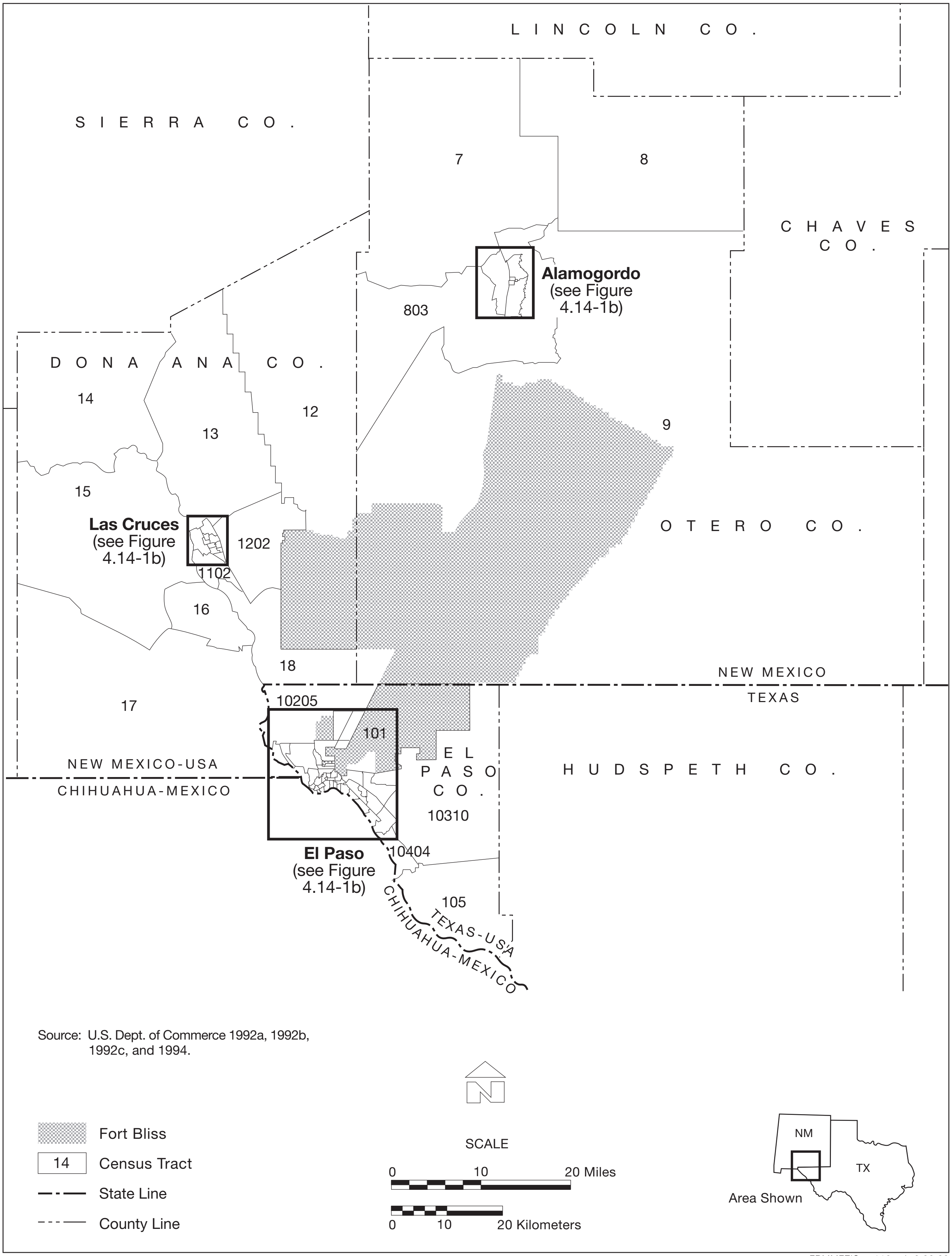

Figure 4.14-1a. Census Tracts in El Paso, Doña Ana, and Otero Counties.

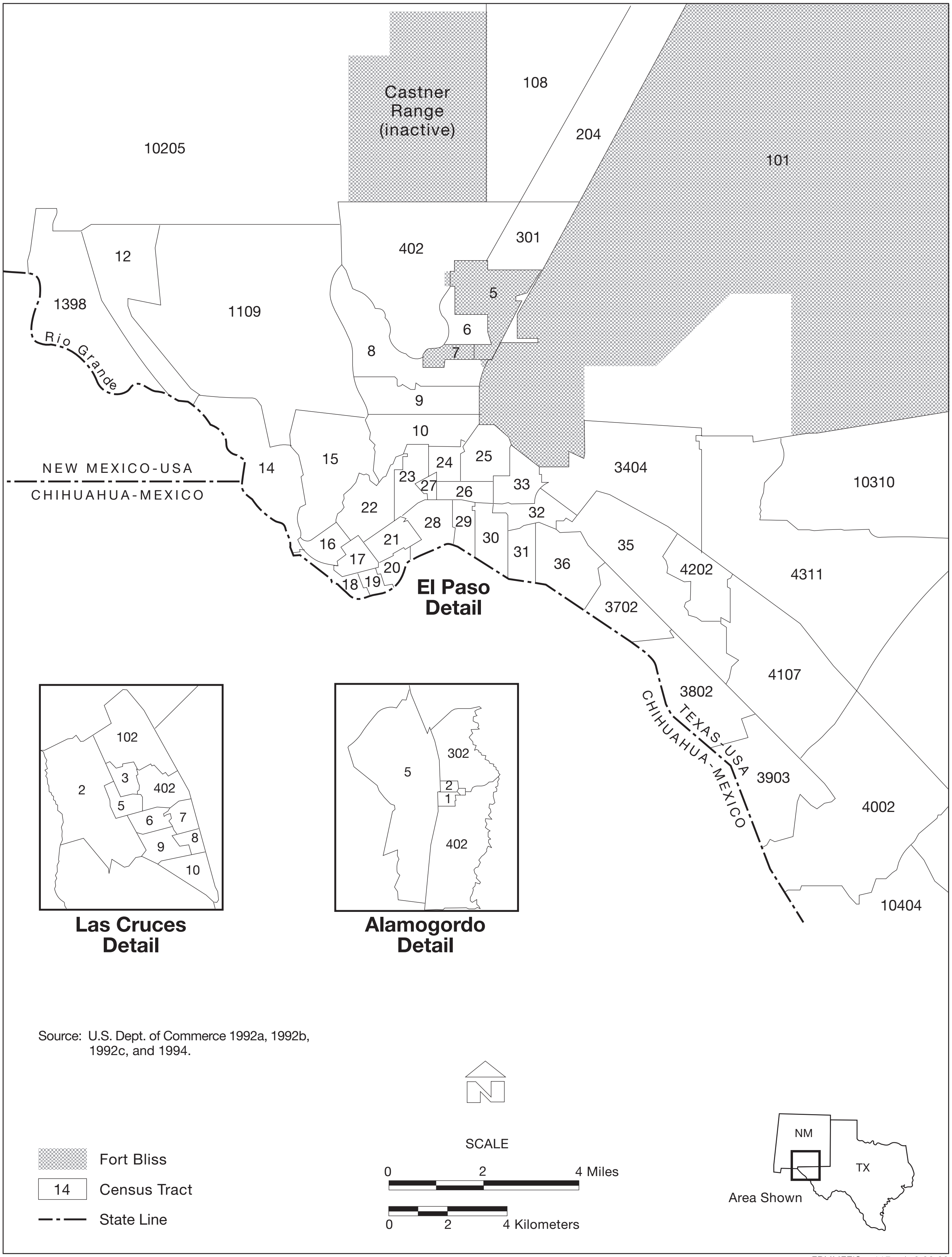

Figure 4.14-1b. Detail of Census Tracts in El Paso, Doña Ana, and Otero Counties.

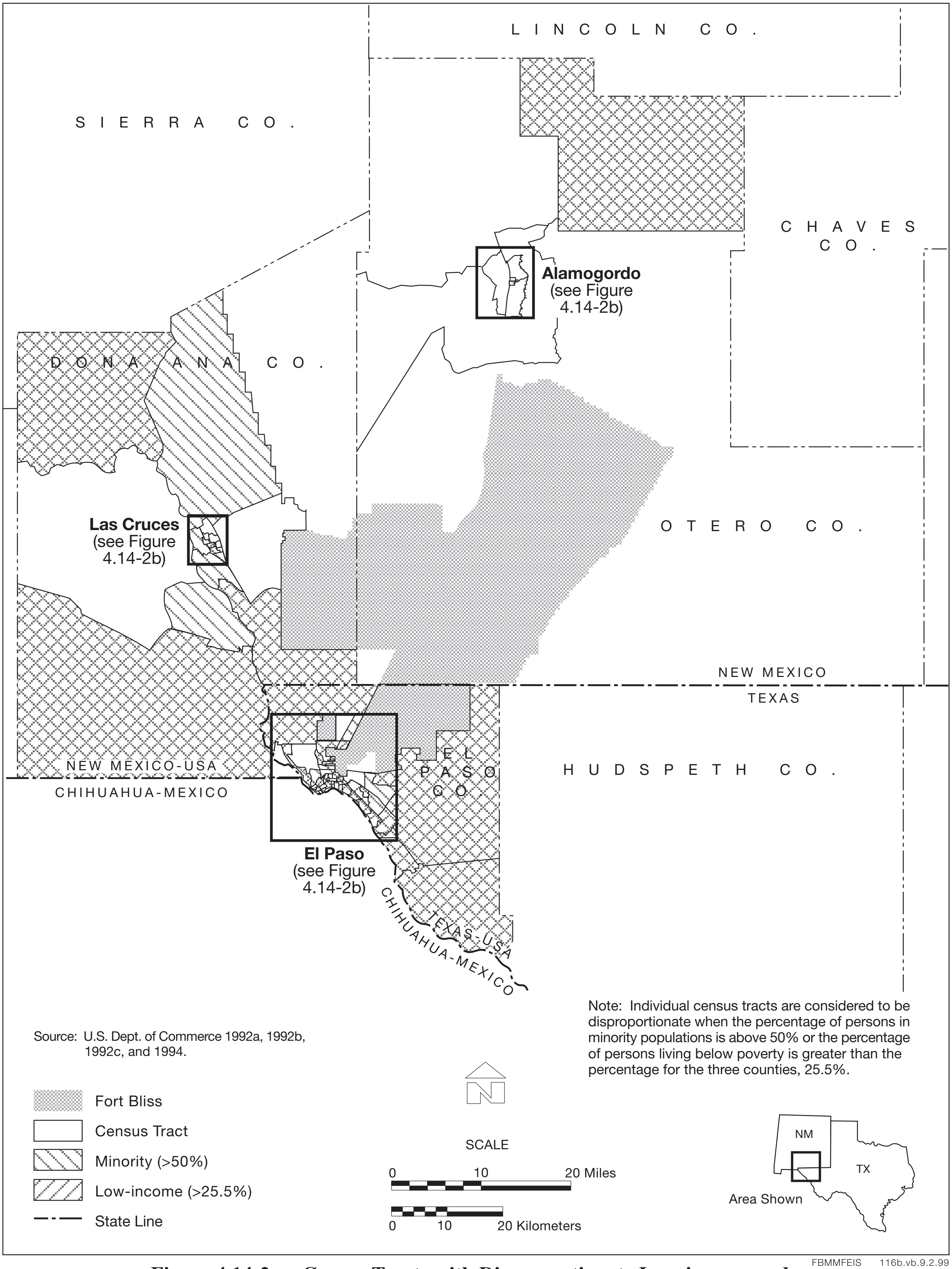

Figure 4.14-2a. Census Tracts with Disproportionate Low-income and Minority Populations.

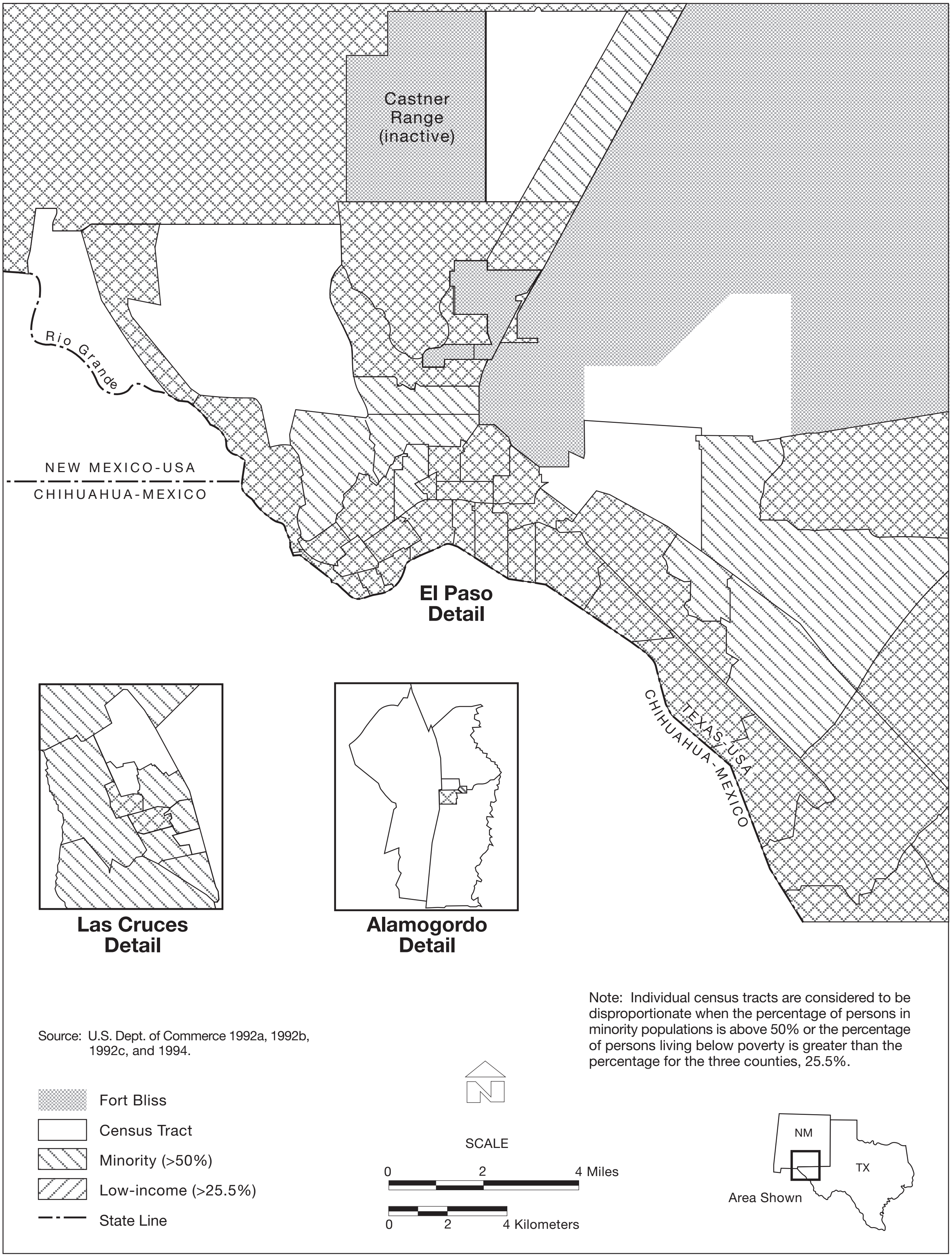

Figure 4.14-2b. Detail of Census Tracts with Disproportionate Low-income and Minority Populations.

Environmental Consequences and Cumulative Effects

5.0

5.0 ENVIRONMENTAL CONSEQUENCES AND CUMULATIVE EFFECTS

This chapter presents the environmental consequences and cumulative effects of implementing each of the four alternatives, including No Action, described in Chapter 3. Discussions of resources are based on the environmental setting specific to the described resource (Chapter 4) as they are potentially impacted. The impact definitions for each resource (beneficial, no impact, adverse, or significantly adverse) are presented in Appendix A. The discussion of environmental consequences follows the order of presentation of the 13 resources described in Chapter 4. Therefore, Chapter 3 has described the proposed action and alternatives, Chapter 4 has described the environmental setting into which the action is being proposed, and Chapter 5 now describes the environmental consequences of implementing each of the alternatives. Additionally, cumulative effects are analyzed and presented by the 13 resources for Alternatives 1, 2, and 3 in Chapter 5. The section below describes the cumulative impacts analysis process.

The federal CEQ defines a cumulative impact as:

> The incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time (40 CFR 1508.7 *Regulations for Implementing the National Environmental Policy Act – Cumulative Impact*).

Cumulative environmental impacts are most likely to arise when a relationship exists between a proposed action or alternative and other actions expected to occur in a similar location, time period, and/or involving similar actions. Projects in proximity to the proposed action or alternative would be expected to have more potential for a relationship that could result in potential cumulative impacts than those more geographically separated. These projects can be proposed by various agencies (federal, state, or local) or persons.

The ROI defined for the Army activities in this PEIS by resource area represents the geographic area established for the cumulative effect analysis. Projects considered for the potential of creating cumulative impacts are described, followed by an impact analysis per resource. In each case, the assessment focuses on addressing two fundamental questions: (1) Does a relationship exist such that the impacts from the proposed action or alternative might affect or be affected by the impacts of the other actions? And (2) if such a relationship exists, does this assessment reveal any potentially significant impacts not identified when the proposed action or alternative is considered alone?

For the purposes of this PEIS, two types of activities have been identified that, in combination with the proposed action, have the potential for contributing to cumulative impacts. They are:

- Ongoing or projected military activities in the ROI, including WSMR and HAFB; and
- Nonmilitary activities and plans that also affect areas or resources affected by the proposed action or alternative, including resource management and planning by the BLM; USFS; states of New Mexico and Texas; Doña Ana and Otero counties, New Mexico; and El Paso County, Texas.

These activities are described in detail in Appendix B, and are summarized as follows.

Military activities at WSMR are centered on mission support of research, development, test, and evaluation of Army missile and rocket systems. WSMR is adjacent to the Doña Ana Range–North

Training Areas of Fort Bliss. Training, testing, and environmental resource management activities of each installation can affect resources and ecosystems that transcend installation boundaries.

Military activities at HAFB with potential to affect Fort Bliss include:

- Expansion of GAF operations, to include bed-down of additional 30 PA-200 Tornado aircraft;
- Establishment of a new air-to-ground tactical target complex on McGregor Range; and
- Deactivation of the 435th Fighter Squadron at HAFB, which would reduce flight operations over McGregor Range.

For the purpose of environmental analysis in this PEIS, expansion of GAF/USAF activities at HAFB and development of a new air-to-ground target complex on McGregor Range is being considered as part of the No Action Alternative (existing environment). The publication of the ROD for the expansion of GAF operations at HAFB in May 1998 selected for implementation the Otero Mesa site on McGregor Range as the new tactical target complex. Therefore, to account for its potential environmental effects, the target complex is currently considered part of the existing environment on Fort Bliss and is analyzed as a cumulative impact under the No Action Alternative because selection of the Otero Mesa target complex adds to the current mission of Fort Bliss.

95 The BLM (a Bureau of the DOI), Las Cruces Field Office encompasses the portions of Fort Bliss in New Mexico. Two RMPs have been issued that describe BLM activities with potential to affect portions of Fort Bliss, or be affected by Fort Bliss activities. The USFS (an agency of the USDA) manages lands adjacent to the northeastern boundary of McGregor Range including grazing, minerals, water, soils, fuel wood gathering, hunting, and recreation. USFS actions that could affect Fort Bliss are included in the forest management plan for the Lincoln National Forest (USFS, 1986).

The states of New Mexico and Texas administer certain lands and highways in the ROI. New Mexico is evaluating plans to widen portions of U.S. Highway 54 near Fort Bliss. Texas has no current plans that could contribute to cumulative effects.

Doña Ana and Otero counties, New Mexico, and El Paso County, Texas are in the ROI for this PEIS. In the New Mexico counties, community and private developments could contribute to cumulative effects. Growth in El Paso and Doña Ana counties could cumulatively affect regional groundwater supplies and regional air quality. Growth in Doña Ana County (particularly the Chaparral area) is encroaching on Fort Bliss installation boundaries, leading to a variety of possible land use-related incompatibilities.

5.1 NO ACTION ALTERNATIVE

The No Action Alternative describes the current mission assigned to Fort Bliss, certain planned developments, and maintenance activities of the installation. Mission activities, projects, and programs for which NEPA documentation was previously prepared are also addressed in the No Action Alternative. A detailed description of the No Action Alternative is presented in Section 3.2. A brief description of the impact analysis structure using four broad categories of activities or projects at Fort Bliss is presented below.

- Mission Activities. Mission activities take place at both the Main Cantonment Area and the Fort Bliss Training Complex. Mission activities conducted within the Main Cantonment Area include command and control; classroom instruction; doctrine or equipment test design; and medical, and logistical, and engineer support activities. Mission activities conducted on the training complex include training to maintain the operational readiness of active duty, reserve, and National Guard units. Training includes:

  - Periodic FTXs;
  - JTXs;
  - Training and Annual Service Practices of U.S. and Allied ADA units; and
  - Testing support for TEXCOM, U.S. Army Missile Command (MICOM) and the WSMR Office of Test Development.

The USAF is expanding GAF operations at HAFB, New Mexico, through the beddown of an additional 30 PA-200 Tornado aircraft at the base. The action includes construction of various facilities at HAFB and the establishment of a new air-to-ground tactical target complex. Through the ROD for the EIS, the USAF selected a McGregor Range Otero Mesa site for the tactical target complex. The mission to provide air-to-ground support to U.S. and GAF units is considered a cumulative impact within the No Action Alternative. The *Fort Bliss Mission and Master Plan PEIS* was developed in parallel with the EIS for the expansion of GAF operations and development of the tactical target complex. Construction of the tactical target complex would add to the Fort Bliss mission. Therefore, the EIS prepared for this USAF action is included by reference in this *Fort Bliss Mission and Master Plan PEIS*.

- Facility Construction and Demolition. The No Action Alternative includes 26 projects for new construction/existing facility renovation or rehabilitation, and related infrastructure improvements. This program is described in Section 3.2.

The example of a CIS component of the RPMP is the P3 CIS that supports the ASMP designation of Fort Bliss as one of the Army's 15 continental U.S. P3s (U.S. Army, 1996d).

The Fort Bliss *Long-range Family Housing Plan* (U.S. Army, n.d. (b)) consists of a number of sequential projects developed around the concepts of new construction on previously undisturbed sites, and demolition of old existing units and replacement with new housing.

Mobilization requirements include upgrades in the troop housing and maintenance areas at Doña Ana, Orogrande, McGregor, and Meyer Range camps. These vary in magnitude, dependent upon the stage of mobilization being implemented. With some maintenance and small, specific facility-related expansion projects, the post's transportation, water, wastewater, electrical, heating, cooling, and fuel systems would be considered adequate for mobilization requirements.

Facility demolition is a part of the Army's Facility Layaway Program to reduce infrastructure and bring operations and maintenance costs for each installation in line with the facilities required to meet their assigned missions. The Main Cantonment Area, Logan Heights, WBAMC, Biggs AAF, and McGregor Range all contain facilities scheduled either for layaway awaiting demolition or for layaway holding for future use.

- Environmental Resource Management. Fort Bliss has an active resource management program that includes integrated training area management, as well as natural resources and cultural resources management. These programs include the following actions under the No Action Alternative:

  - *Integrated Training Area Management.* The standard Army mechanism for dealing with soil and vegetation impacts is through ITAM;
  - *Natural Resource Management.* Continue operations without implementing the INRMP; and
  - *Cultural Resource Management.* Continue operations without implementing the ICRMP.

- Real Estate Actions. Real estate actions that are ongoing at Fort Bliss include ROW, leases, and disposition of excess property.

5.1.1 Land Use

Under the No Action Alternative, the existing 1980s-era LRC of the RPMP as updated periodically would be the continuing planning guidances. Within the Main Cantonment Area, land uses would change in accordance with that era's plan, and relationships between functions, including safety conditions for hazardous and explosive materials and airfield operations, would remain the same. Existing incompatible adjacent land uses and activities (identified in the LRC of the RPMP, [U.S. Army, 1997a]) would persist (see Sections 4.1.1.1 and 4.1.1.2).

5.1.1.1 Main Cantonment Area Including Biggs AAF

In general, the relationship between activities and future development on the main cantonment and adjacent areas would be little changed, and would be generally compatible with surrounding land use and zoning. Exceptions to this are indicated in the following sections. The impacts to land use on the Main Cantonment Area, including Biggs AAF, resulting from the No Action Alternative are discussed below in relation to the four project categories.

Mission Activities. Little change in projected mission or mission support activity would occur, and personnel levels would be fairly stable. Therefore, only relatively minor changes may affect the suitability of land uses.

Relocation of the main ASP on Biggs AAF to McGregor Range would result in safer conditions, benefiting all uses on the Main Post and Biggs AAF, and public roadways in the vicinity. Aircraft operations at Biggs AAF would remain the same, resulting in no increase in noise in the cantonment area.

Noise from surge operations over a 72-hour deployment period at Biggs AAF would expand the area exposed to L_{dn} 65 dB and greater, including some residences in the Aero Vista family housing area. Even though this level of noise exposure is generally considered incompatible with residential use, these conditions would be temporary.

During mobilization, WBAMC could be used to capacity, resulting in increased local traffic in residential areas immediately to the south and west of the hospital where the entrance/exit feeds directly from/into residential streets. Congestion and safety of pedestrians (particularly of children) may be a concern during these periods.

Surges in force strength during mobilization and deployment would temporarily increase traffic and use of facilities, and intensify levels of activity in the Main Cantonment Area and at Biggs AAF. This may result in short-term use of training areas on the Main Post and Biggs AAF for temporary billeting, conversion of some functions for additional troop housing, increased mission and mission support functions, increased activity at WBAMC, and increased traffic on post and in the surrounding area. Land uses on post with the greatest sensitivity to these changes are family housing and community support functions. Family housing is generally segregated from mission activities by location and by perimeter walls, reducing potential exposure of residential areas. Community facilities on post are designed to meet the demands of peacetime military population and, therefore, may be overcrowded and temporarily inadequate for community demands during mobilization.

Traffic may increase on the main municipal roadways around the post during mobilization. More frequent convoys of troops and equipment between the Main Cantonment Area and the Fort Bliss Training Complex may slow traffic on roadways (particularly U.S. Highway 54) on occasion. Although inconvenient, these conditions would not significantly affect land use. Local neighborhood commercial uses in El Paso may benefit slightly from increased sales.

Facility Construction and Demolition. Several construction projects that were already programmed are either completed, ongoing, or scheduled to have begun during the period between FY 95 to 98. Many facilities would support existing facility improvements such as airfield maintenance, vehicle maintenance, troop housing, and medical and community support facilities. These facilities would benefit regular operations, and generally benefit land use supporting the Fort Bliss mission.

Several projects for the airfield will maintain and improve airfield infrastructure, runways, and loading (ramp) areas. Efficiency and safety of operations will also be improved. Family housing replacement projects will meet the need for upgraded housing through FY 14. Location of these projects in existing family housing areas is compatible with surrounding on-post and off-post uses. Housing replacement of 1,952 units would result in improved housing standards and benefit residential use. Under this alternative, the replacement program would occur in areas considered under the 1989 planning guidance. Deficiencies identified in the revised LRC of the RPMP (U.S. Army, 1997a) would continue. This would result in less suitable conditions for most land uses on post, and could indirectly affect surrounding land uses, due to general decline in appearance and less efficient circulation.

Demolition actions under the No Action Alternative would have no direct or permanent impact to land use. During demolition, adjacent areas (particularly housing areas) may experience temporary incompatible increases in noise from the operation of equipment.

Removal of older facilities usually reduces the inventory of substandard structures. In most cases, demolition on post is predicated on redevelopment plans, either for replacement housing or more suitable facilities or uses that will benefit land uses on post. However, because some sites would not be redeveloped under this alternative, improvements to land use may not follow. For example, no replacement facilities are planned for the barracks being demolished on Logan Heights, and resulting open space may result in underutilized community resources in this area and a possible shortage of troop housing in other locations on post.

Several facilities scheduled for demolition have historic value (see Section 3.2.4). These buildings are located in five areas: the 300, 400, 1400, 2100, and 7100 blocks. The demolition plan also includes other buildings that have potential historic value. Review actions required under the NHPA could delay timely redevelopment. Alternatively, preservation of buildings could restrict future site uses. Resulting fragmentation of land uses may result in some inefficiency or additional expense for site development. Additional maintenance may be required for historic properties to prevent deterioration and associated effects on site image. This would conflict with RPMP goals that recognize the importance of an attractively built environment on morale and productivity as well as improving functional efficiency (U.S. Army, 1997a). Further consideration of potential impacts to the historic properties is presented in Section 5.1.9.

Removal of 2,770 family housing units reduces the inventory of substandard military family housing by 818 units. This creates an opportunity to reclassify the use of the land upon which family housing will not be reconstructed. Under the No Action Alternative, the land use classification would remain the same as in the 1989 land use plan as amended in the early 1990s. The deviation between existing and planned uses would increase.

Environmental Resource Management. Management of the natural and cultural resources would continue using current Army mechanisms for planning and siting of mission activities and facilities on a case-by-case basis.

The current land use patterns and their effects upon natural and cultural resource management would continue, such as land use fragmentation that has resulted in the Main Cantonment Area from clustering/enclaving of tenant organizations over time and provides functional benefits of proximity. However, this process has resulted in incompatible adjacent uses (see Section 4.1.1.1) and impediments to developing integrated infrastructure. These conditions would persist under the No Action Alternative. For example, implementation of the *Land Use Plan* (U.S. Army, 1997a) (Figure 3.2-2) would result in no consolidated supply/storage function on the Main Post.

The NHPA will continue to require review of significant historic buildings prior to demolition or renovation. Because of the expense involved, several historic buildings on post have not been removed or reused. Funding for maintenance and security of unused facilities with potential historic significance is inadequate to prevent deterioration and vandalism. As a result, areas are not being redeveloped to best support the Fort Bliss mission. Adjacent land uses are affected by the appearance of dilapidated structures. Demolition of historic structures by neglect remains an issue connected to layaway/abandonment-adverse effect.

Construction projects involving soil disturbance and building modifications will continue to be individually reviewed for compliance with historic preservation regulations, adding time and cost to site development. Although this can result in delays and postponement of suitable redevelopment, direct impacts to land use from resource management procedures are minimal. Use of cultural resources for recreation, education, scientific research, and visual enhancement would continue to be inconsistent due to the lack of coordinated land use and cultural resource planning.

Real Estate Actions. Existing leases, permits, licenses, and ROWs would continue through their contracted periods. No corrective action is currently indicated for any ongoing real estate contracts. Because no change in land use or major construction would be implemented under the No Action Alternative, it is anticipated that contracts would be renewed as needed without modification. No land use impacts are anticipated.

Expansion of the National Cemetery to the west of its existing site would use land that is currently designated as Open Space, and would be compatible with adjacent community areas, residential, and industrial uses which would be compatible with current planning. Construction of a high school in the Logan Heights area on land leased to El Paso ISD would be compatible with existing land uses for residential, recreational, and community services. Additional traffic may be incompatible with pedestrian traffic within the neighborhood and cause congestion at local intersections during peak hours.

5.1.1.2 Fort Bliss Training Complex

Under the No Action Alternative, land use on the South Training Areas, Doña Ana Range–North Training Areas, and McGregor Range is categorized within the RPMP as Category VI–Training/Ranges. No further delineation of land use has been specified for these areas. The terrain, historical use, and natural and cultural resource management objectives dictate land use planning on these ranges and training areas on a case-by-case basis when new activities are considered. The impacts to land use on the Fort Bliss Training Complex resulting from the No Action Alternative are discussed below in relation to the four project categories.

Mission Activities. Little change in the type or frequency of mission activities would occur on most of the Fort Bliss Training Complex. Therefore, existing land use would be relatively unaffected. However, land use planning for these activities would remain fragmented under the current general land use designation (Training/Ranges–Category VI).

Use of the new tactical target complex on Otero Mesa will reduce availability of the area south of New Mexico Highway 506 by up to 60 hours each week, mostly on weekdays. The USAF will be developing procedures with the BLM to minimize disruption to grazing operations (see Section 4.1.2.1). The area is **16**
used for scheduled permitted hunts (that would continue) and infrequently for other recreational activities. Most casual recreation and hunting occurs on weekends and therefore will be relatively unaffected by this new use.

Drifting of smoke from smoke-generating missions can cause unsafe conditions for drivers under certain wind conditions and when the source location is close to a roadway. Similarly, dust from tracked vehicle maneuvers has been identified as a concern for adjacent off-post residential areas in northeast El Paso. Downwind hazard areas are defined as the area beyond the impact point that may be affected by a riot-control chemical agent or by smoke due to downwind drift caused by wind direction and speed. Due to range control procedures, it is considered unlikely that these sources could affect off-post uses (see Section 5.1.6.2).

Military and nonmilitary use of Culp Canyon WSA would not change. Specifically, grazing, public recreation, and wilderness management would be unaffected.

Under sustained mobilization, up to 8,000 additional troops could be housed at the range camps, and additional individual and unit training activities would occur at the ranges. Some facility upgrades in range camps would benefit use in these built-up areas. Training will mostly increase in the South Training Areas, in the Doña Ana Range–North Training Areas, and in the south part of McGregor Range. Increased military use of these areas would not affect grazing or opportunities for public recreation in the north part of McGregor Range. ORV maneuvers in the Doña Ana Range–North Training Areas and South Training Areas would continue at the level required by the mobilization training. Dust could continue to be a concern for adjacent residential areas.

Facility Construction and Demolition. Construction of the first phase of a new ASP on the McGregor Range is sited away from built-up areas in the range camp, and has good highway access. Relocation of this function from the Main Cantonment Area will improve safety conditions for adjacent land uses in a congested urban area. Currently, the quantity-distance zone for the existing ammunition storage area on Biggs AAF extends over portions of U.S. Highway 54 in El Paso. This situation will be eliminated when the new facility becomes operational.

Recent improvements to the Site 10 Road on McGregor Range improved access for military users and range maintenance. Roadway improvements are intended to prevent soil erosion and improve access for fire fighting. Therefore, suitability of land for specific uses is preserved by facilitating land and resource management.

The demolition program under the No Action Alternative included no demolition projects within the range complex, therefore, no impacts to land use would result.

Environmental Resource Management. Training impacts will continue to be monitored. Goals of this program are to efficiently allocate land resources for realistic training with the environmental damage. Continuation of this program may enhance natural resources and productivity of some areas, but may not optimize use of the land and ecosystem management.

Extensive cultural resources on the range complex provide opportunities for scientific research and limited recreational use. Multiple use would continue to be restricted in specially designated areas that have been excluded from all use (Red zones) and limited use (Green zones) on the South Training Areas, Doña Ana Range–North Training Areas, and south McGregor Range in order to preserve potential cultural resources.

Real Estate Actions. The real estate actions on the range that are included under the No Action Alternative occur on the South Training Areas and Castner Range.

South Training Areas. The land exchange with the State of Texas and City of El Paso allowed the construction of Loop 375. Loop 375 bisects TA 1B that is used for off-road tracked vehicles operations. Concrete-lined underpasses allow these operations to continue with a minimum of dust generation, which would have been incompatible with safe use of the roadway. Fort Bliss gained ownership of over 15,000 acres of land in the South Training Areas that had previously been leased, allowing it to control use and management of these areas in the future.

Castner Range. A program for cleanup of Castner Range will continue, as funding is available. The Army has not made any decisions regarding future use or disposition of Castner Range, although surface cleanup of contamination would be adequate for recreational uses provided no ground-disturbing action occurs. This would be compatible with proposed uses in the *Franklin Mountain State Park Master Plan* (TPWD, 1993). Commercial and industrial use would be suitable along U.S. Highway 54, but would require additional subsurface cleanup.

5.1.1.3 Aesthetics and Visual Resources

Main Cantonment Area. New construction on the main cantonment would follow the IDG and RPMP. Site and facility design would address the relationship of new buildings to existing context, architectural treatment, and buffering of potentially incompatible uses. Visual Districts in the IDG represent generalized land use areas. Because they do not always coincide with specific locations, appropriate guidelines would need to be selected for each project. The NHPA would require review for demolition of significant historic properties. However, the IDG does not include provisions for demolition, and therefore facilities over 50 years old outside the designated historic districts, or any facility within or adjacent to historic districts (that contribute to historic context) could be removed, resulting in changes to visual context that could adversely affect historic resources on the installation. Under the existing case-by-case review process for construction and renovation projects, design decisions may not consider preservation of historic context comprehensively. This could result in physical modifications that change the visual context for historic districts or individual structures, resulting in adverse impacts to historic resources. Similarly, modifications to the historic fabric could diminish the contribution of historic themes that are identified as important to visual quality of the post in the IDG.

<u>Fort Bliss Training Complex.</u> The South Training Areas and Doña Ana Range–North Training Areas are comprised of mesquite dunes that are unclassified using the VRM classes. Portions of both parts of this training complex have been disturbed by off-road tracked vehicle operations that are visible in the foreground but do not alter the overall middle and distant visual character. Most of McGregor Range has been classified as VRM Class IV and III due to the undistinctive visual attributes and low sensitivity.

Construction and activities from continuing military activities such as road maintenance on the training complex would be subordinate to the middle and distant natural landscape and not conflict with management objectives for Class IV and III resources. The visual quality of Culp Canyon WSA (VRM Class II) would be unaltered.

As necessary, ongoing or future specific proposals could incorporate methods that minimize the extent of visual modifications. Some visual changes to the foreground would need to be evaluated when specific project actions are known. However, unless extensive land disturbance or very large, new facilities or equipment are involved, visual changes are likely to be consistent with the level of the VRM recommended modifications. The existing classifications consider the area's primary purpose for military activities and the relatively low number of public visitors who see the area.

Relatively minor changes in physical appearance or mission activities throughout the installation could occur under the No Action Alternative. However, adverse impact to visual resources also could result depending upon the specific projects and the IDG application in conjunction with the RPMP.

5.1.1.4 Cumulative Impacts

Actions and future conditions in the ROI that may occur independently of the activities on Fort Bliss could contribute to cumulative impacts when combined with activity on Fort Bliss. These could affect land use on Fort Bliss or surrounding areas. The following actions are considered in relation to land use resources:

- Continued growth and expansion of urban and suburban areas;
- Development at the EPIA, including additional industrial and commercial facilities, new roadways, and possible new or expanded runways;
- Designation of the Organ Mountains NCA;
- Proposed changes in grazing standards on federal lands;
- Future activities on WSMR; and
- Expanded operations at HAFB or by other USAF units.

<u>Main Cantonment Area.</u> Development of peripheral suburbs in the City of El Paso is not anticipated to affect land uses in the main cantonment. Similarly, actions in the RPMP would not affect the City or County of El Paso land use plans. Recent issues of contamination in new subdivisions bordering Castner Range would not be affected by actions in the RPMP and are being addressed under the FUDS program. Industrial and airfield development on EPIA could adversely affect residential use on Biggs AAF if noise exposure levels increase above L_{dn} 65 dB in the housing area and at Ben Milam Elementary School. Additional truck traffic on a proposed Yarborough Road extension from Montana Boulevard to Airport Road, through the airport, could also affect this residential area. This extension would require development of city-owned land along the boundary between Biggs AAF and the EPIA that is currently used by Fort Bliss under a perpetual easement. If this easement was vacated, access to the east side of Biggs AAF and the South Training Areas could be affected. The existing land use plan designations will perpetuate functional incompatibilities on the installation and adversely affect traffic flow, the development of the built and natural environments, and living conditions on Fort Bliss.

<u>Fort Bliss Training Complex.</u> Overall, regional actions discussed in Appendix B *(Cumulative Impacts Analysis Background)* would not significantly affect or be affected by land uses on Fort Bliss training ranges, with the exception of the location of the proposed USAF tactical target complex on either of the two alternative sites on McGregor Range. The USAF selected the option for the target complex straddled across TAs 17 and 21 (grazing units 9 and 13) on Otero Mesa. The alternate option site evaluated by the USAF was in TA 31 in the Tularosa Basin.

When the target complex is constructed, it is expected to be used more than the existing Class C Bombing Range in TA 11, which would consequently experience a decrease in training use. The proposed tactical target complex would increase training use substantially in TAs 17, 18, 19, 20, 21, 22, and 23 (grazing units 9, 10, 11, 12, 13, 14, and 15) from very low or low to high. With the exception of TAs 17 and 21, all of the increase would be in associated SDZs. This proposal would introduce mission facilities and a surface impact area as new uses in TAs 17 and 21. The tactical target complex on Otero Mesa is consistent with the current installation land use designation of Training/Ranges (Category VI). However,
16 the Otero Mesa site would alter the area for grazing and public access, as currently defined, by 2 percent. This represents a potential loss of 450 AUMs on McGregor Range. Access to most of the area south of
96 New Mexico Highway 506 would be restricted during training periods at the target complex. Measures to be implemented in accordance with the 1998 MOU between the USAF and BLM are aimed at minimizing inconvenience for grazing operations caused by reduced access to these areas. Missile firings would need to be coordinated with the use of the tactical target complex. Overall, deconfliction of military missions may result in extending the hours of use for military activities, including maintenance and training area management, and decreasing the time that areas are available for other purposes. This could adversely affect grazing activities and public use and access.

Aesthetically, construction of a tactical target complex on Otero Mesa would entail clearing of vegetation around new targets and construction, and placing facilities and equipment in the 2-by-4 miles impact area. The impact area would be fenced. Improvements would be made to about 15 miles of existing unpaved roadway. These changes in the landscape may be visible in the middle and distant landscape, but would be similar to man-made modifications and natural variations in the landscape. Overall, they would not be noticeable or detract from overall visual quality. The extent of proposed modifications would conform to VRM Class IV objectives of the affected area. Modifications would be similar in the Tularosa Basin site location, but would be less visible from distant viewing locations on the north and east side of the proposed sites.

Designation of the proposed Organ Mountains NCA could indirectly affect military activities on the Doña Ana Range–North Training Areas. As the boundaries are currently defined, use of upper elevations of the Organ Mountains within Fort Bliss as a safety buffer for impact areas, also provides a beneficial protective function for the conservation area with its sensitive biological, cultural, and scenic resources. Future additional use of the conservation area for hiking could increase the potential for public trespass into potentially unsafe areas on the Doña Ana Range–North Training Areas. Much of this area would require extensive assessment and clearing of ordnance and explosive hazards before it would be suitable for public access.

97 Portions of BLM lands to the south and west of the Doña Ana Range–North Training Areas and north of McGregor Range are identified as available for disposal in the White Sands RMP (BLM, 1986a). No

plans are currently being considered for land transfers or sales in these areas. If changed economic conditions precipitate future exchanges and land development bordering Fort Bliss, planning compatible development may require coordination between county governments, future owners, the BLM, and Fort Bliss.

The USFS and BLM are currently examining the extent of impacts of implementing new grazing standards on ranchers in the region (Hannon, 1997). Overall slight reductions in grazing could have minor impacts to the region. However, the effect of changes in grazing standards on livestock uses are still under study. It is likely that new standards will result in reduced grazing allocations in some grazing allotments. It is also likely that the new standards will be less restrictive than current allocations in some units.

Continued residential growth of El Paso County, Chaparral, and Lords Ranch communities will heighten incompatibility between some ongoing military activities that produce dust, noise, or have safety concerns that affect suitability of adjacent uses. For example, recreational use of the Organ Mountains is likely to increase due to population growth in Doña Ana County and El Paso, and increased accessibility resulting from new roadways on public lands on the west side of the mountains. This is likely to result in additional trespass and inadvertent entry of hikers into restricted areas that are unsafe due to ordnance and explosive hazards.

Several man-made and natural factors may modify the visible landscape in the future, including growth of new suburbs and natural fire. The visual character of new development would be directed by plans, policies, and regulations adopted by local jurisdictions. While these modifications are not necessarily degrading, as the rural landscape changes, viewer expectations of the natural landscape may also change. The effect of cumulative modifications is transformation of the natural landscape over time and reduced sensitivity of viewers to man-made features in the landscape. In addition to man-made changes, natural fires play a major role in the evolution of the natural landscape and can periodically cause major visible changes.

5.1.2 Main Cantonment Area Infrastructure

This section discusses the impacts of the No Action Alternative to infrastructure on the Main Cantonment Area. Impacts are presented relating to ground transportation, utilities, energy, and communications.

5.1.2.1 Ground Transportation

The impacts to ground transportation as a result of implementing the No Action Alternative are discussed in this section. The discussion presents the impacts to the roadway network only, since, under this alternative, there are no changes to the railway system. These impacts could result from two of the four activity categories.

Mission Activities. The traffic generated on the roadways within the ROI as a result of activities associated with this alternative would not be adversely affected. The City of El Paso has developed a *Long-range Plan* (El Paso, 1993) that projects the effects on traffic through the year 2015. The increase in the number of vehicle trips is directly related to the increase in population, and the City of El Paso estimates that the number of trips would increase by approximately 3 percent per year for the short term and gradually increase to approximately 6 percent per year by 2016. This background growth rate would accommodate any increase in traffic due to the activities associated with this alternative.

Under sustained mobilization, additional troops would be on site, which would result in additional slow-moving convoys of troops on U.S. Highway 54 between the Main Cantonment Area and the range camps. This additional traffic would impede local commuters in El Paso and between Alamogordo and El Paso. In addition, increased amounts of munitions would be transported between Biggs AAF and the new ASP on McGregor Range. Compliance with DOT regulations would minimize risks to roadway and land users.

Real Estate Actions. A recent land exchange with the State of Texas and City of El Paso allowed for the construction of Loop 375 in the South Training Areas. This new roadway benefits local traffic flow on regional highways and improves access to and development potential of urban fringe areas in eastern El Paso near the Main Cantonment Area.

5.1.2.2 Utilities

The impacts to utilities under the No Action Alternative are presented for the four activity categories. When appropriate, the discussions are separated into water supply wastewater treatment and solid waste disposal.

Mission Activities. As identified in Table 3.2-1, *Peacetime Authorized Strength*, 840 additional personnel (military and civilian) would be located at the installation by FY 02. From FY 02 to FY 16, the number of personnel assigned to the installation is expected to remain constant. Table 3.2-3, *Mobilization Authorized Strength*, identifies the potential force support and regional conflict troop strength of 8,440 that would be temporarily stationed and deployed from Fort Bliss. Based on the assumptions presented in Section 3.2.2, this force would equate to 703 full-time personnel plus the 7,780 sustaining base personnel, or 8,483 personnel that would be stationed in the Main Cantonment Area.

Water Supply. Potable water consumption is directly related to the number of personnel at Fort Bliss and the activities projected to occur. Assuming the historical personal consumption of 202 gpd per individual assigned, potable water requirements in peacetime conditions are anticipated to remain constant or decrease slightly, for a maximum of 5.03 mgd by FY 02. These requirements are anticipated to decrease slightly by FY 16 to 4.7 mgd, as a result of water conserving fixtures and designs installed as a part of new construction on the installation. Potable water requirements during mobilization could reach 1.91 mgd, in addition to the 5.24 mgd defined above. The installation requirement under mobilization conditions could reach 7.14 mgd.

The installation's current supply capacity is 13 mgd of potable water from existing groundwater wells. This capacity is well above the 7.14 mgd under mobilization conditions, and will be adequate to meet projected requirements on the installation for the foreseeable future.

Municipal water will continue to be available to customers, including Fort Bliss, although the possibility of short supplies in the future could increase costs (see Section 5.1.7).

Wastewater Treatment. Wastewater generated by the additional personnel and activities associated with the No Action Alternative during peacetime would increase the average daily flow by 0.08 mgd to 3.06 mgd. With full mobilization, additional wastewater generated would equal 0.85 mgd. By FY 02, the City of El Paso's Delta Street wastewater treatment plant is expected to have adequate capacity to process this additional flow.

Solid Waste Disposal. Solid waste (Class I) generated by the 840 additional personnel during peacetime activities associated with the No Action Alternative would increase the average daily flow by 1.67 tons per day to 37.7 tons per day. With full mobilization, an additional 16.8 tons per day of solid waste would be generated.

Facility Construction and Demolition. Table 3.2-6 identifies a number of projects, which would not directly affect utility consumption. The demolition program identified in Table 3.2-7 will lead to a slight reduction in utility consumption. As housing units are constructed to replace those demolished, utility consumption will decrease as a result of using energy efficient construction techniques; appliances that conserve water and energy; and modern communication systems. The demolition program will affect the waste disposal capacity for construction debris (Type IV), and is discussed below.

Environmental Resource Management. The resource management programs currently executed by Fort Bliss do not have a direct effect on the infrastructure servicing the Main Cantonment Area. If additional corridors are required as a result of new upgrades to utility systems, then resource programs for natural and cultural resources may affect the placement of utility systems, and dictate construction and revegetation requirements.

Real Estate Actions. Acquisition of ROWs, leases, and land exchanges do not have a direct effect on the infrastructure supporting the Main Cantonment Area. Growth and the increase in utility requirements associated with the development of properties disposed of by Fort Bliss are included in the projections for future growth developed by local utility companies.

5.1.2.3 Energy

Electrical requirements from the additional personnel associated with this alternative during peacetime are estimated to increase the average daily consumption by 7,254,200 kWh (4.57 percent) to 165,985,160 kWh. With full mobilization, electrical requirements would increase by 74,141,420 kWh (44.7 percent).

Natural gas requirements from the additional personnel associated with this alternative during peacetime are estimated to increase the average daily consumption by 34,307 million cubic feet (mcf) to 785,022 mcf. With full mobilization, natural gas requirements would increase by 348,857 mcf.

Propane consumption under the No Action Alternative during peacetime would not change, since propane is primarily used at range camps and other satellite facilities.

5.1.2.4 Communications

Communication conditions are not expected to change noticeably under the No Action Alternative during peacetime, with the possible exception of the DSN, which already is overloaded during peak loads. The anticipated increase in personnel in 2002 will result in more difficult access at peak load times if the system is not expanded. Full mobilization would impose additional stresses on the system and also on the already limited space constraints at the Fort Bliss Telecommunications Center.

5.1.2.5 Cumulative Impacts

The City of El Paso Traffic Engineering Department estimates that the number of vehicle trips in the ROI would increase by approximately 3 percent per year for at least the next 5 years through FY 01 (Valdez, 1997). The increase is then expected to gradually grow to approximately 6 percent per year by FY 16.

According to the *El Paso Urban Transportation Study Area Long-range Transportation Plan Year 2015* (El Paso, 1993), there will be a significant increase in the level of congestion for the overall road network in El Paso by FY 15. The freeway network is a specific area of concern. The freeways and expressways carry a large proportion of the traffic, and it is expected that they will be operating at near capacity by the year 2015. Interstate 10 will continue to be the most heavily traveled roadway in the area, and many of the traffic problems that are predicted by the year 2015, are located on or adjacent to Interstate 10. The *Recommended Highway Plan* (El Paso, 1993) developed by the City of El Paso is based on the results of two traffic models tested for the year 2015. The plan proposes the construction of a northeast bypass route from Loop 375 to the New Mexico state line at FM 3255. This route would then connect to New Mexico State Highway 404 and continue through the Franklin Mountains. The studies performed for the *Long-range Plan* (El Paso, 1993) also indicate that congestion will occur on the bypass where it passes through Fort Bliss between Railroad Drive and Loop 375.

5.1.3 Fort Bliss Training Complex Infrastructure

Impacts to the training complex infrastructure resulting from implementation of the No Action Alternative are presented in this section. Impacts to ground transportation and utilities are discussed as appropriate.

5.1.3.1 Ground Transportation

The impacts to training area ground transportation are presented in relation to the roadway network. Railways would not be affected.

Road improvements on the north McGregor Range, to support FTX and JTX such as Roving Sands, would provide increased accessibility for military and nonmilitary uses. This would benefit a variety of activities including environmental surveys and training complex maintenance by both the Army and BLM.

Overall, the traffic generated on the range roadways as a result of activities associated with this alternative would not be adversely affected. However, as discussed in Section 5.1.2.1, periodic increases of convoys on U.S. Highway 54 between the Main Cantonment Area and the range camps would impede commuters.

5.1.3.2 Utilities

Mission Activities. Under the No Action Alternative, peacetime activities at the range camps will continue at the current level. Activities would increase under mobilization conditions depending upon the units mobilized and their pre-deployment training requirements.

Facility Construction and Demolition. Utility requirements at the range camps will continue near their current levels for peacetime and could increase during mobilization conditions. Demolition of certain facilities at McGregor Range is planned. However, the size, type of construction, and dimensions are not available for determining amounts of construction debris generation and the effect on waste disposal capacity. No other impacts to the utility systems are anticipated.

Environmental Resource Management. The resource management programs currently executed at Fort Bliss do not have a direct effect on the infrastructure servicing the range camps. If additional corridors are required as a result of new or upgrades to utility systems, resource programs for natural and cultural resources may affect the placement of utility systems and dictate construction and revegetation requirements.

Real Estate Actions. Acquisition of ROWs, leases, and land exchanges do not have a direct effect on the infrastructure supporting the range areas.

Neither the current mission nor mobilization requirements are expected to be of sufficient size under the No Action Alternative (see Section 3.2) to affect utility service capacity.

5.1.3.3 Energy

Demands on electrical power (supplied by EPEC) and LPG at the training areas are expected to continue at the current level. Temporary increases in demand under mobilization conditions would easily be accommodated.

5.1.3.4 Communications

Demand on the communication systems on the ranges and training areas is not expected to increase under the No Action Alternative.

5.1.3.5 Cumulative Impacts

There are no cumulative impacts relating to infrastructure in the training areas other than to the water supply. The installation's regional water supply is affected by the cumulative effects of groundwater withdrawals, mostly by EPWU and Ciudad Juarez, Mexico. Pumpage from the aquifer exceeds recharge, which means the aquifer is in overdraft condition and is experiencing accelerated rates of water-level decline (see Section 5.1.7). The lowering of water levels in the aquifer has permitted the infiltration of salt water into the fresh-water zones. It is estimated that the aquifer could be exhausted of recoverable fresh water between 2013 and 2025, which, depending on the availability of alternate sources by then, could result in a water-supply shortage in the area. However, municipal water will continue to be available to customers, including Fort Bliss, even in the event of a water shortage. Since 1990, many regional water plan initiatives have been implemented. The extent of potential shortages is dependent upon success of initiatives implemented in meeting regional water planning objectives. No other utility is expected to experience adverse cumulative effects.

5.1.4 Airspace Use

The potential impacts to airspace use resulting from the No Action Alternative are discussed below, in relation to the four project categories.

5.1.4.1 Main Cantonment Area and Fort Bliss Training Complex

Mission Activities. Under the No Action Alternative, there are no planned reconfigurations or changes to Fort Bliss special-use airspace areas, operating conditions, or ATC procedures at Biggs AAF. Only 16 fixed-wing aircraft and 13 UAVs are projected for assignment to Biggs AAF as a result of the relocation of the MIBN (LI). Mission activities under the No Action Alternative would, therefore, have limited impact on airspace or air traffic operations at Biggs AAF. With respect to McGregor Range, the No Action Alternative includes McGregor Range as the location for a new USAF air-to-ground tactical target complex to support the expansion of GAF activities at HAFB. The potential impacts of this tactical target complex are addressed in the *Cumulative Impacts* discussion below.

Facility Construction and Demolition. Although runway and taxiway repairs identified under the No Action Alternative in Table 3.2-6 may cause short-term changes to ATC landing and takeoff procedures at Biggs AAF, none of the construction projects would have any permanent effects on aircraft operations or airspace management. This alternative contains no construction projects that affect McGregor Range/R-5103A/B/C/D and Doña Ana Range–North Training Areas/R-5107A airspace areas. Under the No Action Alternative, facility construction and demolition would not impact airspace use.

Environmental Resource Management. The Fort Bliss environmental resource management programs do not affect airports, and have limited effects on airspace-related operations and management. Flight restrictions are in effect for a raptor habitat located in a portion of the Organ Mountains. Flights below 2,000 feet agl are prohibited in the specified area.

Real Estate Actions. There are no real estate actions involving ROWs, leases, and property dispositions that would affect aircraft operations or airspace use.

5.1.4.2 Cumulative Impacts

Projected military activities, which have the potential to contribute to cumulative airspace use impacts in the airspace ROI, are activities at HAFB and at WSMR. Activities at HAFB with the potential for cumulative airspace use impacts within the airspace ROI are completion of the Taiwanese Air Force

Training program at HAFB and the associated deactivation of the 435th Fighter Squadron, and the establishment of a tactical target complex on McGregor Range. The deactivation of the 435th Fighter Squadron results in the cessation of unit flight operations and disposal of the AT-38 aircraft assigned to the squadron. The 435th flight operations included air-to-ground bombing training in the McGregor Bombing Range R-5103B/C, and low-altitude training in MTRs IR-133 and IR-134/195, which interact with the McGregor Range restricted area. The *Environmental Assessment for The Drawdown of AT-38 Aircraft and Deactivation of the 435 Fighter Squadron at Holloman Air Force Base, New Mexico* (USAF, 1997j) states that the proposed action would result in a decrease of 943 sorties in R-5103B/C and a decrease of 198 sorties in MTRs IR-133 and IR-134/195. The Otero Mesa site, within the McGregor Range/Restricted Area R-5103B/C, was selected by the USAF for the tactical target complex. USAF air-to-ground sorties on McGregor Range in R-5103 (B or "low") was 1,151 sorties in FY 95 and projected to decline to 833 in FY 00 without the USAF tactical target complex. When the tactical target complex is constructed, USAF and GAF sorties are projected to increase by 100 to 933 in FY 00 (USAF, 1998). Although these initiatives may cause a shift and increase of activity within McGregor Range, they do not contain the potential to change airspace operating requirements. There are no impacts to air operations. Further, the tactical target complex does not change the McGregor Range/R-5103B/C airspace area, and all other mission activities under the No Action Alternative are the same, the development of the tactical target complex would have no impacts on airspace use and management.

With respect to potential airspace-related cumulative impacts of WSMR activities, the *White Sands Missile Range Range-Wide Environmental Impact Statement* (U.S. Army, 1998f) identifies ongoing and projected test programs and other missions anticipated at WSMR. The WSMR EIS provides that, relative to the projects and new programs proposed over the next 10 years at WSMR, changes in the scope of operations resulting from each component cannot be predicted or are not defined, and will require separate environmental documentation. However, the broad analysis of potential cumulative impacts conducted in the WSMR EIS did not include airspace as one of the four areas identified as areas of specific cumulative impacts. Based upon the information contained in the WSMR EIS, proposed WSMR activities should have no significant cumulative airspace impacts relative to the Fort Bliss Mission and Master Plan No Action Alternative.

5.1.5 Earth Resources

The impacts resulting from the No Action Alternative to earth resources, including geologic resources and soils, are discussed below.

5.1.5.1 Geology

The discussion of the potential impacts to geology are presented in terms of geologic features, mineral and energy resources, geologic hazards, and geologic investigations, rather than the four activity categories due to the broad nature of geologic resources.

Geologic Features. In general, future activities under the No Action Alternative would disrupt small areas of bedrock for facility construction, ground-based maneuvers, bombing and artillery impacts, and debris fall. These impacts, however, would be confined largely to those areas that have already been affected by similar activities at Fort Bliss. Additional impacts to undisturbed geologic features would be negligible.

Mineral and Energy Resources. Under the No Action Alternative, access to Fort Bliss for commercial mineral exploration and development would continue to be closed, with the exceptions specified in the McGregor Range RMPA (BLM, 1990a). Additional impacts to the availability of mineral and energy resources are not to be expected.

Geologic Hazards. The No Action Alternative would neither substantially increase nor reduce the rate or severity of natural geologic hazards at and near Fort Bliss. Excessive groundwater pumping in many valleys in the arid southwest has caused the surface to subside, sometimes by many feet, along fractures that have damaged man-made structures. Groundwater use under peacetime or mobilization conditions would be similar to current water use at Fort Bliss. Hence, surface subsidence is not expected from implementation of the No Action Alternative.

Injection of fluids into the subsurface has been shown to induce earthquakes under certain conditions. The Army's potential development of geothermal power at the south end of McGregor Range could induce earthquakes upon re-injection of fluids into the geothermal reservoir. Development of this geothermal resource may occur under the No Action Alternative. Any measurable increase in earthquakes from this development would be expected to be minor and of small magnitude. Any damage from induced earthquakes would likely be confined to facilities and structures at the geothermal plant, which would be far from population centers.

Geologic Investigations. Access to Fort Bliss for geologic investigations and research would neither increase nor decrease under the No Action Alternative. Through prior notification and approval, access to most of the land controlled by Fort Bliss can be obtained from the Army during those times when military activities are not being conducted.

5.1.5.2 Soils

To assess potential impacts to soil, the annual soil loss from water and wind on Fort Bliss was calculated using the Revised Universal Soil Loss Equation (RUSLE) (Soil and Water Conservation Society, 1995) and the Wind Erosion Equation (Fuller, 1987). Three categories of impacts in tons/acres/year to the soil resource were used: undisturbed (no impact), moderate impact, and maximum impact. Soil data for the equations were obtained from soil surveys conducted in the Fort Bliss area (USDA, 1971, 1980, 1981), RUSLE software databases, and from the NRCS Map Unit Interpretation Record (MUIR) databases. Results are reported in Table 5.1-1.

The undisturbed scenario assumes current conditions with no disturbance to vegetation or soil. The moderate impact scenario assumes a 50 percent reduction in vegetative cover and 50 percent disturbance to the soil surface. The maximum impact assumes 100 percent removal of vegetation and 100 percent disturbance to the soil surface. See Appendix E for additional assumptions and examples of soil loss calculations. Cumulative effects to vegetative cover and vegetative cover changes on Fort Bliss from 1986 to 1996 are discussed in Section 5.1.8.2. During this period, most reductions in vegetative cover in the mapping units from all natural and man-induced sources were in the lower range of the moderate impact category. Examples of moderately impacted areas include two-track roads, maneuvering lanes, and areas with intermittent small craters. Examples of maximum impact areas would include areas completely lacking vegetation, areas with multiple large craters, and staging areas. See Table 5.1-1 for predicted soil loss from these types of potential impacts. Figures 4.5-4 through 4.5-6 present maps of the soils listed in the table.

Mission Activities. Under the No Action Alternative, current impact to soils caused by missions and field exercises will continue. Major sources of impacts will continue to be the maneuvering of tracked and wheeled vehicles and missile firings. ORV training is presently confined to the South Training Areas, to Doña Ana Range–North Training Areas east of War Highway 11, and only within TA 8 on McGregor Range. However, wheeled vehicles can move off-road within controlled access FTX sites on McGregor Range. Impacts to soils and vegetation varied from light soil disturbance resulting from wheeled vehicles and foot traffic within the controlled access FTX sites to devegetation and soil surface disturbance caused by wheeled vehicles. These types of disturbances can accelerate soil erosion by wind

Table 5.1-1. Soil Associations, Total Acreage, Acceptable Soil Loss and Estimated Annual Soil Loss from Wind and Water for Three Impact Scenarios for Soils in the Fort Bliss Area

Map ID[1]	*Soil Unit Name*	*Total Acres*	*Soil Loss*[2]	*Impact Scenario*[3]					
				Undisturbed		*Moderate*		*Maximum*	
				Water	*Wind*	*Water*	*Wind*	*Water*	*Wind*
13	Forest Service Land–Typic Calciorthids	2,482	5	0.62	16.50	0.78	35.07	0.96	103.20
283	Forest Service Land–Typic and Lithic Argiborolls	3	5	0.04	6.50	0.11	35.07	.00	103.20
293	Forest Service Land–Lithic Argiustolls	232	5	0.06	0.60	1.50	27.12	2.10	103.20
294	Forest Service Land–Lithic Argiustolls	1,027	5	0.09	16.50	2.20	35.07	6.10	103.20
295	Forest Service Land–Lithic Argiustolls	804	5	0.33	16.50	8.40	35.07	11.00	103.20
602	Forest Service Land–Lithic Torriorthents	1,345	5	0.45	16.50	0.55	35.07	0.70	103.20
603	Forest Service Land–Typic Camborthids	2,927	5	2.20	16.50	4.00	35.07	4.60	103.20
604	Forest Service Land–Lithic Torriorthents	10,131	5	0.73	16.50	2.47	35.07	3.80	103.20
AGB	Agustin association, undulating	732	5	0.06	6.40	0.19	30.02	0.65	103.20
AM	Aladdin-Coxwell association	2,149	2	0.09	13.10	0.32	25.40	1.07	76.50
AMC	Armesa very fine sandy loam, 0 to 5 percent slopes	13,836	5	0.11	6.40	0.51	30.02	2.70	103.20
BJ	Berino-Bucklebar association	9,215	5	0.11	36.05	0.29	66.55	0.89	161.40
BK	Berino-Doña Ana association	7,054	5	0.10	20.53	0.32	45.86	0.99	129.60
BL	Berino-Pintura complex	7,633	5	0.11	23.30	0.29	57.47	0.92	154.92
BO	Bluepoint loamy sand, 1 to 15 percent slopes	52	5	0.13	35.10	0.43	66.34	1.56	150.75
BOA	Bluepoint-Onite-Wink association, nearly level	12,829	5	0.06	90.62	0.18	87.90	0.59	141.22
BP	Bluepoint-Caliza-Yturbide complex	1,732	5	0.13	46.23	0.47	60.44	2.22	125.55
BPC	Bluepoint association, rolling	56	5	0.34	131.10	0.84	116.27	2.20	160.80
DCB	Delnorte-Canutio association, undulating	882	3	0.04	0.00	0.15	0.00	0.59	0.00
DCD	Delnorte-Canutio association hilly	1,356	5	0.16	3.20	0.56	8.64	2.05	24.67
DRF	Deama-Rock Outcrop complex, 20 to 50 percent slopes	2,219	1	0.04	0.19	0.45	8.48	5.48	49.85
DTB	Doña Ana-Berino association, gently sloping	2,246	5	0.35	21.36	0.71	46.88	1.55	129.39
ECF	Ector-Rock Outcrop complex, 20 to 50 percent slopes	27,579	1	0.03	0.00	0.15	0.00	1.03	0.00
ESB	Espy-Shanta Variant association, gently sloping	438	5	0.06	0.45		20.34	1.28	77.40

Table 5.1-1. Soil Associations, Total Acreage, Acceptable Soil Loss and Estimated Annual Soil Loss from Wind and Water for Three Impact Scenarios for Soils in the Fort Bliss Area (Continued)

Map ID[1]	*Soil Unit Name*	*Total Acres*	*Soil Loss*[2]	*Impact Scenario*[3]					
				Undisturbed		*Moderate*		*Maximum*	
				Water	*Wind*	*Water*	*Wind*	*Water*	*Wind*
HPB	Holloman-Reeves association, nearly level	1,487	5	0.09	0.79	0.30	28.53	1.14	92.88
HW	Hueco-Wink association, hummocky	159	2	0.09	32.88	0.18	54.02	0.44	129.12
IN	Igneous Rockland-Brewster association	3,869	1	0.01	0.00	0.14	0.00	1.86	0.00
JEC	Jerag-Philder association, gently rolling	4,021	5	0.13	3.70	0.61	25.98	2.90	92.88
LM	Limestone Rockland-Lozier association	4,170	1	0.09	0.00	.39	0.00	1.74	0.00
LOB	Lozier-Rock Outcrop complex, 0 to 5 percent slopes	4,231	1	0.06	1.65	0.23	3.51	0.83	10.32
LOD	Lozier-Rock Outcrop complex, 5 to 20 percent slopes	97,061	1	0.06	1.75	0.31	3.86	1.82	12.60
MBA	Mimbres association, level	29,801	5	0.02	0.20	0.13	8.89	0.73	57.60
MTA	Mimbres-Tome association, nearly level	80,197	5	0.10	17.16	0.39	26.25	1.34	79.80
Mo	Mimbres silty clay loam	35	5	0.02	0.57	0.09	17.07	0.87	78.24
NTD	Nickel-Tencee association, strongly sloping	68,687	5	0.14	21.34	0.64	29.68	3.03	80.04
NU	Nickel-Upton association	11,690	5	0.05	9.22	0.25	23.01	1.40	74.01
OP	Onite-Pajarito association	3,088	5	0.13	37.75	0.26	70.79	0.79	160.80
PAA	Pajarito association, level	22	5	0.03	4.10	0.14	28.87	0.61	103.20
PCB	Pena-Cale-Kerrick association, nearly level	954	5	0.03	3.09	0.18	18.98	1.84	75.60
PEC	Philder very fine sandy loam, 0 to 9 percent slopes	53,018	1	0.17	4.10	0.86	28.87	4.44	103.20
PFB	Philder-Armesa association, undulating	23,007	5	0.10	4.86	0.57	28.18	3.55	99.07
PGB	Pintura-Doña Ana complex, 0 to 5 percent slopes	338,238	5	0.12	21.73	0.35	54.57	1.10	143.22
PHB	Pintura-Tome-Doña Ana complex, 0 to 5 percent slopes	60,017	5	0.16	27.33	0.48	57.68	1.50	150.60
PN	Pinaleno-Nolam association	14,046	3	0.01	4.85	0.11	7.78	0.85	21.30
RAB	Reakor-Tome-Tencee association, gently sloping	1,498	5	0.24	43.80	0.68	51.65	1.92	109.65
RFA	Reyab-Armesa association, gently sloping	19,543	5	0.04	2.60	0.30	26.78	2.50	98.04
RL	Rock Outcrop-Lozier association	5,664	1	0.00	0.00	0.00	0.00	0.00	0.00
RRF	Rock Outcrop-Lozier complex, 20 to 65 percent slopes	90,779	1	0.11	7.43	0.56	15.78	3.04	46.44
SH	Simona-Harrisburg association	532	3	0.13	14.63	0.39	33.56	1.19	96.75

Table 5.1-1. Soil Associations, Total Acreage, Acceptable Soil Loss and Estimated Annual Soil Loss from Wind and Water for Three Impact Scenarios for Soils in the Fort Bliss Area (Continued)

Map ID[1]	*Soil Unit Name*	*Total Acres*	*Soil Loss*[2]	*Impact Scenario*[3]					
				Undisturbed		*Moderate*		*Maximum*	
				Water	*Wind*	*Water*	*Wind*	*Water*	*Wind*
					10.00	0.13	31.82	0.60	103.20
TDB	Tome silt loam, 0 to 5 percent slopes	38,267	5	0.23	25.20	0.76	39.42	2.64	103.20
TE	Tencee-Upton association	3,357	2	0.06	30.17	0.26	45.13	1.20	107.25
TF	Terino-Casito association	10,158	1	0.01	16.55	0.09	26.20	0.71	72.30
WKA	Wink	3,787	5	0.04	25.20	0.14	47.60	0.52	129.00

1. Identification code for soils map in Chapter 4.
2. Acceptable soil loss (tons/acres/year) – the maximum rate of soil erosion that will permit sustained productivity indefinitely. Given as the t-factor in the soil survey. Acceptable soil losses for Forest Service Land soils were assumed to be 5 tons/ac/year.
3. Undisturbed = no disturbance to vegetation or soil, moderate impact = 50% reduction in vegetative cover and 50% disturbance of soil surface, and maximum impact = 100% removal of vegetation and 100% disturbance of the soil surface.

and water because they reduce vegetative cover, compact soils, and disrupt protective soil covers such as plant litter and gravel layers. Tracked vehicle maneuvering has been found to disrupt soil crusts and bisect coppice dunes on soils on the Doña Ana Range–North Training Areas. Vehicle maneuvering can also increase wind erosion rates by a factor of ten (Marston, 1984). Such impacts can also supply loose sand, thus increasing the potential for wind transport of soil.

Roads occupy approximately 45,000 acres (4 percent of the training complex) of the total land cover (Table 4.8-1) on Fort Bliss, and this can create considerable potential erosion problems.

Wheeled vehicles (humvees, heavy trucks) may also cause major impacts to soils. Studies conducted to determine wheeled vehicle impacts on plants and soil on Fort Bliss ranges showed that wheeled vehicles increased soil bulk densities, decreased seed germination of native plants, and decreased above-ground plant productivity (MacKay et al., 1996; USDA, 1995, 1996).

Missile impacts can lead to increased wind and water erosion. The level of soil disturbance by missile impacts depends upon several variables (U.S. Army, 1998f). These include the angle of missile impact, missile speed at impact, the compressibility of the soil material in the impact area, soil water, and soil cohesiveness.

Range fires can also impact soils. Range fires can be caused during training exercises from hot missile debris, tracer ammunition, flares, and spotting charges used to mark the location of inert ordnance. Range fires can lead to a loss of vegetative cover, thus making soils more vulnerable to wind and water erosion.

Mission activities could lead to adverse or significant adverse environmental impacts depending on the location of the activity with respect to sensitive areas (i.e., sensitive species, stream courses, cultural resource areas, or facilities) and the soil association (Table 5.1-1) where the activity is taking place. Soils identified as having the greatest potential for soil erosion in the maximum soil impact scenario are shown by the maximum impact scenario in Table 5.1-1.

Facility Construction and Demolition. Under the No Action Alternative, current impacts to soils caused by construction activities would continue. Facility construction areas most susceptible to water and wind erosion are the same as those for mission activities (Table 5.1-1). The greatest soil impacts would occur during construction of new structures in previously undisturbed areas. Impacts would result from disturbance to vegetation and soil caused by excavation and soil compaction by heavy equipment at the construction site and on temporary access roads. Impacts could also occur from dust. Rainwater runoff could increase due to soil compaction. This, in turn, could cause gullying, mud slides, and flooding. Construction on previously disturbed sites would cause few additional impacts to the soil, unless dust is not controlled or runoff from the disturbance causes erosion on adjacent undisturbed soils. Significant adverse impacts could occur if facility construction occurs in sensitive areas having soils with a high potential for wind and water erosion.

Impacts of demolition on soils are similar to those described for building construction with the exception that most of these soils have been previously disturbed. Impacts include excavation, compaction by heavy equipment, erosion caused by rainwater runoff, and dust from exposed soils. Soils at most demolition sites receive maximum impact (no vegetation, 100 percent disturbance of soil surface) during and after demolition activities. Therefore, without erosion control treatments, soil loss from wind and water could be adverse or significantly adverse, depending upon the soil type.

Environmental Resource Management. Resource management activities with the greatest potential for impacting soils are those associated with land rehabilitation (revegetation treatments, mechanical and chemical plant control, and controlled burning), livestock grazing, and fire suppression. Revegetation activities can involve soil tillage (ripping, disking) and drill or broadcast seeding. These activities can leave the soil surface exposed to erosion forces until plant establishment occurs. In arid environments such as the Fort Bliss area, plant establishment can require several years. In the meantime, soil loss from the unprotected surface can be extensive. In addition, soil loss from wind and water erosion could also be adverse to significantly adverse, depending upon the soil type.

Mechanical and chemical plant control can remove vegetative cover that protects the soil surface from raindrop impact and runoff. Mechanical control can produce greater impacts to soil than chemical control because these techniques often disturb the soil surface during vegetation removal. In comparison, when chemical control is used, plants are killed but left standing. Following chemical or mechanical treatments, negative impacts on soils continue until the area is stabilized through revegetation or other methods.

Grazing impacts soils by decreasing plant cover and increasing soil compaction. More than one-third of McGregor Range is grazed by livestock. No grazing occurs on the South Training Areas nor the Doña Ana Range–North Training Areas except trespass grazing. Impacts from grazing could result in adverse or significant adverse impacts, depending on the location of sensitive areas (i.e., sensitive species and their habitats, cultural resources, riparian areas) and the soil type.

Controlled burns for habitat management have the potential to impact soils by removing the vegetative cover and plant litter that protect the soil surface. In addition, fire suppression activities impact soils by reducing the amount of vegetative cover and litter, and by creating soil disturbances during the construction of backfires and firebreaks. Impacts on soils by the above activities could range from minimum to maximum levels. Therefore, without the mitigation described in Chapter 6.0, soil loss from wind and water could range from no impact to significantly adverse impacts, depending on the location of the resource management activity and the soil type.

Other land rehabilitation and management activities such as tree harvesting (firewood sales), animal control, construction of wildlife nests and drinkers, hay harvesting, recreational activities (hunting, hiking, camping), construction of interpretive trails and signs, fence construction, and grounds maintenance (mostly on post or range camps) could potentially impact soils. The collection of plant and animal data and surveys of threatened and endangered species should not severely impact soils.

Cultural resource activities that impact soils include surveying and evaluating potential cultural sites and archaeological excavations. Archeological excavations are typically very localized and small in area and are not expected to cause severe adverse impacts on soils.

Real Estate Actions. Real estate actions are not expected to impact soil resources.

5.1.5.3 Cumulative Impacts

Potential impacts to geology from past, present, and reasonably foreseeable future activities on lands controlled by Fort Bliss arise largely from mineral exploration and possible development. Mineral exploration within the region near the training areas could increase the potential for exploration on areas open for exploration on McGregor Range. No adverse impacts are expected under the No Action Alternative.

100 Livestock management practices by the BLM, the USFS, and ranchers could cause additional soil loss on parts of McGregor Range if management practices such as increased stocking rates or changes in livestock distribution are implemented. However, with the exception of localized areas, overgrazing is not a problem on McGregor Range. Therefore, cumulative effects associated with grazing practices will be negligible because no changes are anticipated in management. The 5,120-acre tactical target complex on Otero Mesa was selected by the USAF. The alternate site analyzed (USAF, 1998) is in the Tularosa Basin. Soil erodability at both locations ranges from low to high. Soils in much of the area at both sites would be impacted either by construction of the targets, or grooming of targets by blading and dragging the soil surface. Soils exposed during construction and grooming would be vulnerable to erosion by water and wind. Areas that are particularly prone to this migration are highly erodible soils on slopes at each of the two alternative tactical target complex sites, as well as large bare soil targets that are groomed annually. Operations and maintenance at the Otero Mesa site could cause range fires, especially from the use of tracer ammunition, flares, and spotting charges used to mark the location of inert ordnance strikes. Fires would consume vegetation and plant litter and expose the soil surface to the actions of erosion. Several roads used to access the sites would need to be upgraded. This action could cause soil erosion unless careful engineering is conducted to protect the roads and environment from flowing water. If mitigation measures are implemented, adverse or significantly adverse impacts to soils would be minimal.

5.1.6 Air Quality

This section presents the air quality impacts of the No Action Alternative in terms of the missions, mission support, and environmental management categories of activities. Mission activities take place both in the Main Cantonment Area and in the training complex.

5.1.6.1 Main Cantonment Area

Mission Activities. Activities include command and control, classroom instruction, doctrine, or equipment test design, and medical and logistical support activities.

Air quality emissions in the Main Cantonment Area will be determined by the level of activities, including traditional stationary sources associated with operations and facility maintenance, and mobile sources such as personal vehicles and facility-based utility and mission vehicles. Air quality impacts are the result of the level and configuration of facility emissions, and the proximity of the sources to the property boundaries.

One method of projecting future levels of air emissions is to use the number of personnel expected to be assigned to Fort Bliss (future installation strength) as a surrogate measure. Future installation strength should be a good indicator of air emissions in the Main Cantonment Area (and the range complex) because it provides a means of predicting future activity levels on the post, which will result in both stationary and mobile emissions. According to the projections for Fort Bliss, future authorized strength levels through FY 16 will be within approximately 5 percent of the existing levels (FY 96, baseline year). Consequently, air emissions are expected to be virtually unchanged in the Main Cantonment Area through FY 16. In fact, air emissions from Fort Bliss in future years may decrease as more stringent regulatory controls on stationary and mobile sources are implemented. In conclusion, air quality impacts from the Main Cantonment Area would either remain the same or decrease through FY 16.

The only foreseeable conditions in which there could be significant increases in installation strength at Fort Bliss would be during mobilization of Army Reserve and National Guard units at the post. Under full mobilization, it is projected that there could be a maximum increase of 16,220 personnel stationed at Fort Bliss for short periods. By its nature, mobilization is only temporary, with an average annual number of 8,483 FTE personnel being assigned to the installation. However, the result would be an increase in emissions due to additional activities, traffic, and training operations at Fort Bliss. Aside from higher levels of personnel and traffic in the Main Cantonment Area, much of the increased activity and operations would be expected to occur on the range complex as part of the training and preparation for mobilization. In addition, there would probably be increased levels of aircraft and support operations at Biggs AAF in support of the mobilization effort.

In order to evaluate the potential air quality impacts of full mobilization, the impacts of a similar activity were considered. This activity, the annual Roving Sands, is conducted annually at Fort Bliss. Many units come to Fort Bliss to participate in the Roving Sands JTX, involving up to 20,000 personnel, which is somewhat more than anticipated in a full mobilization. The air quality impacts of Roving Sands have been evaluated in the *Final Programmatic Environmental Impact Statement for the Joint Training Exercise Roving Sands* (U.S. Army, 1994a). The conclusions reached in the Roving Sands EIS were used to provide an estimate of the air quality impacts in the cantonment area of a full mobilization.

In the Roving Sands 1997 JTX, approximately 6,500 personnel were located at bivouac sites in the field, with up to 9,500 remaining in the cantonment area of Fort Bliss. A supplemental EA was developed for Roving Sands 1997, which concluded that the actions were not expected to result in additional air quality impacts. Vehicle operations associated with the exercise would result in temporary degradation of the air quality, but emissions of criteria pollutants would not exceed minimum emission thresholds established under the CAA. In addition, the EIS found that the emissions from this action would not be expected to cause or contribute to any exceedance of the air quality standards leading to nonconformance with the EPA's Conformity Rule or the CAA. Consequently, it is not expected that increased air emissions would cause significant air quality impacts in the vicinity of the Main Cantonment Area, even under a full mobilization scenario.

Facility Construction and Demolition. The air quality impacts of the projects proposed in the P3 CIS were addressed in a document entitled *Draft Environmental Assessment for Army Strategic Mobility Program Facilities at Fort Bliss, Texas and New Mexico* (U.S. Army, 1997b). The impacts to air quality would be minimal. In general, because of the nature of demolition activities, air quality impacts will be very short-term and localized in extent.

Environmental Resource Management. Environmental resource management activities in the Main Cantonment Area are not of the nature to significantly affect air quality.

Real Estate Actions. Air quality impacts from these activities in the Main Cantonment Area are expected to be insignificant.

5.1.6.2 Fort Bliss Training Complex

Mission Activities. Most of the air quality emissions on the range complex are from mobile sources associated with the field exercises, including off-road operation of wheeled and tracked vehicles; combustion of fuels in vehicles, equipment, and aircraft; smoke signaling; missile firings; and ordnance detonation.

The basis of the air quality impact analysis of the Roving Sands JTX is provided in the Roving Sands EIS (U.S. Army, 1994a). Vehicle and equipment use during the training exercises would generate localized increases in CO, NO_x, PM_{10}, SO_2, and VOC. In addition, there are emissions from aircraft participating in the exercise. However, the mobile sources of these pollutants are spread throughout the 2,000 square miles of the range complex during the Roving Sands exercise.

The emission estimates provided in the Roving Sands EIS have been estimated for an assumed 10-day period within the 2 to 4 weeks in which the Roving Sands exercise may be held. These estimates are summarized in Table 5.1-2.

Table 5.1-2. Criteria Pollutant Emissions by Source Category from Roving Sands Exercise, Fort Bliss Range and Training Area Complex

Source Category	*Total Emissions on Fort Bliss Training Complex During Roving Sands Exercise (tons)*				
	CO	*NO_x*	*PM_{10}*	*SO_2*	*VOC*
Army Vehicles and Equipment	111.3	61.2	4.3	4.0	8.0
Aircraft	7.9	182.5	3.7	7.4	1.1
Total Emissions	*119.2*	*243.7*	*8.0*	*11.4*	*9.1*

Note: Aircraft are estimated to spend one-quarter of their total flight time over the Fort Bliss ranges and training areas. Consequently, 25 percent of total estimated aircraft emissions during sorties are allocated to Fort Bliss.

The air emissions from ground-based sources, such as Army vehicles and equipment, will be dispersed throughout the range complex of more than 2,000 square miles. Emissions from aircraft will be released at different altitudes during flights, so that emissions will be dispersed over approximately 10,000 cubic miles of airspace. Thus, emissions will be dispersed widely and no significant long-term adverse impacts on air quality would be expected.

Particulate emissions generated by tracked and wheeled vehicles over dirt roads (i.e., fugitive dust emissions) were not included in these estimates. Fugitive dust is generated both during maneuvers on the range complex, and when tracked or wheeled vehicles use the tank trails to move from the Main Cantonment Area to the range complex area. Fugitive dust emissions created on the range complex would primarily result in localized, short-term effects. Impacts at locations beyond the perimeter of Fort Bliss are expected to be minimal.

According to the Roving Sands EIS, the total estimated ground-based air emissions from the other FTXs periodically conducted on the range complex would be a maximum of 15 percent of the air emissions from the Roving Sands exercise.

A second major field exercise on the Doña Ana Range–North Training Areas is the Rio Bravo combined arms team exercise. This exercise is run by the 460^{th} Chemical Brigade and includes the generation of battlefield obscurant (smoke) from fog oil (unburned light mineral oil) on the ranges as part of a tactical training program for troops. Smoke will be produced by small turbine generators mounted on vehicles and will be limited to a maximum of 45 minutes in any one exercise. This smoke generation is likely to result in localized short-term reductions in visibility and air quality on small parts of the range complex. However, the smoke will not leave the range areas (U.S. Army, 1994a); therefore, there will be no air quality impacts beyond the Fort Bliss range perimeters.

The other foreseeable activity that could result in significantly increased activity on the Fort Bliss range complex under the No Action scenario is full mobilization. As discussed above, full mobilization could result in a maximum, short-term increase of 16,220 personnel, somewhat less than the number involved in the annual Roving Sands JTX.

Based on the maximum number of personnel involved in a full mobilization, it is estimated that the number of personnel and equipment using the range complex, and the resultant magnitude of air emissions, would be very similar to that deployed during the Roving Sands JTX. Consequently, no significant air quality impacts are expected at the ranges and training areas.

Environmental Resource Management. Environmental resource management, in general, does not affect air quality. However, controlled burns could result in localized short-term effects.

Facility Construction and Demolition. Road grading, excavation, material hauling, placement, and compacting of material for maintenance and improvements will occur under this alternative. The impacts to air quality would be short-term and localized in extent. In general, because of the nature of demolition activities, air quality impacts will be very short-term and localized.

Real Estate Actions. Air quality impacts from these activities are expected to be insignificant.

5.1.6.3 Cumulative Impacts

Mission activities, under in the No Action Alternative, are those currently occurring, plus the USAF's 101
expansion of GAF operations at HAFB, New Mexico, through the beddown of an additional 30 PA-200 Tornado aircraft at the base. The action includes the establishment of a new air-to-ground tactical target complex on the Otero Mesa portion of McGregor Range to be used for training by USAF and GAF aircrews.

The Otero Mesa site would result in two sources of emissions: temporary emissions resulting from the construction of the tactical target complex, and increases in emissions from aircraft using the tactical target complex during training. Construction activities would result in temporary increases of air emissions, but they would only occur for the duration of the construction period. Consequently, the construction-related impact on air quality is expected to be below the significance level.

Increased emissions were estimated for aircraft flying over the McGregor Range to and from the tactical target complex, and during training operations directly over the proposed tactical target complex (Table 5.1-3).

Emissions of CO and NO_x are much lower than estimated emissions for the Roving Sands exercises discussed earlier. Because these aircraft emissions are released at altitudes ranging from a few hundred feet agl to thousands of feet agl, they will be dispersed much more effectively than ground-based emission sources. Consequently, it would be expected that the air quality impacts on McGregor Range would be insignificant.

Table 5.1-3. Criteria Pollutant Emissions Resulting from Proposed United States Air Force and German Air Force Operations over McGregor Range

Airspace	*Annual Emissions on McGregor Range, Fort Bliss, New Mexico (tons/year)*				
	CO	*NO_x*	*PM_{10}*	*SO_2*	*VOC*
McGregor Range	7.8	14.3	1.4	0.8	1.8
Tactical Target Complex	19.4	84.4	5.7	3.0	3.1
Total Emissions	*27.2*	*98.7*	*7.1*	*3.8*	*4.9*

Source: USAF, 1998.

Under the No Action Alternative, activities at the WSMR should not have an air quality impact at Fort Bliss. Increasing airspace use associated with the USAF option to construct a tactical target complex on the McGregor Range to support the GAF would increase emissions affecting air quality. However, air quality modeling using the Multiple-Aircraft Instantaneous Line Source (MAILS) Dispersion Model shows the impacts are insignificant. Therefore, no cumulative effects are expected.

5.1.7 Water Resources

Potential impacts to water resources are regional in nature and are related to mission activities, facility construction, and demolition. Environmental resource management activities have the potential to have minor effects on surface water in locations defined as Waters of the U.S. Real estate actions have no impact on surface water.

5.1.7.1 Main Cantonment Area and Fort Bliss Training Complex

Groundwater from the underlying basin-fill deposits of the Hueco Bolson supplies most of the water used by Fort Bliss. In 1996, Fort Bliss produced 5,172 af of water from military well fields and purchased 481 af from El Paso, for a total of 5,653 afy. The El Paso amount includes 97 afy for McGregor Range Camp. Water for the Doña Ana Range Camp is obtained by wells on the west side of the Hueco Bolson in New Mexico. Water demand under the No Action Alternative is expected to remain essentially static at around 5,653 afy for the foreseeable future. Water levels in the Fort Bliss wells have been declining about 1 foot per year due to groundwater withdrawals. Evaluation of water quality data from 1992 to 1995 did not show any problems with the Fort Bliss water supply. All constituents were below regulated MCLs. Treatment for arsenic removal may be required at some of the Army well fields if the MCL for arsenic is lowered as proposed (see Section 4.7.5.2). Future declines of water levels in the Hueco Bolson can be expected to result in increasing salinity in the Fort Bliss area. Impacts to groundwater from the No Action Alternative are minor but contribute to the overall regional cumulative groundwater situation.

5.1.7.2 Cumulative Impacts

The City of El Paso obtained 44 percent of its water (56,702 af) in 1996 from the Hueco Bolson which could be substantially depleted by 2025; the remainder comes from the Messilla Bolson, northwest of the city, and the Rio Grande. In 1996, Fort Bliss wells pumped 5,173 af of groundwater (Mathis, 1997) or less than 10 percent of the total withdrawals from the Hueco Bolson by the City of El Paso (see Section 5.7.4.2). As much as an additional 100,000 af of water may have been pumped from the Hueco Bolson by neighboring Ciudad Juarez, Mexico, for a total regional pumpage of over 156,700 af from the Hueco Bolson. While pumpage at Fort Bliss affects local water levels and water quality at the two well fields, its effect in the metropolitan El Paso area is barely noticeable. Fort Bliss pumps (5,173 af) or purchases (481af) 3.6 percent of the total annual pumpage from the Hueco Bolson. Decreasing or increasing production at the Fort Bliss well fields or at the Soledad well field on the Doña Ana Range–North Training Areas will have little effect on either forestalling or hastening the eventual depletion of fresh water in the aquifer.

Water demand for direct military use for all purposes on Fort Bliss in 1996 was 5,654 af, which came from the Army wells and City of El Paso sources in the Hueco Bolson. The installation's direct use is 2.4 percent of the total water supplied (234,056 af) in the ROI, which includes other City of El Paso and Ciudad Juarez sources. Military and civilian employees who work on Fort Bliss but reside off-post and military retirees and the families of these groups contribute indirectly to the water demand from all sources resulting from the presence of Fort Bliss. Indirect military use, that is water for domestic use of the 65,700 area residents who live in the El Paso area as a result of employment and services at Fort Bliss can be estimated based on the relative per capita residential and commercial water use. An additional 12,400 af (5.3 percent of total demand) are estimated to be used by the Fort Bliss-related residents of the region. Fort Bliss direct and indirect usage accounts for less than 7.7 percent of the total regional demand. Cumulative factors that affect El Paso regional water supplies also affect military supplies. As the population and water use of El Paso continue to expand, and water supplies in the Hueco Bolson approach depletion, municipal water may become more expensive or result in indefinite deliveries to customers.

Although direct military water use is less than 3 percent as large as municipal use in the ROI, including Ciudad Juarez, factors that affect El Paso water supplies also affect military supplies. As the population and water use of El Paso continue to expand, and water supplies in the Hueco Bolson approach depletion, municipal water may become more expensive or result in indefinite deliveries to customers. Contingency plans, including the current water conservation policy, are being developed to address potential future water shortages. Water conservation is beneficial even when water supplies are plentiful.

5.1.8 Biological Resources

Implementation of the No Action Alternative would affect biological resources through troop/vehicle training, missile and other weapons testing, aircraft operations in airspace over Fort Bliss, and natural resources management.

5.1.8.1 Main Cantonment Area and Fort Bliss Training Complex

Mission Activities. Most biological resources on Fort Bliss are found in the training complex. Training and testing can result in maneuver and impact damage to biological resources from vehicle maneuvers and weapons strikes. Damage can be caused by the movement of large tracked or wheeled vehicles over the landscape. Vegetation can be crushed or uprooted and soils can be mixed or compacted. These types of environmental impacts are most prominent at concentrations of activities such as command centers, staging areas, and bivouac sites and ORV training areas. Weapons strikes damage occurs from missiles, artillery rounds, inert bombs, or small arms rounds directly impacting flora and fauna and soil. This type of environmental impact is localized and generally negligible. Noise from aircraft operations have the potential to disturb wildlife. Wildfires can be started when hot missile parts or incoming rounds land on the ground, as well as from ground vehicles used during maneuvers training. Numerous fires occur on Fort Bliss each year but data regarding the exact number, date, location, and area burned are incomplete. Uncontrolled fires and improper road maintenance have the potential to cause adverse impacts on biological resources.

Under current conditions, environmental resource management is reactive in nature. A description of the components of environmental resource management under current conditions is provided below. This description provides the baseline comparison of the potential impacts of implementing the INRMP, which is part of Alternative 1. The description of the current resource management approach appears in a separate subsection titled *Environmental Resource Management* at the end of Section 5.1.8.1. Many of the components of this approach include vegetation, wildlife, and sensitive species considerations that are inappropriate to separate into biological categories.

Vegetation. Impacts to vegetation would occur primarily as a result of continued mission activities. Sources of impacts from mission activities would include ORV maneuvers, and weapons firing and surface impacts on the Doña Ana Range–North Training Areas and McGregor Range. The primary types of disturbance from these mission activities would include vegetation disturbance, wildfires, and reduced/lost vegetation productivity due to soil erosion (see Section 5.1.5.2 for discussion of soil erosion). Vegetation impacts from continued actions including approved real estate, demolition, and construction activities within the main cantonment and other built-up areas (e.g., missile launch areas, McGregor Range Camp, weapon firing ranges, range control and communication areas, missile launch areas) would be negligible since biological resources are limited in these locations.

Ground Disturbance. Vegetation disturbance would occur when tracked and wheeled vehicle maneuvers occur off road. ORV maneuvers take place in the Chihuahuan Desert shrublands and grassland plant communities and occur on all of the South Training Areas, in TAs 3 through 7 on the Doña Ana Range–North Training Areas, and TA 8 on McGregor Range (see Figures 3.3-4, 3.3-6, and 3.3-8). The South Training Areas cover about 107,000 acres, and approximately 97,200 acres of this land (91 percent of the total) is open for ORV maneuvers. Mesquite coppice dune and sandscrub comprise about 73,900 acres, or 76 percent of the total land available for ORV maneuvers. Creosote and tarbush shrublands cover 5,700 acres (6 percent of total) and mesa grasslands 2,100 acres (2 percent) in the maneuver areas. The remaining land open to ORV maneuvers is disturbed ground (9,900 acres or 10 percent) and other less common plant community types. The Doña Ana–North Training Areas cover approximately 297,000 acres and the land open to ORV maneuvers is about 209,000 acres (70 percent of total). In the maneuver areas, mesquite coppice dune and sandscrub cover about 185,500 acres (89 percent of the total). Creosote tarbush shrublands cover the next largest area in the land open for ORV maneuvers (7,500 acres or 4 percent), while the basin and mesa grassland cover 6,100 acres (3 percent). The remaining acreage is comprised of disturbed land (9,200 acres or 4 percent) and other minor plant communities. McGregor Range covers about 698,00 acres, and the amount of land open to ORV maneuvers is approximately 32,400 acres (5 percent of the total). About 26,800 acres (83 percent) of land open to ORV maneuvers is covered by mesquite coppice dune and sandscrub plant community types. Disturbed ground covers the next largest area in the ORV maneuver areas (4,300 acres or 13 percent) and the remaining land is covered with minor plant community types. The level of use for ORV maneuvers is very low to moderate on the South Training Areas, moderate to high on the Doña Ana Range–North Training Areas, and moderate on McGregor Range (see Tables 3.3-4 through 3.3-6). The amount of new area directly disturbed by vehicle maneuvers will not increase substantially, since new training areas would not be opened up under the No Action Alternative.

ORVs can significantly alter landscape and vegetation communities (Committee on Environmental and Public Policy, 1977). Above-ground vegetation biomass and cover, and root growth are reduced by vehicle traffic (USDA, 1996; Barton et al., 1966). Vehicle impacts have also been reported to alter soil characteristics (e.g., infiltration, bulk density, erosion rates), reduce soil fertility, increase seed loss in the soil, and increase plant root exposure (Marston, 1986; Wilshire, 1977). Several studies to measure vegetation changes from natural processes, vehicle maneuvers, and other human activities have been conducted on Fort Bliss. For example, Land Condition-trend Analysis (LCTA) for 1991 through 1993 showed that mesquite coppice dunes had the lowest plant canopy coverage of all plant communities on McGregor Range, whether or not they were used for ORV maneuvers. However, mesquite coppice dune plant communities used for ORV maneuver had approximately 60 to 70 percent bare ground compared to about 50 percent bare ground in mesquite coppice dunes not used for training. Mesquite coppice dunes not used for ORV maneuvers had a higher percent litter coverage (about 40 percent) than areas used for military training (20 to 30 percent) (O'Regan et al., 1995). In a study of the impacts of tracked vehicles in the creosotebush and mesquite coppice dune plant communities on McGregor Range, percent cover of shrubs and perennial grasses was reduced while annual grasses and herbs increased in areas used for tracked vehicle maneuvers (U.S. Army, 1996dd). Based on these studies, it appears that vehicle maneuvers alter plant communities by changing plant composition from perennial to annual species and reducing litter, but may not necessarily change overall plant cover. In addition, recovery of vegetation would probably not occur in the approximately 314.200 acres of plant communities that would continue to be used for ORV maneuvers under the No Action Alternative. Therefore, impacts from continued ORV maneuvers under the No Action Alternative would probably be negligible in mesquite coppice dune plant communities (286,200 acres) where ground cover is usually sparse, and adverse in other impacted plant communities (28,000 acres) which originally had a greater percentage of ground cover (see Appendix A for criteria to determine the level of the impact).

Continued weapons firing (e.g., missile, mortar, tank, artillery, inert bombs) would disturb vegetation in impact areas on Doña Ana Range–North Training Areas and McGregor Range. Surface impacts from weapons firing occurs in about 13,439 acres of designated impact areas in the desert below and the lower slopes of the Organ Mountains on the Doña Ana Range–North Training Areas. The majority of this area is creosotebush/tarbush shrublands and foothill desert shrublands (7,000 acres), and basin and foothill grasslands (6,000 acres). A small amount of montane shrublands (136 acres) and pinyon pine/juniper woodlands (46 acres) are also in the area. The remainder is roads, facilities, and barren areas. The level of use of this area is high, and 40 percent of this use is from surface impacts (see Table 3.3-5).

On McGregor Range, weapons strike areas are in the Chihuahuan Desert shrublands plant communities in the Tularosa Basin in TA 32 (McGregor Launch Complex and Meyer Range), TAs 39, 30, and 31 (SHORAD and Orogrande missile ranges), and TA 11 (20-acre Class C Bombing Range) (see Figure 3.3-6). The level of use of TA 32 is high but only 8 percent of this use is from weapons surface impacts (see Table 3.3-8). The level of use at the SHORAD and Orogrande ranges is also high and 14 to 31 percent of this use is from weapons strikes. The level of use at the bombing range is moderate and 21 percent of this use is from surface impacts. Continued use of the weapons strike areas would not increase over current levels and there would be a negligible increase in damage to vegetation over damage that has already occurred. Therefore, there would be a negligible impact to vegetation, which would result in limited removal of vegetation in desert shrubland and grassland plant communities on the Doña Ana Range–North Training Areas and McGregor Range.

The use of 25 controlled access FTX sites for Patriot training would continue (see Figure 3.3-9). These 25 FTX sites cover 5,132 acres with 15 large sites covering 3,732 acres scattered in various locations on Otero Mesa, and five large sites (1,248 acres) and five small sites (152 acres) covering 1,400 acres the Tularosa Basin. The sites on Otero Mesa are primarily in grasslands (3,407), while the sites in the basin are primarily in desert shrublands (1,144 acres). The amount of land disturbed during the 1996 and 1997 Roving Sands exercises was 772 and 394 acres, respectively. Of these totals, 694 acres in 1996 and 256 acres in 1997 were disturbed in Chihuahuan Desert shrubland (mostly mesquite-coppice dunes). Most of this disturbance took place in the training areas on the Doña Ana–North Training Areas. Seventy-eight acres in 1996, and 138 acres in 1997 were disturbed in grasslands. Most of this was on Otero Mesa. In addition, no grasslands were disturbed on Otero Mesa during the 1998 Roving Sands exercise. In 1996, eight FTX sites were disturbed on Otero Mesa and the largest area of disturbance was 26 acres. In 1997, six sites were disturbed and the largest area of disturbance was 105 acres.

Military activities at the 10 FTX sites in the Tularosa Basin occur principally in the desert shrublands plant communities. As indicated earlier, there is little grass and herbaceous vegetation in the mesquite coppice dune interdunal spaces, while vehicle use in the creosotebush type could result in a reduction in grass cover. However, ORV maneuvers do not take place at the FTX sites, so impacts to vegetation would be localized. Therefore, operations associated with Roving Sands at the FTX sites in the Tularosa Basin would result in little impact to vegetation. The remaining FTX sites are on Otero Mesa. Activities at these sites during Roving Sands typically result in the flattening or elimination of the grass cover. However, the root systems remain intact and after the completion of the exercise, the grass typically resprouts during the summer rainy season. During some years, the recovery can be slowed during droughts and livestock grazing can also hamper recovery.

The impacts of the Roving Sands exercise on most FTX sites in the mesa grasslands is negligible. The percent vegetation cover at the FTX sites is not significantly different from surrounding areas as indicated by the LANDSAT data (see Tables 5.1-6 and 5.1-8 later in this section). These tables show that the change in vegetative cover between the two data points in 1986 and 1996 is similar in the FTX sites, which are grazed, and other grazed portions of mesa grasslands. These data indicate that the majority of the sites recover and, as indicated above, the rate of recovery is dictated by the amount of precipitation after the completion of the exercise, and grazing. Some areas may be slower to recover than others and the invasion of annual grasses and herbs has been observed at some sites. Overall, the impacts of the Roving Sands exercises on grassland vegetation at the FTX sites are slight, given the small amount of land that is affected (0 to 138 acres from 1996 through 1998) and the subsequent recovery of most of the grasslands.

At present, there are an estimated 45,000 acres of land covered with roads on Fort Bliss (see Table 4.8-1). Road maintenance activities and users of the roads have the potential to affect vegetation along existing roads by: (1) widening existing roads during maintenance or from repeated driving on the road edge, (2) creating new sections of road next to sections that are no longer passable, (3) grading roads so they become deeper and are more susceptible to water erosion, and (4) creating gullies along roads. The number of acres of vegetation affected by road maintenance and road users is not known, but the impacts to vegetation from these activities is expected to continue under the No Action Alternative.

Fire. Fire resulting from ORV maneuvers, missile debris, and weapons strikes could occur in training areas where these activities are authorized as described above. These fires occur in the Chihuahuan Desert shrublands and grasslands plant communities in the Tularosa Basin in the South Training Areas, Doña Ana Range–North Training Areas, and McGregor Range. In addition, fires occur in the grasslands of Otero Mesa on McGregor Range and the montane shrubland and riparian plant communities, pinyon pine/juniper woodlands, and conifer forests in the Organ Mountains on the Doña Ana Range–North Training Areas.

The effects of fires on various vegetative communities on Fort Bliss have been studied. Grass cover was substantially reduced during the first year after a fire. As Vogel et al. (U.S. Army, 1996l) found in shrublands plant communities in the Tularosa Basin on Fort Bliss, grass cover was reduced from about 36 percent to 6 percent. Various studies have shown that grasslands will recover from fires in 2 to 4 years (Finberg, 1994; Bock and Bock, 1992; Martin, 1983). Black and blue grama are two of the most abundant grass species on Fort Bliss (U.S. Army, 1996j). Black grama can be slow to recover from fire, especially if the area is grazed (Martin, 1983; Reynolds and Bohning, 1956; Wright, 1974). In Texas, fire did not benefit blue grama and it will recover, especially if precipitation was above normal during the preceding winter-spring period (Wright, 1974). Other studies have shown that blue grama is slow to recover from fire (Ahlstrand, 1982; Dix, 1960; Finberg, 1994). However small prescribed burns in Arizona did not appear to have a long-term effect on blue grama (Bock and Bock, 1992). Banana and Torrey's yucca are common in the grasslands plant communities, and 5 years after a fire on the Doña Ana Range–North Training Areas, Torrey's and banana yucca mortality were 61 percent and 30 percent, respectively. Some of these "dead" plants produced root sprouts (McGoldrick, 1994). Cholla (*Opuntia imbricata)* is a common woody plant species in the Otero Mesa grasslands (U.S. Army, 1997n) and fire kills or injures most plants less than 1.5 feet tall; mortality of tall cholla was estimated to be 27 percent (Bunting et al., 1980; Dwyer and Pieper, 1967).

Vogel et al. (U.S. Army, 1996l) studied the effects of fire in the creosote bush and tarbush shrub plant community on McGregor Range; shrub cover was reduced from about 23 percent to 13 percent after a fire, and showed no recovery after 2 years. Vogel et al. (U.S. Army, 1996l) do not provide data on the fire mortality of creosote bush, but other studies showed that mortality was about 97 percent and that plants that were scorched (i.e., had their leaves burned off) usually died. There was delayed mortality in some plants that retained green leaves. After a fire in Arizona, 37 percent of the creosote bush sprouted and in California, only 3 percent sprouted (Brown and Minnich, 1986; and McLaughlin and Bowers, 1982). Honey mesquite is a common shrub on Fort Bliss and plants less than 1.5 years old were easily killed by fire; 2.5-year-old plants were severely damaged, and plants over 3.5 years old were very fire tolerant (Wright et al., 1976). Various studies have shown that the closely-related velvet mesquite (*Prosopis velutina)* is also very fire tolerant (Bock and Bock, 1992; Cable, 1967; Martin, 1983). Sotol and lechugilla are common in the desert shrublands of the Hueco Mountains and the foothills of the Organ Mountains. A fire in the foothills of the Organ Mountains resulted in 36 percent mortality for sotol (McGoldrick, 1994), while a 75 percent reduction in cover from a fire was noted for this species elsewhere in New Mexico (Ahlstrand, 1982). This species sprouted from the terminal buds in lightly and moderately burned areas and regained most of its cover after 3 years (Ahlstrand, 1982). Lechugilla did not respond well to a fire that reduced its cover by 81 percent; there was little sign of recovery after 7 years (Ahlstrand, 1982). The effects of fire on prickly pear cactus varies with species, with Englemann prickly pear (*Opuntia engelmannii)* being fairly fire resistant (Bunting et al., 1980; Cable, 1967; Reynolds and Bohning, 1956) and brown-spined prickly pear (*O. phaeacantha)* suffering 70 percent mortality from fire (Bunting et al., 1980). Fire-related mortality to other species of cactus is generally high; barrel cactus (*Ferocactus wislzenii)* suffered 59 to 67 percent mortality (McLaughlin and Bowers, 1982; Reynolds and Bohning, 1956; McGoldrick, 1994), pincushion cactus (*Mammillaria* sp.) mortality was 74 and 96 percent (Bunting et al., 1980; McLaughlin and Bowers, 1982), hedgehog cactus (*Echinocerceus* sp.) mortality was 88 to 94 percent (Bunting et al., 1980; McLaughlin and Bowers, 1982), and bee hive cactus (*Coryphantha vivipara*) mortality was 100 percent (Bunting et al., 1980).

Pinyon pine/juniper woodlands occur on Fort Bliss (U.S. Army, 1996j) and in 1994, a fire burned through sections of this vegetation type in the Organ Mountains. Two years after the fire, the average percent cover and total number of plant species in 1996 was greater in the burned site (86 percent cover and 35 species) than the unburned site (49 percent cover and 29 species) (U.S. Army, 1997z). Data regarding tree mortality from this fire is not available. All juniper less than 4 feet tall were killed during a grass fire in New Mexico. Overall 13.5 percent of the pinyon pines and 24 percent of the junipers were killed (Dwyer and Pieper, 1967). Elsewhere in New Mexico, redberry juniper (*Juniperus pinchotii)* coverage was less on burned sites than unburned and it was estimated that it would take damaged trees 25 to 50 years to attain preburn heights (Ahlstrand, 1982). Other woody species such as mountain mahogany and scrub oak (*Quercus* sp.) have been observed to reproduce through sprouts after a fire (Ahlstrand, 1982). Fire can reduce pinyon pine/juniper (especially trees less that 4 feet tall) coverage and result in increased grass cover (Wright and Bailey, 1982).

Ponderosa pine forests occur on Fort Bliss (U.S. Army, 1996j) and a 1994 fire in the Organ Mountains resulted in light to moderate burns in this type. Two years after the fire, the average percent cover was greater in the lightly burned site (89 percent) than the moderately burned site (72 percent) while the number of plant species was greater in the moderately burned site (37 species) than the lightly burned site (27 species) (U.S. Army, 1997z). The average presettlement fire intervals in ponderosa and ponderosa/mixed conifer stands in the Organ Mountains was 5.9 and 4.0 years, respectively. Since 1900, the number of fires in the Organ Mountains and elsewhere in the southwestern United States has been greatly reduced (Swetnam and Baisan, 1996). The advent of grazing and fire suppression measures in these forests has resulted in an increase in fuel loads, understory density, and stand density, which increases the probability of stand replacement fires (Covington and Moore, 1992). Fuel loads were sampled in 15 stands including the Lincoln National Forest and they averaged about 22 tons per acre (Sackett and Haase, 1996). Controlled burns can reduce total fuel loading by 55 percent, and dead woody vegetation by 64 to 80 percent (Sackett et al., 1996).

Wildfires have the potential to have a significant adverse effect on vegetation by damaging preferred grassland plant communities especially during drought years (e.g., black grama grasslands), reducing shrub cover in the Chihuahuan Desert shrubland plant communities, reducing pinyon pine/juniper tree density, or resulting in stand replacement fires in the ponderosa pine and ponderosa pine/mixed conifer forests.

In certain cases, fire can be beneficial depending on the land management strategies. For example, if a reduction of conifers in pinyon pine/juniper woodlands or shrubs in grasslands are management objectives, then fire could have a positive impact. However, these fire management strategies are best
102 implemented with prescribed burns, which can take place under at least partially controlled conditions. Wildfires may occur under less than ideal conditions and can produce results that may have undesirable impacts to vegetation.

Wetland and Arroyo-riparian Drainages. Wetlands occur on the Doña Ana Range–North Training Areas near land used for ORV maneuvers. However, these wetlands and all other wetlands on Fort Bliss are protected from military training activity, so the No Action Alternative would have no impact on wetlands due to ORV maneuvers and weapons surface impacts. Impacts to arroyo-riparian drainages (Waters of the U.S.) would occur primarily as a result of continued ORV maneuvers and weapons surface impacts. As discussed under vegetation, the primary types of disturbance from these mission activities would include vegetation crushing and trampling, wildfires, and reduced/lost vegetation productivity due to soil erosion (see Section 5.1.5.2 for discussion of soil erosion).

Ground Disturbance. As discussed in Section 4.8, a total of 1,228 dry washes with distinct streambeds and sides, comprising 1,874 miles, have been mapped on McGregor Range and the South Training Areas, and 142 washes totaling 545 miles were mapped on Doña Ana Range–North Training Areas (U.S. Army, 1998h) (see Figure 4.8-4).

Most of these drainages on the South Training Areas are in the Hueco Mountains, which are off-limits to ORV maneuver (see Figure 4.8-4). Similarly, the vast majority of arroyo-riparian drainages on the Doña Ana Range–North Training Areas (523 miles, 98 percent) are in and near the Organ Mountains and not in the ORV training areas. The remaining drainages (9.4 miles) on this part of the training complex have been, or have the potential to be, impacted by ORV maneuvers. Only 0.8 mile or 0.03 percent of the total number of miles of arroyo-riparian drainages on McGregor Range occur in TA 8 where ORV maneuvers are allowed. Vegetation recovery on previously disturbed sites that continue to be used would be unlikely, and some limited disturbance of undisturbed drainages is likely. Arroyo-riparian drainages that are no longer in use would recover slowly. Therefore, the impacts of ORV maneuvers on arroyo-riparian drainages under the No Action Alternative would be negligible because few drainages have the potential to be affected. This is especially true on the South Training Areas and McGregor Range.

As with vegetation, the impacts of weapons strikes on arroyo-riparian drainages would be negligible because such strikes would be in areas that have been disturbed historically and impacts of weapons strikes would be localized and widely scattered.

Impacts to arroyo-riparian drainages may occur from the operation of the FTX sites. However, the use of these areas would be sufficiently flexible to avoid wetlands and arroyo-riparian drainages. Therefore, under the No Action Alternative there would be no effect to wetlands or arroyo-riparian drainages from the operation of the existing 25 FTX sites.

Fire. There have been no studies regarding the impacts of fire to wetlands on Fort Bliss. Fire has the potential to have moderate to high impacts on woody plant growth in wetlands such as the willow/box elder riparian areas in the Organ Mountains or the mesquite/little-leafed sumac/willow growth that occurs around some stock tanks in the Tularosa Basin. As indicated in the vegetation discussion, mature mesquite plants are fire tolerant, so many of these plants would be expected to recover after a fire. However, it will likely take a few years for these plants to attain their preburn height. Velvet mesquite attained 48 percent of its prefire height 4 years after being burned in Arizona (Bock and Bock, 1990). Large-leafed sumac (*Rhus trilobata)* sprouts vigorously after fires (Dwyer and Pieper, 1967), so it is assumed that little-leafed sumac will also sprout after a fire. As with mesquite, it will probably take many years for damaged sumac to attain their preburn height and density. It is expected that the grasses, sedges, and other herbaceous species that occur at wetlands on Fort Bliss would recover much more quickly. For example, big sacaton (*Sporobolus wrightii)*, which forms tall, dense stands at stock tanks and in arroyo-riparian drainages on Fort Bliss, had attained preburn percent cover and 54 percent of preburn height 2 years after a burn (Bock and Bock, 1978). Therefore, fire has the potential to result in significantly adverse impacts to woody vegetation at wetlands.

Fires have burned in the arroyo-riparian drainages on Fort Bliss including in the Chihuahuan Desert shrubland and grassland plant communities on McGregor Range and elsewhere on Fort Bliss. Skeleton goldeneye and little-and large-leaf sumacs are common shrubs in the foothill drainages (Cockman, 1996). Skeleton goldeneye density was higher on burned than unburned sites and it reproduces through root and crown sprouts (Ahlstrand, 1982). The dominate shrub species in the submesa drainages are desert willow, little-and big-leaf sumac, honey mesquite, creosote bush, skeleton goldeneye, and tarbush (Cockman, 1996). Based on the information presented above, many of these species, except possibly creosote bush, would be expected to recover from a fire but would take years to attain prefire height and density. Yucca and cholla are common woody plants and grama grass and tobosagrass are common grass species in the ephemeral swales in the grassland plant communities on Otero Mesa. As indicated in the previous discussion on fire, a large percent of yucca and cholla have the potential to be damaged or killed by fire. These shrubs and other woody vegetation may recover via root sprouts but would take many years to attain prefire height. As shown in Section 4.8, the woody plants in the arroyo-riparian drainages of Fort Bliss are important for wildlife and the maintenance of biodiversity on Fort Bliss. Grama grass 102
could recover from fire within 1 to 2 years particularly if the fire occurred during periods of above-average precipitation. If the fire occurred during dry periods, its recovery would take longer. Tobosagrass can be severely harmed by fire during dry years but during wet periods, its productivity can increase two-to-three fold if the soil is moist at the time of the burn (Wright and Bailey, 1982). Therefore, fire has the potential to result in adverse impacts to shrubs in arroyo-riparian drainages and ephemeral swales on Fort Bliss. The impact of fire on grass species can be negative if it occurs in dry years and neutral to positive if it occurs in wet years.

Wildlife. Impacts to wildlife would primarily occur on the ranges and would result from ORV maneuvers, weapons, surface impacts, noise, and fire. Impacts to wildlife from continued actions including approved real estate, demolition, and construction activities within the cantonment and other built-up areas (e.g., missile launch areas, McGregor Range Camp, weapon training ranges, range control and communication areas, missile launch areas) would be negligible since ecological resources are limited in these locations. Although electrical power lines have the potential to electrocute wildlife, particularly raptors, few incidents have been reported.

Ground Disturbance. Direct wildlife mortality from off-road maneuvers and weapon surface impacts would continue. See earlier discussions under the vegetation heading which describe the location of training areas used for ORV maneuver and weapons surface impact zones. The impacts to populations due to direct wildlife mortality probably would be negligible because populations have been exposed to these activities for several years and population levels would reflect this consistent disturbance; therefore, little, if any, change would be expected.

ORV maneuvers would continue to disturb up to approximately 314,200 acres of wildlife habitat on the South Training Areas, Doña Ana–North Training Areas, and McGregor Range. As indicated in the vegetation section, ORV maneuvers would occur principally in the mesquite coppice dune sandscrub plant communities (286,200 acres or 91 percent of the total). See Section 4.8 and Appendix F for wildlife species that occur in the mesquite coppice dune sandscrub habitat. Impacts to previously undisturbed habitat would be minimal since there would be no expansion of training into undisturbed habitat under No Action. In addition, because of the recent reduction in the number of tracked vehicles, the level of activity and disturbance would be less than historic activity levels.

Surface impacts from weapons training could impact wildlife habitat on the Doña Ana–North Training Areas and McGregor Range. The location of weapons surface impacts zones on both ranges as well as the plant communities types subject to such impacts appears above in the vegetation section. As with vegetation, the impacts of weapons surface strikes on wildlife habitat would be negligible because these impacts are widespread and affect only a small area when they strike the earth.

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The use of the existing 25 controlled access FTX sites would result in the temporary disturbance of wildlife for a 10- to 13-day period each year during Roving Sands. Some wildlife use of the FTX sites would be precluded because of the presence of equipment and humans. Additionally, wildlife adjacent to the sites may be impacted by human activity. The impacts to wildlife would be negligible due to the small size of the area used and short duration of this activity. Wildlife species affected would be those that occur in the Chihuahuan Desert shrublands and Otero Mesa grasslands on McGregor Range; see Section 4.8 and Appendix F for wildlife species in these two general plant community types.

Use of the 25 FTX sites may result in mortality of animals. In addition, the use of these areas would increase the potential temporary displacement or startling of wildlife during training activities. However, given the small amount of land that is typically affected (see *Vegetation* section) and the short duration of military use of these sites the potential for wildlife mortality is slight. Use of these sites have the potential to adversely impact wildlife.

Noise. Wildlife may be startled by noise associated with short-term events such as missile firings/strikes, weapons training, and aircraft overflights. Studies and incidental observations have been made on the response of animals to noise such as aircraft overflights. Reported animal responses vary among species, and the ability of species to adapt to overflights also varies. As an example, the potential consequences from noise are thought to be greatest on breeding animals (NPS, 1995).

Both physiological and behavioral animal responses to noise have been reported (Knight and Gutzwiller, 1995). Physiological effects may include temporary or permanent hearing threshold shifts, masking of auditory signals, increased respiration and heart rate, and increased corticosteroid levels. Reported hearing threshold shifts were related to noise sources that were of much greater duration (minutes and hours) than an aircraft overflight or missile firing, or weapons training. Behavioral responses may include animals becoming alert and turning toward the sound source, running from the sound source, changes in activity patterns (e.g., interrupted feeding), nest abandonment, or change in habitat use. It has been speculated that if the changes are sufficiently severe, the health and survival of an individual animal may be reduced. If a large number of animals are affected, then population declines potentially could result.

In general, literature suggests that impacts to wildlife populations of species the same or similar to those found on Fort Bliss appear to be short-term and affects individuals, but does not translate to long-term or population-level impacts. However, no conclusive studies have been conducted on the potential long-term impacts from noise exposure. Because of the lack of conclusive studies and inconsistent responses by wildlife reported in studies, potential impacts can only be predicted as variable, with a probable low likelihood of population level impacts.

Many studies and surveys have been conducted regarding the impact of noise on birds. The studies and surveys indicate that noise has the potential to result in short-term, adverse impacts on individual or small groups of birds (Lamp, 1989). The effects of loud noise on raptors have been studied. The studies indicate that raptors appear to have the ability to adapt to noise and human activities (Anderson et al., 1990). Therefore, noise levels from the No Action Alternative would not adversely impact raptors.

Infrequent low-level helicopter flights occur in some of the canyons in the Sacramento Mountains foothills. Recent nesting raptor studies have not been conducted in these areas, but based on observations during other studies, the red-tailed hawk, golden eagle, and prairie falcon, as well as other species, have the potential to nest in this area (see Section 4.8.3). Several studies evaluated raptor response to helicopters. Richie (1987) reported that peregrine falcon responses varied from no response to flushing when helicopters were within 2,000 feet of the birds. Craig and Craig (1984) reported that prairie falcons, red-tailed hawks, and golden eagles either did not respond or flushed from perches when helicopters passed nearby. In a study of red-tailed hawk response to helicopters, Anderson et al. (1989) reported that birds would flush from their nests but that the overflights did not affect raising of the young. White and Sherrod (1973) reported that nesting raptors flushed from nests overflown by helicopters that approached unseen. The authors suggested that raptors may be more likely to flush if the noise or sight of the aircraft is sudden and in close range to the nests. In a study of spotted owl response to helicopters, it was determined that owls would flush if the helicopters approached within 150 feet, would exhibit an alert response when helicopters were up to 1,300 feet away, and showed no response when they were over 2,200 feet away (USAF, 1997k). Based on this, there is the potential for raptors to flush from their perches or nest sights if low-flying helicopters come within 1,300 feet or less of their locations. If these flights are infrequent, there would likely not be negative impacts on raptor reproductive behavior. However, if raptors were flushed from their nest sites on multiple occasions by low-flying helicopters, nest abandonment would be possible.

Few studies have been conducted on the effects of noise on bats. Howell (1992) found that noise from unmanned aerial vehicles overlapped with lesser long-nosed bats' hearing at only one frequency (30 kilohertz [kHz]), and flights at operational cruising altitude (3,000 feet agl) were inaudible. In another study conducted on the lesser long-nosed bat (USAF, 1993), the authors found no apparent short-term effects of low-altitude jet aircraft on bat maternity roosts; however, the authors stated that the results may not be adequate to extrapolate to other areas or conditions (USAF, 1993). Griffin et al. (1963) found echolocating Townsend's big-eared bats were able to resist jamming from a constant noise field by orienting to second harmonics. Jamming resistance and an ability to navigate and locate targets despite acoustical clutter and interference has been demonstrated for numerous other bat species (Simmons et al., 1974; McCarthy and Jen, 1983; Troest and Mohl, 1986; Schmidt and Joermann, 1987). Based on these limited studies there would be no adverse impacts on bats.

Studies on the effects of noise on wild small mammals have shown response by individual animals but the few studies on populations' attributes did not show changes from noise exposure. Chesser et al. (1975) documented increased adrenal and body weights as well as temporary threshold shifts in hearing. Long-term exposure to noise has been shown to cause increased adrenal weights in mice, which generally corresponds to higher levels of stress. However, no adverse impacts on longevity, reproductive success, or health were detected or noted (Chesser et al., 1975). A study testing the effects of ORV impacts reported that vehicle noise caused a temporary shift in hearing sensitivity in desert kangaroo rats, with recovery of hearing thresholds taking at least three weeks (Brattstrom and Bondello, 1983). Under the No Action Alternative, there would likely be no adverse impacts on small mammals.

Studies of big game exposed to noise events generally suggest that responses to overflights are usually temporary, and temporary changes would not be detrimental to populations (Lamp, 1989). However, Weisenberger et al. (1996) suggested that the interaction of noise with other environmental factors should be evaluated using free-ranging animals. Historic presence of big game on military installations demonstrates that big game can exist in areas with vehicle maneuvers and low-level, military aircraft flights; however, it is unknown whether population levels would be greater if noise events from military events occurred at lower levels. As examples, mule deer and bighorn sheep populations continue to exist under airspace where low-level aircraft sorties have been flown for years at such training areas as the USAF's Nellis Range, Nevada, and Goldwater Range, Arizona. Therefore, based on site-specific conditions, noise has the potential to have no adverse impacts on big game.

Fire. The effects of fire on invertebrate and vertebrate species have been studied on Fort Bliss and elsewhere. Arthropods were sampled in pitfall traps before and after controlled burns in the Chihuahuan Desert shrublands in the Tularosa Basin (U.S. Army, 1996l). Comparison immediately after the burn and up to 1 year after the burn showed that there were no differences in the average number of arthropods captured at the burned and control sites. This indicates that, at least for the short-term, fires of similar size and intensity may have no impact on arthropods in the Chihuahuan Desert shrubland plants communities. Samples in burned and unburned locations in the Jemez Mountains shortly after a fire showed a 46 to 69 percent decrease in genera and 26 to 29 percent decrease in individuals. Light traps in burned areas showed a 75 percent decrease in arthropods shortly after a fire; 1 year later, the volume of arthropods captured in light traps was similar in burned and unburned areas (Pippin and Nicholas, 1996). Limited data indicated that the number of harvester ant mounds was greater in burned than unburned areas (Fair and Henke, 1997).

The effects of fire on reptiles and amphibians has received little study (Scott, 1996). The box turtle can suffer heavy losses from fire; 25 dead box turtles were found after an August burn in Oklahoma (Bingham et al., 1965). Limited direct mortality from fire to snakes and lizards has been documented in other studies (Erwin and Stasiak, 1979; Simons, 1989). Reptiles were sampled shortly after a fire on burned and control plots in the Chihuahuan Desert shrubland habitat in the Tularosa Basin (U.S. Army, 1996l). The Trans-Pecos striped whiptail lizard was a common species and the average number in the burned and control plots was similar. The average number of side-blotched lizards (another common species) in the burned plots decreased 54 percent, while the decrease in the control plots was 20 percent. A third common species, the western marbled whiptail, decreased by about 26 percent on burned plots after the fire, while there was a 7 percent increase in the control plots. The average number of both of these species was similar in the burned and control plots two to three months after the fires. The average reptile species richness was similar in the burned and the control plots. Therefore, under the fire conditions of this study, short-term, adverse impacts on some species of reptiles may occur.

Direct mortality to birds from fires would generally be limited to the destruction of nests with eggs or young birds. For example, in Nebraska, one meadowlark and 38 ground nests of the ring-necked pheasant (*Phasianus colchicus)* were destroyed by fire (Erwin and Stasiak, 1979). Fire could have a direct effect on birds-of-prey if an active nest site were to be burned. The effects of fire on birds in ponderosa pine forest varies with the intensity of the fire. Fires limited to the forest floor and understory may have little effect on species diversity and abundance while a stand replacement fire may result in most species being replaced (Hutto, 1995; Horton and Manning, 1988). Species that can be favored by a fire in ponderosa forest are the chipping sparrow, lark sparrow, dark-eyed junco, western bluebird, northern flicker, and house wren (Overturf, 1979 as cited in Hall et al., 1997). Species that can be negatively impacted by fire include the pigmy nuthatch, mountain chickadee, ruby-crowned kinglet, Grace's orange-crowned and Virginia's warblers, and the hermit thrush (Johnson and Wauer, 1996). Fire also alters habitats, which can result in changes to the bird community. In ungrazed grasslands in Arizona fire resulted in an increase in species such as the mourning dove, lark sparrow, horned lark, chipping sparrow, and Say's phoebe. Species that avoided these recently burned grasslands were Cassin's, grasshopper, Botteri's sparrows, eastern meadowlark and Montezuma quail (Aid, 1990; Bock and Bock, 1992 1990). Species that did not respond to fire in these grasslands were scaled quail, ash-throated flycatcher, western kingbird, northern mockingbird, canyon towhee, rufous-crowned sparrow, and brown-headed cowbird (Aid, 1990). Some species of birds-of-prey are attracted to recently burned grasslands because prey species are more easily observed after fire or are more abundant in new growth after a fire (Beck and Vogel, 1972; Lehman and Allendorf, 1987).

Breeding bird surveys in the Organ Mountains in 1996 included sample points in burned and unburned habitat. Preliminary results indicate that the number of birds detected in the unburned, medium burn and high burn areas were similar. However, the average number of species per census plot for all habitats combined showed that there were over twice as many species detected in the unburned plots than the burned plots. The reduction in bird species richness was most pronounced in the xeric woods where about 11 species were detected per plot in the unburned plots and 2 were detected per plot in the burned habitat. The difference in bird species richness in the desert scrub/grass habitats was also pronounced (eight species in unburned and two species in high burned habitat). The difference in bird species richness between burned and unburned plots was much less in the arroyo/riparian, mesic woods, mixed conifer, and montane scrub habitats (U.S. Army, 1997o). Based on these studies, fire may result in positive, adverse, or no impacts to bird species diversity. In addition, fire can result in a short-term shift (one to a few years) in bird species composition in grassland habitats and a long-term shift (a decade or more) in wooded habitat where the trees have been destroyed by a fire.

Mammals have been categorized as having fire-positive or fire-negative responses to fire. Negative response mammals include those that forage for invertebrates in the litter layer, live in dense vegetation, or nest above ground. Mammals that occur at Fort Bliss in this group are the hispid cottonrat, pinyon mouse, pocket mouse, antelope ground squirrel, white-throated woodrat, and western harvest mouse. Fire positive species include those that use microhabitats with a relatively open herbaceous layer and/or nest under ground. Included in this group are the deer mouse, white-footed mouse, cottontail rabbits, and hispid cotton mouse (Ford and McPherson, 1966). An overall short-term increase in the number of small mammals 1 year after a fire has been documented (Bock and Bock, 1983; Tester, 1965). In general, predators such as the badger, bobcat, red fox, and coyote, as well as most ungulates, show increases in the use areas after a burn (Ford and McPherson, 1966).

Direct mortality of mammals from fire has been documented. In a California study, 28 woodrats (*Neotoma fuscipes)* and nine desert cottontails were found dead after a fire in the chaparral. It was believed that most of the woodrats and rabbits living in the burned area perished in the fire (Chew et al., 1959). Two burns in Arizona resulted in the almost complete elimination of the white-throated woodrat and least cotton rat (*Sigmodon minimus)* while deer, white-footed, and grasshopper mice were unaffected (Bock and Bock, 1978). In Nebraska, an inspection of harvest mice nests yielded eight with dead young and 72 of 92 where the fire had burned into the inner chamber. Species such as the deer, white-footed, and plains pocket mice were apparently unaffected (Erwin and Stasiak, 1979).

Threatened, Endangered, and Sensitive Species and Species of Concern. The types of potential impacts to sensitive species due to ORV maneuvers and weapons surface impacts would be similar as those described for vegetation and wildlife. However, the probability of impacts to these resources would be lower because the presence of these species generally is limited and most populations do not occur in areas where ORV maneuvers and other training takes place. The one known population of night blooming cereus on Fort Bliss occurs on Doña Ana Firing Range 49 (U.S. Army, 1990). It is believed that recent road building and maintenance may have resulted in the elimination of a few individuals in the population. The known locations of most of the remaining protected and sensitive species (e.g., sensitive plant species populations in the Hueco and Organ mountains, bald eagle winter roosts, Mexican spotted owl and peregrine falcon potential nest habitat) are protected and would not be affected by troop maneuver and training exercises. Potential nesting habitat for the Mexican spotted owl and peregrine falcon occurs in the ponderosa pine and mixed conifer forest in the northwest corner of the Organ Mountains on Doña Ana Range (see Figure 4.8-2). Helicopter activity at the Doña Ana Firing Range would not disturb this potential habitat because the areas used for weapons firing are 2 or more miles from the potential habitat (see Figures 4.8-2 and 3.3-6). Helicopters in the area would be more than 2,000 feet away from the potential habitat, which was the minimum distance where no response was elicited by spotted owls from helicopter overflights (USAF, 1997k). Therefore, helicopter flights in the potential habitat would not affect the Mexican spotted owl if it were to nest in the Organ Mountains in the future. Since the peregrine falcon potential habitat is the same area as the spotted owl's, it is assumed that helicopter flights would not affect this species either. Of the 400 air operations on Doña Ana Range–North Training Areas, all but 26 went east of the potential habitat (see Table 4.4-2). Therefore, there are no other air operations on Doña Ana Range that could affect Mexican spotted owl and peregrine falcon potential habitat (USAF, 1997k).

As indicated in Section 4.8.4, the Mexican spotted owl is a rare winter visitor in the Sacramento Mountains foothills. This species does not nest in this area and there is no potential nesting habitat. Therefore, the occasional low-level helicopter flights in the foothills of the Sacramento Mountains would not have or would have only a negligible effect on the Mexican spotted owl on the rare occasions this species is in the area. In addition, the McGregor Range airspace overlaps a very small portion of the south end of the once proposed Mexican spotted owl critical habitat in the Sacramento Mountains. This small portion of once proposed critical habitat is pinyon pine/juniper habitat that may occasionally be used by wintering or dispersing owls as has been observed on McGregor Range. Therefore, the infrequent air operations over this small amount of habitat would have no or negligible effect on the Mexican spotted owl.

The continued use of FTX sites has had a negligible impact to potential habitat of either the aplomado falcon or the mountain plover. As indicated in the vegetation section, 15 FTX sites occur on Otero Mesa and of the 3,732 acres covered by these sites, 3,407 or 91 percent are grasslands. The remaining land is 251 acres of disturbed ground such as roads and 74 acres of shrub dominated habitat. Military activities at these sites result in the flattening and elimination of the grass cover. The vegetation recovers after the military personnel have left the area and precipitation and livestock grazing can affect the rate of recovery. The military are typically present at the FTX sites for 10 to 13 days per year during the Roving Sands exercise. All the sites are not used each year. For example, 8 sites were used in 1996 involving 78 acres. In 1997, 6 sites were used and 138 acres were affected. There were no sites used in 1998. This use of potential habitat represents 0 to 4 percent of the land within the 15 FTX sites on Otero Mesa, which is less than 1 percent of grasslands on the Fort Bliss portion of Otero Mesa.

As indicated in Section 4.8.4.4, recent surveys indicate that the mountain plover does not nest on Otero Mesa on Fort Bliss, although one bird was observed during the Spring 1999 migration. However, Otero Mesa is a historic breeding range for this species and it could occur in the area in the future. The impact of reduced grass cover at some of the FTX sites on Otero Mesa from military activities may be beneficial to mountain plover potential habitat because, as indicated in Section 4.8.4.4, this species is frequently found in areas of reduced grass cover such as prairie dog towns. Military activities at the FTX sites would preclude the mountain plover from using the occupied land. However, this impact would be negligible because of the short duration of the exercise and the small amount of habitat in use.

As indicated in Section 4.8.4.4, the aplomado falcon has not been observed during surveys on McGregor Range during the last few years, although an unconfirmed observation was reported below the Otero Mesa escarpment in 1997. This indicates that this species does not nest on Otero Mesa but much of the grasslands on Otero Mesa is considered potential aplomado habitat based on habitat analysis (see Section 4.8.4.4). The overall effect of Roving Sands exercises on percent vegetation cover at the FTX sites on Otero Mesa has been negligible, although there have been short-term reductions in grass cover in limited areas (0 to 138 acres for Roving Sands 1996, 1997, and 1998) (see above). This short-term reduction in grass cover would have a negligible effect on the breeding bird populations, which are the principal prey items for the aplomado falcon. The worst case would be the elimination of breeding birds from the affected areas which could affect up to 14 pairs in 1996 and 24 pairs in 1997, based on 18 pairs per 100 acres (Raitt and Maze, 1968), and 78 acres cleared in 1996 and 138 acres cleared in 1997. However, breeding birds would be expected to inhabit the disturbed land during recovery although there may be a shift in species composition to species better adapted to short grass habitat. Based on breeding bird surveys on Otero Mesa (see Table F-9 in Appendix F) and information from fire and grazing studies (see previous discussions and Section 5.18.2), bird species such as the mourning dove, lark sparrow, and horned lark would respond favorably to a reduction in vegetation while species such as the meadowlark may avoid these areas. Other common nesting species such as the western kingbird, northern mockingbird, and ash-throated flycatcher would not be affected (Aid, 1990; Bock and Bock, 1992; Bock and Bock, 1990). As indicated in Section 4.8.4.4, the meadowlark was the aplomado falcon's principal prey species at occupied territories in Mexico. However, other species such as the northern mockingbird, western kingbird, and mourning dove, which would likely not be affected by reduced grass cover, were also important prey species for the aplomado falcon (Montoya et al, 1997). Therefore, the short-term reduction in grass cover at the affected FTX sites would have a negligible impact on the aplomado falcon potential habitat because (1) potential prey species would inhabit the sites during recovery, and (2) a maximum of 4 percent of the habitat at the 15 FTX sites and less then 0.1 percent of the plant communities on Otero Mesa on Fort Bliss would be affected. Human occupation of the FTX sites during Roving Sands would preclude their use by the aplomado falcon. This impact would also be negligible given the short time period (10 to 13 days) the sites are occupied by military personnel and the small amount of potential habitat that has been affected. The one exception would be if an aplomado falcon established a nest site at or near an FTX site. In the past, aplomado falcon surveys were conducted on Otero Mesa before Roving Sands and none were found. If an aplomado falcon nest site were discovered, the USFWS and the NMDGF would be notified. Measures would be taken to protect the nest site from military activities associated with Roving Sands as well as all other military and civilian use.

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Potential impacts of military- and naturally-caused wildfires on sensitive species is summarized in Table 5.1-4. Based on available information, fire has the potential to have an adverse impact on plant species such as night blooming cereus and grama grass cactus, less potential to impact species such as Sneed pincushion cactus which grows in rocky terrain, and Alamo beard tongue which grows on cliffs.

The 1994 fire in the Organ Mountains did not have an adverse impact on sensitive plant species that were in the burned area (Table 5.1-4). However, a stand replacement fire could affect some species due to increased sedimentation and reduced tree cover. Fire has the potential to be a positive force for such species as the Texas horned lizard, ferruginous hawk, mountain plover, and burrowing owl. A stand replacing fire in the conifer forests in the Organ Mountains could have a negative impact on potential spotted owl and peregrine falcon habitat, as well as gray vireo and Organ Mountain chipmunk habitat. Other species such as the bald eagle, loggerhead shrike, and bats would likely not be affected by fire (Table 5.1-4). This analysis does not include migrants such as the black tern, white-faced ibis, piping plover, and willow flycatcher which are so infrequently observed on Fort Bliss that fires would not affect them.

Table 5.1-4. Potential Effects of Fire on Sensitive Species and Sensitive Species Habitat on Fort Bliss

Species	*Potential Fire Effects*	*References*
PLANTS		
Sneed pincushion cactus	Effects of fire on this species unknown. The Organ Mountains pincushion cactus grows in similar habitat and has a growth form like Sneed pincushion cactus. The Organ Mountains pincushion cactus were surveyed after the 1994 fire in the Organ Mountains. The average number of stems, plant size, and reproductive stems were similar in burned and unburned plots. Sneed pincushion occurs in rocky terrain with low fuel loads, which may reduce its susceptibility to fire, as was observed for the Organ Mountains pincushion cactus.	Bunting et al., 1980; U.S. Army, 1980b; U.S. Army, 1997q
Alamo beardtongue	This species grows in rocky canyon bottoms and on cliffs, which would likely limit its susceptibility to fire damage or mortality.	U.S. Army, 1991c
Organ Mountains evening primrose	Preliminary results of the Organ Mountains fire effects study indicate this species has recovered to preburn levels. However, a stand replacing fire could have a negative impact on this species by increasing sedimentation into its habitat.	U.S. Army, 1996n
Organ Mountains figwort	Preliminary results of the Organ Mountains fire effects study indicate this species is more productive in burned than unburned plots. However, a stand replacing fire could have negative effects on this species by increasing sedimentation or opening up its habitat.	U.S. Army, 1996n, 1997q
Standley whitlowgrass	This species grows in cliffs and large boulders in the conifer forests, which may limit its susceptibility to fire. This species survived a low intensity burn in the Chiricahua Mountains.	U.S. Army, 1994b
Grama grass cactus	Given its small size and habit of growing within clumps of grass, it would be very susceptible to being killed by fire. Its ability to recover from fire is unknown.	Corral, 1997
Night blooming cereus	Would be susceptible to fire damage and/or mortality in its desert shrub habitat. Ability to recover from fire is unknown.	
Hueco Mountains rock daisy	This species grows in mesic slopes and on vertical cliffs well-protected from fire and its susceptibility to fire damage is low. Its ability to recover, if any, from fire is not known.	U.S. Army, 1991c
Nodding cliff daisy	Species grows on shaded cliffs, so the potential for fire to effect this species is low.	U.S. Army, 1994b
Organ Mountains pincushion cactus	This species grows in rugged rocky terrain and because of this, it is believed that fire would damage only a small number of individuals.	U.S. Army, 1994b
Crested coral-root	This species grows in shaded organic soil in oak woodlands and the removal of the tree canopy by fire would probably result in the local elimination of this species.	U.S. Army, 1994b
INVERTEBRATES		
Woodland snails	The woodland snails occur in rocky slopes in the Organ Mountains. Fuel loads on these slopes are likely low, which would limit these species susceptibility to fire. In addition, they live below ground much of the time, which would also lessen the potential for fire to have a negative impact on them.	U.S. Army, 1994b
REPTILES		
Texas horned lizard	This species was more common in burned than unburned grazed and ungrazed habitat, so fire may have a positive impact by opening up the habitat. Fires may have a negative impact on populations that hibernate < 2.5 centimeters below ground but other population that hibernate deeper may not be affected.	Fair and Henke, 1997
BIRDS		
Peregrine falcon	This species occurs only as a sporadic migrant on Fort Bliss so fires would not effect it. If it were to nest in potential habitat in the Organ Mountains, a stand replacement fire in the conifer and riparian plant communities could have a negative effect on this species.	

Table 5.1-4. Potential Effects of Fire on Sensitive Species and Sensitive Species Habitat on Fort Bliss (Continued)

Species	*Potential Fire Effects*	*References*
BIRDS (Continued)		
Northern aplomado falcon	This species was associated with grassland habitats in the southwestern United States where fire was a common occurrence before fire suppression measures were implemented. Therefore, non-catastrophic fire in potential aplomado habitat on Fort Bliss would not be expected to reduce its long-term suitability for this species.	
Bald eagle	Fire in the pinyon pine/juniper habitat used by this species in the winter could eliminate perch sites. However, given the open nature of this habitat and the resistance of mature pinyon pine/juniper to fire mortality, all perch trees would likely not be eliminated so fire would have little impact on wintering bald eagles on Fort Bliss.	U.S. Army, 1980a
Mexican spotted owl	Although this species does not nest on Fort Bliss, limited potential habitat occurs in the Organ Mountains. A stand replacement fire (first fire this century in this forest) in California spotted owl habitat adversely affected 54 territories, including 12 that were destroyed. Such a stand replacement fire in the Organ Mountains could adversely affect this species potential habitat.	Lehman and Allendorf, 1987
Mountain plover	Although the mountain plover is not known to breed on Fort Bliss, fire in potential grassland habitat on Otero Mesa may improve the habitat since this species prefers open areas such as created by prairie dogs or by over grazing.	Knopf and Miller, 1994; Miller and Knopf, 1993; Sager, 1996
Ferruginous hawk	Fire may benefit migratory and wintering ferruginous hawks on Fort Bliss by making prey more accessible or resulting in greater prey density in areas of new plant growth.	Lehman and Allendorf, 1987; U.S. Army, 1991b
Western burrowing owl	Direct mortality by fire has not been documented, although young caught outside their burrow during a fire could suffer mortality. Fires may benefit burrowing owls by increasing prey availability and reducing litter in its grassland habitat. This species has been reported to use burn areas five days after a fire.	Lehman and Allendorf, 1987
Loggerhead shrike	This species is common and widespread on Fort Bliss so localized sporadic fires would probably not have a negative impact on this species. Fires may benefit this species by making prey more accessible.	
Gray vireo	This species was recorded during the breeding season from oak and oak/juniper habitat in the Organ Mountains. A major fire in these areas could adversely affect the habitat of this species.	U.S. Army, 1994b
MAMMALS		
Bats	Areas such as cracks and crevices in the Otero Mesa Escarpment used by bats would not be impacted by fire. Bats that roost in the various plant communities could be negatively affected by fire. The susceptibility of bats to fire is unknown because little data are available regarding the distribution of bats on Fort Bliss.	
Gray-footed chipmunk	A fire in the wooded habitat used by this species in the Sacramento Mountains foothills on Fort Bliss could have a negative impact due to alteration of its habitat.	
Organ Mountains chipmunk	The 1994 fire in the Organ Mountains appeared to have little negative effect on this species. This fire appeared to create favorable conditions for this species by opening up habitat. However, a major stand replacement fire in the chipmunks habitat could have a negative impact by destroying its habitat and making this species more susceptible to predation.	U.S. Army, 1997q
Arizona black-tailed prairie dog	Fire would likely not affect prairie dog towns due to low fuel loads. Fires may benefit this species by creating new plant growth for them to feed on.	

Facility Construction and Demolition. Under the No Action Alternative, facility construction and demolition would take place at the cantonment area and other built-up areas such as McGregor Range Camp. These activities would result in no to negligible impacts to vegetation, wetlands and arroyo-riparian drainages, wildlife, and sensitive species because of the already highly disturbed nature of these areas and the high level of human activity.

Environmental Resource Management. Resource management practices currently in place at Fort Bliss are reactive in nature, as described in Section 3.2.5. Under this system, resource management is geared towards uses such as military activities, grazing, hunting, or conducting surveys and monitoring studies for threatened or endangered species. The various components of the current management approach are discussed below. Grazing takes place on McGregor Range and is managed by the BLM. Limited forestry management takes place in the Lincoln National Forest at the north end of McGregor Range and is managed by the USFS. The impacts of these management practices on biological resources are addressed in the Section 5.1.8.2, *Cumulative Impacts.*

Game Harvest. Currently, hunting is allowed on portions of the South Training Areas, Doña Ana Range–North Training Areas, and McGregor Range. No hunting is allowed in the cantonment area or on Castner Range.

Hunting pressure is established by the NMDGF and the goal of their management of the mule deer herd is to provide opportunities to hunt antlered deer while maintaining healthy deer herd and habitat. Deer hunting on the South Training Areas occurs under regulations of the Texas Parks and Wildlife Department.

Hunting is allowed only during times that are compatible with the Army training and other activities and in accordance with state law. Although deer occur in the desert shrubland plant communities in the Tularosa Basin and the grasslands of the Otero Mesa, the largest numbers are found in the pinyon pine/juniper woods in the Sacramento Mountains foothills. Deer hunting on the withdrawn portion of McGregor Range is limited and consists of a special weekend hunt that takes place during the October to December timeframe. Hunting does not occur on McGregor Range every year. For example, permits were not issued during years of low deer density such as during 1989, 1990, and 1995 (NMDGF, 1997). Deer hunting on the Lincoln National Forest at the north end of McGregor Range is open to hunting per state regulations.

Pronghorn antelope are hunted in the fall. This species occurs principally on Otero Mesa although some animals frequent the Tularosa Basin. The annual hunt occurs on the Otero Mesa and takes place over one weekend in the fall. The NMDGF is responsible for managing this species and the management goal is to maintain quality recreation (large bucks to hunt) by maintaining or improving herd size and characteristics. Management goals for the pronghorn are to maintain grasslands on Otero Mesa in good to excellent ecological conditions and maintain a pronghorn population of 700 to 750 animals (BLM, 1990a).

Small game hunting for such species as quail and mourning dove also takes place on Fort Bliss. Although the distribution of small game hunters is not known, most probably hunt in the South Training Areas because of its close proximity to El Paso. Other popular small game hunting locations are around stock tanks such as Mack Tanks on McGregor Range that hold water most of the time and can attract large number of mourning doves as well as quail.

Overall, big and small game hunting on Fort Bliss is not expected to have an adverse impact on the biological resources. In addition, the implementation of the No Action Alternative would have no impact on hunting on Fort Bliss.

Sensitive Species. Sensitive species and species of concern include endangered, threatened, and other species identified by the Federal Government and the states of Texas and New Mexico. The occurrence of these species on Fort Bliss is discussed in Section 4.8.4. Also included is sensitive species habitat such as that identified for the aplomado falcon on McGregor Range. Under the No Action Alternative, survey and monitoring studies of sensitive species will continue to take place at Fort Bliss. These surveys will take place to provide assurances that Fort Bliss is in compliance with all applicable federal and state regulations regarding these species. Sensitive species surveys and monitoring would have no impact on biological resources.

Nongame Species. Up until recently, very few studies regarding nongame species, other than for sensitive species, have been conducted on Fort Bliss. Many of the nongame species studies currently underway such as inventories for amphibians, reptiles, and mammals and studies of nesting birds in various habitats are being conducted to provide the necessary description of existing conditions required to assess the environmental impacts for various projects under NEPA. Nongame species surveys and studies would have no impact on biological resources.

Wetlands. Wetlands are limited on Fort Bliss and occur in widely scattered locations. The identification of the location of all USACE jurisdictional wetlands on Fort Bliss is now in progress. The protection of wetlands has been policy at Fort Bliss for many years, and any potential impact to jurisdictional wetlands is subject to the USACE 404 Permit process. Under the multiple-use management strategy, the delineation of wetlands that may be affected by a proposed action is required as is the mitigation of the loss of any jurisdictional wetlands. Wetlands protection would have no negative impact on biological resources.

Revegetation and Erosion Control. Revegetation and control of erosion is one of the major elements of the Fort Bliss environmental resource management program. The purpose of this element is to repair lands damaged by military activities and to prevent the further degradation of soils, vegetation, and water in areas being used for military activities. Fort Bliss does not currently have a formal revegetation and erosion control plan. However, activities consistent with such a plan have taken place on Otero Mesa to reduce erosion. The plan would have no negative impact on biological resources and if it were implemented, it would likely have positive impacts due to habitat rehabilitation and protection of degraded areas from further use.

Pest Management. The *Fort Bliss Pest Management Plan,* approved in December 1997, as discussed in more detail in Section 4.12.2.6, *Pesticides*.

Fire Management. The USACASB has a fire suppression plan for the Fort Bliss Training Complex. The BLM is responsible for monitoring and suppressing all nonmilitary fires on withdrawn land and Army fee-owned land. Fort Bliss is responsible for monitoring and suppressing all fires caused by military activities on withdrawn land and army fee-owned land. In addition, the BLM may use prescribed burns with the approval of Fort Bliss.

Unique and Sensitive Areas (UASAs). UASAs such as playas, springs, arroyos, and grasslands and BLM-designated areas such as ACECs are provided some protection under current conditions (U.S. Army, 1998j). There is no potential for adverse impacts on biological resources by designating UASAs. However, these areas have the potential to be adversely or significantly adversely impacted by inadvertent or accidental military activities.

5.1.8.2 Cumulative Impacts

105 Activities in the ROI on and around Fort Bliss that add to the cumulative effects, over time, of military activities include construction and operation of a tactical target complex on McGregor Range, timber harvesting, wood collecting, and recreation activities in the Sacramento Mountains including McGregor Range, and grazing on and in the area of McGregor Range.

Vegetation. Cumulative impacts of military and nonmilitary activities on vegetation on Fort Bliss over a 10-year period is being monitored by Fort Bliss through National Aeronautics and Space Administration (NASA) LANDSAT Thematic Mapper Imagery. As indicated above, other potential sources of cumulative impacts on vegetation could occur from the USAF tactical target complex and various nonmilitary activities.

NASA LANDSAT Thematic Mapper Imagery Monitoring. Fort Bliss DOE is in the process of developing a monitoring system to assess training, grazing, and natural impacts on natural and cultural resources on Fort Bliss. Monitoring is a four-part process consisting of remote sensing reconnaissance, site inspections, plot sampling, and GIS analysis. Remote sensing reconnaissance scans the entire land base to monitor seasonal trends, detect impacts, and focus field investigations on high-priority areas. Field investigations quantify intensity of impacts on natural and cultural resources. Distribution, frequency, and intensity of impacts will be stored in a GIS database.

NASA LANDSAT Thematic Mapper imagery will be used to monitor the entire landscape of Fort Bliss at high spatial resolution to capture variability in land cover on training areas. Validation will occur through inventory and monitoring of natural and cultural resources. This capability will allow positioning of monitoring plots to provide an accurate sample of impacts on the training landscape. Additional post sampling analysis using plot data, monitoring data, and GIS themes will allow analysts to map the extent and impact of training activities on a landscape scale.

This analysis reflects the process being implemented at Fort Bliss to evaluate cumulative impacts of military training, grazing, and natural processes on training lands. To this end, Fort Bliss has acquired historical satellite imagery from 1972 to 1997. These images will be used to establish long-term trends in landscape change on Fort Bliss. For this PEIS, the data from 1986 and 1996 were used to illustrate the developing process for evaluating change in natural and man-induced change (Figure 5.1-1). Change occurred from drought (1994 and 1995 were particularly dry years) and fire (more frequent or larger fires occurred during 1989 and 1994), as well as from training activity that occurred during the ten years. The results from this analysis must be interpreted with some qualifications. The model was generated from plot data in grassland and desert shrub communities where vegetation cover ranged from 15 percent to 53 percent of the total covered area. Extrapolation of the model to other vegetation types or to vegetation cover outside of the range of the model cannot be evaluated for accuracy. Therefore, comparisons made in other vegetation types or outside of the model's range should be viewed as preliminary comparisons. The images used in the analysis represent a snapshot view of conditions for 2 days, 10 years apart, and do not represent trends in vegetation cover. Because only two observations were used, the validity of the trend analysis is not very high.

Precipitation and fires are important factors affecting vegetation cover. These factors can produce change in short and long time frames, depending on their duration and intensity. Data from precipitation monitoring indicate that during the 30 months preceding the 1986 image there was a total 33.15 inches of precipitation on WSMR, approximately 37.60 inches at Oro Grande, and 29.00 inches at EPIA. The regional average among these stations was approximately 33.25 inches during this period prior to July 1986. There were 16.69 inches of precipitation on WSMR, 27.55 inches at Oro Grande, and 16.69 inches

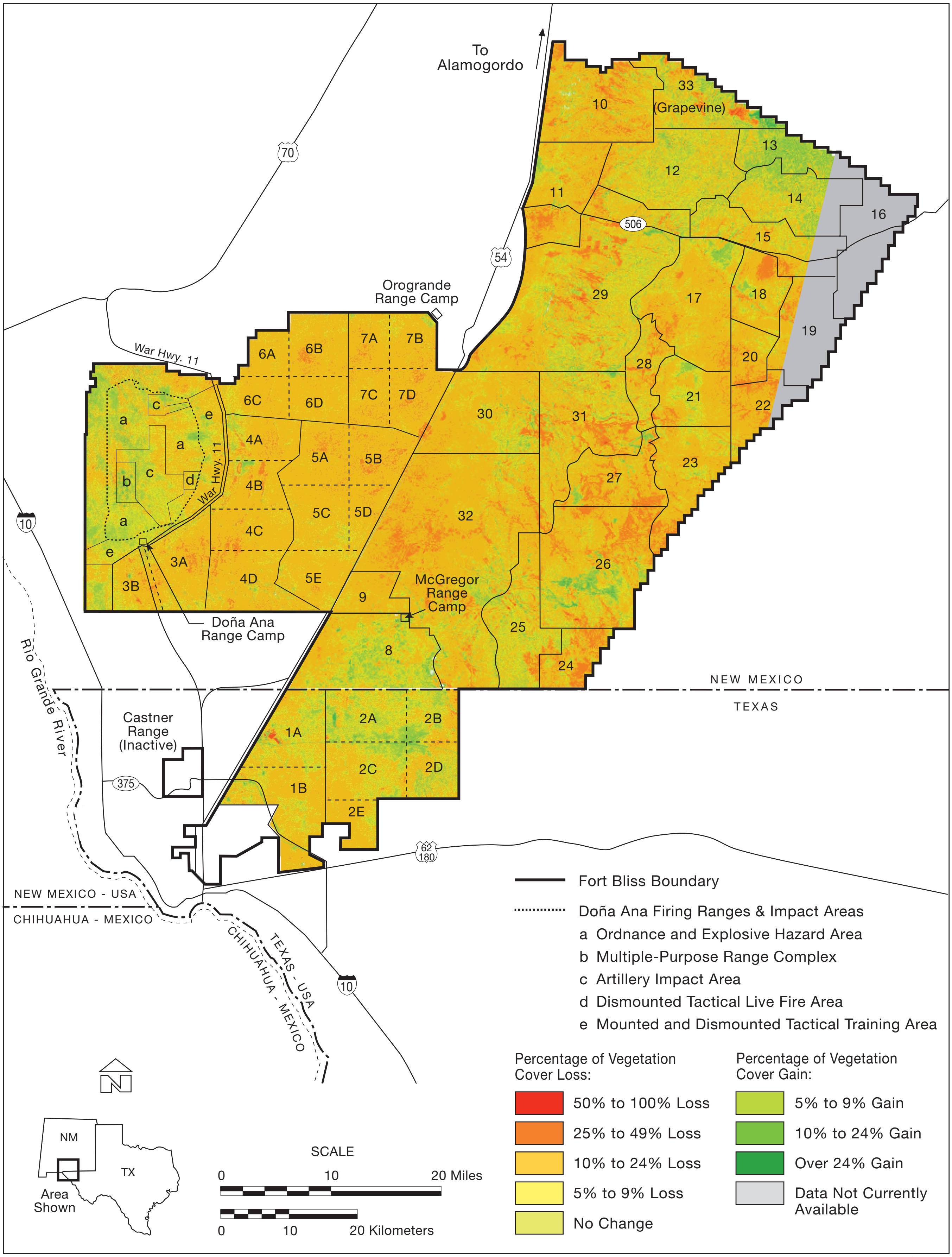


Figure 5.1-1. LANDSAT Derived Vegetation Change on Fort Bliss, 1986 to 1996.

at EPIA in the 30 months preceding the 1996 image. The average of these stations for the 30 months prior to July 1996 was 20.31 inches. Fire data indicate low fire frequency prior to the 1986 image and relatively high fire frequency prior to the 1996 image. There were significant fires in the Organ Mountains in 1993 and 1994 and on Otero Mesa in 1993 and 1994. Natural causes were responsible for 31 fires and 7 fires were attributed to man-made causes. These data suggest that vegetation cover would generally decline from 1994 to 1996 as a result of below normal precipitation and that cover would be drastically reduced in areas that were affected by fires. Results from change analysis of cover maps suggest that there is generally less vegetative cover in 1996 in all cover types than there was 1986 (Figure 5.1-2, and Table 5.1-5). Areas impacted by fire suffered greater losses in cover (e.g., conifer forests in the Organ Mountains) than relatively undisturbed areas.

These results indicate that woody vegetation at high elevations was not affected as severely by drought; most cover loss was associated with fires in these vegetation types. The most sever drought effects were at lower elevations in Mesquite coppice dune and sand scrub vegetation. Vegetation cover in grazed grasslands is lower than in ungrazed grasslands for both dates (Tables 5.1-6 and 5.1-7). Vegetation cover in Roving Sands controlled access FTX Sites is similar to vegetation cover in grazed areas (Table 5.1-8). More data are needed to assess plant cover response to drought years and moist years in desert environments; this would require analysis of long-term data sets that represent a series of wet and dry years.

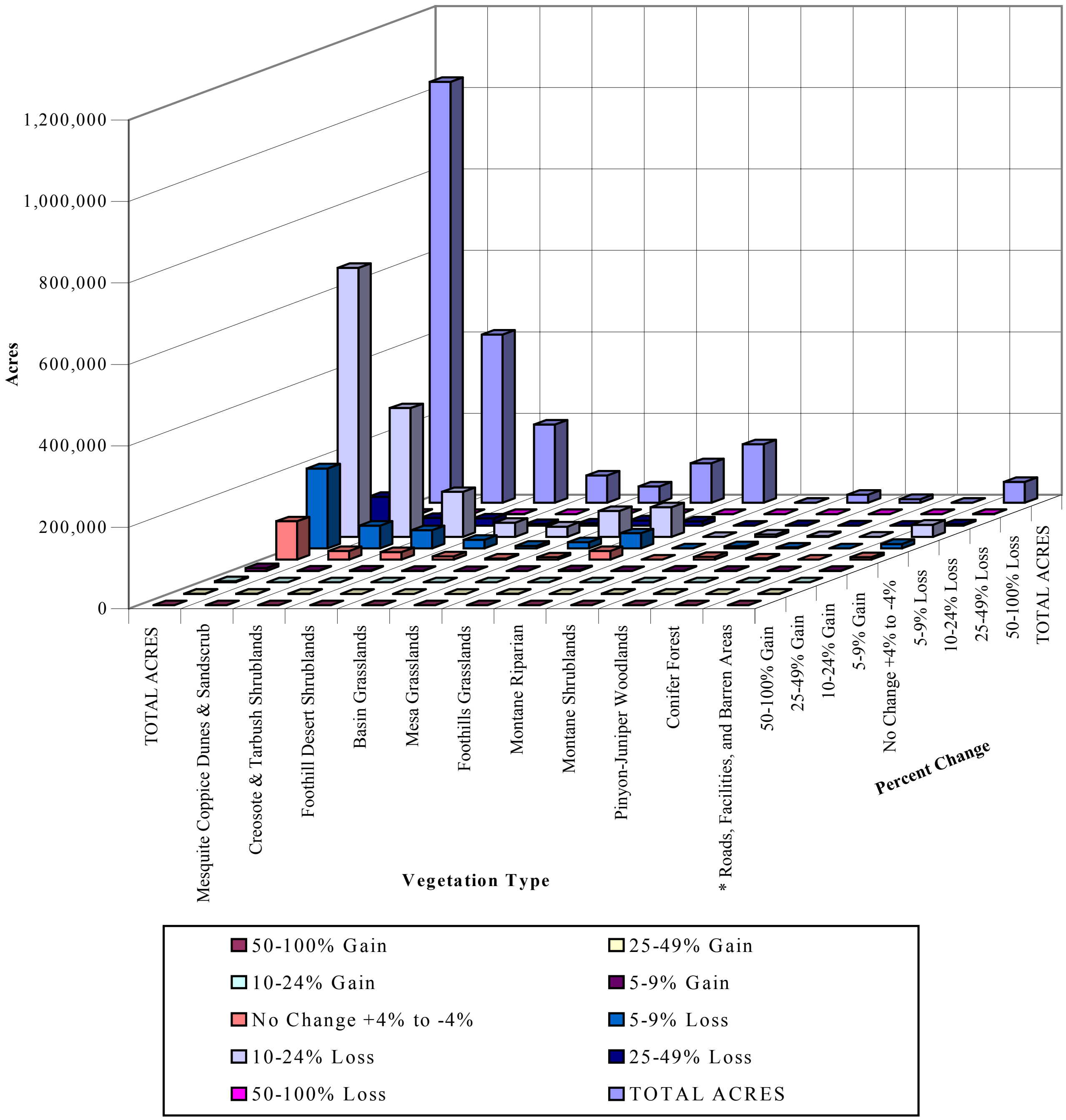
Tactical Target Complex. Under the No Action Alternative, 1,000 to 5,120 acres of vegetation would be disturbed from construction and maintenance of a new tactical target complex, from potential wildfires, inert ordnance and flare use, and from ordnance strikes (USAF, 1998). Construction of this complex on Otero Mesa would disturb grassland plant communities.

Forestry. Timber harvesting takes place on USFS lands outside Fort Bliss and this activity directly alters vegetation composition and structure. Current timber harvest strategies attempt to balance the need for wood products, wildlife production, recreation, and other land uses. For example, timber harvest methods and timing are closely evaluated and controlled to ensure that Mexican spotted owl populations and other species requiring different ages of timber stands are maintained. Cumulative effects associated with timber harvest on lands outside Fort Bliss would be negligible because no changes are anticipated in current management practices.

Forest management on Fort Bliss is restricted to wooded habitat. There is an estimated 33,358 acres of woodlands consisting of montane riparian, montane shrublands (which include small trees), and pinyon mountains. The oneseed juniper and pinyon pine forest types (mapping units 28 and 29 on Table 4.8-1) are the only forest types that occur in the Sacramento Mountains foothills on Fort Bliss (see Figure 4.8-3). These types receive low levels of forest management (e.g. cutting firewood) as specified in the *Lincoln National Forest Plan* (USFS, 1986). Forest management under the No Action Alternative would have a slightly adverse impact on vegetation due to firewood removal and, generally no impacts on wildlife and sensitive species.

Given that forestry practices on and outside Fort Bliss would have no or only negligible cumulative impacts to vegetation as well as wildlife, this source of cumulative impacts is not considered in this analysis.

Grazing. Livestock grazing occurs on 271,810 acres of McGregor Range, as well as on 18,038 acres on the Lincoln National Forest at the north end of McGregor Range (see Figure 4.1-10 for location of grazing lands on McGregor Range). Grazing on McGregor Range is administered by the BLM, while the USFS administers grazing on the Lincoln National Forest. The majority of grazing occurs in the



* Roads, Facilities, and Barren Areas: mapping unit includes vegetated areas such as disturbed natural vegetation, golf courses, parade grounds, vegetation surrounding facilities such as the El Paso Water Treatment Lagoons and McGregor, Doña Ana, and Orogrande Range Camps.

Figure 5.1-2. Changes in Percent Vegetation Cover in Ten Plant Community Types and Disturbed Ground, 1986 to 1996.

Table 5.1-5. Vegetation Cover and Dynamics on Fort Bliss, 1986 and 1996

Mapping Unit	*% Total Vegetation Cover*[1]		*Average Change*	*Mapping Unit Area Change*[3]		
	1986	*1996*		*% Area with Loss*	*No Change*	*% Area with Gain*
Mesquite Coppice Dunes and Sandscrub	34	19	-15.00%	95	5	
Creosote and Tarbush Shrublands	48	35	-13.00%	90	10	0
Foothill Desert Shrublands	61	49	-12.00%	87	12	1
Basin Grasslands	45	29	-16.00%	92	7	1
Mesa Grasslands	41	31	-10.00%	94	6	0
Foothills Grasslands	58	47	-11.00%	83	15	2
Montane Riparian	79	72	-7.00%	69	29	1
Montane Shrublands	71	65	-6.00%	57	36	7
Pinyon/Juniper Woodlands	79	75	-4.00%	49	38	12
Conifer Forest	91	82	-9.00%	72	24	4
Roads, Facilities, and Barren Areas[2]	39	28	-11.00%	83	13	4

1. Total vegetation cover is the indicator of ecological conditions used in the modeling.
2. Mapping unit includes vegetated areas such as disturbed natural vegetation, vegetation surrounding facilities such as the El Paso Water Treatment Lagoons and McGregor Range Camp.
3. The ranges indicated are 5-100% Loss, ±5% No Change, and 5- over 24% Gain as shown by Figure 5.1-1.

Table 5.1-6. Vegetation Cover and Dynamics of Grazed Areas on Fort Bliss, 1986 and 1996

Mapping Unit	*% Total Vegetation Co0 ver*[1]		*Average Change*	*Mapping Unit Area Change*[3]		
	1986	*1996*		*% Area with Loss*	*No Change*	*% Area with Gain*
Mesquite Coppice Dunes and Sandscrub	33	18	-15.00%	94	6	0
Creosote and Tarbush Shrublands	42	27	-15.00%	93	7	0
Foothill Desert Shrublands	51	41	-10.00%	81	17	2
Basin Grasslands	41	24	-17.00%	96	4	0
Mesa Grasslands	44	29	-15.00%	95	5	0
Foothills Grasslands	55	45	-10.00%	77	20	3
Montane Shrublands	65	60	-5.00%	50	42	8
Pinyon/Juniper Woodlands	70	66	-4.00%	42	48	10
Roads, Facilities, and Barren Areas[2]	41	28	-13.00%	86	12	2

1. Total vegetation cover is the indicator of ecological conditions used in the modeling.
2. Mapping unit includes vegetated areas such as disturbed natural vegetation, vegetation surrounding facilities such as the El Paso Water Treatment Lagoons and McGregor Range Camp.
3. The ranges indicated are 5-100% Loss, ±5% No Change, and 5- over 24% Gain as shown by Figure 5.1-1.

grassland plant communities on Otero Mesa, although some grazing occurs in the Chihuahuan Desert shrubland plant community types of the Tularosa Basin. See Section 4.1, *Land Use*, for more details regarding grazing on Fort Bliss. Grazing has the potential to have adverse impacts on vegetation from localized overgrazing around stock tanks and in riparian areas as described below. In addition,

Table 5.1-7. Vegetation Cover and Dynamics of Ungrazed Areas on Fort Bliss, 1986 to 1996

Mapping Unit	*% Total Vegetation Cover[1]*		*Average Change*	*Mapping Unit Area Change[3]*		
	1986	*1996*		*% Area with Loss*	*No Change*	*% Area with Gain*
Mesquite Coppice Dunes and Sandscrub	36	20	-16.00%	98	2	0
Creosote and Tarbush Shrublands	50	36	-14.00%	90	9	1
Foothill Desert Shrublands	61	49	-12.00%	90	9	1
Basin Grasslands	51	35	-16.00%	92	7	1
Mesa Grasslands	52	36	-16.00%	91	7	2
Foothills Grasslands	58	44	-14.00%	88	10	2
Montane Shrublands	74	64	-10.00%	67	25	8
Pinyon/Juniper Woodlands	75	76	1.00%	33	34	32
Roads, Facilities, and Barren Areas[2]	43	29	-14.00%	89	9	2

1. Total vegetation cover is the indicator of ecological conditions used in the modeling.
2. Mapping unit includes vegetated areas such as disturbed natural vegetation, vegetation surrounding facilities such as the El Paso Water Treatment Lagoons and McGregor Range Camp.
3. The ranges indicated are 5-100% Loss, ±5% No Change, and 5- over 24% Gain as shown by Figure 5.1-1.

Table 5.1-8. Vegetation Cover and Dynamics of Roving Sands Controlled Access Field Training Exercise Sites on Fort Bliss, 1986 to 1996

Mapping Unit	*% Total Vegetation Cover[1]*		*Average Change*	*Mapping Unit Area Change[3]*		
	1986	*1996*		*% Area with Loss*	*No Change*	*% Area with Gain*
Mesquite Coppice Dunes and Sandscrub	35	19	-16.00%	82	14	2
Creosote and Tarbush Shrublands	46	29	-17.00%	78	21	1
Basin Grasslands	44	28	-16.00%	98	2	0
Mesa Grasslands	42	27	-15.00%	92	8	0
Foothills Grasslands	49	27	-22.00%	98	2	0
Roads, Facilities, and Barren Areas[2]	39	23	-16.00%	90	8	2

1. Total vegetation cover is the indicator of ecological conditions used in the modeling.
2. Mapping unit includes vegetated areas such as disturbed natural vegetation, vegetation surrounding facilities such as the El Paso Water Treatment Lagoons and McGregor Range Camp.
3. The ranges indicated are 5-100% Loss, ±5% No Change, and 5- over 24% Gain as shown by Figure 5.1-1.

trespassing cattle have been observed in the Fillmore and Soledad canyon areas of the Organ Mountains (U.S. Army, 1998j).

Under the No Action Alternative, livestock would continue grazing the grassland plant communities on Otero Mesa, as well as in the desert shrublands plant communities mostly north of New Mexico Highway 506 (see Figure 4.1-10). In general, the grass cover on Otero Mesa is likely less than it would be with reduced or no grazing. A comparison of percent grass cover on Otero Mesa to a more lightly grazed Chihuahuan Desert grassland in Mexico showed that grass cover was 53 to 63 percent higher in Mexico (U.S. Army, 1997p; Montoya et al., 1997). According to Meyer (U.S. Army, 1997p):

> "effects of long-term and heavy grazing occurring on the mesa (Otero Mesa) are apparent. Overall low volume of grass cover, bunch grasses elevated on pedestals, few grass and forb species relative to ungrazed areas, and the ubiquitousness of such species as burrowweed (*Haplopappus* sp.), Russian thistle (*Salsola iberica)*, and snakeweed are evidence of overgrazing."

Other studies have shown that excluding livestock from grasslands has resulted in an increase in plant species diversity and percent grass canopy cover. For example, grazed grasslands in Arizona had 29.2 and 63 percent cover, and after being fenced to exclude livestock for 15 years, the percent cover was 85.3 and 85.7 percent, respectively (Brady et al., 1989). Therefore, continued grazing on McGregor Range would likely result in reduced plant species diversity, increased bare ground, and a reduction in vegetation cover compared to similar ungrazed vegetation. This possibility was verified from the preliminary results of the post-wide LANDSAT vegetation mapping, which showed that percent vegetation cover was greater in ungrazed than in grazed areas (see Tables 5.1-6 and 5.1-7). In addition, the BLM (1980) found that grass cover is less on Otero Mesa than it would be under reduced or no grazing.

105

The use of the controlled access FTX sites and military related fires are the principal Fort Bliss activities that could contribute to the cumulative effects to grasslands on Otero Mesa. The number of acres of grasslands affected by military related fires on Otero Mesa has not been determined. As discussed under NASA LANDSAT Thematic Mapper Imagery Monitoring, a preliminary assessment of fires on Fort Bliss indicated that 7 out of 38 fires, or 18 percent, were from military sources. As indicated in Section 5.1.8.1, fires have the potential to have adverse impacts on vegetation including grasslands. For this analysis, it is assumed that the number of military related fires on Otero Mesa is small compared to the number of naturally occurring fires and the impacts of military activities on grasslands at the controlled FTX sites are negligible because of the small amount of this community type affected and the subsequent recovery of vegetation at most sites. As indicated in Section 5.1.8.1, the vegetative cover at the FTX sites, which are grazed, and the surrounding grazed lands is similar. In addition, both the FTX sites and the surrounding grasslands have shown a similar decrease in vegetative cover from 1986 to 1996 (see Tables 5.1-6 and 5.1-8). Fort Bliss military-related impacts to the grasslands on Otero Mesa represents a small contribution to the cumulative impacts to this type in the ROI; and therefore, the cumulative impacts of no action on the grassland on Otero Mesa would be negligible.

Wetlands and Arroyo-riparian Drainages. Sources of cumulative impacts to wetlands and arroyo-riparian drainages (Waters of the U.S.) would be the construction of the USAF tactical target complex and grazing on McGregor Range.

Tactical Target Complex. The construction of a tactical target complex on Fort Bliss would not impact wetlands because no jurisdictional wetlands occur. The USAF selected site is on Otero Mesa. Fires from the tactical target complex would have the potential to spread to wetlands in the vicinity. The nearest wetland to either proposed site is at Mack Tanks about 2.5 miles from the lower site (see Figure 4.8-7 for the location of Mack Tanks). A fire break would be constructed around the tactical target complex and fire suppression measures would greatly minimize the potential for fires from the complex to reach this or any other wetlands. It is therefore assumed that there would be no adverse cumulative impacts to wetlands as a result of the construction of a tactical target complex.

The tactical target complex on McGregor Range would likely result in adverse cumulative impacts to arroyo-riparian drainages and swales due to construction, operation, and fires. Up to 8.7 miles of these drainages could be affected at the proposed tactical target complex if sited on Otero Mesa and 6.1 miles in the proposed tactical target complex if sited in the Tularosa Basin. This represents 0.35 percent and 0.25 percent, respectively, of Waters of the U.S. on McGregor Range. The importance of these areas as wildlife habitat has been documented (see Section 4.8) and every attempt will be made to eliminate or minimize construction activities in these drainages. Proposed road and bombing array construction drawings are not yet available so the number of acres of Waters of the U.S. that may be impacted is not known. In addition, fires on and near the alternative tactical target sites would impact additional arroyo-riparian drainages and swales that are not directly impacted by construction and operation. The magnitude of the impacts of fire on arroyo-riparian drainages and swales cannot be determined due to the lack of historic fire data and projections of the increase in fires. However, as indicated in Section 5.1.8.1, fire has the potential to result in adverse effects to vegetation in arroyo-riparian drainages and swales.

Grazing. Livestock grazing occurs only in wetlands and other Waters of the U.S. on lands on Otero Mesa and north of New Mexico Highway 506. Most wetlands occur around man-made stock tanks and in general these areas are heavily impacted by cattle. Cattle concentrate around stock tanks to obtain water, more succulent vegetation, and shade if available. Observations indicate that the herbaceous vegetation around the man-made stock tanks is very heavily grazed and bare ground is in evidence in many areas. Shrubs in these areas are also heavily grazed and some stock tanks have scattered large cottonwood trees (USAF, 1997e, f). Therefore, grazing would likely continue to have an adverse cumulative effect on these man-made wetlands on Otero Mesa. Observations of wetlands in the desert shrublands, montane shrublands, and pinyon pine/juniper woodlands north of New Mexico Highway 506 have not been made, so the impacts of grazing in wetlands in these areas is not known.

Many of the Waters of the U.S. in the grassland plant communities on Otero Mesa are broad swales that are grass dominated and appear similar to the surrounding upland areas. The impacts of grazing on these swales would be similar to that described above for vegetation. Evidence of heavy grazing in
shrub-dominated (mostly little-leaf sumac) drainages on Otero Mesa, consisting of more than 50 percent 108
of the annual vegetation growth removed and bare ground on banks due to livestock trampling, was observed (USAF, 1997a, b). Continued grazing on historically used grazing units would have cumulative adverse effects on Waters of the U.S.

The use of the controlled access FTX sites would have little or no effect on wetlands or other Waters of the U.S. because the sites are not placed near wetlands and or arroyo-riparian drainages and swales that are Waters of the U.S. Military-related fires have the potential to burn in wetlands but this potential impact is negligible given the potential for a low number of military related fires relative to natural fires
and the low number and widely dispersed distribution of wetland on Fort Bliss. Fires have burned in 105
arroyo-riparian drainages and swales but the source of these fires is not currently known. Given that the number of military fires relative to natural fires appears to be low based on available data, it is assumed that the effects of fires on these watercourses are negligible. Overall, the direct impacts of no action on wetlands and Waters of the U.S. are negligible compared to other activities in the ROI so the cumulative impacts of no action on these resources are negligible

Wildlife. The construction of a tactical target complex and grazing have the potential to result in cumulative impacts to wildlife.

Tactical Target Complex. The estimated loss of 1,000 to 5,120 acres of natural plant communities on McGregor Range as a result of a tactical target complex would have adverse cumulative impacts on wildlife. Within the proposed tactical target complex site are arroyo-riparian drainages and swales that have been shown to be important to wildlife (see Section 4.8) and as indicated above, there is a potential for an adverse cumulative impact to these drainages. Therefore, there is the potential for adverse cumulative impacts to wildlife due to the elimination and disturbance of regional wildlife habitat in upland areas and arroyo-riparian habitat.

When the tactical target complex is constructed, the number of low-level aircraft sorties would increase from about zero to 14 per day over portions of McGregor Range near the complex. Wildlife under and near the flight paths would have a greater potential to be startled. The increased exposure to noise may result in lower wildlife population levels in some areas or reduced use of some areas. As an example, fewer birds may continue to nest along the Otero Mesa escarpment and other portions of McGregor Range because of the increased frequency of aircraft overflights. Therefore, the operation of the tactical target complex has the potential to have adverse cumulative impacts on wildlife in the region due to noise.

Grazing. Studies have shown that grazing can affect wildlife species richness and abundance. Jones (1981) sampled lizards in seven lightly and seven heavily grazed desert habitats in Arizona. Except for the Sonoran desert shrublands, all lightly grazed sites had greater lizard species richness and abundance then heavily grazed sites.

Grazing has the potential to have cumulative impacts on birds. Studies of breeding birds in southeastern Arizona have shown that the lark sparrow and horned lark are more common in grazed areas while the grasshopper and Cassin's sparrows are much more common in lightly grazed or ungrazed sites (Bock and Webb, 1984). Other species that respond positively to grazing are the common nighthawk, northern mockingbird, and black-throated sparrow. Other species that responded negatively to grazing were the Savannah and Henslow's sparrows (Bock et al., 1993). As indicated in Section 4.8.4.4, grazing on Otero Mesa may be responsible for reduced populations on meadow larks compared to ungrazed grasslands. Raptors such as the prairie falcon, American kestrel, northern harrier, various species of *Buteos*, and the great horned owl have been observed to forage more frequently in open areas during the summer. Studies of the red-tailed hawk and American kestrel showed that they tended to nest more frequently in grazed than ungrazed locations (Kochert, 1989). In a summary of the impacts of grazing on birds of prey, Bock et al. (1993) determined that raptors that probably respond positively to grazing include the golden eagle and burrowing owl while the northern harrier, Swainson's hawk, and short-eared owl may show a negative response to grazing. Studies of the Baird's sparrow on Fort Bliss have demonstrated the importance of ungrazed grasslands to this sensitive wintering species (see Section 4.8 for more details) (U.S. Army, 1997t) and Klute et al. (1997) determined that ungrazed grasslands contained significantly more seeds used by wintering grassland birds then grazed fields.

Studies of small mammals in grazed and ungrazed grasslands in southeastern Arizona showed that rodents were more abundant in ungrazed areas. The hispid pocket mouse, western harvest mouse, white-footed mouse, grasshopper mouse, and hispid cotton rat were trapped significantly more often in ungrazed then grazed habitats. Merriam's kangaroo rat was the only species recorded more from grazed habitats. The silky pocket mouse and deer mouse were equally abundant in grazed and ungrazed habitats (Bock et al., 1984). In a study on the effects of grazing on small mammals in semiarid shrub-grassland habitats in south-central Utah, ungrazed habitats had 50 percent greater species richness and 80 percent higher abundance than grazed sites (Rosenstock, 1996).

Therefore, grazing on McGregor Range has an adverse cumulative effect on reptile and small mammal populations due to potential lower species richness and abundance when compared to ungrazed areas. Continued grazing would have mixed effects on birds in that some species would benefit while populations of other species would be reduced as a result of grazing. However, grazing would have an
109 overall adverse cumulative impact on birds because it could result in the reduction of important species such as meadowlarks which are an important food source for the northern aplomado falcon (see Section 4.8.4) and a reduction in the quality of nesting and wintering grassland habitat for species such as the Baird's, grasshopper, and Cassin's sparrows.

105 The cumulative impacts of no action on wildlife are negligible because: (1) the military use of the FTX sites occurs for only 10 to 13 days each year, (2) the amount of habitat disturbed at the FTX sites is small and wildlife would use this habitat during recovery (see discussion of impacts of FTX on wildlife in

Section 5.1.8.1), and (3) the number of military fires in the grasslands of Otero Mesa are likely small (see discussion of fires in Section 5.1.8.2).

Sensitive Species. As with the other biological resources, the construction and operation of the tactical target complex on Fort Bliss and grazing have the potential to result in cumulative impacts to sensitive species.

Tactical Target Complex. The loggerhead shrike was the only sensitive species observed during biological surveys on the two proposed alternative tactical target complexes (USAF, 1997a, b). Surveys were conducted at these two locations for the grama grass cactus, night blooming cereus, mountain plover, and western burrowing owl and none were observed (USAF 1997e, f, k). Raptor surveys were also conducted at and near the two sites and no sensitive species were recorded from the sites although a ferruginous hawk was observed flying over the Otero Mesa escarpment about 3.5 miles southeast of the Tularosa Basin complex site on March 28, 1997, and an unconfirmed immature, aplomado falcon was observed below the Otero Mesa escarpment on May 23, 1997, about 3 miles southeast of the Tularosa Basin site (USAF 1997c, d).

The loss of 5,000 acres of grassland habitat on the site selected on Otero Mesa represents a loss of Texas horned lizard and loggerhead shrike habitat, foraging habitat for wintering and migrating ferruginous hawks, and potential aplomado falcon and mountain plover habitat.

Grazing. Grazing, as fire, can have positive, negative, or neutral effects on sensitive species. Sensitive species that may benefit from grazing are the ferruginous hawk, mountain plover, burrowing owl, loggerhead shrike, and black-tailed prairie dog (Bock et al., 1993; Lehman and Allendorf, 1987; Knopf and Miller, 1994; Miller and Knopf, 1993; Saab et al., 1995; Sager, 1996). Sensitive species that may be negatively impacted by continued grazing practices on McGregor Range are the aplomado falcon and Baird's sparrow (U.S. Army, 1997p, t). Species that may have no response to grazing or the response is unknown are the grama grass cactus, Texas horned lizard, and bald eagle (Fair and Henke, 1997; Jones, 1981). Sensitive species such as the peregrine falcon, Mexican spotted owl, willow flycatcher, Bells' vireo, and varied bunting are uncommon and irregular migrants or wintering birds on grazed lands on McGregor Range and grazing would not affect these species. Therefore, livestock grazing on McGregor Range may have a positive cumulative impact on some sensitive species and adverse cumulative impacts on others such as potential aplomado falcon habitat.

Grazing by trespassing cattle in Fillmore Canyon in the Organ Mountains had a negative impact on the Organ Mountain evening primrose, which is a sensitive plant species that grows in this canyon. In 1996, many plants in the study plots throughout the canyon were badly damaged by cattle. Grazing from trespass cattle was reduced in 1997, and most of the plants impacted in 1996 have recovered (U.S. Army, 1998k).

The No Action Alternative is not expected to result in cumulative impacts to sensitive species because, as
shown in Section 5.1.8.1, the FTX sites have a negligible impact on sensitive species and fire has the 16
potential to have positive, neutral, or negative impacts on sensitive species. Fire caused by military 105
activities appears to be less frequent than natural fires (see Section 5.1.8.2).

5.1.9 Cultural Resources

Under the No Action Alternative, the proposed RPMP (including the ICRMP and other supporting documents) would not be implemented and cultural resource management at Fort Bliss would continue to take place on a project-by-project basis outside the framework of programmatic agreements and without reference to the mission imperative. Fort Bliss would continue to operate under the 1982 HPP, the first such plan developed for a specific installation. The effects of mission activities on cultural resources would continue to be addressed by the application of Section 106 of the NHPA in response to individual undertakings. Under this alternative, consultation with interested Native American tribal governments as required by federal law would also take place on a project-by-project basis. Likewise, the identification, documentation, and evaluation of architectural resources would be completed in response to both of these undertakings.

In preparing this PEIS, the Army is complying with AR 200-4, which encompasses compliance with NEPA, NHPA, and associated federal regulations (36 CFR 60.4, 36 CFR 800) that require impacts to cultural resources from federal undertakings be taken into consideration as part of the decision-making process. NHPA requires that federal agencies consult with the SHPO and the ACHP before any actions are taken. This process also requires that concerns of interested parties be considered.

The Section 106 NHPA review process for Fort Bliss consists of consultation with the Texas or Mexico SHPO, as appropriate, cultural resource inventory (site identification), evaluation of each cultural resource's eligibility for listing in the NRHP, determination of effect to the resource from the undertaking, and avoidance or mitigation of impacts. Fort Bliss has consulted with the Texas and New Mexico SHPOs to develop procedures to expedite the process.

Impacts to cultural resources are typically assessed by: (1) identifying the nature and location of all elements of the proposed action and alternatives; (2) comparing those locations with identified cultural resources, sensitive areas, and surveyed locations; (3) determining the known or potential significance of cultural resources that could be affected; and (4) assessing the extent and intensity of the effects.

The impact assessment process for cultural resources centers on the concept of significance. Various federal laws and regulations provide protection to cultural resources that are significant. The NHPA provides the greatest protection to significant cultural resources, i.e., those that are eligible for nomination to the NRHP (see discussion of the NHPA in Section 4.9). In addition, U.S. Army Pamphlet 200-4 provides guidance for implementation of Army policy regarding compliance with all laws and regulations associated with cultural resources management. A summary of NRHP eligibility for archaeological and architectural cultural resources in the areas affected by the proposed action was presented in Section 4.9.

For this PEIS, impact analysis for cultural resources has employed guidelines and standards set forth in the Section 106 process defined under the NHPA and cultural resource management procedures at Fort Bliss. The Section 106 process requires identifying significant cultural resources potentially affected by a federal action, determining the effect of that action, and implementing measures to avoid, reduce, or otherwise mitigate those effects.

An action results in adverse effects to a cultural resource eligible for nomination to the NRHP when it alters the resource's characteristics, including relevant features of its environment or use, in such a way that it no longer qualifies for inclusion in the NRHP (36 CFR 800.9[b]). Potential adverse effects could include the following:

- Physical destruction, damage, or alteration of all or part of the property;

- Isolation of the property from, or alteration of the character of, the property's setting, when that character contributes to the property's qualification for the NRHP;

- Introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting if setting is integral to the property's significance;

- Neglect of a property resulting in its deterioration or destruction; and
- Transfer, lease, or sale of the property if this alters land use or protection for a resource.

Although all effects whether beneficial, of no effect, or adverse are evaluated, only adverse effects are mitigated under Section 106 of the NHPA.

General Sources of Impacts. Potential impacts to NRHP-eligible archaeological and architectural resources, traditional cultural resources; and historic landscapes on Fort Bliss can be categorized according to the source of the impact. Potential sources of impacts that were considered for this PEIS include:

- Ground disturbance, including erosion, resulting from:
  - Military actions (e.g., construction, operation, and maintenance of facilities; vehicle maneuvers; missile testing, targeting, and training; use of drop zones; small arms, gunnery and artillery activities; ordnance delivery; and firefighting), and
  - Nonmilitary actions such as grazing and recreation;
- Noise, vibration and visual impacts resulting from military and nonmilitary construction, operations, or maintenance;
- Access-related impacts resulting in increased vandalism due to improved access; and
- Changes in land status that result in reduced legal or *de facto* protection for significant cultural resources.

These potential sources of impacts to cultural resources will first be described in general under the No Action Alternative. However, they apply to more than one alternative. Specific impacts to cultural resources caused by the No Action Alternative are also discussed.

5.1.9.1 Main Cantonment Area and Fort Bliss Training Complex

Cultural resources may be primarily affected by mission activities on the Fort Bliss Training Complex and by facility construction or demolition in the Main Cantonment Area.

Mission Activities. Under the No Action Alternative, little change in the type or frequency of missions would occur on the Fort Bliss Training Complex; therefore, existing land use would be relatively unchanged. Missile launch events are likely to be infrequent. Under sustained mobilization, up to 8,000 additional troops would be housed at the range camps, and additional individual and unit training activities would occur at the ranges. Training would increase primarily in the South Training Areas, in the Doña Ana Range–North Training Areas, and in the south part of McGregor Range. Military use would decrease the availability of these areas for recreation with its potential to affect cultural resources. Off-road training in the Doña Ana Range–North Training Areas and South Training Areas would continue at the present level.

Ground Disturbance. Any of the potentially ground-disturbing activities that occur on Fort Bliss can also potentially impact any class of cultural resources. These activities could include: construction, maintenance and operation of facilities, vehicle maneuvers and associated activities; missile testing, targeting, and training; use of drop zones; small arms, gunnery and artillery activities; ordnance delivery; firefighting; and nonmilitary actions such as grazing and recreation. This variety of potentially ground-disturbing activities is geographically limited. For example, ordnance delivery only occurs on a target; ORV maneuvers occur on approved terrain in specific locations on the South Training Areas, Doña Ana Range–North Training Areas, and TA 8 in the southern part of McGregor Range; and grazing is limited to permitted areas.

Ground disturbance can affect the integrity of a cultural resource, which may then directly affect its ability to convey significant scientific information. Because integrity comprises a key criterion for determining a cultural resource's eligibility for nomination to the NRHP, ground disturbance is a particularly important source of impact. Ground disturbance can cause direct effects to cultural resources, such as breakage or other damage to artifacts and features, or can disturb their physical integrity by moving them from their original location. Ground disturbance can also result in indirect effects, such as erosion caused by vehicle maneuvers, that leads to damage to a cultural resource.

Erosion is a natural and ongoing geomorphological process that can significantly alter the archaeological record. The rate of erosion is not uniform, as it is affected by a number of interdependent variables, including soil type, vegetation, slope and precipitation. Because of the differences in erosion rates, cultural resources in some areas on Fort Bliss are more susceptible to erosion than others. When the susceptibility to erosion is increased as a result of ongoing or planned activities on Fort Bliss, that is of specific concern in analyzing impacts for each alternative. For example, some activities currently conducted on the training complex can cause increased erosion by breaking the natural protective surface crust or by reducing vegetation cover. These processes have been noted by archaeologists working on Fort Bliss. For example, on the southern training areas of Fort Bliss south of McGregor Range, and the Doña Ana Range–North Training Areas west of McGregor Range, tracked and wheeled vehicles were one source of damage to the ground surface, creating ruts up to 8 inches deep in-place (Whalen, 1977; Skelton et al., 1981).

Wind and water erosion can also cause significant mixing and movement of archaeological materials. Because of the specific soils on Fort Bliss, the climate, and the sparse vegetation, any military activity that reduces vegetation cover is likely to accelerate erosion. Nonmilitary activities on Fort Bliss can also increase erosion. For example, grazing occurs in some areas on Fort Bliss and can contribute to reduced vegetation and erosion (Trimble and Mendel, 1995). The Fort Bliss cultural resources database indicates that hundreds of cultural resources have been affected by erosion. The erosion potential of soils at Fort Bliss is discussed in Section 4.5.6.

Vehicle Maneuvers and Related Activities. Tracked vehicles, wheeled vehicles, foot traffic, trenches, trash disposal pits, and bulldozed tank emplacements all have the potential to adversely affect cultural resources through ground disturbance. Training activities such as tracked and wheeled vehicle maneuvering, emplacement excavation, and bivouacs constitute the "single most destructive source of adverse military impact on the prehistoric and historic resources" according to observations made during one archaeological survey of McGregor Range (Beckes et al., 1977). The Fort Bliss cultural resource database indicates that hundreds of prehistoric archaeological sites have observable damage from wheeled and tracked vehicles.

Human trampling of archaeological remains, especially in sand and loose soil, was experimentally determined to cause substantial displacement of objects (Gifford-Gonzalez et al., 1985). Besides displacement, human trampling can damage stone tools (Pryor, 1988). Both displacement and damage can affect cultural resources significance.

Missile Training, Targeting, and Testing. Missile training and system testing constitutes a large part of the activities undertaken on Fort Bliss. These activities generally involve the firing of missiles from prepared positions at target drones or down range, sometimes onto WSMR. The impact of missile fragments and target drone debris falling to the ground has the potential to impact all types of cultural resources. Generally, however, the fragments are small and are unlikely to cause damage. Larger fragments, intact missiles, or target drones do occasionally fall on archaeological sites. One archaeological survey of McGregor Range reported that test firing of surface-to-air missiles during the 1970s had little visible effect on cultural resources, except for the impact of heavy Nike boosters and the required activities of missile debris retrieval personnel (Beckes et al., 1977). The chance of larger fragments falling onto a cultural resource is small due to the infrequency of missile fragments and drone debris of this size.

Use of Drop and Landing Zones. Several small drop and landing zones are on the Doña Ana and McGregor ranges. No specific observations relating to impacts to cultural resources are available for Fort Bliss.

Small Arms, Gunnery, and Artillery Use. An archaeological survey of McGregor Range reported that the surface firing of 20mm, Vulcan, and 40mm anti-aircraft fire "badly disturbs archaeological sites within the firing arc" (Beckes et al., 1977).

More recently, a survey on the Doña Ana Range–North Training Areas reported an area used as an artillery impact area from the 1940s through the 1970s had craters 3-to-4 feet in diameter on almost all the sites (U.S. Army, 1995h).

Ordnance Delivery Impacts. A small area in the northern portion of McGregor Range is used as a Class C bombing target range. The only ordnance used on this range is inert. Inert ordnance of this size causes about 4 square feet of damage to the ground. Repeated ordnance delivery can cause considerable ground disturbance near targets. Observations made at other ranges using nonexplosive ordnance (Peter, 1988) indicate that the greatest amount of damage occurs within 300 feet of a target (or about 6.5 acres). Less damage occurs between 300 and 1,000 feet of a target (i.e., in an area smaller than 75 acres). Only sporadic instances of ground disturbance were observed at these ranges more than 1,000 feet from a target.

Noise, Vibrations, and Visual Intrusions. Vibration effects to cultural resources on McGregor Range can originate from a variety of sources, including ground sources such as construction and blasting, as well as military overflights. McGregor Range is currently overflown by military aircraft, but overflights are infrequent and generally at a high altitude. No supersonic flights are allowed over McGregor Range.

Archaeological resources are unlikely to experience adverse effects from aircraft overflight on McGregor Range. No data exist that would indicate that surface artifact scatters and subsurface archaeological deposits are affected by vibrations resulting from subsonic aircraft overflight.

However, architectural resources have been shown to be susceptible to impacts from vibrations, depending on a number of factors (cf. King, 1987; Konon and Schuring, 1985; Nichols et al., 1971; Richart and Woods, 1970; Siskind et al., 1980). Studies have established that subsonic noise-related vibration damage to structures, even historic buildings, requires high decibel levels generated at close proximity to the structure and in a low frequency range (USFS, 1992; cf. USAF, 1983, 1988; cf. Sutherland, 1990). Aircraft must generate at least 120 dB at a distance of no more than 150 feet to potentially result in structural damage (USAF, 1988) and, even at 130 dB, structural damage is unlikely.

Studies conducted by the USAF at a prehistoric standing adobe structural remnant in Arizona evaluated the impact of low-level subsonic, B-52, and fighter aircraft overflights of the area. This study concluded that such overflights had no adverse effect (USAF, 1988). Similarly, the probability of vibration damage to buildings from low-level subsonic airplane flights is very low (less than 0.3 percent). This probability applies even to fragile, poorly constructed wood-frame buildings. Vibration studies at the museum building with adobe and beam construction at White Sands National Monument indicate that "the general continuous induced vibrations from highway traffic and jet aircraft in the normal takeoff pattern are probably causing no detrimental structural effects to the building" (King et al., 1988), but the authors recommend maintaining a minimum distance of 200 feet from "irreplaceable adobe-masonry structures" and adobe artifacts within.

There is evidence on both sides of the issue of the effects of helicopter overflight on architectural resources. Although noise and vibrations from helicopters can be 30 to 40 times higher than ambient levels, as compared to a high of 60 times ambient for low-flying jet aircraft (King at al., 1988), the duration of noise and vibration is considerably longer from helicopter overflight. Extremely close and low overflights (50 feet) by heavy (more than 20,000 pounds) helicopters have a high probability of damaging architectural resources (Sutherland, 1990). Howver, close approach helicopter flights of 300 feet have not been demonstrated to damage archaeological architectural structures (U.S. Army, 1988).

The effects of noise and visual intrusions on cultural resources may also be related to setting. Noise that affects setting may be caused by construction and maintenance, machines, and aircraft. To be adversely affected, the setting of a cultural resource must be an integral part of the characteristics that qualify that resource for listing in or eligibility to the NRHP. Because of modern development, this is often not the case for significant cultural resources. Even in rural areas, noise intrusions from vehicles and machinery may create a noise environment inconsistent with the original setting of the cultural resources. If, however, the audible and visible aspects of the setting are fundamental to the resource's significance, audible or visual intrusions sufficient to alter the setting can adversely affect the cultural resource. The nature and magnitude of the impacts depend upon the characteristics of the affected cultural resource, the amount by which the sound level exceeds baseline levels, the other types of noise sources in the vicinity of the cultural resource, and the frequency at which people visit the resource.

Noise and visual impacts may be of less importance to resources whose NRHP eligibility rests primarily on their scientific importance, such as archaeological sites. However, for cultural resources where integrity of setting is an important significance criterion, such as traditional cultural resources and historic landscapes, changes in setting can affect the resource's NRHP eligibility. Actions that could potentially impact a resource's setting include: the addition of new roads, buildings, or features; removal of fences and other features; changes in native vegetation; or changes in land use out of character with traditional uses (e.g., recreation). One historic landscape has been identified on McGregor Range, and the potential exists for others. There are no architectural or archaeological resources for which setting has been defined as a characteristic essential to the resource's NRHP eligibility.

Audible intrusions could also have potentially adverse impacts to the setting of certain traditional cultural resources. For example, traditional ceremonies and rituals by Native Americans may depend in part on isolation, solitude, or silence. An aircraft flying overhead, even at high altitudes, could be deemed an auditory or visual intrusion if it occurs during a ceremony or at another inappropriate time. Native American groups with historic ties to Fort Bliss, the Mescalero Apache and the Tigua, have not identified specific traditional cultural resources on the installation.

Access. Access to cultural resources can result in impacts to cultural resources. Vandalism often affects the types of cultural resources (e.g., historic buildings, large pueblos, rockshelters, or rock art) most likely to be determined eligible for listing on the NRHP, because these are typically the most visible cultural resources. When these resources are located near roads, they become even more vulnerable to vandalism.

In a study of vandalism on archaeological sites in Colorado (Nickens et al., 1981), proximity to unpaved access roads was a predictor for rates of vandalism. Vandalism has been noted during a few archaeological investigations on Fort Bliss. In a report on the caves and rockshelters of the southern Hueco Mountains on Fort Bliss, Alvarez and Leach (1997) report pot-hunting (holes with associated back dirt), modern refuse (both military and civilian), and graffiti. Architectural resources like historic buildings and structures could be impacted by use as campsites (increasing fire danger), by recreational target shooting, military target shootings, inadvertent use as assault training sites, graffiti, trash accumulation, and salvage of materials from the structure. The Fort Bliss cultural resource database indicates that more than 100 prehistoric archaeological sites have observable vandalism.

Awareness of the possibility for adverse impacts by vandalism has fostered a number of in-depth studies, including Williams (1978), Lyneis et al. (1980), Lightfoot and Francis (1978), Reid (1979), Warren et al. (1980), and Scott (1980). These studies indicate that increased vandalism could affect the kinds of cultural resources most likely to be determined eligible for the NRHP such as historic buildings and structures, large prehistoric archaeological sites, rock shelters, or rock art because they are generally more visible than isolated artifacts in small artifact scatters.

Some of the sites, in particular Escondido Pueblo, have been seriously vandalized. Numerous pits and trenches were noted in the 1970s (Beckes et al., 1977).

Purposely destructive actions to archaeological sites, such as “pot-hunting” (unauthorized excavations and artifact theft), defacement, and illegal ORV use, are the most destructive adverse impacts to cultural resources that can be linked to access.

Fire. Fire can cause major damage to various types of cultural resources, and activities that significantly increase fire risk may have an adverse effect on the resources. Range fires on Fort Bliss can result from weapons firing in the impact areas and SDZs and from various activities within the training areas. Sometimes, nearly as destructive as the range fire itself, are the necessary and unavoidable fire suppression efforts. Fires can also result from the maintenance and repair of buildings. Vandalism of buildings might also increase fire risk.

The effects of fire on historic structures can be devastating, depending on the nature of the fire and the structure. Impacts can range from minor smoke and water damage to total destruction.

The effect of fire on archaeological resources is generally minor. An experimental study undertaken at the Materials and Ecological Testing Laboratory, Western Archeological and Conservation Center of the NPS, showed that common lithic materials do not undergo significant changes even when heated in a furnace (Bennett and Kunzman, 1986). Other studies indicate that for many common artifact materials, no significant effects occur unless the temperature of the fire exceeds 1,000°F (U.S. Army, 1989b). Generally speaking, grass fires do not generate the temperatures or last long enough to alter most archaeological artifacts unless they involve ground disturbance. On the other hand, the effects of fires in forests (such as exist in portions of the Doña Ana Range–North Training Areas and McGregor Range), which can burn hotter and longer, can cause more damage, including color changes to ceramics and lithics and spalling of lithic artifacts.

More potentially damaging can be the fire-fighting activities themselves. In particular, the bulldozing of fire lines can cause significant damage to archaeological resources (U.S. Army, 1989b). Other fire-fighting activities such as the use of flame retardant chemicals have the potential to alter or destroy archaeological residues such as charcoal, pollen, and food residues. Slurry drops by fire bombers can harm rock art sites (Marshall, 1998).

Recreation. Unauthorized off-road recreation in portions of Fort Bliss can lead to inadvertent disturbance to cultural resources, particularly archaeological sites.

Grazing. Nonmilitary activities, in particular stock grazing, can also cause a significant amount of ground disturbance, particularly in erosion-prone areas (Nielsen, 1991; Shea and Klenck, 1993). Portions of McGregor Range are currently used for grazing by the BLM. Studies in areas similar to McGregor Range have shown that reduction of the vegetation by grazing causes significant erosion (Trimble and Mendel, 1995). Cattle also break the surface crust with their hooves, create trails to and from watering points, and remove vegetation in wallows. These activities can also damage cultural resources. Artifacts in grazed areas are more likely to be broken and displaced than in ungrazed areas because of trampling.

Facility Construction and Demolition. Under the No Action Alternative, facility construction would consist of new construction, facility renovation or rehabilitation, and infrastructure improvements such as roads. Programs include construction of new family housing in several areas, and mission-related construction in the main cantonment, at Biggs AAF, and WBAMC. Facility and infrastructure construction activities that could potentially impact cultural resources under this alternative include: foundation or trench excavation, grading or filling; asphalt removal; heavy machinery movement; soil compaction; and the renovation of historic buildings or facilities. New structures or additions to structures whose designs are not compatible with existing historic buildings within the main cantonment could also be considered an adverse effect. Any of these activities could adversely affect existing cultural resources in areas that have not been previously cleared for renovation or construction by the Fort Bliss DOE.

Under the No Action Alternative, facility demolition would include NRHP-eligible family housing and barracks more than 50 years old, as well as other facilities in the main cantonment, Logan Heights, WBAMC, McGregor Range Camp, and Biggs AAF. Facility and building demolition activities that could potentially adversely affect cultural resources under this alternative include demolition of historic buildings or facilities; trench excavation, grading, or filling; asphalt removal; heavy machinery movement; and soil compaction.

Alteration or Demolition of Buildings. Buildings and other structures that are listed in or eligible for nomination to the NRHP, either individually or as contributing members to a district, can be adversely affected by demolition or by certain types of alteration or renovation. Adverse effects can be avoided, reduced, or eliminated through a variety of mitigation measures.

Environmental Resource Management. Activities undertaken as part of natural resource management procedures that have the potential to impact cultural resources, relate to fire and soil management practices. Fire management practices, unless they involve ground disturbance or use of fire retardants from aircraft, have the potential to damage rock art sites. Potential damage to cultural resources from natural resource management is minimized and or avoided through coordination of the two management programs.

Real Estate Actions. According to 36 CFR 800.9, adverse effects on historic properties may include transfer, lease, or sale of the property, except when adequate restrictions or conditions are included to ensure preservation of the property's significant features. If the historic property is transferred from one federal agency to another, this is not in itself an undertaking that would have adverse effects because the resource is still managed under the NHPA. However, the transfer may lead to other undertakings or activities that could adversely affect the resource. For example, improved access could potentially increase the risk of vandalism. Under the No Action Alternative, existing leases, permits, licenses, and ROWs would continue through the contracted periods. A program for cleanup of the Castner Range would continue with the future use or disposition of the lands undecided. It is not anticipated that real estate actions under the No Action Alternative would have an adverse effect on cultural resources.

5.1.9.2 Cumulative Impacts

Past, present, and reasonably foreseeable future actions in the ROI that may occur independent of the activities on Fort Bliss could contribute to cumulative impacts on cultural resources on Fort Bliss or in the surrounding area. The actions considered for the analysis of cumulative effects include:

- Ongoing and projected military activities in the ROI, including WSMR and HAFB; and
- Nonmilitary activities and plans, including resource management and planning by the BLM, USFS, states, and counties.

While some of these various actions could affect cultural resources in southern New Mexico and West Texas, it is unlikely that the impacts associated with the No Action Alternative would affect or be affected by most of them.

The development of a USAF tactical target complex for use by the GAF (USAF, 1998) could adversely affect archaeological resources on McGregor Range. The USAF, in consultation with the ACHP, the New Mexico SHPO, and Fort Bliss will comply with Section 106 of the NHPA regarding appropriate mitigation for resources potentially affected by USAF actions on the range. Fort Bliss also has established MOUs with the USFS and the BLM regarding the treatment of cultural resources on portions of McGregor Range.

The establishment and use of a tactical target complex on McGregor Range could result in adverse impacts to archaeological resources. The USAF-selected site on Otero Mesa contains 22 identified sites. Of these, nine sites are considered eligible for listing on the NRHP or have undetermined eligibility, while 13 are considered ineligible (USAF, 1998). Depending on the specific placement of targets within the impact area, none, some, or all of the cultural resources present could be impacted. Only inert bombs will be used at the new target complex and potential impacts to cultural resources could be similar to those discussed for the existing Class C McGregor bombing target. No historic architectural resources or Native American TCPs have been identified within the Otero Mesa site (USAF, 1998).

5.1.10 Noise

The noise analysis considers A-weighted and C-weighted noise resulting from military operations, transportation and construction activities, aviation, and the impulsive noise resulting from the use of high explosives in ordnance. Additional specific information on noise and its assessment methods is presented in Section 4.10 and Appendix G, *(Noise Analysis)*.

5.1.10.1 Main Cantonment Area and Fort Bliss Training Complex

For the No Action Alternative, those activities that have the potential to create noise impacts are addressed in each of the major project-related categories identified below.

Mission Activities. On the Main Cantonment Area of Fort Bliss and at Biggs AAF, while ongoing mission activity has the potential to create some noise, it is usually intermittent and transient with little ongoing or long-term impact. However, if full mobilization were to occur, aviation-related noise impacts would occur at Biggs AAF during the airlift phase of operations. Full mobilization is estimated to require the throughput of 72 C-5A and 8 C-141 aircraft within a 72-hour period. This means that on average, there would be 24 C-5A arrivals and departures and approximately 3 C-141 arrivals and departures per 24-hour period.

Although this is a unique situation, and does not represent normal or routine operational activity at Biggs AAF, these additive operational levels were added to normal daily average operations to assess the impact that would be experienced during that brief time period. Table 5.1-9 reflects the change in acres of land exposed to Noise Zone II and III noise levels. The Noise Zone II and III contours associated with this surge requirement are shown in Figure 5.1-3.

Table 5.1-9. Noise Level Exposure under Full Mobilization

Noise Zone	*Sound Level*	*Acres of Land Exposed Under Current Operations*	*Acres of Land Exposed Under Surge*	*Change*
II	L_{dn} 65-75	2,153.7	7,773.0	+ 361%
III	L_{dn} > 75	706.5	2,110.9	+ 299%
Total Area Exposed to L_{dn} 65 or Greater		*2,860.2*	*9,883.9*	*+ 345%*

Source: USAF, 1990a, b.

To further assess the changed noise levels associated with this surge in aircraft operations, selected points along the 65 and 75 L_{dn} contours under normal operations were designated for specific point analysis. Under the surge, the noise levels at these points increased from a high of 11 dBA northeast of the field to a low of 0.90 dBA southwest of the field (USAF, 1990a, b). However, it should be noted that even under these surge operations, which were additive to normal operations, that all portions of the L_{dn} 65 contour (Noise Zone II) remained within the installation boundaries.

Other mission activities with the potential to create noise on the ranges involve a continuation of ongoing activities in the training areas, and continued missile firings. However, these specific activities are sporadic, highly transient, and of relatively short duration. Therefore, aviation-created noise on the range is considered to be the dominant noise source in that area, and no substantive changes are planned for these activities under this alternative. Aviation-related noise on the ranges as described in Section 4.10 is estimated to continue at present levels. Noise levels currently range from a uniformly distributed noise level of L_{dnmr} 40 to L_{dnmr} 49 (Lucas and Calamia, 1994). Furthermore, all of these noise levels remain within the confines of the restricted airspace. Since even a doubling of operations would only result in a calculated increase of 3 dBA, noise on the ranges is not considered a major factor under this alternative. Impulsive noise resulting from the use of ordnance on the ranges, and within the impact areas of the Organ Mountains is anticipated to continue as in current conditions. The Noise Zone II and III contours resulting from these operations are shown in Figure 4.10-3.

Facility Construction and Demolition. Construction activities under the No Action Alternative would cause brief, localized, transient noise. Operation of heavy vehicles around the construction site would probably be the greatest noise source. Facility demolition planned under this alternative would create temporary, localized noise. However, no significant long-term adverse effects would be expected to occur.

Environmental Resource Management. Under the No Action Alternative, management of resources using ITAM practices could create temporary, localized noise in some areas. For example, the use of motorized earth-moving equipment would create localized noise. However, no significant long-term noise impacts would be anticipated.

Real Estate Actions. Representative real estate actions under the No Action Alternative would not create any noise impacts.

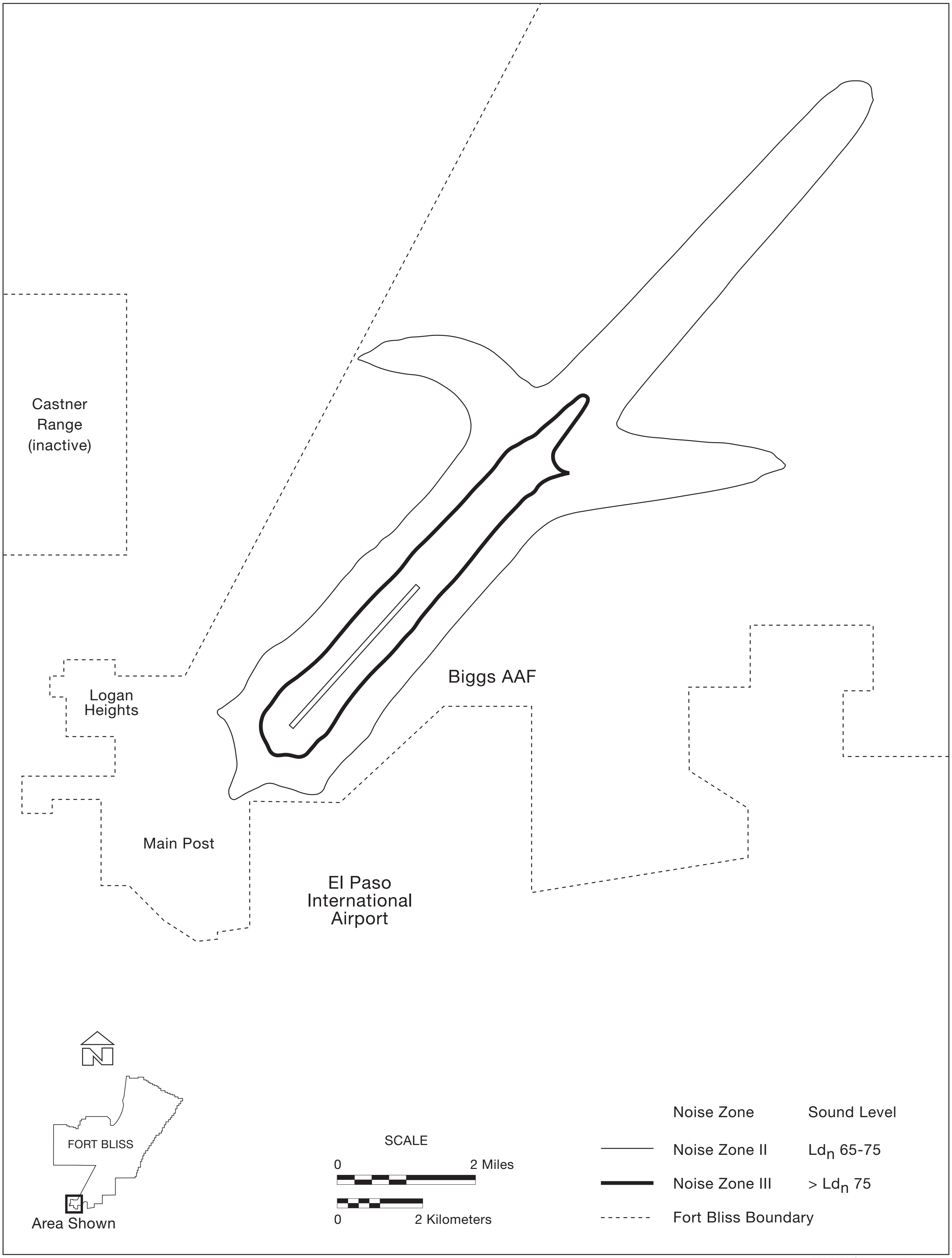


Figure 5.1-3. Noise Zones under Mobilization - Biggs Army Airfield.

5.1.10.2 Cumulative Impacts

Activities conducted on Fort Bliss and its training complex, when coupled with other activities in the region, have low noise impacts, with one exception. Since the proposed expansion of GAF activities at HAFB has been approved, a new air-to-ground training range will be constructed on McGregor Range at Otero Mesa. This could result in localized noise increases in the immediate vicinity of the range. In either location, noise levels directly over the targets would reach L_{dnmr} 80. However, at other locations on the range, noise would be significantly less (USAF, 1998). Since this noise is localized on a training range, and does not extend past the boundaries of the restricted airspace, no land use incompatibilities result. This elevated noise is
110 not considered to be significant. A MTR provides access to McGregor Range airspace (Figure 4.1-4). However, it is not part of the McGregor Range restricted airspace. Furthermore, noise levels on this route are not significantly high, ranging from L_{dnmr} 50 to L_{dnmr} 54.

Under ongoing operations, since Biggs AAF is located immediately adjacent to the EPIA, the land area abutting both facilities is subjected to the combined noise of aviation activities conducted from both. The combined noise contours from these cumulative operations is shown in Figure 4.1-5 (U.S. Army, 1997a).

5.1.11 Safety

The major activities associated with the No Action Alternative are discussed below.

5.1.11.1 Main Cantonment Area and Fort Bliss Training Complex

Mission Activities. The relatively stable personnel and equipage levels, and the continuation of administrative, instructional, medical, and logistical support functions do not create any specific safety issues or concerns. Under existing conditions there are no significant outstanding ground, fire, explosive, or flying safety issues or shortfalls. The projections through FY 02, which indicate little change, would not be expected to create any safety deficiencies. Although full mobilization has the potential to increase the installation population to a maximum of 35,220 for short periods, other already-approved activities addressed below should preclude any safety shortfalls. In developing these projects, the installation-supporting infrastructure was deemed adequate to accommodate the additional demands resulting from each activity.

In large part, representative mission activities in the training areas and on the ranges reflect a continuation of ongoing activities. The primary emphasis will be on maneuver, force employment, weapons live-firing, and missile firing. These activities range from selected units conducting FTXs, to major JTX (e.g., Roving Sands).

Around Biggs AAF, since almost all of the area involved in safety zones is within the installation boundaries, there is little or no conflict in managing these appropriate land uses.

Safety considerations are involved with these mission activities due to increased human presence, use of ordnance, live firing of missiles, and aircraft overflight. However, as discussed in Section 4.11, maneuver and firing exercises are conducted in accordance with detailed operating procedures documented for each range and each specific event type conducted. Responsibilities for fire detection and suppression are clearly described. Safety zones associated with all live-firing events are evacuated prior to the event, and, if applicable, ordnance and unexploded hazards are removed after the event. All ordnance, including malfunctioned ordnance, is handled, stored, processed, and disposed of in accordance with approved operating procedures. Slight changes in the levels of use of specific ranges, or in the number of missiles fired do not necessarily increase safety risks. Scheduling prevents incompatible range-use conflicts. While some safety risks are associated with any live-fire event, each live-fire or missile-firing event can be considered as a discreet event. Ground, fire, and explosive safety risks are managed by conducting the event in accordance with established procedures. Therefore, if each event is so conducted, no single event presents any more risk than any other.

No activities described under the No Action Alternative indicate any major changes to current levels of aviation activity, either at Biggs AAF or in the restricted airspace associated with the training areas and ranges. Therefore, it is assumed that rotary- and fixed-wing operations both at the airfield and on the ranges would remain relatively stable as described in Section 4.11. As previously discussed, flight safety risks are low, and would be expected to remain at that level.

Facility Construction and Demolition. Under the No Action Alternative, currently approved facility construction would occur. No specific ground, fire, explosive, or flight safety issues are associated with any of the proposed facilities. Added crash response capability and an expansion of the fire station will improve fire and crash response at Biggs AAF. There are no unique construction requirements associated with any of the proposals.

Explosive safety on Fort Bliss will be enhanced by two of the ASMP activities. The new ammunition storage facility will be fully licensed for munitions storage, and the new ammunition "hot pad" to be constructed on Biggs AAF will enhance safety during the processing, handling, and transshipment of munitions through the airfield.

As part of current planning, older inefficient facilities with little utility will be demolished. Of the facilities approved for demolition, the majority are family housing units. There are no significant safety concerns associated with this proposed demolition. During demolition, standard industrial safety practices will be enforced.

Environmental Resource Management. Under the No Action Alternative, staff at Fort Bliss would continue to manage resources using ITAM practices. No specific or detailed natural or cultural resource management plans would be implemented. ITAM practices, of themselves, do not create any ground, fire, explosive, or flight safety risks.

Some developmental or restoration tasks may either create new ground disturbances, or rehabilitate ground that has already been disturbed. Rehabilitative measures should, to the extent practicable, attempt to reestablish native species of vegetation. This will minimize the potential for the invasion of exotic, weedy species of vegetation that may have the potential to create or exacerbate fire risk.

During restoration activities, it is most likely that gasoline- and diesel-powered equipment and vehicles will be used. There is some risk associated with sparks, hot exhaust systems, and mufflers coming into contact with vegetation during periods of high fire potential. However, avoiding areas with significant vegetation during these periods will minimize the risk.

Performing work in areas Fort Bliss categorizes as temporary impact areas should create minimal safety issues with missile debris or ordnance and explosive hazards. However, in areas categorized as permanent impact areas, any human presence and activity in the area may create a safety risk. Personnel should be aware of the potential for encountering missile debris or ordnance and explosive hazards in these areas, and appropriate precautions should be taken before major ground disturbance occurs.

In range areas that support concentrated aviation activity, any natural resource management actions dealing with revegetation should consider potential bird-aircraft strike risks. To the maximum extent practicable, actions developing high-quality habitat that would attract birds should be minimized. Any actions that would discourage birds from congregating in these areas will enhance flight safety.

Real Estate Actions. None of the representative real estate actions associated with this alternative create safety concerns, with the exception of the disposition of the Castner Range. The Castner Range was historically used as a permanent impact area, and is significantly contaminated with ordnance and explosive hazards. Although cleanup of the range has commenced, it is not complete. Before all of the containment land associated with the Castner Range can be excessed and disposed, surface and subsurface ordnance and explosive hazards decontamination must be complete.

5.1.11.2 Cumulative Impacts

No activities proposed under the No Action Alternative on Fort Bliss indicate any potential for creating cumulative safety impacts. Potential cumulative effects could arise from other military activities in the region, or from potential activities conducted in the private sector.

Many activities conducted on the WSMR are very similar to those conducted on the Fort Bliss ranges (i.e., ordnance testing and development, missile live firings, etc.). When conducted, these activities occur over land and within restricted airspace that is controlled by WSMR. As with ordnance use on the Fort Bliss ranges, ordnance use on WSMR is governed by detailed safety procedures that apply similar criteria for developing safety and clear zones applicable to the ordnance or weapon being fired. These safety zones ensure that no person is exposed to risk at the firing or impact point, or anywhere along the ground/air flight track or trajectory of the weapon. Flight paths used ensure that the ordnance will always be contained within the installation's borders. As previously discussed, each ordnance firing event is discreet. Therefore, if each is conducted in accordance with all prescribed safety procedures, there is no cumulative safety risk. On those rare occasions when both WSMR and the Fort Bliss ranges are involved in the same test (e.g., live-fire of the ATACMS), coordination between the two agencies ensures that there is no airspace or land-area conflict.

At HAFB, the termination of flight training for the Taiwanese Air Force significantly reduced the number of T-38 aircraft sorties using McGregor Range airspace and the Class C bomb circle located in its northern portion. This action reduces flight safety risks in the area, and reduces the numbers of training bombs dropped on the Class C range. Overall, fire and flight safety are improved since fewer aircraft will be using the airspace, and fewer training bombs will be dropped resulting in less exposure of vegetation to the high heat generated by the spotting charges in the bombs. Additionally, since fewer training bombs will be dropped, there will be less potential for malfunction, thus improving explosive safety. However, a second activity associated with HAFB involves the USAF development of new air-to-ground training complex on the McGregor Range on Otero Mesa. The increased use of the airspace associated with
111 McGregor Range will have some safety impacts. The added numbers of aircraft using the range as well as the additional flight hours associated with the range use will increase flight risk to some small degree. The construction and use of the range will have the potential to increase fire risk. Finally, construction, use, and maintenance on the range performed by the USAF, coupled with maneuver and live-fire activities in the area conducted by the Army, indicate the potential for a safety impact resulting from ordnance and explosive hazards. However, close coordination between all users and regular grooming of the range will minimize this potential risk.

In the private sector, land is being developed for residential use along the western boundary of the Doña Ana Range–North Training Areas. However, access is controlled to those areas of the range associated with safety zones activated for specific ordnance use, and all safety zones are located within range boundaries. Therefore, this encroachment does not create a safety risk to the public.

5.1.12 Hazardous Materials and Items of Special Concern

5.1.12.1 Main Cantonment Area and Fort Bliss Training Complex

The major activities associated with the No Action Alternative are discussed in this section.

<u>Mission Activities</u>

Hazardous Materials. Hazardous materials include chemicals and ordnance and explosive hazards.

<u>Hazardous Chemicals.</u> Fort Bliss would continue to store and use hazardous chemicals during training exercises and installation maintenance. The types and quantities of hazardous materials would remain essentially the same as described in Section 4.12.1. The HSMS would provide an automated tracking system that maintains an inventory of all hazardous chemicals on the installation from "cradle-to-grave." Ordnance would continue to be expended on the ranges without significant changes in type or amount.

<u>Ordnance and Explosive Hazards.</u> There is some concern regarding potential contamination of seeps and springs in the Organ Mountains and the Soledad aquifer recharge areas due to ordnance and explosive hazards. This section discusses the potential for ordnance and explosive effects on seeps and springs in the Doña Ana Range–North Training Areas and in the Soledad aquifer.

In 1996, an investigation was conducted on the Nellis Air Force Range (NAFR) near Nellis (AFB), Nevada, to provide a snapshot in time of (1) the presence or absence of bombing residues at ten representative bombing target complexes under presumed "worst case" conditions, (2) the extent of bombing residues in the soils, and (3) a preliminary screening of the "worst case" data against background and/or other conservative human-health risk-based screening criteria. Nine of the complexes were heavily used. Munitions fired/dropped on the complexes included air-to-ground missiles, cluster bomb units, high-explosive ammunition, general-purpose bombs, rockets, and inert ordnance (USAF, 1996).

The data indicated that certain inorganic parameters are elevated as a result of the bombing activities. These parameters include cadmium, chromium, copper, nickel, zinc, and cyanide and, to a lesser degree, lead. Antimony and mercury may also be attributable to ordnance although the detectable concentrations were generally very low. None of the parameters that are believed to be related to bombing activities exceeded the EPA Region IX Preliminary Remediation Goals (PRGs) (EPA, 1995) for soils in industrial settings except one chromium and one zinc sample.

Explosive compounds were detected in most samples. Trinitrotoluene (TNT) was the most commonly detected compound, being found in 32 percent of the samples. The TNT PRG of 64 mg/kilogram was exceeded in 4 percent of the samples.

Precipitation on the NAFR ranges from 4 to 16 inches per year, and the evaporation rate is 58 to 69 inches per year. The depth of groundwater is estimated to be greater than 200 feet.

The impact area on the Doña Ana Range–North Training Areas is similar to NAFR in terms of average annual precipitation (about 10 inches per year at Orogrande), evaporation rate (10 times the precipitation rate), and the fact that the depth to groundwater is generally greater than 200 feet.

It is doubtful that any portion of the impact area would have been subject to a greater concentration of ordnance than the NAFR target complexes. The seeps and springs are at a higher elevation than the targets and would therefore be less likely to be hit by munitions on a frequent or regular basis.

Based on the results of the NAFR investigation and the similarity of the Doña Ana Range–North Training Areas, and the fact that seeps and springs are in an impact area rather than a target area, it is unlikely that there is any significant potential for contamination of springs and seeps in the Organ Mountains and recharge area of the Soledad aquifer due to ordnance and explosive residues and detonation products.

Hazardous Wastes. Fort Bliss would continue to generate hazardous wastes. The types and amounts of hazardous wastes would remain essentially the same as described in Section 4.12.1. Hazardous waste management, disposal procedures, and spill prevention and control would remain the same as described in Section 4.12.1. The generation of hazardous wastes managed under existent procedures would not result in adverse impacts.

Items of Special Concern. The following discussion describes items of special concern at Fort Bliss.

Medical and Biohazardous Waste. Medical and biohazardous wastes would continue to be generated under this alternative at approximately the same rate. Waste collection, storage, and disposal processes would remain the same. The generation of medical and biohazardous wastes would not cause adverse impacts.

Low-level Radioactive Waste. WBAMC and various Fort Bliss commands would continue to generate small amounts of low-level radioactive wastes. The types and amounts of these wastes would be about the same as described in Section 4.12.2. Management process for the radioactive wastes would remain unchanged. The generation of low-level radioactive waste would not result in adverse impacts.

Asbestos. Asbestos abatement performed prior to facility renovation and demolition would continue to generate asbestos waste. Asbestos waste materials would continue to be disposed of in the Fort Bliss sanitary waste landfill. The generation of asbestos material wastes would not cause adverse impacts.

Lead-based Paint. The project for encapsulating lead-contaminated surfaces on the exterior areas of family housing would continue. Lead wastes generated from demolition of buildings would continue to be characterized to determine if it is a hazardous waste. The generation of lead wastes would not result in adverse impacts.

Pesticides. The current storage and use of pesticides and associated certification and management plans would continue. The use of hazardous pesticides would not result in adverse impacts.

Polychlorinated Biphenyls. The PCB management plan would continue to provide guidance for PCB identification, sampling, removal, disposal, and record keeping. The handling of PCB-contaminated equipment and soils would not result in adverse impact.

Petroleum Storage Tanks. Fort Bliss would continue to use both USTs and ASTs. The four-phase system to upgrade the underground storage tanks to meet federal and state requirements would continue to be implemented. Once the storage tank upgrades are complete, the use of the tanks should have minimal environmental impacts.

Related Management Programs. There are two principal programs at Fort bliss relating to hazardous materials and items of special concerns.

Installation Restoration Program. Current IRP activities and public interaction would continue. Restoration of currently identified sites would continue and any new sites that are identified would be included in the program. The contaminated wastes that are removed from IRP sites would be managed in accordance with approved practices and procedures; therefore, they would not result in adverse impacts. The overall impact of the program would be beneficial, since contaminated sites would be restored.

Pollution Prevention. Fort Bliss would continue to identify and implement pollution prevention initiatives to reduce the amount and types of hazardous materials used and the amount and type of hazardous wastes that are generated from the use of these materials. The IPPP and the HSMS will address pollution prevention and waste minimization issues and provide an automated tracking system for hazardous materials and chemicals. Improvements under this program result in beneficial impacts.

Facility Construction and Demolition. Currently approved facility construction would not have adverse impacts due to construction debris. Construction would not have any impact on the use of hazardous chemicals or the generation of hazardous wastes. Asbestos and lead wastes will be generated during facility demolition. The removal and disposal of these wastes in accordance with approved SOPs and regulations would not have adverse environmental impacts.

Environmental Resource Management. Resource management plans will not impact the use of hazardous chemicals or the generation of hazardous wastes.

Real Estate Actions. Proponents of real estate transactions with parties outside the Army conduct a screening to determine the likelihood of contamination: if no hazardous material storage, release into the environment or structures, or disposal took place on the subject property or the release of hazardous materials into the environment is not considered probable; or if the existence or potential for release of hazardous materials into the environment or structures exists. If there was a release or a potential for release the proponent must carry out DERP investigation procedures. If there was not a release or the potential for a release there would be no adverse impact.

5.1.12.2 Cumulative Impacts

None of the activities in the No Action Alternative on Fort Bliss have the potential to contribute to cumulative impacts on hazardous material use or waste management processes. The establishment of a new tactical target complex would produce a significant increase in the amount of ordnance expended on the range. Maintenance of the complex would result in a 30 percent increase (approximately 150,000 pounds) annually in the generation of nonhazardous scrap metal. This increase is significant but would not pose any environmental threat or create additional environmental impacts on the Fort Bliss Training Complex.

5.1.13 Socioeconomics

5.1.13.1 Main Cantonment Area and Fort Bliss Training Complex

Implementation of changes in mission activities will, in most cases, manifest themselves in changes in personnel levels and physical infrastructure requirements (construction and demolition of facilities).

Mission Activities

Peacetime Authorized Strength. Changes in mission activity will often have associated changes in personnel levels at the installation. The addition of missions will normally increase the number of personnel (both active-duty military and civilian) assigned to an installation, whereas the removal or transfer of missions will have the opposite result. As outlined in Table 3.2-1 (contained in Chapter 3.0 *Description of the Proposed Action and Alternatives*), by FY 02 it is anticipated that the peacetime authorized strength at Fort Bliss will increase to 11,590, which is 950 above the FY 96 level of 10,640.

The number of authorized personnel is then expected to remain virtually constant through FY 16. The number of authorized civilian positions at the installation is expected to decline by 120 from 7,520 in FY 96 to 7,400 in FY 02 and then remain constant through FY 16.

Associated with changes in personnel levels will be changes in payroll (total wages and salaries). Such variations will, in turn, have implications for the local economy because of changes in the quantity of income available for personal consumption expenditures. In FY 96 the combined military and civilian payroll (of $518.5 million) contributed 59 percent of the total payroll and expenditures (excluding payments to military retirees) associated with Fort Bliss ($872 million) as portrayed in Table 4.13-14. With changing mission requirements, changes in procurements as well as payrolls can be expected. In the absence of information describing such likely changes in procurement activity associated with increased personnel levels, estimates are made. These estimates are based on the historic relationship between personnel levels and the value of local and nonlocal purchases and contracts, utilities, and non-U.S. expenditures exhibited over the period FY 94 to FY 96. Projected levels of payroll and expenditures through FY 16 are derived using their historic relationship with military and civilian personnel levels. Payroll and expenditure levels for the following categories are derived from changes solely in military personnel numbers: military payroll, PX local purchases, NAF local purchases, commissary local purchases, and student impact aid. Expenditure levels for the following categories are derived from the aggregate of military and civilian personnel levels: local procurements, military construction projects, and utilities. Civilian payroll levels are derived solely from projected civilian personnel levels.

It is estimated that the personal consumption expenditures in the local economy by additional personnel assigned to the installation and additional procurement of goods, services, utilities, and construction activity will support 397 additional jobs in the local economy in FY 02. Most of these additional jobs will be in the services sector of the economy.

Mobilization Authorized Strength. Mobilization activities at the installation could involve substantial increases in the number of personnel assigned to Fort Bliss on a temporary basis (as described in Table 3.2-3). The additional personnel (comprised mostly of U.S. Army Reserve and National Guard members) associated with deployment and mobilization are categorized into three groups: Force Support Package, Regional Conflict, and Sustaining Base. Only the last group, Sustaining Base personnel, would remain at Fort Bliss for the duration of any conflict. Personnel of the other two groups would remain at the installation for relatively short periods of time prior to their deployment. In the absence of specific information regarding the duration of stay and the levels of expenditures by personnel during such times, a number of programmatic assumptions are made to enable quantitative analysis to be accomplished. For purposes of analysis, it is assumed that the duration of the hypothetical regional conflict would be 1 year. It is assumed that the number of Sustaining Base personnel at the installation will increase by 7,780. Personnel associated with both the Force Support Package (2,290) and Regional Conflict (6,150) categories (8,440 total personnel) are assumed to remain at the installation for an average of 1 month. Thus, the 8,440 such personnel equate to 703 full-time equivalent personnel. It is assumed that all these additional personnel will reside in facilities located on the main cantonment or at the range camps and will not occupy contract quarters off-post. Further, since most of these personnel will have families and/or financial obligations at their permanent places of residence, it is assumed that only 25 percent of their expendable income will contribute to the local economy. The addition of these personnel, even for relatively short periods of time will also, it is assumed, have implications on the level of procurement and other expenditure activities at the post, as is the case under peacetime conditions.

Given the assumptions outlined immediately above, it is estimated that the expenditures by the additional military personnel assigned to the installation during deployment and mobilization will total approximately $63 million and additional procurements estimated at $20 million associated with their activities will support, on an annual basis, 1,005 additional jobs in the local economy. Most of these additional jobs will be in the services sector of the economy.

Facility Construction and Demolition. The addition or deletion of missions and personnel at the installation has implications for the number and adequacy of existing facilities. In the absence of detailed cost information describing each of the facilities proposed for construction in the future, it is assumed that construction activity in future years will replicate that occurring in FY 96. During this year, expenditure on Fort Bliss on Military Construction Program (MCP) projects totaled more than $72 million (see Table 4.13-14). It is estimated that expenditures of this magnitude in a single year would contribute 1,073 jobs to the local economy. Of these jobs, 550 would be in the construction sector of the economy with the remaining 523 spread throughout other sectors of the local economy.

Much of the demolition of facilities at Fort Bliss, especially of military family housing units, is directly associated with the construction of new facilities and/or the refurbishment and renovation of existing structures. For purposes of analysis the costs associated with this demolition are included, in the construction and renovation costs and, thus, are included in the assessment of the effects of facility construction provided immediately above. The demolition of facilities without their replacement through new construction will contribute additional direct and secondary jobs to the local economy.

Real Estate Actions. It is not anticipated that real estate actions such as land exchanges and land leases will have effects in the local economy that would not otherwise be captured in activities unrelated to Fort Bliss. For example, the proposed new El Paso ISD high school, to be located on government-owned land in Logan Heights, is required based on general growth trends in the school district and could have been alternatively located.

Employment related socioeconomic impacts are not considered to be significant for any of the actions addressed in the above section.

5.1.13.2 Cumulative Impacts

Over the period 2000 through 2015, total employment in the three-county ROI is projected to increase from 450,384 jobs to 564,410 jobs, at an average annual rate of 1.3 percent. This rate slightly exceeds that projected for the State of Texas. The addition of a total of 1,227 jobs (840 direct and 397 secondary) attributable to the projected growth in peacetime personnel with a possible additional surge of 9,488 jobs (7,780 sustaining base plus 703 FTE from the force support and regional conflict package and 1,005 secondary) that could accompany mobilization activities would not significantly influence these regional trends. It is estimated that activities at Fort Bliss supported 8,267 secondary jobs in the local economy in FY 96. The additional local jobs generated by projected changes in levels of peacetime activity comprise only 5 percent of this value. It is unlikely that population increases associated with such employment rises will create adverse effects on community services such as public schools, police and fire protection, health care services, and public finances.

Development of a new tactical target complex on McGregor Range, as part of proposed actions on HAFB, would be expected to increase expenditures between $4 and $20 million (depending on the option selected) during 1998 and 1999 and result in increased employment levels. Some of the employment opportunities associated with these potential activities could be located in Otero County and would be considered a beneficial impact.

5.1.14 Environmental Justice

This section examines potential environmental justice effects under the No Action Alternative. The following discussion describes the public participation program that is being conducted by the Army to ensure awareness of the alternatives considered in the PEIS, summarizes environmental justice concerns identified through the public participation process, and presents analysis of environmental justice effects.

A public participation program is being conducted to ensure that members of the public, and especially, minority and low-income residents living in the project area, are aware of the EIS and have opportunities to participate. The PEIS public participation process was expanded to include identification of organizations representing and serving members of low-income populations and minority populations in the project area. Letters inviting participation in the PEIS process, and describing the project alternatives and the environmental justice EO, were sent to approximately 75 organizations and individuals in June 1997. The list of contacts is contained in Appendix H, along with copies of the letter and accompanying fact sheet in English and Spanish that were sent to all recipients.

5.1.14.1 Main Cantonment Area and Fort Bliss Training Complex

The following resource sections within the PEIS were reviewed to identify any resources with potentially adverse or significant impacts. Potential impacts that could affect populations living off-post were the focus of this analysis. If adverse impacts were identified, the duration and significance of impacts were considered and, where appropriate, an analysis was done to determine if there was a potential for disproportionately high human health or environmental impacts to low-income or minority populations.

- Land Use. Family housing replacement projects would continue to meet the need for upgraded housing on Fort Bliss. The planned removal of Van Horn housing reduces the amount of substandard housing on the installation. Representatives of organizations representing homeless persons in the El Paso area have expressed concerns about demolition of housing on Fort Bliss. For example, in 1996, the Army coordinated with the El Paso Coalition for the Homeless about the proposed demolition of housing. The Army voluntarily delayed the demolition to give that organization time to develop a plan for retaining the housing for use by homeless persons. A feasible plan was not ultimately developed and the housing demolition went forward. For this PEIS, a homeless advocacy group was contacted as part of the targeted environmental justice outreach process for the PEIS.

  Taken together, proposed land use changes, such as those described in *Land Use* Sections 5.1.1, 5.2.1, and 5.3.1, would generally be beneficial, with some impacts to land use from other resources, such as traffic and noise, being adverse, but not significant. Land use impacts would primarily occur on post within the Main Cantonment Area and within the boundaries of the range and training areas, and would not be expected to have disproportionately high and adverse human health and environmental effects on low-income and minority populations.

- Infrastructure. Changes in ground transportation, utilities, and related infrastructure in the Main Cantonment Area and training areas would support proposed facility construction, projected personnel strength levels, and training requirements. Infrastructure changes and increased use levels would primarily affect areas on post and within the boundaries of the training ranges and training areas. No significant adverse effects have been identified and no environmental justice effects are expected.

- Airspace. The No Action Alternative would have no impacts on airspace or air traffic operations and is not expected to have any environmental justice impacts.

- Earth Resources. Impacts to geology and soils would not have adverse impacts on human health or the environment that would affect populations in the project area and would have no environmental justice impacts.

- Air Quality. Under the No Action Alternative, future authorized strength levels through FY 02 would be within approximately 5 percent of the existing levels and are projected to remain at FY 02 levels through FY 16. Even under a full mobilization scenario, which would result in almost a doubling of the current installation strength similar to that experienced annually for the Roving Sands JTX, increased air emissions in the main cantonment and range/training areas are not expected to cause significant air quality impacts. No environmental justice impacts are expected for air quality.

- Water Resources. Under the No Action Alternative, short-term increases in water demand could strain the facilities and infrastructure of the range-camps and related facilities in Doña Ana and Otero counties. Areas reliant upon local groundwater resources may experience short-term deficit pumping to meet increased demand. Impacts to local surface water resources associated with posting large numbers of military personnel and equipment on the McGregor and Doña Ana ranges could increase sediment load, and impact surface water availability, quality, duration and use, and local land use practices, vegetation, and wildlife, particularly if large maneuvers are not conducted in the dry months under controlled conditions. There would, however, be no adverse impacts to human health or the environment that would directly affect nearby populations and no environmental justice impacts are expected.

- Biological Resources. Impacts to biological resources, including vegetation, wetland habitat, wildlife, and threatened and endangered species are not expected to result in adverse impacts on human populations in the project area or to cause any environmental justice impacts.

- Cultural Resources. Because of their value to Native American groups, aspects of cultural resources related to TCPs are highlighted below. The Army is contacting Native American groups regarding the development of the ICRMP. In addition, Native American groups were contacted as part of the environmental justice outreach mailing effort. Overflights may have potentially adverse impacts to the setting of TCPs valued by Native Americans living in the project area. No significant traditional Native American traditional resources have been identified under the restricted airspace. Noise may affect Native American cultural properties in a variety of ways. Auditory impacts to other, presently unidentified, Native American resources beneath the airspace are possible, but probably would be infrequent.

- Noise. For the No Action Alternative, noise levels at Biggs AAF resulting from full mobilization were modeled and compared to normal aircraft operations. Under surge operations, all portions of the L_{dn} 65 contour remained within the installation boundaries and thus, persons living off the installation would be exposed to noise levels under L_{dn} 65. Aviation related noise on the ranges is expected to continue at levels similar to the present noise levels of L_{dnmr} 40 to L_{dnmr} 49, and these noise levels are expected to remain within the confines of the restricted airspace. Impulsive noise resulting from the use of ordnance on the ranges and within the impact areas of the Organ Mountains is anticipated to continue at current levels. Construction activities under the No Action Alternative would cause localized, transient noise over brief periods, some of which could affect off-post areas. No significant, adverse noise effects would occur under the No Action Alternative, and no noise-related environmental justice effects are expected.

- Safety. Safety considerations are involved with increased human presence, use of ordnance, live firing of missiles, and aircraft overflights. However, training and firing exercises are conducted in accordance with detailed operating procedures and already approved projects should preclude any safety shortfalls associated with increases in the installation population. No significant increases in safety risks have been identified in connection with mission activity, facility construction or demolition, resource management, or real estate actions and no environmental justice effects are expected.

- Hazardous Materials and Items of Special Concern. Fort Bliss would continue to store and use large quantities of hazardous materials during training exercises and installation maintenance and to expend ordnance on the ranges. No significant environmental or health effects have been identified. No environmental justice impacts are expected in connection with hazardous materials and hazardous waste.

- Socioeconomics. Although projected changes in personnel levels could change the mix of job classifications and pay-grades of personnel assigned to Fort Bliss, absolute increases in total direct personnel would benefit the local economy through creation of additional secondary employment, for example in the service sector, which could provide additional employment opportunities and income for workers in lower wage categories. The population of El Paso County, which would potentially derive the greatest economic benefit, was 74.3 percent minority in 1990, compared to 59.2 percent in Doña Ana County, 35.8 percent in Otero County, and 69.1 percent in the three-county area. The percentage of persons living below the poverty level was approximately 26.3 percent in El Paso County, 25.6 percent in Doña Ana County, 16.2 percent in Otero County, and 25.5 percent in the three-county area. Socioeconomic impacts would benefit the local economy and are expected to provide benefits to the general population including low-income and minority populations living in the area.

EO 13045, Protection of Children From Environmental Health Risks and Safety Risks, requires that each federal agency identify and assess environmental health risks and safety risks that may disproportionately affect children, and address such risks in their policies programs, activities and standards. Neither the proposed action nor any of the other alternatives would have the potential to cause environmental health risks or safety risks that would disproportionately affect children.

5.1.14.2 Cumulative Impacts

There would be no disproportionately high or adverse human health and environmental impacts on minority or low-income populations.

5.2 ALTERNATIVE 1

Alternative 1 includes the proposed implementation of the revisions in the RPMP component and contributing plans. These revisions to the plans affect the manner in which the ongoing mission of Fort Bliss is carried out on a daily basis. This alternative contains all the actions contained in the No Action Alternative plus the implementation of short- and long-range plans, construction and demolition programs, and environmental resource management plans with potential to affect the installation environment. A detailed description of Alternative 1 is presented in Section 3.3. Alternative 1 is briefly described below in terms of three of the four categories of activities at Fort Bliss. Real estate actions beyond that described in the No Action Alternative are not anticipated as a part of Alternative 1 and are, therefore, not discussed in this section.

- Mission Activity. Mission activities as described in the No Action Alternative remain the same for Alternative 1.

- Facility Construction and Demolition. The CIS example that supports the revision of the RPMP is the P3 CIS that was described under the No Action Alternative.

The revised construction projects and schedules under Alternative 1 differ from those in the No Action Alternative by: replacing additional family housing units in Logan Heights-West; replacing family housing in the Aero Vista Area in FY 01, instead of in FY 00 and FY 02; and by replacing fewer family housing units in the north main cantonment during FY 10.

Facility demolition under Alternative 1 continues the previous facility reduction program and the Army Family Housing Program described under the No Action Alternative. Alternative 1 demolition projects and schedules differ from those in the No Action Alternative by rescheduling planned demolition of family housing in Aero Vista from FY 00 to FY 01, and in Van Horn Park from FY 02 to FY 99, FY 00, and FY 01.

For nonfamily housing, differences include: additional units being demolished; extension of demolition schedule through FY 01; scheduled demolition of some facilities not being carried out and vice versa; and the possibility of land use classifications for facilities being changed.

- Environmental Resource Management. Installation programs and plans that integrate environmental resource management with mission requirements include ITAM, which is the same as described for the No Action Alternative. However, under Alternative 1, ITAM also interfaces with the proposed implementation of the RPMP, INRMP, and ICRMP.

5.2.1 Land Use

Under Alternative 1, the RPMP, ICRMP, INRMP, and Chapter 3.0 of the TADC would be implemented at Fort Bliss. These plans incorporate various management goals and actions that would affect the use of land on the installation and surrounding areas. This section evaluates how implementation of these plans and other planned actions would impact land use in the Main Cantonment Area and on the Fort Bliss Training Complex.

5.2.1.1 Main Cantonment Area

The land use effects and impacts resulting from additional mission activities, facility construction and demolition, and resource management actions are discussed below.

Mission Activity. Mission activities within the Main Cantonment Area, including Biggs AAF, would not change from those currently conducted and evaluated in the No Action Alternative. No impact to land use would result.

Facility Construction and Demolition. Construction projects included in the military family housing program and several P3 CIS projects would be completed for Alternative 1 within the Main Cantonment Area. These projects generally are programmed to meet specifically defined facility requirements or to replace inadequate facilities of the same type. Several of these projects would replace existing housing with new units. Providing adequate facilities is essential to complying with development codes and Army regulations, which set standards to promote functionality and to protect health and safety. Through upgrading and replacing substandard facilities, Fort Bliss maintains the suitability of land to support specific uses.

Like the No Action Alternative, demolition and construction of several residential housing areas are proposed between FY 98 and FY 12. Demolition and replacement would occur in Aero Vista housing on Biggs AAF between FY 97 and FY 02; in Logan Heights between FY 06 and FY 08; and in the 1400, 1500, and 1800 areas on the northwest side of the Main Post between FY 04 and FY 06. New housing is also planned for the WBAMC area between FY 98 and FY 04. Slight variations in scheduling of projects and additional housing in Logan Heights (West) over the No Action Alternative would not adversely affect land use. These projects will improve suitability of residential land use by eliminating substandard or inadequate housing and providing new improved housing. Demolition and construction activities may temporarily impair adjacent residential and community uses because of the noise from operation of equipment and additional truck traffic. Dust generation would be controlled during construction and demolition.

In addition, two tactical equipment shops would be constructed, and portions of roadways would be widened and realigned between FY 99 and FY 02. It is assumed that new facilities would be located in appropriately designated land use areas. Because these projects would improve functional efficiency and compliance with codes and regulations, suitability of defined land use areas would benefit.

The red brick homes in the 300 and 1400 areas, industrial facilities in the 1300 area, and the 2100 and 7100 areas on WBAMC, have potential historic value. Any demolition and redevelopment of these historic areas would involve coordination under the ICRMP for Fort Bliss (see Section 5.2.1.2 and Section 5.2.9) to ensure compliance with the NHPA.

The impacts of the ASMP projects shown in Table 3.3-7 are incorporated in this alternative by reference (U.S. Army, 1998a). One of these, a new tactical vehicle overpass (over Fred Wilson Road) will become the main route for traffic between Biggs AAF and the Main Post. Better traffic circulation will improve functional efficiency on post. Surrounding industrial, airport-related, and commercial land uses along Fred Wilson Road, Airport Road, and Butterfield Industrial Park would benefit by separation of military from nonmilitary local traffic.

Implementation of the proposed land use plan would result in new development, redevelopment, and future infrastructure improvements throughout the main cantonment. Additional construction and demolition activities are likely to occur that are not currently identified under the proposed action. Provided these activities follow the organizational framework of the RPMP, they would be suitably located, and provide benefits to the land uses that they support. Disruptive noise and dust from extensive construction activities near areas with high levels of human activity would be minimized by temporary buffers and standard construction management practices. Additional truck traffic during construction may affect local traffic, and adversely impair efficient functioning of adjacent areas temporarily.

The Fort Bliss RPMP would implement land use decisions based on defined goals and a structured planning process. In general, the plan would allocate land resources to provide functional efficiency and the ability to optimize supporting infrastructure. Land uses would be organized to minimize conflicts between adjacent uses. Figure 3.3-1 illustrates proposed land uses on the main cantonment.

The intention of the RPMP is to provide a planning framework that will improve land use relationships in the main cantonment. The plan attempts to consolidate functions, to co-locate compatible or interactive functions, and to separate incompatible functions. Within this structure, some areas will benefit overall from planned relationships, but sometimes special site treatment may be needed to lessen incompatible adjacencies. An example of this is the current and planned relationship of troop housing next to either family housing or maintenance areas. In either case, buffering (such as attractive landscape screening) can provide separation when needed. The IDG provides a menu of solutions that are both visually pleasing and functional and, therefore, the issues will be dealt with on a case-by-case basis in the future. The IDG will be easier to apply if it is revised to reflect more accurately the evolution of land organization envisioned in the RPMP.

Overall, resulting use of land in the main cantonment would meet the goals of the Master Plan and better support the Fort Bliss mission. No appreciable impacts to surrounding areas would result if suitable buffers are used when adjacent uses are incompatible. Separation can be achieved by open space barriers (such as walls, berms, or landscape buffers), building orientation, street layouts, and access design. The following paragraphs summarize the major changes in land use and resulting effects for the Main Post, Logan Heights, WBAMC, and Biggs AAF.

Main Post. Many land uses would be consolidated on the Main Post primarily by absorption of open space. Industrial, maintenance, and training functions would continue to be concentrated in the eastern half of the post, with residential, community and administrative functions in the western half. Remaining open space would be retained as necessary ponding areas for on-site drainage. In general, land use would benefit from elimination of some existing incompatible adjacent uses, and improved functional relationship between land uses. However, depending on the rate of absorption and intensity of land uses, adequate infrastructure improvements would be needed to optimize land resources. The following summarizes the major beneficial land use actions for the Main Post:

- Unsuitable residential uses in Van Horn housing and 5200 Area exposed to high noise levels and within APZs for EPIA, would be converted to industrial and supply/storage, and recreation uses, respectively.

- The Hawk training area along Marshall Road would be redeveloped for family housing. This residential use would be compatible with adjacent residential and community uses.

- Motor pool industrial uses would be relocated from a predominantly residential area (1400 and 1500 areas) to an expanded industrial area south of Fred Wilson Road. The current area would be converted to residential use, compatible with adjacent residential, community and administrative areas. Demolition of existing historic properties for this redevelopment would be contingent upon requirements under the NHPA (see Section 5.2.9).

- Maintenance areas that are currently incompatible with adjacent community facilities and open space at Forrest and Marshall roads would be developed for new troop housing and expanded community facilities. This location provides good access for troops to support services. However, increased human activity in this portion of the Main Post could result in less efficient flow of traffic and unsafe conditions for pedestrians.

- Community facilities would be expanded in several areas, providing convenient support to adjacent family and troop housing areas. Expanded community facilities in the 800 Area would provide a compatible buffer with residential uses to the west, but be marginally compatible with rail-served storage areas to the east. Renovation or redevelopment of this area may affect historic structures. Preservation of these facilities could provide opportunities for innovative reuse of warehouses. New community facilities between Pleasanton and Dudley Road may need to be buffered from expanded training areas in the old GM Park to the east.

- Additional outdoor recreation areas throughout the Main Post would generally enhance living and working conditions. Troop housing would benefit from a new outdoor recreation area north of Stennes Road that would provide a buffer from maintenance areas and convenient recreation facilities for trainees.

- Community facilities along Robert E. Lee Road that are currently considered incompatible with surrounding training areas, would be suitably converted to training areas.

- The 5200 Area family housing, which is currently isolated by open space and training areas, would be converted to more suitable training area use. New adjacent community facilities may need to be buffered from training areas.

- A new sanitary landfill will ensure adequate capacity for solid waste disposal at Fort Bliss. Siting considerations for a new sanitary landfill would need to provide adequate separation and displacement from runway approaches to avoid potential conflicts between congregating birds and airfield activities.

Some continuing and new incompatible adjacent land uses would be unavoidable. These can generally be managed through visual buffers, noise-reducing construction materials, limiting intensity of use, or arranging circulation. The following areas would benefit from these types of site specific actions:

- Training areas west of Jeb Stuart Road may visually detract from qualities of predominantly residential, administrative, and community adjacent uses.

- Expansion of industrial use at Haan and Jeb Stuart roads adjacent to community facilities would be compatible with large commissary buildings and loading areas to the north. However, potential visual impacts to new community facilities to the west, and traffic circulation between these functions would need to be considered in future site development.

- Troop housing would be adjacent to new family housing at the intersection of Forrest and Marshall roads, and would continue to be adjacent to the 500 Area family housing. Roadways would provide some separation between these areas that can have incompatible patterns of use.

Surrounding off-post areas would not generally be affected by intensification of use on the Main Post because of physical separation provided by arterial roads and fences, and compatibility of similar adjacent functions. An exception to this is two schools located directly south of the Main Post, where training areas could be expanded. The use of adjacent land for education would be incompatible with intensified training activities that could occur in the future. Use of these areas during mobilization may have temporary adverse impacts on adjacent residential areas.

Logan Heights. Residential use of Logan Heights would intensify with both expanded troop and family housing in existing open space. Supporting community uses would also expand to meet demands of the increased residential population. Some supply/storage use would remain, although this use is not optimally located next to community facilities and off-post residential areas. Concentrated troop housing is separated from family housing by a perimeter wall, reducing potential incompatible noise and traffic between the two areas. Overall, intensification of the use of this area would be internally compatible. Most proposed uses would be compatible with adjacent areas. Buffering between on-post troop housing and industrial and off-post residential areas would be beneficial.

WBAMC. Overall, land use actions within this area would have beneficial effects on land use. Open space and aging community facilities would be replaced by residential use. New family housing would be compatible with similar adjacent, off-post uses. New troop housing for support staff at the medical complex would be suitably located adjacent to the hospital, but may conflict with adjacent family housing and should be separated with a wall or landscape buffer. New community areas would buffer troop housing from any future off-post residential uses to the north. A small training area would be provided to support classroom training for troops housed in this area. The medical facilities would be expanded to encompass current administrative uses, and have no effect on land use. Conversion of the 7100 Area for residential use may present opportunities to integrate historic preservation with redevelopment plans, enhancing the quality of the environment for residents of this area.

Biggs AAF. Land use changes at Biggs AAF would primarily convert open space and pockets of community and recreational areas to expand supply/storage areas along the airfield, consolidate troop housing and community facilities, and to buffer these uses with a new administrative area. The administrative area would be located along the airfield to directly support aviation-related and mission functions. These changes will increase capacity for staging equipment, particularly during mobilization, and allow for future facility development to support the Fort Bliss troop training mission.

Additional community facilities and housing replacement in the Aero Vista area would improve residential use. Open space to the south and west of the housing area would be converted to training areas. These would remain essentially as open areas, but new outdoor recreation areas would buffer training activities from residential areas. The existing ASP and associated restricted zones would remain designated for supply/storage to provide flexibility for continued or future munitions storage.

Resulting expansion and intensification of mission use of this area over the long-term would be compatible with residential use through buffering and provisions for recreation. Surrounding airfield, industrial, and commercial uses on EPIA would be compatible with land use changes.

Environmental Resource Management. Because of previous alteration of the natural environment on the Main Cantonment Area, the INRMP would have little affect on land use management in this area. Soil conditions, protection of habitat for threatened and endangered species, and preservation of wetlands may constrain development of specific areas.

Preservation of historic structures can provide recreational opportunities and visually enrich the surroundings, making a more livable environment. Implementation of the ICRMP for Fort Bliss would indirectly affect the use of land resources on the installation. Preservation of the historic character of areas and individual buildings within the Main Cantonment Area may limit land use options in some locations. Use may be restricted to a similar or past use; development of adjacent land may be restricted; and exterior modification of structures that contribute to an historic setting may be limited.

Generally, the ICRMP is intended to streamline coordination and review of actions that have little potential to adversely affect historic resources. This would allow minor site improvements and routine facility repairs to be accomplished efficiently, allowing buildings and infrastructure to be maintained adequately for designated land uses. In some cases, review and mitigation required under the ICRMP could delay development and result in facility deficits in functional categories.

Demolition and construction of historic properties would be coordinated through the ICRMP for Fort Bliss. Some of the old warehouses in the 800 Area would be renovated for similar supply and storage uses, and others would be demolished and replaced with new residential units and community facilities. These actions would need to be reviewed in accordance with the ICRMP.

5.2.1.2 Fort Bliss Training Complex

The land use efforts and impacts on Fort Bliss training areas resulting from mission activities, facility construction and demolition, resource management, and real estate actions are presented in this section.

Mission Activity. Little change in Army mission activity is proposed for the South Training Areas, Doña Ana Range–North Training Areas, and McGregor Range under Alternative 1. Therefore, no change in land use on the Fort Bliss training areas would result. However, the RPMP addresses land use allocation for the Fort Bliss training areas in a general manner. Implementation of the more specific land use designations, described in Chapter 3.0 of the TADC, would further assist military planners to guide and analyze the environmental impact of potential military uses of the training complex. Conceptual plans for current and future military use of the training areas have been translated into a land use planning framework in the TADC. This process and the resultant description of current training area use are presented in Section 3.3.3.2. Thirteen mission and training activities and uses were identified (see Table 3.3-2) were grouped into ten training areas and land use categories (see Table 3.3-1) that reflect the layering and mix of activities and uses that occur in the training areas. Most categories share several similar uses, and are differentiated by additional mission activities. For example, most categories include use for SDZs, aircraft operations, and dismounted training, but only some areas are used for FTX activities, ORV maneuvering, for weapons firing. The overall land use zones for the training areas are shown in Figure 3.3-2.

Facility Construction and Demolition. Facility construction and demolition identified in Section 3.3.4 would occur under this alternative. Additional projects currently identified would occur on McGregor Range and are discussed below.

Construction of Phase II of the new ASP on McGregor Range would expand the ammunition storage capacity for the installation and reduce safety concerns in urban areas (see Section 5.1.1.2, *Mission Activity*).

Environmental Resource Management. Under Alternative 1, Fort Bliss would implement two environmental resource management plans, the INRMP and the ICRMP. Each plan provides a framework for environmental management of lands for which the Army is responsible. The intent of the plans is to seek a balance between competing potential uses, while maintaining the primary goal of supporting the military mission without degrading natural and cultural resources.

The INRMP also sets natural resource-based outdoor recreation for the Fort Bliss community as an important goal. Implementation of the plan should enhance opportunities for multiple use that are compatible with the military mission. This could result in optimization of some uses at the expense of others. Existing programs and tools used for allocating land resources in these training areas would be used and expanded in the INRMP. Under Alternative 1, the allocation of training land and ranges to recreational use would be through ITAM in coordination with the INRMP, as well as all applicable federal, state, host nation, or other local laws and regulations.

On McGregor Range, the INRMP applies to Army fee-owned land and managing impacts of military missions on withdrawn public land, as specified in the MOU. The 1990 MOU between Fort Bliss and the BLM is included in Appendix D. The BLM retains management for public access uses on withdrawn land as enumerated in the FLPMA, PL 99-606, and the McGregor Range RMPA (BLM, 1990a). Specific issues are identified in the INRMP that could affect land use both within the training complex and surrounding areas. These are summarized below.

The INRMP does not propose changes in land use on Fort Bliss. However, to achieve multiple goals, actions may be defined or prescribed that may restrict the use of some areas. Any actions recommended for withdrawn land on McGregor Range affected by military activities would need to be coordinated with the BLM in accordance with the RMPA. Potential effects on current land uses on Fort Bliss from implementing the INRMP are summarized below. 114

Fort Bliss may limit military activity or segregate land in order to restore or protect a variety of natural resources. This could reduce the area available for certain military uses, or redistribute where activities occur. For example, activities on areas with unstable, erodible soil, and high slopes, or with sensitive or critical habitat, may be unsuitable for intensive activities, construction, or grazing. Some areas may be sustainable for use on a rotational basis, allowing for regeneration after disturbance. Management activities may temporarily exclude specific ground disturbing uses or activities, but not permanently change land use.

Use of prescribed burns on Army-owned and managed lands would be incompatible with other uses during the time of the burn, but only temporary in duration. Burns on McGregor Range would need to be coordinated with and approved by the BLM, where resources on with withdrawn land could be affected, such as visual resources, grazing, or public recreation.

Fort Bliss may initiate oryx hunting on the South Training Areas, in accordance with applicable state (of Texas) laws and regulations. This would provide new recreational opportunities to the public in these areas, and could increase the frequency of recreational use. The INRMP indicates that an *Organ Mountains Management Plan* would be developed to manage a variety of resources including recreational use in the Organ Mountains. Because this area is a permanent impact area and safety buffer, ensuring public safety and flexibility for current and future military missions would tend to precluded recreational use. Enforcement of safety and security policies may reduce trespass grazing and hiking that currently occurs along the western slopes and canyons of the Organ Mountains.

There are no other specific actions proposed in the INRMP that would alter land use and availability for specified uses.

Through the ICRMP, Fort Bliss would integrate historic preservation requirements with planning and conducting military training, construction, repair, and real property and/or land use decisions by implementing near- and long-term cultural resource management priorities. Current land use restrictions would be reviewed, redefined, or refined based upon cultural assemblages and geomorphology across Fort Bliss. The ICRMP would complement BLM management of cultural resources on McGregor Range as specified in the RMPA. The procedures in the ICRMP would avoid or minimize conflict between mission and conservation of cultural resources considerations in land use decisions.

5.2.1.3 Aesthetics and Visual Resources

Main Cantonment Area. Potential impacts to aesthetic and visual resources on the main cantonment would be similar to the No Action Alternative. Additional construction of family housing in

Logan Heights (west) would fit within the surrounding off-post residential context. Changes in scheduling of demolition projects would have no permanent impact on visual resources.

Fort Bliss Training Complex. Potential impacts to aesthetic and visual resources would be the same as for the No Action Alternative. Use of prescribed burns for habitat management in specific areas under the INRMP could temporarily alter the landscape, but not in a manner dissimilar to natural fires. These actions would be coordinated with the BLM's management objectives.

Review, under the ICRMP, of projects adjacent to historic properties may have a beneficial impact on aesthetic compatibility.

5.2.1.4 Cumulative Impacts

Implementation of the LRC of the RPMP should, in general, be compatible with growth in surrounding areas. Most land uses in the vicinity of the main cantonment would benefit from improved circulation and roadway projects. Construction on the main cantonment would not visibly alter surrounding areas or the context of historical sites in the surrounding area. Implementation of the INRMP may improve or protect a variety of natural resources on the installation. Management actions would not have impact on land use in combination with other activities in the region.

5.2.2 Main Cantonment Area Infrastructure

5.2.2.1 Ground Transportation

Traffic impacts described in the No Action Alternative would be improved as a result of the street realignment and widening project scheduled for FY 01. Effects of the rail and air development complexes that are part of the ASMP are described in the project-specific EA (U.S. Army, 1997b) and incorporated here by reference.

5.2.2.2 Utilities, Energy, and Communications

For Alternative 1, personnel strength will remain the same as identified for the No Action Alternative in Tables 3.2-1 and 3.2-3. Utility and energy consumption and communications are expected to be the same as identified in Sections 5.1.2.2, 5.1.2.3, and 5.1.2.4, with the exception of the sanitary landfill proposed for development in FY 01. No change in land use results from siting the new 233-acre landfill one-half mile northeast of the existing landfill. Therefore, potential impacts to the utility, energy, and communication systems would be the same as identified for the No Action Alternative except for the proposed landfill.

5.2.3 Training Area Infrastructure

For Alternative 1, personnel strength will remain the same as identified for the No Action Alternative in Tables 3.2-1 and 3.2-3. Ground transportation, utility and energy consumption, and communications are expected to be the same as identified in Section 5.1.3. Therefore, potential impacts in the areas of transportation, utility, energy, and communications would be the same as identified for the No Action Alternative.

5.2.3.1 Cumulative Impacts

Potential impacts to land use, aesthetic and visual resources would be the same as for the No Action Alternative. Similarly, cumulative impacts to the Main Cantonment Area and training area infrastructure would be the same as for the No Action Alternative.

5.2.4 Airspace Use

The potential impacts to airspace use, resulting from Alternative 1, are discussed below in relation to the four activity categories.

5.2.4.1 Main Cantonment Areas and Fort Bliss Training Complex

Mission Activity. Mission activities for Alternative 1 are the same as those described in the No Action Alternative. Accordingly, mission activity projects under Alternative 1 would have no impacts on airspace use and management.

Facility Construction and Demolition. There are no construction projects identified under this alternative that would affect aircraft operating conditions at Biggs AAF, or that would affect the McGregor Range/R5103B/C or Doña Ana Range–North Training Areas/R-5107A airspace areas. Therefore, there are no construction projects under Alternative 1 that will impact airspace use in the ROI.

Aviation-related demolition projects under Alternative 1 consist of the removal of two aircraft hangars along the Biggs AAF flight line that have been declared excess. Removal of these hangars will not affect aircraft or airfield operations at Biggs AAF. Therefore, this alternative contains no facility demolition projects that will impact airspace use.

Environmental Resource Management. As noted in the No Action Alternative, the Fort Bliss resource management programs are land management programs that do not affect airport- and airspace-related operations and management.

5.2.4.2 Cumulative Impacts

Alternative 1 does not introduce any aircraft or airspace operating conditions that differ from the No Action Alternative. Therefore, the airspace-related cumulative impacts for Alternative 1 would be as discussed under the No Action Alternative.

5.2.5 Earth Resources

The potential impacts to earth resources resulting from Alternative 1 are discussed below. The discussion presents the impacts to geology and soils.

5.2.5.1 Geology

Impacts to geologic resources resulting from the implementation of Alternative 1 would be the same as those discussed for the No Action Alternative.

5.2.5.2 Soils

The potential impacts to soils, resulting from Alternative 1, are discussed below in relation to the five activity categories.

Mission Activity. Mission activities for Alternative 1 are the same as those described in the No Action Alternative. Therefore, impacts to soils from mission activities for this alternative would be the same as those described for the No Action Alternative.

Facility Construction and Demolition. Facility construction projects included in this alternative are similar to those in the No Action Alternative but differ primarily in the timing and property mix that is projected. Impacts to soils from those projects requiring excavation or compaction would be similar to those described in the No Action Alternative.

Demolition of structures would include more than 3,098 family and nonfamily housing structures. Impacts to soils from the demolition of these structures would be similar to impacts described under the No Action Alternative.

Environmental Resource Management. Natural resource management activities that could impact soils under Alternative 1 are similar to those under the No Action Alternative. The major difference would be that management and coordination of resource management activities would be refined through the implementation of the INRMP. The INRMP emphasizes an ecosystem management approach. This change in management would provide greater protection for, and more effective rehabilitation of the soil resource. This plan combined with information from a more detailed soil survey of Fort Bliss (currently underway), would allow more precise identification of, and therefore better management of highly erodible soils.

Activities described in the ICRMP that could adversely impact soil resources include surveys and excavations of cultural resources. Impacts to soils under this alternative would be similar to those described under the No Action Alternative, with the major exception being the addition of a ground disturbance management plan.

5.2.5.3 Cumulative Impacts

Cumulative impacts under Alternative 1 would be the same as those described under the No Action Alternative.

5.2.6 Air Quality

This section presents the air quality impacts of Alternative 1 at Fort Bliss.

5.2.6.1 Main Cantonment Area and Fort Bliss Training Complex

Mission Activity. Mission activities described in the No Action Alternative remain the same for Alternative 1.

Facility Construction and Demolition. The activities will result in short-term, localized increases in air emissions. However, it is expected that the air quality impacts of these activities will be insignificant.

Environmental Resource Management. The Fort Bliss INRMP recommends the development and implementation of a fire management plan to ensure proper use of prescribed burning and wildfire control. The implementation of a prescribed burning program on Fort Bliss will result in significant short-term increases in air emissions. However, timing the burns with proper meteorological conditions will help to reduce the air quality impacts during prescribed burning events.

5.2.6.2 Cumulative Impacts

The cumulative air quality impacts of activities at Fort Bliss that might be anticipated to occur under Alternative 1 were evaluated. In general, the air emissions produced by activities under this alternative will result only in short-term, insignificant air quality impacts that will quickly disperse when that activity is completed, with no known residual effects.

An additional activity under Alternative 1 that could result in cumulative air quality impacts, if or when regional conditions exist for more than a short-term period or over a very localized area, is the implementation of a fire management plan at Fort Bliss.

5.2.7 Water Resources

5.2.7.1 Main Cantonment Area and Fort Bliss Training Complex

Groundwater from the underlying basin-fill deposits of the Hueco Bolson supplies most of the water used by Fort Bliss. Under Alternative 1, water demand for Fort Bliss is similar to that under the No Action Alternative, and would be expected to remain at a fairly constant level of 5,700 afy through 2016. Consequently, the effects of pumpage from the Army well fields on the Hueco Bolson aquifer would be similar to those under the No Action Alternative.

5.2.7.2 Cumulative Impacts

Under Alternative 1, groundwater withdrawals, probably in excess of 150,000 afy, from the Hueco Bolson in the metropolitan El Paso and Ciudad Juarez areas, will be similar to those under the No Action Alternative. Resultant effects on pumping levels and water quality also will be similar. Forecasts of the depletion of fresh water in the aquifer between 2013 and 2025 would remain unchanged.

5.2.8 Biological Resources

In general, the same type of impacts to biological resources from implementation of the No Action Alternative would occur if Alternative 1 were implemented, because this alternative includes all the aspects of the No Action Alternative. In addition, the INRMP would be implemented as part of Alternative 1. On McGregor Range, the INRMP applies to Army fee-owned land and managing impacts 115
of military missions on withdrawn public land as specified in the 1990 MOU with the BLM.

The potential impacts of implementing the INRMP are summarized at the end of this section because many of the components of this plan include vegetation, wildlife, and sensitive species considerations. The separation of these components into biological categories would be inappropriate. In addition, the focus of the INRMP impacts analysis is different from the other biological impacts' analysis presented in this section. The analysis considers the potential impacts of implementing a plan that will provide Fort Bliss guidance regarding the management of its natural resources. A key goal of the INRMP is to set ecosystem management objectives, one of the most important being to maintain integrity of existing ecosystems in support of sustainable training. Other objectives are detailed in Section 3.3.5. The actual site-specific impacts resulting from the implementation of one of the components of the INRMP cannot be determined until the specific component is activated because of site-specific projects. For example, the fire management plan, which is one component of the INRMP, would include guidance and recommendations regarding the various factors that would need to be considered if a prescribed burn is proposed; there will be no site-specific impacts analysis of the flora and fauna because the plan itself will not contain site-specific proposals to conduct prescribed burns. Once a specific proposal for a prescribed burn has been made, site-specific impacts on the flora and fauna, based on the analysis of the recommendations in the fire management plan, can be determined. See Section 3.3.5 for an overall description of the INRMP.

5.2.8.1 Main Cantonment Area and Fort Bliss Training Complex

Impacts to vegetation, wetland habitat, and wildlife would be similar to those described for the No Action Alternative. It is anticipated that these impacts would be less due to the implementation of the INRMP. Alternative 1 also includes numerous construction and demolition projects as described in Sections 3.3.3 and 3.3.4. These activities would take place in the built-up cantonment area, along with a few projects at the McGregor Range Camp. The impacts of these activities on biological resources would be minimal due to the previously disturbed nature of the sites.

<u>Mission Activities</u>

Vegetation. The impacts to vegetation from implementing Alternative 1 would be similar to the No Action Alternative (see Section 5.1.8.1) because the level of military activity on the ranges would remain the same. The degree of these impacts may be less under Alternative 1 because the INRMP would be implemented (see a following section for analysis of the impacts of implementing the INRMP). The development and implementation of the INRMP fire management plan could reduce potential impacts to vegetation under this alternative. For example, prescribed burns could be used to reduce the potential for a stand replacement fire in the conifer forests in the Organ Mountains.

Wetland and Arroyo-riparian Drainages. As with the No Action Alternative, there are not expected to be adverse impacts to wetlands from Alternative 1; although fires resulting from military activities could impact wetlands. Arroyo-riparian drainages could be impacted to the same degree as under the No Action Alternative. Implementation of the INRMP could result in a reduction of these impacts because these drainages are seen as important for the maintenance of biodiversity on Fort Bliss, and the fire management plan could result in lowering the frequency of fire in wetlands and Waters of the U.S. As with the No Action Alternative, impacts to arroyo-riparian drainages would be adverse under this alternative.

Wildlife. The impacts to wildlife due to the implementation of Alternative 1 would be similar or somewhat less then for the No Action Alternative. The impacts to wildlife under Alternative 1 would likely be less because the INRMP is based on the ecosystem management approach, which considers the maintenance of biodiversity for all activities that will take place on Fort Bliss. This means that game, as well as nongame and sensitive species of wildlife will be considered during the planning and implementation of military activities. As with the No Action Alternative, the impacts to wildlife from weapons strikes would be negligible; the impacts of vehicle maneuvers may be adverse; and the impacts of noise and fire on some animal groups may be adverse.

Threatened, Endangered, and Sensitive Species, and Species of Concern. Under Alternative 1, the impacts to sensitive species would be the same or somewhat less than the No Action Alternative. As with the No Action Alternative, implementation of Alternative 1 would have an adverse impact on some sensitive species, a positive impact on others, and no impact on the rest. In addition, implementation of the INRMP may result in a reduction in the potential for negative impacts on sensitive species. For example, if prescribed burns were used to reduce fuel loads in the Organ Mountains, the potential for a stand replacement fire would be reduced and, therefore, the potential for such a fire to have negative impacts on sensitive plants, potential spotted owl and peregrine falcon habitat (to the degree it exists on Fort Bliss), as well as on the gray vireo, and Organ Mountain chipmunk, would be reduced.

<u>Facility Construction and Demolition.</u> Under Alternative 1, facility construction and demolition programs would take place with a revised mix and schedule, compared to those under the No Action Alternative (see Section 3.3.2 and 3.3.3). As with the No Action Alternative, these projects would take place at the cantonment area. Negligible impacts to vegetation, wetlands and arroyo-riparian drainages, wildlife, and sensitive species would occur, because of the already highly disturbed nature of these areas and high level human activity.

Environmental Resource Management. There are 28 components to the INRMP, and all are interrelated with some or all of the other components (Table 5.2-1) (U.S. Army, 1998c). This interrelation or integration of components will facilitate ecosystem management and the preservation of biodiversity.

Each component is discussed in greater detail below. In general, implementation of the INRMP would have a positive impact on biological resource areas of Fort Bliss where the Army has primary environmental resource management responsibilities or compliance responsibilities. The ecosystem management strategy, and increased communication and cooperation among the various users of Fort Bliss, would enhance maintenance biological resources.

Forest Management. (Item 1 of Table 5.2-1) Under the INRMP, at least 14 components may need to be considered for decisions and activities associated with forest management. As shown on Table 4.8-2, woodlands cover 10,205 acres on Fort Bliss. Most of the wooded areas are covered with pinyon pine – juniper plant communities (9,439 acres) with the rest being montane ripiarian woods (395 acres) and conifer forest (371 acres). Approximately 4,360 acres of the pinyon pine – juniper woods are in the Sacramento Mountains foothills and are managed either by the BLM or the USFS. The remaining woodlands are in the Organ Mountains and are managed by Fort Bliss.

The *Forest Management Plan for the Organ Mountains* will be prepared. The plan will include mapping and inventory of the forest stands and provide data on the fire fuel loads in the various stands. The plan will develop a strategy to manage the fuel loads to lower the potential for a stand replacement fire from occurring in the Organ Mountains. The forest management plan will also be used to facilitate the protection of biodiversity in the Organ Mountains and will be closely linked to watershed, fire, sensitive species, and nongame management plans.

Grazing Management. (Item 2 of Table 5.2-1) Under the INRMP (U.S. Army, 1998c), at least 21 components would need to be considered regarding decisions and activities associated with the potential for grazing on the South Training Areas and Doña Ana Range–North Training Areas of Fort Bliss. There is currently no grazing in the South Training Areas or Doña Ana Range–North Training Areas. 116

Activities could include the creation, repair, and upgrading of stock tanks and the water delivery system; maintenance and upgrading of roads; and opening areas for grazing. Alterations of the grazing management plans, as well as other activities associated with grazing, would need to consider potential conflicts on habitat, game, pest, and fire management plans. Under the ecosystem management approach, a determination of the specific grazing projects being considered to effect ecosystem integrity and biodiversity would be required. Potential impacts on grazing are indeterminable at this time.

Habitat Management. (Item 3 of Table 5.2-1) Habitat management plans will be a part of the INRMP. Habitat management could take many forms indicating that, potentially, most other components of the INRMP would need to be considered before specific habitat management actions take place.

Potential habitat management practices may include but not be limited to: (1) planting vegetation for wildlife, erosion control, and land rehabilitation; (2) seed harvesting to be used in revegetation; (3) constructing water control management structures; (4) constructing water units; (5) brush cutting; (6) weed and noxious plant control; (7) controlled burns; and (8) construction of fences to protect sensitive natural resources.

Table 5.2-1. Interrelationship between Components of the Draft Natural Resources Management Plan for Fort Bliss, Texas

Components	*Components (numbered)*																											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
1. Forest management		●	●	●	●			●	●						●	●	●		●	●		●	●	●	●			●
2. Grazing management	●		●	●	●	●	●		●	●		●		●	●	●	●		●	●	●	●	●	●	●			●
3. Habitat management	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●	●	●	●	●	●	●
4. UASA[a]-Organ Mountains	●	●	●		●	●		●	●						●	●			●	●		●	●	●	●			●
5. UASA-Sensitive species habitat	●	●	●	●		●	●	●	●	●	●	●	●	●	●	●	●		●	●		●	●	●	●			●
6. UASA-Arroyo-riparian areas		●	●	●	●		●		●		●	●	●		●	●	●		●	●		●	●	●	●	●		
7. UASA-Otero Mesa		●	●		●	●		●	●	●				●	●	●	●		●	●		●	●	●	●	●		●
8. UASA-Cliffs, caves, mines	●		●	●	●		●				●	●	●		●	●			●	●					●			
9. UASA-Wetlands, playas, springs	●	●	●	●	●	●	●				●	●	●		●	●	●	●	●	●	●	●	●	●	●	●		●
10. UASA-Black grama grassland		●	●		●		●								●		●	●	●	●				●	●	●		●
11. UASA-Hueco Mountains			●		●	●		●	●						●	●	●	●	●	●		●		●	●			●
12. UASA-Culp Canyon WSA		●	●		●	●		●	●						●	●	●		●	●		●		●	●			
13. UASA-Castner Range			●		●	●		●	●						●	●	●		●	●		●		●	●			
14. UASA-Shinnery oak/natural dunes		●	●		●		●								●	●			●	●				●	●			
15. UASA-Buffer zones	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●	●	●	●	●		●	●					
16. UASA-Steep slopes/highly erodible soils	●	●	●	●	●	●	●	●	●		●	●	●	●	●		●		●	●		●	●	●	●	●		
17. UASA-Earthen tanks	●	●	●		●	●	●		●	●	●	●	●		●	●			●	●		●	●		●			●
18. Game harvest management			●												●				●	●					●			
19. Sensitive species management	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●	●	●	●	●	●	●	●	●
20. Nongame species management	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●			●			●			●
21. Transplants and stocks		●							●										●			●						●
22. Wetlands management	●	●	●	●	●	●	●		●		●	●	●		●	●	●		●	●	●		●	●	●			●
23. Water quality management	●	●	●	●	●	●	●		●						●	●	●		●			●		●	●			
24. Soil resource management	●	●	●	●	●	●	●		●	●	●	●	●	●		●			●			●	●		●	●		
25. Fire management	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●	●	●	●	●		●	●	●		●		●
26. ITAM			●			●	●		●	●						●			●					●	●			
27. Cantonment area management			●																●									●
28. Pest management	●	●	●	●	●		●		●	●	●						●		●	●	●	●			●		●	

[a] "UASA" = Unique and sensitive areas.
● Integration Between Components Likely Required.
Source: U.S. Army, 1998c.

Under ecosystem management, habitat management should not compromise ecosystem integrity and should result in the conservation of biodiversity. In addition, potential conflicts of specific habitat management actions with military activities, forest management, grazing, fire management, sensitive species and habitats, wetlands and Waters of the U.S., watershed process, erodible soils, and UASA areas need to be identified and resolved.

UASAs. (Items 4 through 17 of Table 5.2-1) UASAs comprise 14 components of the INRMP as listed on Table 5.2-1 (U.S. Army, 1998c). UASAs include the Organ Mountains; sensitive species habitat; arroyo-riparian areas; Otero Mesa; cliffs, caves, and mines; wetlands, playas, and springs; black grama grasslands; the Hueco Mountains, Culp Canyon WSA, Castner Range, shinnery oak, and other natural dunes; buffer zones around UASA's; steep slopes and highly erodible soils; and earthern tanks. The protection of these areas or resources is important in the maintenance of biodiversity on Fort Bliss and under current conditions, the Army has regulations in-place to protect some of these areas (U.S. Army, 1998c). Under the INRMP, additional special protection areas may be identified during the ongoing baseline and monitoring studies. In addition, the implementation of the INRMP will result in greater communication and coordination between the military units, the DOE, and other entities resulting in a reduced probability of accidental or inadvertent negative impacts to the UASAs.

Game Harvest Management. (Item 4 on Table 5.2-1) In addition to being compatible with the Fort Bliss military mission, hunting and the management of huntable populations will need to be compatible with ecosystem management and the maintenance of biodiversity consistent with the INRMP. Instead of managing for a single species, game management under the ecosystem approach will need to identify, consider, and rectify potential conflicts with other management plans and components of the INRMP such as forestry resources, grazing, habitat management, sensitive species and their habitats, nongame species, wetlands, UASAs areas, watershed processes, and steep slopes and erodible soils. For example, habitat management practices such as grazing, fire, and disking to improve game species habitat have been used in the past without consideration of nongame species such as the Texas horned lizard (a federal species of concern and State of Texas Sensitive Species) and other species (Fair and Henke, 1997). Such nongame species would be considered as part of specific game management actions under the INRMP.

Rare, Threatened, or Endangered Species (Sensitive species) Management. (Item 19 on Table 5.2-1) In general, sensitive species and their habitat are components of the INRMP that need to be considered during the planning process for military activities on Fort Bliss, or for implementing resources management plans for forest resources, grazing, hunting, fire, and habitat management. Sensitive species management plans for specific species appear in Appendix C of the INRMP (U.S. Army, 1998c). The implementation of specific actions to manage sensitive species will need to be consistent with the goals of ecosystem management.

Nongame Species Management. (Item 20 of Table 5.2-1) Nongame species include sensitive species (see above), as well as most of the other wildlife species that occur on Fort Bliss. Inventories for amphibians, reptiles, birds, and mammals have been and continue to be conducted on Fort Bliss. Results from these studies will provide species lists along with data on distribution and relative abundance of many nongame species on Fort Bliss. These studies have shown that the arroyo-riparian habitat on Fort Bliss is important for neotropical migrant and nesting birds and reptiles (see Section 4.8.3). Other important areas for nongame species are the Organ Mountains, the Otero Mesa escarpment, the Hueco Mountains, and the Sacramento Mountains foothills. It is anticipated that additional areas important to nongame species and the maintenance of biodiversity will be identified as a result of these studies.

Implementation of the INRMP will result in the consideration of nongame species not only for specific military activities, but also for essentially all specific resource management activities including forest, grazing, game, habitat, pest, and fire management.

Transplants and Stocks. (Item 21 of Table 5.2-1) Transplants and stocking are techniques that are used to enhance existing populations or to introduce new species to an area. These techniques can be used when native species have declined or disappeared from an area. For example, black-tailed prairie dogs from Otero Mesa were used to restock areas where black-tailed prairie dogs had been eliminated from their historic range. No transplants or stocking of vegetation or wildlife have occurred on Fort Bliss, although there is the potential for the introduction of grass carp (*Cteno pharyngodon*) into ponds on the golf course to control aquatic vegetation.

Wetlands Management. (Items 22 of Table 5.2-1) Under the INRMP, the protection, delineation, and mitigation of wetlands losses is required as described under the No Action Alternative. In addition, a more detailed analysis of the functional aspects of wetlands consistent with ecosystem analysis and the maintenance of biodiversity would take place. This analysis may include determining if the wetland is important for neotropical migratory and breeding birds and other nongame species, an important use area for game species, and/or importance of area for sensitive species.

The potential effects of all military activities on wetlands will need to be considered, as well as potential effects of various natural resource management plans such as forest, grazing, game, habitat, and fire management plans.

The location of Waters of the U.S. are currently being mapped on Fort Bliss; mapping has been completed on the South Training Areas, Doña Ana Range–North Training Areas, and McGregor Range (see Section 4.8.2). As with jurisdictional wetlands, impacts to Waters of the U.S. are subject to the 404 Permit process. Most of the probable Waters of the U.S. are dry washes that traverse Fort Bliss and in the past, military activities have taken place in some of these washes. Recent studies on Fort Bliss have shown that some of these washes are important travel corridors for neotropical migrant birds and are important to a variety of nongame as well as game species. Under the INRMP, certain proposed activities in Waters of the U.S. would be evaluated to determine if the action is subject to the 404 Permit process, but it would also undergo more detailed study to determine its importance in terms of maintaining biodiversity. As with wetlands, the potential effects of environmental resources management activities on Waters of the U.S. will need to be addressed before these actions can take effect.

Water Quality Management. (Item 23 of Table 5.2-1) The principal mechanism for the water quality management is erosion control, and an erosion survey is currently under way on Fort Bliss. At present, no specific water quality management plans exist. The primary objectives of water quality and erosion management plans would be to: (1) protect, maintain, or improve the quality of soil and water resources; (2) prevent deterioration of soil and watershed conditions where possible; and (3) prevent or minimize damage to natural site characteristics and prevent economic losses due to floods, sedimentation, or accelerated runoff (U.S. Army 1998c). Other factors that may need to be considered for any watershed project include forestry, grazing, habitat, sensitive species, nongame species, wetlands, and fire management plans, as well as ITAM.

Soil Resources Management. (Item 24 of Table 5.2-1) AR 200-3 requires that sources of dust, runoff, and soil erosion be controlled to prevent damage to land and water resources, as well as equipment and facilities. In addition, cryptogamic crusts have important ecological functions and need to be considered under soil resources management. To this end, a comprehensive soil survey is being prepared for Fort Bliss, which will provide information on soil types and characteristics, as well as identify areas that have erosion problems along with potential corrective measures. This information will be used to identify areas that are highly susceptible to erosion, activities that may have adverse impacts to soils in these areas, mitigation measures, and alternate areas to conduct military activities. Fort Bliss currently addresses erosion problems and prioritizes erosion sites for treatment in an informal program of revegetation and erosion control. Various other components of the INRMP would need to be considered depending on the specific soil resource management strategy that is being implemented.

Fire Management Plan. (Item 25 on Table 5.2-1) The *Fort Bliss Fire Management Plan* has not been completed. Fort Bliss currently has a fire suppression plan that outlines fire control procedures 5 miles and more outside the cantonment area and are under the control of Range Control. Fires within 5 miles of the cantonment area are the responsibility of the Fort Bliss Fire Chief. The BLM is responsible for monitoring and suppressing all nonmilitary fires on McGregor Range, while the military is responsible for monitoring and suppressing all military-related fires on the range.

The *Fort Bliss Fire Management Plan* will include the above existing fire suppression plan and will also address other fire management issues. For example, the INPMP will identify sensitive areas in terms of the maintenance of biodiversity and, if possible, the fire management plan will provide recommendations to lessen the impact of fires on sensitive areas. The plan will also address prescribed burns and include a discussion of factors that need to be considered before a prescribed burn is implemented. This would include such factors as: (1) the purpose of prescribed burns; (2) probable locations where such burns may take place; (3) approximate size of burn; (4) recommend time of year to conduct prescribed burn; (5) weather parameters that need to be met before a prescribed burn can take place; and other information. Prescribed burns may take place in the Organ Mountains to reduce the fuel loads or in grasslands to reduce shrub cover. As indicated in Section 5.1.8.1 under *Vegetation*, the long-term suppression of fire in forested areas, including the Organ Mountains, has lead to the accumulation of fuel loads that could result in a stand replacement fire. The objective of prescribed burns in these mountains would be to lower the fuel loads to lessen the potential of future large fires. Use of prescribed burns will have to be carefully evaluated and potential conflicts with military operations as well as all the other components of the INRMP could occur (Table 5.2-1). For example, prescribed fires have the potential to conflict with forest management, grazing, game harvest, and pest management. In addition, the potential effects of prescribed burns on sensitive species and their habitat, nongame species, wetlands, water quality and watershed processes, UASAs, WSAs, and areas of steep slopes and erodible soils will need to be addressed.

ITAM. (Item 26 of Table 5.2-1) ITAM is a management and decision-making process that integrates Army training requirements with natural resource management. Fort Bliss ITAM has four components, including: (1) monitoring land and resource condition through the LCTA; (2) soldier environmental awareness; (3) land rehabilitation and erosion control technologies to conserve resources through land rehabilitation and maintenance (LRAM); and (4) the integration of training requirements with the natural resources through training requirements integration (TRI) (U.S. Army 1998c). The purpose of the LRAM is to repair damaged land to facilitate military activities and prevent further degradation of the natural resources. Another important function of the LRAM is to identify areas that are least susceptible to damage from military activities. LRAM uses the Site Rehabilitation Prioritization system to identify and prioritize degraded training areas for potential rehabilitation. The DOE will review all rehabilitation proposals to make sure they are consistent with the ecosystem management approach and have considered other components of the INRMP such as sensitive habitats and species.

The TRI component of ITAM is designed to site military missions and other land uses in areas capable of supporting these uses. TRI includes rest and rotation of training lands and scheduling the use of lands according to their carrying capacity. At present, land carrying capacity is judged subjectively based on the observation of training impacts. In the future, carrying capacity will be judged more objectively to support decisions concerning use of the land.

Cantonment Area Management. (Item 27 of Table 5.2-1) The cantonment area is highly developed and does not contain many natural resources. The primary goal of cantonment area management is to provide an aesthetically pleasing and pest-free environment. Another major component of cantonment area management is the protection of water resources. Chemical use and waste disposal need to be carefully monitored because the cantonment area has been subject to flooding in the past. Chemicals are used mainly for lawn and golf course maintenance, while wastes are disposed of in a landfill on Fort Bliss.

Storm water runoff is stored in a detention pond so the contamination of groundwater and other water resources from this runoff is not likely. In addition, Fort Bliss has a *Storm Water Pollution Prevention Plan*.

Pest Management. (Item 28 of Table 5.2-1) Fort Bliss has a *Pest Management Plan*, which establishes priorities for pest management on Fort Bliss and provides guidelines for operating an effective pest management program. Specific aspects of the program include health and environmental safety and pest identification, as well as information on the transport, storage, use, and disposal of pesticides. Major animal pests can include mice, gophers, cats, dogs, skunks, termites, mosquitoes, flies, cockroaches, and other insects. The primary plant pests are Bermuda grass, silver nightshade, nut grass, sandbur, kochia, and Russian thistle. Within the context of ecosystem management, pest management would consider the potential effects on ecosystem process and biodiversity. This would include considering potential impacts to sensitive species and their habitats, wetlands and Waters of the U.S., nongame species, game species, and UASAs. Potential conflicts with other management plans such as forest resources, grazing, hunting, habitat management, and fire would be identified and rectified. In addition, pest reduction or eradication measures would take place in an environmentally sound manner such as using methods that are least damaging to the environment and/or using pest control compounds that are approved by the EPA.

Impacts Summary. Based on the foregoing analysis, the implementation of the INRMP on Fort Bliss will result in the following positive impacts to the biological systems on Fort Bliss:

- Enhanced communication, coordination, and cooperation between the DOE and other Fort Bliss entities such as USACASB, Director of Plans, Training, Mobilization, and Security (DPTMS), and the Directorate of Public Works and Logistics (DPWL);

- Enhanced communication and cooperation between the DOE and agencies such as the BLM, USFS, and NMDGF, which have management responsibilities for some of the natural resources on Fort Bliss;

- Consideration of ecosystem process and the maintenance of biodiversity in natural resource management, military training and testing activities, and public use of Fort Bliss for recreation activities such as hunting;

- Increased assurance for the protection of natural resources where possible; sensitive species, sensitive and important habitats, UASAs, biodiversity and areas important for the maintenance of biodiversity, and nongame wildlife species;

- Increased assurance that all activities that take place on Fort Bliss will comply with applicable federal and state natural resource regulations; and

- Increased assurance that military activities will occur in the most appropriate locations from an ecosystem function and maintenance of biodiversity perspective.

Facility Construction and Demolition. Under Alternative 1, facility construction and demolition programs would take place with a revised mix and schedule, compared to those under the No Action Alternative (see Sections 3.3.2 and 3.3.3). As with the No Action Alternative, these projects would take place at the cantonment area. Negligible impacts to vegetation, wetlands and arroyo-riparian drainages, wildlife, and sensitive species, would occur because of the already highly disturbed nature of these areas and the high level of human activity.

5.2.8.2 Cumulative Impacts

Cumulative impacts associated with Alternative 1 would be similar to the No Action Alternative. The degree of these impacts may be somewhat reduced in Alternative 1 due to the positive impacts of implementing the INRMP.

5.2.9 Cultural Resources

Alternative 1 includes the proposed implementation of the RPMP and contributing plans, as well as all actions contained in the No Action Alternative.

5.2.9.1 Main Cantonment Area and Fort Bliss Training Complex

Impacts to cultural resources that would result from the implementation of the proposed action are presented in this section. Impacts are described in relation to the major activity categories.

Mission Activity. Mission activities for this alternative are the same as for the No Action Alternative.

Under Alternative 1 and the implementation of the ICRMP, Fort Bliss will accomplish integration of historic preservation requirements with planning and conducting of military training, construction, maintenance, repair, and real property and/or land use decisions by implementing short- and long-term cultural resource management priorities. Implementation of Alternative 1 would also encourage more long-range studies that would identify and evaluate cultural resources on the installation well in advance of mission activities. The ICRMP would provide a structure in which information regarding the known cultural resources would be maintained in a more accessible format, increasing the value of the information for planning purposes, and improving project coordination by completing the Section 106 process earlier. The 36 CFR Part 800 that implements Section 106 of the NHPA requires a formal review process that takes a minimum of 90 days each time an action is planned that might have an adverse affect on any buildings, archeological sites, bridges, objects, districts, landscapes, etc., that are eligible for inclusion in the NRHP. It also requires that properties that haven't been evaluated go through the process until they are found eligible or ineligible.

Using the ICRMP, procedures would be established to avoid or minimize conflict with mission activities, while enhancing the preservation and conservation of cultural resources. This would be accomplished through consistent mechanisms that would accelerate the routine process of identifying cultural resources in areas to be impacted and mitigating those impacts. The ICRMP also establishes priorities for cultural resource inventories and evaluations on the various ranges in order to compile the baseline information, on McGregor Range, necessary for the effective management of the cultural resources throughout the installation. On McGregor Range, cultural resources are managed in accordance with the RMPA for McGregor Range.

The ICRMP sets up procedures that will allow Fort Bliss to accomplish routine actions following pre-approved procedures and report them for review annually. As long as the plan is followed and the annual report is accepted, Fort Bliss manages the program. This plan also is proactive in the sense that some actions such as local emergencies and construction modifications are reviewed quicker than the standard regulations allow. Actions may be individually reviewed when the pre-approved procedures do not meet mission requirements or are not appropriate in a particular circumstance. For the Army and other land and real property managing agencies with day-to-day operational control of historic properties, 36 CFR Part 800 recognizes that project-by-project compliance for each action is not practical.

A further example of the proactive nature of the ICRMP is the archaeological management program. The priority of this program will be its transition to a management program driven by the short- and long-term goals of the Fort Bliss military mission. As military reductions and realignment compress the available land for training within the continental United States, Fort Bliss must be able to support training of units not only permanently assigned to the installation, but also U.S. and allied units assigned elsewhere. Its primary goal will be to examine and manage archaeological properties in areas where training needs require the most intensive land use and flexibility. It also includes proactive evaluation of range areas where specific facilities are projected for construction and/or land areas are projected for expanded or modified training capability.

The ICRMP will give Fort Bliss the opportunity to manage its cultural resources within predefined limits and report its actions annually, without the burden and delay of prior review of each action.

Because Fort Bliss has had neither a systematic program for identification, evaluation, and treatment of historic properties, nor public participation in its program, the ICRMP provides a reasonable schedule and budget for the identification, evaluation, and treatment of historic properties. It also requires that Fort Bliss make documentation available to the public and address public comment and objections.

Facility Construction and Demolition. Alternative 1 construction projects would include a changed schedule for the replacement of family housing units in Logan Heights-West and Aero Vista, and fewer family housing replacements in the north main cantonment than would occur under the No Action Alternative. Other proposed construction would include utilities work and the establishment of a new field training area on the McGregor Range. Many of the additional facility construction projects outlined under this alternative have the potential to impact cultural resources. These potential impacts would be to architectural resources (construction without ground breaking), archaeological resources (construction with ground breaking), and TCPs (construction in nonbuilt-up areas). However, implementation of Alternative 1 could have a beneficial effect on cultural resources because procedures identified in the ICRMP and associated documents could significantly reduce the impacts to cultural resources through increased coordination, focus, and planning.

Alternative 1 facility demolition projects would continue as described in the No Action Alternative with some exceptions; family housing demolition in Aero Vista and Van Horn Park would be rescheduled, additional units of nonfamily housing would be demolished, and the demolition status of some facilities would change.

The planned demolition of some structures in the main cantonment, Logan Heights, Aero Vista, and the WBAMC has the potential to adversely affect some historical architectural resources. For example, 64 structures are included in the William Beaumont General Hospital Historic District, which is eligible for inclusion in the NRHP. However, implementation of Alternative 1 could have a beneficial effect on the architectural resources in these areas because procedures identified in the RPMP, ICRMP, and associated documents could significantly reduce the impacts to cultural resources through increased coordination, focus, and planning.

Environmental Resource Management. In addition to activities discussed under the No Action Alternative, Alternative 1 would implement the RPMP, ICRMP, and INRMP. Adoption of the procedures outlined in the INRMP, ICRMP, and supporting documents would have a beneficial effect on cultural resource management at Fort Bliss. It would improve guidance for resource managers, encourage communication, improve information access, accelerate investigations, reduce conflicts, increase conservation, and generally improve the focus of the process. More specifically, implementation of the ICRMP would provide:

- Increased environmental training for range users;
- Increased enforcement of cultural resource laws and regulations;
- Improved coordination with other management activities;
- Increased efficiency in routine, reoccurring cultural resource management activities;
- Increased public awareness and participation in the cultural resource management program; and
- A reduction in potential conflicts between cultural resources and mission activities resulting in proactive management and awareness of significant cultural resources.

5.2.9.2 Cumulative Impacts

The nature of the impacts under the No Action Alternative and this alternative remain similar. However, the implementation of the ICRMP and other management plans would have a beneficial effect in that the cumulative effects to cultural resources should be reduced by introducing better, more consistent, long-term management practices over the No Action Alternative.

5.2.10 Noise

This section addresses noise associated with Alternative 1. Those projects and activities included in the programs of Alternative 1 that have the potential to create noise impacts are addressed in each of the activity-related categories identified below.

5.2.10.1 Main Cantonment Area and Fort Bliss Training Complex

Mission Activity. On Fort Bliss and Biggs AAF, mission activities remain as described for the No Action Alternative. As previously discussed in Section 5.1.10, the major element of these activities with the potential to create noise impacts is at Biggs AAF during mobilization.

Mission activity on the ranges generally continues as described for the No Action Alternative. As previously discussed, noise levels associated with these activities is random, sporadic, and transient. Furthermore, the noise levels are not significantly high, and are totally confined within the range boundaries.

Facility Construction and Demolition. Under Alternative 1, the facility construction program would be similar to that described under the No Action Alternative. On Fort Bliss and Biggs AAF, noise associated with construction activities would be localized, of a temporary nature, and would not be expected to create any L_{dnmr} that would create disturbance to significant numbers of persons exposed to the noise. On the ranges, construction-related noise would also be localized to the construction site, and would not extend beyond range boundaries.

Facility demolition planned under this alternative would be similar to that proposed for the No Action Alternative. Noise resulting from demolition activities would be localized, temporary, and would not create any long-term adverse impacts.

Environmental Resource Management. Some environmental resource management programs could require the use of motorized earth-movement equipment that would result in localized, temporary noise in some areas. However, no long-term noise effects would occur.

5.2.10.2 Cumulative Impacts

Cumulative impacts under this alternative would be as described under the No Action Alternative in Section 5.1.10.2.

5.2.11 Safety

5.2.11.1 Main Cantonment Area and Fort Bliss Training Complex

Those projects and activities within the programs under Alternative 1 that have the potential to impact safety are addressed in each of the activity-related categories identified below.

Mission Activity. Activities and the associated impacts under this alternative remain the same as under the No Action Alternative.

There are no known conditions within the Fort Bliss cantonment area that create any extraordinary ground safety issues.

Facility Construction and Demolition. The construction program projects under Alternative 1 include elements of the P3 CIS, military housing, and other projects discussed under the No Action Alternative, as well as other maintenance, industrial, and housing facilities, range improvements, and community infrastructure upgrades. The planned construction of additional troop and family housing units, and three tactical maintenance shops do not involve any unique construction practices or materials.

Other range upgrades and improvements include the Multipurpose Small Arms Range and Combat Pistol Course (MSAR/CPC), upgrade of Patriot Launch Site 1, FAW Sites 4 and 10, and development of a multi-purpose small arms range. If developed, the MSAR/CPC would be located on the Meyer Range complex. These ranges currently support extensive small arms training. Safety procedures developed for these operations would remain applicable for any new activities. There are no significantly increased risks associated with this proposal. Upgrades to other launch and firing points would enhance safe use of these areas.

Other industrial construction involves the relocation of an ASP from the Main Post to McGregor Range. This project, with all supporting infrastructure, will improve explosive safety on McGregor Range, and reduce explosive safety risk in the Main Cantonment Area.

Other potential projects involve the development of a sanitary landfill and upgrades to streets. Neither of these projects creates safety concerns, as long as the landfill project is sited far enough away from any aviation activities to minimize the effects of the high concentrations of birds that are normally associated with landfills.

The majority of the facilities planned for demolition under this alternative are family housing units. As previously discussed in Section 5.1.11, there are no specific safety issues associated with facility demolition, other than the need to comply with federal and state requirements for the management of items of special concern such as asbestos (see Section 5.2.12).

Environmental Resource Management. Under Alternative 1, environmental resource management will be accomplished in accordance with ITAM, the INRMP, and the ICRMP. Safety considerations associated with activities under ITAM were discussed previously in Section 5.1.11, and remain valid under this alternative. The INRMP and ICRMP add program specificity and an expanded scope for managing, preserving, and enhancing regional resources. In general, the safety considerations applicable to ITAM are also applicable here. However, some specific aspects of each program also create specific potential safety considerations.

There are elements of the INRMP that introduce the potential for increased joint use of portions of the training areas and ranges. Increased access also indicates the need for increased surveillance and control, to ensure clearing of areas that may be involved in military range use. These factors, along with the attendant removal or mitigation of hazards in the area, will have a positive safety impact. Overall, implementation of the INRMP would be expected to enhance safety on the training complex. 117

Personnel conducting ICRMP resource surveys must be sensitive to the possible presence of ordnance and explosive hazards. However, if proper procedures are established, ground and explosive safety risks will remain low.

5.2.11.2 Cumulative Impacts

Cumulative effects under this alternative remain as discussed in Section 5.1.11.

5.2.12 Hazardous Materials and Items of Special Concern

5.2.12.1 Main Cantonment Area and Fort Bliss Training Complex

Mission Activities

Hazardous Materials

Hazardous Chemicals. There would be a slight increase in the use of hazardous chemicals because of new facilities such as the tactical equipment shops, the expansion of the ASP, and the upgrade of weapons training sites. However, since the installation strength and assigned equipment would remain approximately the same as for the No Action Alternative, the increased use of hazardous chemicals would be insignificant. There would be a slight increase in the potential for releases of fuels, oils, and hydraulic fluids during the servicing and operation of construction equipment. The increased use of hazardous chemicals would have no adverse environmental impacts.

Hazardous Wastes. There could be a slight increase in hazardous waste generation because of the use of slightly increased amounts of hazardous chemicals in the new facilities. Hazardous waste disposal processes would be the same as those described for the No Action Alternative. The increased generation of hazardous wastes would have no adverse environmental impacts.

Items of Special Concern

Medical and Biohazardous Wastes. The environmental impacts from medical and biohazardous wastes under this alternative, are the same as those described under the No Action Alternative.

Low-level Radioactive Waste. Under this alternative, the environmental impacts from the generation of low-level radioactive wastes, would be the same as those described for the No Action Alternative.

Asbestos. There would be a significant increase in the generation of ACMs from the demolition of both family and nonfamily housing. Asbestos waste materials would be disposed of in an on-post solid waste landfill. Since total planned landfill capacity is adequate, there would be no adverse impact.

Lead-based Paint. Under this alternative, there would be an increase in the generation of lead-contaminated wastes from demolition of housing facilities. Waste disposal processes would be the same as those described for the No Action Alternative. The increase in the generation of lead wastes would result in no adverse impacts because the wastes would be managed in accordance with applicable standards and regulations.

Pesticides. The environmental impacts from pesticides, under this alternative, would be the same as those described for the No Action Alternative.

Polychlorinated Biphenyls. The environmental impacts from PCBs, under this alternative, would be the same as those described for the No Action Alternative.

Petroleum Storage Tanks. The environmental impacts from petroleum storage tanks, under this alternative, would be the same as those described for the No Action Alternative.

Related Management Programs

Installation Restoration Program. Under this alternative, the environmental impacts from the IRP would be the same as those described for the No Action Alternative.

Pollution Prevention. The environmental impacts from the pollution prevention program, under this alternative, would be the same as those described for the No Action Alternative.

Facility Construction and Demolition. Facility construction will have negligible impacts on the use of hazardous chemicals and the generation of hazardous wastes.

There would be a significant increase in the generation of ACMs and lead-contaminated wastes from the demolition of both family and nonfamily housing. The increase in asbestos and lead wastes (see *Asbestos* above) would result in no adverse environmental impacts because these wastes would be properly managed.

Environmental Resource Management. Environmental resource management plans will not impact the use of hazardous materials or the generation of hazardous wastes.

5.2.12.2 Cumulative Impacts

Cumulative effects under this alternative remain as described under the No Action Alternative.

5.2.13 Socioeconomics

Personnel levels during peacetime and mobilization conditions under Alternative 1 are not expected to vary noticeably from those anticipated for the No Action Alternative discussed in Section 5.1.13. Since potential socioeconomic effects are derived directly from these personnel levels, the results reported for the No Action Alternative will be replicated here.

5.2.13.1 Main Cantonment Area and Fort Bliss Training Complex

Under Alternative 1 there would be a shift in the location of numerous military family housing units from the Main Post to the Logan Heights area, a short distance to the west. There are currently three schools (all elementary and operated by the El Paso ISD) located on Fort Bliss property: Bliss (on the Main Post), Milam (on Biggs AAF), and Logan (in the Logan Heights military family housing area). The relocation of military families and their children could cause disruptions of a short-lived nature to enrollment levels at each of these schools. It must be added, however, that none of the schools exclusively serves children of military personnel and their catchment areas contain areas located off the installation. No significant adverse impacts associated with this planned redistribution of military family housing units is anticipated.

5.2.13.2 Cumulative Impacts

It is unlikely that any population increases associated with added employment in either El Paso County or Otero County will create adverse effects on community services such as public schools, police and fire protection, health care services, and public finances.

5.2.14 Environmental Justice

5.2.14.1 Main Cantonment Area and Fort Bliss Training Complex

Land Use. Under Alternative 1, the RPMP would be implemented. Changes in the construction projects and schedule from the No Action Alternative would occur, such as revised demolition and construction of new family housing and development of troop housing, community facilities, outdoor recreation areas, industrial uses, and infrastructure, which would provide improved facilities to meet mission requirements and would generally be consistent with adjacent on-post uses. Surrounding off-post areas would generally not be affected by intensification of use on the Main Post because of physical separation provided by arterial roads, and compatibility of similar adjacent functions. An exception to this is two schools located directly south of the Main Post where training areas would be expanded. The use of adjacent land for education would be incompatible with potential intensified training in the future or if mobilization occurs. Some continuing and some new incompatible adjacent land uses would be unavoidable. These areas would benefit from site specific actions such as visual buffers (both internally and with adjacent off-post areas, for example buffering between expanded troop housing in Logan Heights and off-post residential areas), noise reducing construction materials, limiting intensity of use, or arranging circulation.

Land use impacts would generally be beneficial, and would primarily affect areas on post within the Main Cantonment Area and within the boundaries of the range and training areas. Adjacent off-post areas would not be appreciably affected. Census tracts located off-post adjacent to the Main Post, generally have minority and low-income population percentages that are similar to or higher than the general population of El Paso County (see Section 4.14), which is 74.3 percent minority, and had 26.3 percent of the population living below poverty in 1990. Potential small reductions in available grazing lands, recreation access, and additional isolated noise effects related to proposed use of the McGregor Range for a tactical target complex, would not be appreciable but could affect some users and adjacent areas. Land use impacts from the proposed action would not be expected to cause disproportionately high and adverse human health and environmental effects on low-income and minority populations.

Infrastructure. Changes in ground transportation, utilities, and related infrastructure in the Main Cantonment Area and training areas would be similar to the No Action Alternative. No significant adverse effects have been identified and no environmental justice effects are expected.

Airspace. Airspace activity is the same for Alternative 1 as for the No Action Alternative, except for the proposed new target complex on McGregor Range, which would not change the related airspace area and has been addressed in a separate EIS. Impacts on airspace or air traffic operations are not expected to have any environmental justice impacts.

Earth Resources. Facility construction and demolition actions would be similar to those under the No Action Alternative and could cause soil disturbance. However, impacts to geology and soils would not have adverse impacts on human health or the environment that would affect populations in the project area and would have no environmental justice impacts.

Air Quality. Air quality impacts would differ from the No Action Alternative primarily with regard to the construction and use of the proposed tactical target complex on McGregor Range. These actions are not expected to cause any exceedance of air quality standards or regulatory noncompliance. No environmental justice impacts are expected for air quality.

Water Resources. Water resource impacts would be similar to those described in the No Action Alternative. No significant, adverse impacts to water resources have been identified, and no environmental justice impacts are expected.

Biological Resources. In general, impacts to biological resources from implementation of Alternative 1 would be the same as for the No Action Alternative. Impacts to biological resources, including vegetation, wetland habitat, wildlife, and threatened and endangered species are not expected to result in adverse impacts on human populations in the project area and would not cause environmental justice impacts.

Cultural Resources. Implementation of the ICRMP would increase the likelihood of reaching cultural resource management goals through the use of SOP guidelines. It would assist with goals such as providing information for long-term facility planning, streamlining routine undertakings, identifying potentially sensitive areas of traditional Native American use, and maintaining open lines of communication with stakeholders.

As with the other alternatives, the Army is coordinating with Native American groups regarding the development of the ICRMP, and Native American groups were contacted through the environmental justice outreach mailing. Overflights may, as with the other alternatives, have potentially adverse impacts to the setting of TCPs valued by Native Americans living in the project area. No significant traditional Native American resources have been identified under the restricted airspace. Noise may affect TCPs in a variety of ways. Auditory impacts to other, presently unidentified, Native American resources beneath the airspace are possible, but probably would be infrequent.

Noise. More construction and demolition projects would occur than under the No Action Alternative, but noise effects would be localized and transient over brief periods. No significant adverse noise effects are anticipated and no noise-related environmental justice effects are expected.

Safety. Safety considerations differ from the No Action Alternative due to the siting of new air defense training sites on McGregor Range, which may require surveys for and clearing of ordnance and explosive hazards. Implementation of the INRMP would increase joint use of portions of the range areas and require increased control. No environmental justice impacts are expected in connection with potential increases in safety risks.

Hazardous Material and Waste Management/Pollution Prevention. There would be a slight increase in the procurement, storage, and use of hazardous materials and the generation of hazardous wastes as compared to the No Action Alternative, and a significant increase in the generation of ACMs from facility demolition. No environmental justice impacts are anticipated.

Socioeconomics. Personnel levels under this alternative are not expected to vary from the No Action Alternative and, therefore, socioeconomic effects would be the same as for the No Action Alternative. Socioeconomic impacts would benefit the local economy and are expected to provide benefits to the general population including low-income and minority populations living in the area.

5.2.14.2 Cumulative Impacts

There would be no cumulative environmental justice impacts from Alternative 1.

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5.3 ALTERNATIVE 2

Alternative 2 incorporates the actions described in the No Action Alternative and Alternative 1, except where management actions proposed in Alternative 1 supercede actions currently taking place in the No Action Alternative.

The distinguishing characteristic of Alternative 2 is the mission requirement to develop additional controlled access FTX sites on the installation, specifically on McGregor Range. The DA force structure realignment co-located ADA Brigades in the continental U.S. at Fort Bliss. This realignment established Fort Bliss as the Army's ADA Center of Excellence. At present, there are no adequate air defense training sites on the Fort Bliss Training Complex to support the training requirements of the ADA Brigades. Actions planned to improve the capabilities to support FTXs are:

- Mission Activities. This would involve identification of an additional 13.5 square miles of suitable terrain to support FTXs. Some sites would likely be located on Otero Mesa south of New Mexico Highway 506, while the remainder would likely be east of U.S. Highway 54 in the Tularosa Basin portion of McGregor Range. The entire training area would be closed when the FTX sites are in use. The new FTX sites would be accessible for use throughout the year, but would not be used 25 continuously. Potential environmental impacts could result from training use by increasing the size of training units. Land use designations on McGregor Range would not change.

- Facility Construction and Demolition. Facility construction and demolition activities under Alternative 2 would be the same as those described under Alternative 1.

- Environmental Resource Management. Environmental resource management activities under Alternative 2 would be the same as those described under Alternative 1.

This section describes only those activities that are unique to Alternative 2, and their contribution to cumulative effects. The reader is referred to Section 5.2 for discussions of Alternative 1 impacts.

5.3.1 Land Use

5.3.1.1 Main Cantonment

Land use impacts on the main cantonment would be the same as those previously described in Sections 5.1.1.1 and 5.2.1.1.

5.3.1.2 Fort Bliss Training Complex

Under this alternative, five existing controlled access FTX sites would be removed from the current Patriot Site inventory, resulting in an additional 13.5 square miles being newly designated for field training activities on McGregor Range. The FTX sites may be unfenced so that cattle could continue to graze. When being used for an exercise, the training area in which the site is located would be closed to 118 public access. It is possible that all the sites would be located in the nonmountainous grazing areas, where risks from ordnance and explosive hazards are suitably low for concentrated vehicular and ground troop activity. Because it is not currently known how frequently sites would be used and which grazing units would consequently be most affected, a separate EA would be completed if this action is carried forward. However, potential effects to grazing from loss of productive grazing land and loss of access to perform grazing management tasks, and reduced access to withdrawn lands for recreation, are the primary potential land use impacts. In any case, the land use designations presented under Alternative 1 in Figure 3.3-8 would not change.

Ground disturbance and resultant loss of forage can result from field exercise activities, but use of existing controlled access FTX sites in grazing areas has not decreased their value for grazing operations, as indicated by continuing high bid values for AUMs on McGregor Range. However, it is difficult to predict long-term effects on forage (and potential reductions in grazing land) due to lack of vegetative plot data. However, grazing conditions on the new controlled access FTX sites are expected to be similar to those on the existing sites used for Roving Sands. This action could, therefore, have a minor but temporary impact on grazing. If the new sites are used intermittently during the year, as proposed, recreational access (primarily for hiking and game bird hunting) could be reduced to the extent of additional use occurring weekends and during the hunting season when public recreation is the most frequent. In some cases, it may be preferential to exclude cattle from sites where restoration could be hampered by continued grazing. Based on current data and imagery regarding Roving Sands activities, about 100 acres of land on Otero Mesa used for field exercises may experience a temporary reduction in vegetative cover following Roving Sands activities (Locke, 1999). This could increase proportionally to increases in FTX use, but would still remain a very small percentage of grazing area that may lose productive capacity temporarily. It is anticipated that licensed deer and antelope hunts would continue to be coordinated between the NMDGF, BLM, and Fort Bliss, resulting in no impact on these activities.

5.3.1.3 Aesthetic and Visual Resources

Use of FTX sites could disturb vegetation and produce imprints of tire tracks that are visually unappealing in the foreground. By rotational use of sites, this disturbance should recover and cause no long-term effects on the visual landscape. Under the worst case scenario, areas of land would be destroyed and not recover. These would detract from visual quality in localized areas, but are not likely to be highly noticeable or incongruous with the distant landscape.

5.3.1.4 Cumulative Impacts

Cumulative impacts for the main cantonment and surrounding areas would be the same as under Alternative 1 (see Section 5.2.1.2). In combination with activities under the No Action and Alternative 1, there could be cumulative effects on grazing and recreation. Loss of 2 percent of the current grazing area in TAs 17 and 21, and potential temporary reduction in productivity or rangeland on FTX sites (affecting a maximum of 3 percent of the grazing area) could reduce the quantity or quality of grazing on 5 percent of the grazing land on McGregor Range, and less than 1 percent of grazing resources in Otero County. Training at the new target complex and increased use of FTX sites could limit access to much of Otero
116 Mesa south of New Mexico Highway 506 by 60 hours each week during weekdays and a few additional days each year. Agreements between the BLM and the USAF are aimed at maintaining grazing operations at functional levels. In general, Otero Mesa would be available for recreation on weekends. Given the very low level of public use of these areas currently, and widespread availability of public land in the region, this would have a minor impact on the recreational use in the region.

5.3.2 Main Cantonment Infrastructure

Under this alternative, personnel strength will remain the same as for Alternative 1. As a result, transportation, utility, energy, and communications impacts in the Main Cantonment Area would be the same as for Alternative 1.

5.3.3 Training Area Infrastructure

Potential impacts would be the same as for Alternative 1, with the exception that on-road vehicle traffic would increase on McGregor Range to the extent that the additional controlled access FTX sites are used.

5.3.4 Airspace Use

5.3.4.1 Main Cantonment Area and Fort Bliss Training Complex

In addition to the actions specified in Alternative 1, Alternative 2 accommodates mission requirements through the development of new controlled access FTX sites on McGregor Range. The new controlled access FTX sites would be established within the boundaries of the existing McGregor Range airspace use area. In as much as there is no change to the configuration of the McGregor Range airspace area, Alternative 2 would not impact airspace use in the ROI.

5.3.4.2 Cumulative Impacts

Alternative 2 does not introduce any aircraft or airspace operating conditions that differ from the previous two alternatives. Therefore, the airspace-related cumulative effects for Alternative 2 would be as discussed under the No Action Alternative.

5.3.5 Earth Resources

5.3.5.1 Geology

The establishment of additional controlled access FTX sites will not affect geological structure, either within Fort Bliss, or regionally.

5.3.5.2 Soils

The potential impacts to soils, resulting uniquely from Alternative 2, are discussed in this section. The distinguishing characteristic of Alternative 2 is the development of additional controlled access FTX sites on 13.5 square miles of land on McGregor Range. Impacts to soils at controlled access FTX sites could include compaction from wheeled vehicles and foot traffic, and possible increased local erosion, resulting from disruption of protective soil crusts and vegetation by vehicles and foot traffic.

FTX activities in these sites could lead to adverse or significant adverse environmental impacts, depending on the location of the FTX activity with respect to sensitive areas (i.e., sensitive species, stream courses, cultural resource areas, or facilities), and the soil association (see Table 5.1-1) where the activity is taking place. The potential for significant adverse impacts is greatest on those soils identified as having the greatest potential for soil erosion in the maximum soil impact scenario (Table 5.1-1).

5.3.5.3 Cumulative Impacts

Under Alternative 2, cumulative effects to the soil resource could increase slightly from those described under Alternative 1, depending upon the activities and amount of use of the additional controlled access FTX sites.

5.3.6 Air Quality

This section presents the unique air quality impacts of Alternative 2.

5.3.6.1 Main Cantonment Area and Fort Bliss Training Complex

Under this alternative, there is the potential for a moderate increase in air emissions due to the utilization of additional controlled access FTX sites. However, these sites would be widely spaced, and would have relatively low levels of air emissions at the individual training sites. Consequently, air quality effects would be localized and short-term, with minimum impacts beyond the perimeter of Fort Bliss.

5.3.6.2 Cumulative Impacts

The cumulative air quality impacts of activities at Fort Bliss that might be anticipated to occur under Alternative 2 were evaluated. In general, the air emissions produced by activities under this alternative will result only in short-term, insignificant air quality impacts that will quickly disperse when that activity is completed, with no known residual effects.

5.3.7 Water Resources

The establishment of additional controlled access FTX sites has no impact on water resources.

5.3.8 Biological Resources

5.3.8.1 Main Cantonment Area and Fort Bliss Training Complex

Alternative 2 would have a greater impact on biological resources than the No Action Alternative or Alternative 1, because an additional 13.5 square miles of land would be used for controlled access FTX sites for military training (see Section 3.4 for a description of this alternative). These controlled access FTX sites would be on McGregor Range (see Figure 3.4-1). The impacts of this alternative on biological resources on the remainder of Fort Bliss would be the same as described under Alternative 1
121 (Section 5.2.8). For these reasons, the following sections focus on biological resources that may occur on McGregor Range. In addition, the INRMP is part of this alternative, as well as Alternative 1, so the potential reductions in impacts due to the implementation of the INRMP consistent with the 1990 MOU between the Army and the BLM would also apply to Alternative 2. For example, the implementation of the *Fire Management Plan* as part of the INRMP could be used to restore grassland plant communities or protect sensitive species. Fort Bliss would not institute changes to forestry, grazing, and other resource uses until it was determined that they were consistent with the 1990 MOU and the ecosystem management outlined in the INRMP. See Section 5.2.8 for a more detailed discussion of the INRMP and how it would result in a reduction in impacts to biological resources on Fort Bliss.

<u>**Mission Activities**</u>

Vegetation. The impacts of ORV training in TA 8, weapons strikes, use of the 25 controlled access FTX sites, and fires on vegetation, as described under Alternative 1, would also occur under Alternative 2. In addition, the implementation of the INRMP, as described for Alternative 1, would serve to reduce these impacts to vegetation as indicated above and in Section 5.2.8.

An additional 13.5 square miles of land would be available for the operation of additional FTX sites under Alternative 2 (see Figure 3.4-1). Most of the sites being considered for these new FTX locations are on the Otero Mesa south of New Mexico Highway 506; the remainder are near the eastern boundary of McGregor Range below the Otero Mesa escarpment in TA 26 and in the Tularosa Basin next to U.S. Highway 54 in TAs 29 and 11 (see Figure 3.4-1). All the potential locations in the Tularosa basin are in the mesquite coppice dune sandscrub plant communities (see Figures 3.4-1 and 4.9-3). All the potential locations on Otero Mesa are grazed and are mostly in the mesa grassland plant community. Some locations are also partially in basin grasslands. The two locations below the Otero Mesa escarpment are in ungrazed mesa grasslands in the high quality grama grass grassland described in Section 4.8-1. The new sites could be used multiple times per year, which has the potential to prevent the recovery of the grassland plant community, resulting in an increase in bare ground and/or the invasion of exotic weed species such as African rue and/or Russian thistle. In addition, there is a potential for increased wind and water soil erosion due to an increase in bare ground. There is also a small chance that fire could start at these locations from vehicles or other causes, and impact more vegetation. Therefore, the use of the new sites has the potential to have an adverse impact on vegetation, particularly the grasslands on Otero Mesa and below the Otero Mesa escarpment in TA 26.

Wetlands and Arroyo-riparian Drainages. The impacts of ORV training in TA 8 and fire on wetlands and arroyo-riparian drainages (probable Waters of the U.S.), as described under the No Action Alternative, would also occur under Alternative 2. In addition, the implementation of the INRMP, as described under Alternative 1, would serve to lessen impacts to Waters of the U.S., as indicated above. In addition, the wetlands management plan and conservation of unique and sensitive species such as wetlands, playas, springs, earthen tanks, and arroyo-riparian areas as specified in the INRMP, would contribute to the reduction of environmental impacts in these arenas.

Additional impacts may occur if activities at the existing and proposed controlled access FTX sites affect wetlands and arroyo-riparian drainages. However, it is assumed that the siting of these facilities is flexible enough so they would not affect wetlands and other Waters of the U.S. If the controlled access FTX sites do affect Waters of the U.S., a 404 Permit may be required from the USACE.

Wildlife. The impacts of ORV training in TA 8, noise, and fire on wildlife, as described under the No Action Alternative, would also occur under Alternative 2. In addition, the implementation of the INRMP as described under Alternative 1, would serve to lessen these impacts to wildlife as described above. The INRMP also contains specific components related to wildlife such as measures to protect the habitat and/or game management plans as well as identifying sensitive species and their habitat.

Additional impacts would occur to wildlife due to the establishment of new sites on McGregor Range. This would include impacts to reptiles, amphibians, birds, and mammals, which occur in the desert grassland habitat on Otero Mesa and the Chihuahuan Desert shrubland habitat in the Tularosa Basin. See Section 4.8.3 for a discussion of the species of wildlife known to occur in these plant community types on McGregor Range. In addition, noise and human activity associated with the controlled access FTX sites would result in a reduction of wildlife use in unaffected habitat, in a zone around the controlled access FTX site. This disturbance could take place at any time because these locations are intended for year-round ADA use and access, and are not restricted to Roving Sands use only.

Threatened, Endangered, and Sensitive Species, and Species of Concern. The impacts of ORV maneuvers, noise, and fire, on sensitive species, as described under the No Action Alternative, would also occur under Alternative 2. In addition, the implementation of the INRMP, as described under Alternative 1, would serve to lessen these impacts to sensitive species. Measures identified above would serve to reduce impacts to sensitive species, as well as the sensitive species management plan and measures to protect sensitive species under unique and sensitive areas.

The uses of the new controlled access FTX sites have the potential to impact sensitive species due to the disturbance to sensitive species and their habitat. Use of sites in the Tularosa Basin could result in the disturbance of sensitive species such as the Texas horned lizard and loggerhead shrike. Use of the new FTX sites on Otero Mesa would have the potential to affect these same two species plus wintering species such as the ferruginous hawk and Baird's sparrow. Activities at the new FTX sites on Otero Mesa would also occur in potential aplomado falcon and mountain plover habitat, and if these two species reestablished breeding territories on Otero Mesa on McGregor Range, activities at the new FTX sites could have a negative impact on them.

Environmental Resource Management. Environmental resource management would be via the INRMP that would be implemented under Alternative 1, consistent with the 1990 MOU between the Army and the BLM for McGregor Range.

Facility Construction and Demolition. Under Alternative 2, facility construction and demolition projects would be similar to Alternative 1 (see Section 3.3.4). As with Alternative 1, these projects would take place at the cantonment area and other built-up areas such as McGregor Range Camp. These activities would result in no-to-negligible impacts to vegetation, wetlands and arroyo-riparian drainages, wildlife, and sensitive species, because of the already highly disturbed nature of these areas and the high level of human activity.

5.3.8.2 Cumulative Impacts

Implementation of Alternative 2 would result in greater cumulative impacts than those of the No Action Alternative or Alternative 1, because of the use of the new controlled access FTX sites. The cumulative impacts to vegetation, Waters of the U.S., and wildlife, would be adverse. Cumulative impacts to wetlands and sensitive species would be negligible.

5.3.9 Cultural Resources

Alternative 2 contains all of the actions described in the No Action Alternative and Alternative 1, with the addition of the mission requirement to develop additional controlled access FTX sites on the installation, specifically on McGregor Range.

5.3.9.1 Main Cantonment Area and Fort Bliss Training Complex

While the nature of the impacts under the No Action Alternative, Alternative 1, and this alternative are similar, the intensity of training area use would be greater. The additional 13.5 square miles (8,640 acres) of controlled access terrain used to support FTXs would be located on Otero Mesa and in the Tularosa Basin portion of McGregor Range. Recent cultural resource surveys in these areas conducted by the USAF for proposed tactical target complexes (USAF, 1998), indicate densities of .03 to .05 cultural resources per acre. However, most of the cultural resources found during these surveys were determined to be not eligible for nomination to the NRHP. Based on the density of significant cultural resources, it is likely that the 13.5 square miles could contain between 10 and 30 cultural resources that are eligible or potentially eligible for nomination to the NRHP. However, the potential locations would be surveyed in an effort to avoid sensitive resources. Implementation of the ICRMP would help manage potential effects on any significant cultural resources.

5.3.9.2 Cumulative Impacts

Because of the mission activities on McGregor Range, the implementation of Alternative 2 would result in greater cumulative impacts than those of the No Action Alternative or Alternative 1. However, the implementation of the ICRMP and other management plans would have a beneficial effect, in that the cumulative effects to cultural resources should be reduced by introducing better, more consistent, long-term management practices over the No Action Alternative.

5.3.10 Noise

Activities uniquely representative of Alternative 2, with the potential to create noise impacts, are activities on the additional 13.5 square miles of land that would be devoted to expanded controlled access FTX activities. The noise associated with these operations would remain dispersed and transitory. Noise from these sources would be compatible with existing land uses (training areas), and no elevated noise levels would be expected to occur outside of the training area boundaries. No significant noise impacts are associated with Alternative 2 mission activities.

5.3.11 Safety

The projects and activities that are unique to Alternative 2 have no additional safety considerations other than those expressed in the No Action Alternative and Alternative 1.

5.3.12 Hazardous Materials and Items of Special Concern

Hazardous materials and items of special concern impacts remain the same under Alternative 2 as under Alternative 1 and the No Action Alternative.

5.3.13 Socioeconomics

With an increased training capability under Alternative 2, it is likely that a greater number of military units and personnel will spend time at Fort Bliss. It is highly probable, also, that increased support will be required to accommodate the added training activities. Such support would include added procurement of goods and services, mostly from the local economy.

It is not possible at this time to predict either the exact number of additional personnel on TDY, or the duration of their stay. Nor is it possible to predict the likely value of additional procurements needed to support the training activities. In the absence of such activity-specific information, a programmatic approach to quantifying the direct and secondary effects is adopted. The direct and secondary employment effects associated with spending of both TDY expenditures (for lodging and meals), and for procurements, are expressed in a standard manner, i.e., for each additional million dollars of expenditures.

Regarding TDY expenditures, it is assumed that prevailing Federal Government per diem rates apply ($102 per day in the El Paso area). Of this per diem amount, two thirds ($68) is allocated to lodging, with the remaining one third ($34) for meals. One million dollars of expenditures is the equivalent of about 9,800 TDY days, or almost 2,000 persons, each having a stay with a duration of 5 days. The injection into the local economy of one million dollars for such TDY expenses would support a total of about 22 full-time jobs, 15 of which would be in the hotel and food and beverage sectors of the local economy.

If lodging expenses at contract quarters are paid for directly by the Army, then expenditures by personnel are for meals. The injection into the food and beverage sector of the local economy of one million dollars for such TDY expenses would support a total of about 22 full-time jobs, 17 of which would be in the food and beverage sector of the local economy.

In the case of the procurement of goods and services required to support training activities, expenditures will be made for a variety of items. Based on information contained in an Army analysis of the economic effects associated with Roving Sands exercises, it is possible to estimate the employment effects resulting from the spending of one million dollars on goods and services in the local economy that support such activities. The major items procured include hotel rooms (27 percent of total expenditures) and van rentals (23 percent). Other items, such as cellular phones, diesel fuel, temporary office trailers, copiers, business connection fees, and water service, represent smaller shares of the total expenditures. These purchases are made from the following economic sectors: hotel, wholesale trade, business services, and miscellaneous services. The injection into the local economy of one million dollars for the purchase of goods and services required to successfully conduct training activities, would support a total of about 21 full-time jobs, 14 of which would be directly in the four mentioned sectors of the local economy.

It is unlikely that any population increases associated with added employment, in either El Paso or Otero counties, will create cumulative adverse affects on community services such as public schools, police and fire protection, health care services, and/or public finances.

5.3.14 Environmental Justice

Impacts of Alternative 2 are the same as the No Action Alternative and Alternative 1, with the addition of 13.5 square miles of area that would be used for new controlled access FTX sites. There are no towns located near the range in the vicinity of these training areas. The closest community, Pinon, which had a population of 76 persons in 1990, is located approximately 10 miles northeast of McGregor Range and would be over 15 miles from the closest training site. Impacts to the public would be negligible and there would be no environmental justice impacts.

There would be no cumulative environmental justice impacts from Alternative 2.

5.4 ALTERNATIVE 3

Alternative 3, the Army's preferred alternative, examines installation capabilities in addition to the existing missions and activities discussed under the No Action Alternative and Alternatives 1 and 2. These conceptual uses of the installation capabilities are derived from informal pre-planning activities that include strategic initiatives being explored by the installation, as well as range and training area capabilities described in the TADC. Potential activities include additions and deletions from the TADC, Chapter 4, *Future Development Concept*, and other installation initiatives. These concepts for future land use and development are based upon installation capabilities, but have no identified training drivers or requirements and have not been submitted for formal mission activity or financial planning actions. A detailed description of Alternative 3 is presented in Section 3.5.

This section presents Alternative 3 potential programmatic environmental effects in the four categories of activities or projects at Fort Bliss that could occur in addition to those discussed in the No Action Alternative and Alternatives 1 and 2. Each category is discussed when applicable to impacts in the environmental resource area being described.

- Mission Activities. Mission activities being considered under this alternative include:

  - Combat Aviation Training. Since 1991, the Army has been exploring the feasibility of relocating aviation training to a site better suited for the Kiowa Warrior, Longbow (Apache) Comanche, and potential future unit-level, aviation-training requirements. Plans to relocate the training are active and ongoing. Installation capability to support this activity requires a 62.1-by-124.2-mile training area, an airfield, the ability to meet night-time (2200 to 0400 hours) demands, and the ability to train without noise conflicting with the environment.

  - Periodic Field Training Exercises. The following activities are more intensive examples of capabilities currently being considered by Fort Bliss. All, except possibly the post-mobilization unit validation, will require additional NEPA documentation as specifics of the proposal are formulated. Regardless of the actions actually implemented, land use compatibility on the Fort Bliss ranges would be fully considered. The scope of the project's intensity and its proposed location would be dependant on a number of factors including the consideration of ecosystem management consistent with the INRMP; the avoidance of ACECs; the Culp Canyon WSA; sensitive cultural resources; sensitive species and habitat; unique biological areas; distance to roads; and compatibility with soils, topography, vegetation, and related resources.

  - Helicopter Training Complex. The Cane Cholla Helicopter Gunnery Range and the existing Hellfire Training Area on McGregor Range could be developed into a state-of-the-art helicopter training complex. If this concept were implemented, a firing fan with dimensions of approximately 13 by 14 miles in the southern area of McGregor Range would be used as an attack helicopter gunnery range. This range is currently in the concept development stage, but would consist of moving and pop-up targets. The firing would be from a firing box within this area that would constrain firing azimuth and location to ensure safety fans are respected. In addition, new support facilities for a battalion (500 to 800 personnel) would be needed, perhaps in the vicinity of the McGregor Range Camp.

  - TBM Target. At present, Fort Bliss does not have the capability to use a TBM in live FIREX. Since all Continental U.S.-based Patriot Battalions are located at Fort Bliss, a TBM target would enhance Patriot training scenarios. The TBM would overfly TAs 10, 11, 12, 25, 27, 29, 30, and 31.

- Post-mobilization Unit Validation. Fort Bliss has the facilities and capacity to support post-mobilization unit validation training for Heavy Brigades from the Army National Guard. After validation, the unit could then be deployed to the theater of operations from the P3 facilities being developed at Biggs AAF. This National Guard Heavy Brigade would consist of approximately the same assigned strength and number of tracked and wheeled vehicles as assigned to the 3rd ACR (previously assigned to Fort Bliss during the 1980s and early 1990s). The numbers and types of training areas and ranges required are not expected to exceed those used by the 3rd ACR. These training areas and ranges are described in Section 3.5.3.2.

- Heavy Division Training Center. Fort Bliss has the training areas, ranges, airspace, and training facilities to support a mechanized/armor division. Extensive training areas and airspace exist to support brigade-on-brigade training. The Doña Ana Range–North Training Areas have adequate training areas and ranges to support Tank and Bradley gunnery, as well as field artillery and aviation gunnery training. While the types of training would not change from those that currently exist, the intensity of use of Fort Bliss training areas and ranges could increase during the annual training cycle. For example, currently there is one major training exercise, Roving Sands, which is conducted annually for a period of approximately 2 weeks. An increase in intensity could include another training exercise with two brigades of personnel and associated equipment (a brigade is composed of 3,000 to 5,300 personnel) for a training period of approximately 2 weeks. Supporting equipment for the two hypothetical brigades could include approximately 960 wheeled vehicles, 490 tracked vehicles, 30 helicopters, and 6 fixed-wing aircraft. This hypothetical brigade equipment configuration is similar to the 3rd ACR equipment previously assigned to Fort Bliss (approximately 380 tracked vehicles, 900 wheeled vehicles, 350 trailers, 100 generators, and 70 helicopters).

- National Guard Training Center. The Doña Ana Range–North Training Areas with its base camp, training areas, and tank gunnery ranges, provide an ideal setting for a National Guard Training Center. A company or larger set of equipment could be permanently stationed at the Doña Ana Range Camp and maintained by the USACASB. National Guard units from throughout the U.S. could be scheduled for annual training at Fort Bliss using the MPRC-H, the training areas and other ranges as necessary to maintain training proficiency.

- Test Support, Army Tactical Missile System. The Block IB ATACMS has extended range that may require launches from Fort Wingate, New Mexico, into McGregor Range. If this occurs, this would be the first launch of ATACMS into McGregor Range. Appropriate safety and environmental clearances will be obtained before this test can be conducted. Flights of the Block IB ATACMS are currently envisioned for FY 02. IB ATACMS would impact in the Tularosa Basin in TA 25 east of FAW 10. The missile would carry inert munitions and would self-destruct on impact with all fuel expended.

- Utility Improvement. Exploration under the ongoing Geothermal Program could lead to the design and installation of a geothermal, binary generation, and desalination plant. Future prospects for continued exploration efforts to discover new geothermal systems include the unexplored regions of Fort Bliss.

• Facility Construction and Demolition. Several types of range improvement projects are included in unfunded installation initiatives or in Chapter 4.0 of the TADC. These projects are conceptual, build upon existing capabilities, and could be required to meet future missions.

- MOUT. Construct a new, permanent, fire-resistant, standard MOUT training complex. There are three potential MOUT locations. If sited near the South Training Areas, a MOUT could be east of Biggs AAF, between the prison camp and the JTF-6 complex. If sited on Doña Ana Range–North Training Areas, the MOUT would be located near Doña Ana Range Camp. If sited on McGregor Range, the MOUT would be located in TA 8, immediately west of Meyer Range.

- Water Well. Construct one water well at the Doña Ana Range Camp. Construct one 0.5-mg water storage tank at Doña Ana Range Camp. Provide a permanent 95,000 linear-foot distribution system linking the well and storage tank at Doña Ana Range Camp, with the existing water distribution system at McGregor Range. Provide the electrical service necessary to support all of these facilities.

- Rail Spur. Develop a rail spur from the UP/SP rail line to the McGregor and/or Doña Ana Range camps. This project would include construction of a rail spur from the UP/SP rail line to a point west of Doña Ana Range Camp. The connecting point would be off existing track paralleling U.S. Highway 54. The spur would run westward along the southern boundary of Doña Ana Range–North Training Areas, then turn north and run along the western boundary of TA 3B, then terminate near Doña Ana Range Camp. This project could also include construction of a rail spur from the UP/SP rail line to McGregor Range Camp. The connecting point would be off existing track paralleling U.S. Highway 54. The spur would run eastward toward McGregor Range Camp. An additional spur would split south off the east spur into the interior of TA 8, southwest of the range camp. An additional possibility is extension of the Orogrande rail spur (currently on BLM land) onto Fort Bliss.

- ASPs. Expand ASPs in McGregor Range, Phase III. This project would be located 1.5 miles east of U.S. Highway 54 and 1 mile south of the main access road from U.S. Highway 54 to McGregor Range Camp. This is also the current location of the existing ASP.

Additional NEPA documentation will be required prior to implementation of these projects. Construction of the MOUT training complex and the construction of rail spurs to the range camps would require NEPA documentation. Because operations of a new rail line into Doña Ana Range Camp could adversely affect residential uses (in Chaparral), additional analysis would be required based on conditions at the time of the project.

- Environmental Resource Management. Environmental resource management activities such as ITAM would continue along with operations implementing the INRMP and ICRMP.

- Real Estate Actions. Several potential new real estate actions are currently envisioned. They are: (1) the joint use of Biggs AAF and EPIA; (2) inner loop connecting Fred Wilson Road with Montana Avenue, passage between the two airfields; (3) connector road between Inner Loop and Loop 375; and (4) Northeast Parkway. Items 2 and 3 are primarily ROW easements.

5.4.1 Land Use

The following section evaluates the potential effects on land use resulting from the implementation of Alternative 3 missions, and associated construction and demolition activities. Analysis will focus on the component ranges within the range complex and surrounding areas. Because specific locations and levels of activity are not known, a qualitative range of potential land use impacts is provided. Impacts on the Main Cantonment Area are addressed where an envisioned action may change or increase use of specific locations or facilities. Envisioned actions that could significantly affect land management activities under the ICRMP and INRMP are identified.

5.4.1.1 Main Cantonment Area

Mission Activities. Intensified use of the Main Cantonment Area resulting from increased training area operations would have no significant impacts on land use. Land allocation and development under the RPMP would accommodate organized growth to support new or additional use.

Biggs AAF. Relocation of aviation training activities requiring night use of the airfield could have adverse affects on residential uses on the Main Post and Biggs AAF.

Joint-use of Biggs AAF with EPIA could increase the use of Biggs AAF runway by commercial aircraft. Improvements of the airfield for this action, and the additional back-up capability provided by EPIA would benefit airfield uses for the Fort Bliss mission, particularly during surge periods for mobilization or deployments.

Facility Construction and Demolition. Impacts on land use from facility construction and demolition to support enhanced activities at Fort Bliss would be similar to those described for Alternative 1 (see Section 5.2.1.1).

Environmental Resource Management. Impacts resulting from land uses and development in the Main Cantonment Area would be similar to those described for Alternative 1 (see Section 5.2.1.1).

Real Estate Actions. Operational MOUs or MOAs between the installation, the EPIA, and the FAA may be required to implement the joint use of military and civilian property. Long-term leases or ROW agreements may need to be established to ensure beneficial impact placement, and operation of a connecting taxiway between EPIA and Biggs AAF. No other real estate actions are identified for the Main Cantonment Area under this alternative; therefore, impacts would be the same as described in Section 5.1.1.1.

5.4.1.2 Fort Bliss Training Complex

In addition to activities and uses of the range complex under the No Action Alternative and Alternatives 1 and 2, a range of hypothetical actions based upon installation capabilities is described in Alternative 3. Potential land use impacts from new or expanded mission activities on the training areas and ranges are summarized below. Because any combination of activities could be implemented in the future, analysis will focus on maximum impact that could result. No demolition projects are proposed under this alternative; therefore, this category of action will not be addressed.

South Training Areas

Mission Activities. Mission activities under Alternative 3 would be similar but more intensive than under other alternatives. In addition, portions of the South Training Areas would be used occasionally as a safety buffer for firing of IB ATACMS from an off-site location. During firings, no other military or nonmilitary uses could occur. The exact location of impact area and safety buffer is not known at this time. If it were to extend beyond the Fort Bliss boundary, off-post areas may also need to be evacuated. Most of the surrounding land in west Texas is privately owned and sparsely populated. Evacuation agreements would be needed with affected property owners. Advance notification and visual inspections would be required prior to firings. Extension of safety buffers to the south, over developing suburban areas in East El Paso would not be compatible with concentrated populations. Evacuation would be impractical and safety risks could result.

Possible siting of a MOUT and CTF to the east of Biggs AAF would involve mostly facility use, on-foot training, and use of smoke and obscurants. This latter activity could be incompatible with residential areas to the south under some wind conditions. Similarly, depending on site location, smoke could affect air traffic control for Biggs AAF or EPIA.

Facility Construction and Demolition. Construction and use of facilities for a MOUT and CTF would have little impact on surrounding land uses. Standard dust control measures would be used during construction.

Environmental Resource Management. Environmental resource management would be the same as described for Alternative 1 (Section 5.2.1.2). No changes in military land use categorization would result.

Real Estate Actions. Siting of future facilities would need to avoid existing utility ROWs. If utility infrastructure needs to be rerouted, these would need to be agreed to by purveyors, and appropriate contractual issues resolved.

Doña Ana Range–North Training Areas

Mission Activities. Activities on Doña Ana Range–North Training Areas would be similar in type to existing operations. Use of the training areas and ranges for Heavy Division and National Guard training centers would increase the amount of tracked vehicle use. This would have little impact on surrounding uses provided adequate standoff distances are reserved between residential areas to the south and operations areas. Both noise and dust from operations could be incompatible in immediate proximity to adjacent residential communities to the south for short periods, particularly under certain wind conditions.

Increased operations in training areas would limit their availability for recreation. Although current public use is infrequent, the range has good game-bird hunting opportunities relatively close to a growing urban area. Additional artillery and rocket firings would increase use of the south part of the Organ Mountains as an impact area. This would have no impact on surrounding uses. Closures of War Highway 11 are likely to increase, but would be relatively short (a few hours) in duration on any given day. Timing of operations to avoid closure during commuting hours would lessen inconvenience of road closure. Increased storage of equipment and billeting of troops at Doña Ana Range Camp would be compatible with existing land use.

Rail operations on a new rail spur would be adjacent to private property and some residences along the southern boundary. This new industrial and transportation function would alter conditions for residents in rural surroundings. Operations on the new rail spur would probably be sporadic, except during periodic exercises when they may increase. During these periods, noise from train traffic may be noticeable to residents, but is not anticipated to result in incompatible average noise levels off post. Additional NEPA documentation would be prepared if this project is to be implemented, based on more defined siting information and land use conditions at the time of the project.

Facility Construction and Demolition. Proposed construction projects would mostly occur at Doña Ana Range Camp, improving infrastructure and community facilities for military personnel. Additional facilities may be required to maintain suitable conditions at the Range Camp. Roadway improvements would benefit functions on the range and reduce dust. Improved water service would benefit functions in the built-up range camp. Tank crossing locations may be needed to avoid potential breakage of the new water line.

Environmental Resource Management. Environmental resource management would be the same as described for Alternative 1 (Section 5.2.1.2). Increased use of Doña Ana Range–North Training Areas may exacerbate safety concerns associated with trespass and increasing pressures of recreational encroachment in the Organ Mountains. Additional safeguards, such as fencing or patrolling, may be needed to control access along that sensitive boundary.

Real Estate Actions. The new water line would need to avoid existing underground pipelines and power lines in established ROWs.

McGregor Range. Overall, a combination of envisioned missions that use installation capabilities would be suitable for McGregor Range. However, increased military use would result in less availability of some areas for multiple uses.

Mission Activities. Land use categories for McGregor Range would remain essentially the same as currently defined.

Locations within Tularosa Basin in southern McGregor Range for proposed new combat aviation and/or helicopter gunnery ranges would generally be compatible with military activities. Because this area is not currently accessible for public use (except for two small hunting zones near the range camp), activities would have little effect on grazing and recreation. Safety buffers for some munitions could extend to the north over grazing areas, resulting in reduced accessibility during training times. Residents in the community of Oro Grande could experience additional overflight by aircraft, particularly helicopters, which may be incompatible with residential uses.

Surrounding areas may be affected by noise from increased aircraft operations in military training routes and restricted airspace over non-DoD property by any of these actions. Use of a TBM target for Patriot missile firings may increase the probability of debris deposition over portions of northern McGregor Range and the co-use area of Lincoln National Forest. This may require more frequent use of these areas as a safety buffer. During TBM target firings, New Mexico Highway 506 would be temporarily closed and access to areas to areas for recreation, hunting, and grazing management would be slightly reduced.

122 McGregor Range has been proposed as the impact site for Block IB ATACMS missiles launched from Fort Wingate, New Mexico. Potential safety issues affecting underlying land areas and uses have been assessed in the *Theater Missile Defense Extended Test Range EIS* (see Section 5.4.11.1).

Any road improvements on north McGregor Range to support expanded military use would improve public access for ranching activities and recreation. However, these same improvements could lead to increased vandalism problems for cultural resources. Depending on the type and extent of improvements, areas classified for semiprimitive recreational opportunities may be reduced. Improved roadways can function as firebreaks, and therefore benefit land use management and grazing by reducing risk of extensive fires.

Increased storage of equipment and billeting of troops at the McGregor Range Camp would be compatible with existing use. Additional facilities may be required to maintain suitable conditions for these functions.

Location of a new geothermal, binary generation and desalination plant in south McGregor Range would have little effect on land use. Site selection would need to consider potential impacts on ROW, military safety issues, and sensitive resources or protected areas.

Facility Construction and Demolition. Several construction projects would expand or improve facilities and infrastructure on McGregor Range, including troop support facilities, water and wastewater projects, road and rail improvements, and final phases of the ASP. These would generally have beneficial effects on military uses. Road improvements and new water distribution lines would have no impact on surrounding (off-post) land uses. Assuming these projects are located within areas currently developed with infrastructure and facilities in dominantly military use areas, construction would have little impact on nonmilitary use or access. Siting would need to avoid sensitive and valuable natural and cultural resources, and specially designated management areas.

Construction of a 32-facility MOUT training complex in TA 8 would be compatible with surrounding uses on Fort Bliss. Due to distance, potential for impacts on off-post areas are negligible. Siting would need to avoid existing utility ROWs with underground pipelines supplying energy from El Paso to McGregor Range Camp.

Construction for the various proposed facilities, roads, and training complexes would use industrial materials from commercial suppliers or from sources on McGregor Range. Materials would generally be taken from existing borrow pits and quarries. Since BLM manages mineral resources on withdrawn land, if new sources are needed for particular projects, the Army would coordinate locations with BLM. Also, the Army would implement any of BLM's requirements for maintaining or reclaiming disturbed areas.

Environmental Resource Management. Environmental resource management activities and affects on land use would be similar to those described for Alternative 1 (Section 5.2.1.2). Natural and cultural resources would be managed within the planning framework of the INRMP, ICRMP, and BLM's RMPA and the 1990 MOU between the BLM and the Army. The Army's INRMP and ICRMP would provide beneficial guidance for Army responsibilities under the 1990 MOU and for minimizing potential adverse effects of military actions. Slightly reduced access for grazing operations resulting from envisioned implementation of installation capabilities could limit time available for the BLM to manage its grazing program. Recreational resources would be less available for public use, but no specific goals for recreation management would be affected.

Real Estate Actions. The ROW for the new water line between the Doña Ana Range–North Training Areas and McGregor Range Camp would pass beyond the boundary of the withdrawn land. As such, the new alignment and ROW should be coordinated and any applications processed through the BLM for portions within McGregor Range. No other real estate actions are identified under this alternative and impacts would be the same as those described in Section 5.1.1.2.

5.4.1.3 Aesthetics and Visual Resources

Main Cantonment Area. Impacts to visual resources would be the same as described for Alternative 1 in Section 5.2.1.3.

Fort Bliss Training Complex. Potential changes to ground cover in the South Training Areas and Doña Ana Range–North Training Areas from increased tracked vehicle use would be visible in the foreground. To the extent that alterations are perceived as damage from man-made causes they may reduce visual quality. However, these changes would have little affect on the middle and far distant landscape where composition of landform elements, line, color, and light are primary determinants of visual quality. Proposed utility and rail spur projects would be visible alterations to the landscape, particularly in the fore and middle distance. These modifications may not be consistent with VRM objectives for VRM Class III locations along U.S. Highway 54, but would be similar in scale and type to existing man-made features (such as roads, utility lines, equipment) in the overall cultural landscape. These modifications could alter the visual context of cultural sites in south McGregor Range and on the Doña Ana Range–North Training

Areas, affecting integrity and eligibility of some sites for NRHP. Potential impacts on cultural resources are further addressed in Section 5.4.9.

On McGregor Range, small zones with expanded facilities and use (such as impact areas), roadway improvements, and rail spurs, would not alter the overall visual context. Slight modifications would be similar to the existing man-made fabric that is visible within the cultural landscape. Visible changes would be similar to those described in Section 5.3.1.3. It is anticipated that most actions would have no impact on visual resources or management objectives. However, actions with potential to change the landscape or to be visible would need to be evaluated when further defined.

5.4.1.4 Cumulative Impacts

Expansion of military capabilities may potentially restrict some activities on or access to portions of Fort Bliss. The primary nonmilitary uses that can be affected are grazing and public recreation. No envisioned capability is currently defined that would convert grazing land to other uses. If future activities were to frequently restrict access to Otero Mesa on weekends, this could impede grazing operations, and could require additional analysis or mitigating procedures, similar to those developed between the BLM and USAF for the tactical target complex. Growth in adjacent communities and expanded military operations could create incompatible adjacency between residential and military training areas. This is primarily a concern along the south border of the Doña Ana Range–North Training Areas. Currently, these functions are compatible because of adequate separation and relatively low intensity of both military and residential development. Increased tracked vehicle operations and possible rail operations on the Doña Ana Range–North Training Areas could produce undesirable noise and dust in encroaching residential areas. Expansion and infill in Chaparral is likely as population increases in the region, increasing the number of persons who would potentially be affected. County plans do not currently identify Fort Bliss "border issues" as a concern. Compatibility problems that may result from an absence of land use controls in this area may result in compatibility problems in the long-term planning horizon.

As population increases, land managers are anticipating demands for recreation resources to increase. Decrease in opportunities on McGregor Range could be viewed as an erosion of a regional resource. Concerns are primarily focused on access to Otero Mesa due to its distinctive grasslands, wilderness, and hunting opportunities. Relatively few members of the public recreate on Otero Mesa each year. Most of the current use is associated with licensed hunts, which will continue in the future. The Otero Mesa land mass extends beyond McGregor Range, where access is not restricted to the public. Expanded military operations would only slightly decrease access to Culp Canyon WSA, and actions would not change the existing wilderness quality. Therefore, overall impacts to recreational land use would be negligible.

Changes in grazing standards on federal lands may be one of several factors that are affecting the regional livestock industry. Recent trends indicate small-scale ranch operations have been failing, and this may be caused by combined effects of these changes. Continuing stresses on marginal enterprises can represent an adverse impact. However, value of grazing on McGregor Range has remained high. Therefore, it is unlikely that minor changes in grazing resources resulting from expanded military operations would jeopardize contracted grazing operations on the range. Furthermore, grazing opportunities on McGregor Range are only a small percent of regional and county grazing resources, and any small reductions would have little effect on regional uses.

Cumulative impacts on visual resources would be the same as described for Alternative 1 (see Section 5.1.1.4). Proposed construction under this alternative could contribute cumulatively to slow modification of surrounding landscape in the Chaparral area and along U.S. Highway 54. Due to relatively low visual resource value in the area, this would have minimal impacts on visual resources.

Major projects involving large facilities or extensive soil disturbance would need to be evaluated in the future when the projects are more defined.

5.4.2 Main Cantonment Area Infrastructure

The possible joint use of Biggs AAF and EPIA under this alternative would require construction and operation of a taxiway and cargo facilities. Demands for water and power would increase during the construction phase, and power demand for taxiway lighting would result in a permanent increase.

The cargo facility would be connected to existing water-supply and communication systems, but probably would not result in a noticeable increase in demand. The increased demand for power is expected to have a small impact but cumulative impacts under this alternative will remain essentially the same as identified for the No Action Alternative.

5.4.3 Training Area Infrastructure

The construction and operation phases of several actions being considered under Alternative 3 potentially will increase demands for all services. The possible actions include the MOUT, comprised of a 32-building training facility, in either the South Training Areas, Doña Ana Range–North Training Areas on McGregor Range; a National Guard training center in the Doña Ana Range–North Training Areas; the paving of more than 20 miles of roads on McGregor Range and to the proposed landfill north of the Main Cantonment Area; a water well at Doña Ana Range Camp; rail spurs to the range camps; a helicopter training complex on McGregor Range; and a geothermal power generation/desalination plant in McGregor Range.

Construction of any of these actions could temporarily increase demands for water, power, communications, and transportation on a temporary basis. Operation of the training facilities and geothermal power generation/desalination plant could permanently increase the demand for utility services and transportation. Cumulative impacts on transportation, power, and communication under this alternative will show a modest increase. The effect of increased water supply will hardly be detectable, and its cumulative effect will remain as described for the No Action Alternative.

5.4.4 Airspace Use

The potential impacts to airspace use resulting from the implementation of Alternative 3 are addressed below in each of four major project-related categories.

5.4.4.1 Main Cantonment Area and Fort Bliss Training Complex

Mission Activities. Under Alternative 3, there are five mission activities, in addition to those addressed in previous alternatives, that would involve airspace considerations. These are: the possible relocation of combat aviation training activities to Fort Bliss; a helicopter training complex to support FTX; additional helicopters and fixed-wing aircraft and increased use of the Fort Bliss ranges and training areas for flight training in support of a Heavy Division Training Center; the development of facilities at Biggs AAF to support Army National Guard Post-mobilization Unit Validation Training; and Test Support for the ATACMS. The ATACMS missions may consist of 4 to 6 test firings per year of a TBM carrying inert munitions from Fort Wingate, New Mexico, into the existing McGregor Range. To support this activity, the airspace corridor between the WSMR and McGregor Range may have to be closed to all air traffic while the missile is en route. However, other periodic missile test firings between the WSMR and McGregor Range presently occur that result in closure of this airspace corridor. The ATACMS activity does not result in any new airspace restrictions. No changes to the configurations of the McGregor

Range/R-5103B/C or Doña Ana Range/R-5107A airspace areas are proposed to support any of these five activities. The construction of facilities at Biggs AAF to support National Guard Post-mobilization Unit Validation Training is the same as the aviation-related construction projects identified in Alternative 1. Because there is no change to existing airspace areas or air traffic operating conditions, the mission activities under this alternative would not affect airspace use in the ROI.

Facility Construction and Demolition. The Army and the City of El Paso have discussed the concept of limited joint use of Biggs AAF and EPIA runway and taxiway facilities. Both airports would be linked by construction of a new taxiway connecting runway access taxiways at each facility. As stated in the *El Paso International Airport Master Plan and Noise Control Study* (EPIA, 1991), such limited joint use would give flexibility to ATC, provide EPIA with a back-up runway for emergency use, and allow for diversion of military aircraft that use EPIA to Biggs AAF. With respect to civil aircraft use of Biggs AAF by EPIA air traffic, the current and future mission of Fort Bliss would have priority over nonmilitary aircraft operations at Biggs. The potential airspace related impacts of the joint use concept are addressed in the Cumulative Effects discussion below.

With respect to the Doña Ana Range–North Training Areas and McGregor Range, facility construction under this alternative consists entirely of mission support buildings, rail spurs, and infrastructure improvements. There are no actions involving airspace use and management.

Environmental Resource Management. As previously noted, the Fort Bliss environmental resource management programs are land management programs that do not affect airport- or airspace-related operations and management. The designation of an airport facility as a cultural resource would not affect airport- or airspace-related operations or management.

5.4.4.2 Cumulative Impacts

As noted in Section 4.4.1, the proximity of Biggs AAF to EPIA does not preclude simultaneous aircraft operations at both airports. Currently, peak traffic periods or instrument meteorological conditions may require the use of ATC procedures at Biggs and EPIA as if both facilities were a single airport. Limited joint use of Biggs AAF and EPIA would not significantly change any of these air traffic operating conditions. Limited joint use should not require any changes to the existing El Paso Approach Control airspace structure. Accordingly, the concept of limited joint use of Biggs AAF and EPIA under Alternative 3 should have no impacts upon airspace use and management.

5.4.5 Earth Resources

The impacts to geologic resources and soils are presented below.

5.4.5.1 Geology

Impacts to geologic resources for each of the major project categories resulting from the implementation of Alternative 3 would be the same as those discussed for the No Action Alternative and Alternatives 1 and 2.

5.4.5.2 Soils

The potential impacts to soils as a result of implementing Alternative 3 are addressed for each of the major activity categories.

Mission Activities. The envisioned use of Fort Bliss Training Complex capabilities for missions and exercises is to maintain current programs and add additional activities over time. Envisioned uses fall under the category of periodic FTXs. Examples are a helicopter training complex, combat aviation training, additional missile targets, Post-mobilization Unit Validation, a Heavy Division Training Center, and a National Guard Training Center. Sources of impacts to soils from these activities would be similar to those described under the No Action Alternative (e.g., maneuvering of wheeled and tracked vehicles and missile firings). Although the types of activities would not change from those described in Alternatives 1 and 2, the intensity of use on Fort Bliss ranges could increase during training activities. Likewise, adverse or significant adverse impacts to soils could also increase.

Facility Construction and Demolition. Construction projects under Alternative 3 may include a 32-building MOUT training complex on one of either the South Training Areas, Doña Ana Range–North Training Areas or McGregor Range; a taxiway to join Biggs AAF with EPIA; installation of a geothermal, binary generation and desalination plant; various training, supply and storage facilities; road improvements; a water well; and rail spurs.

Most of these facilities would be constructed in the Main Cantonment Area or in range camps where most soils have been previously disturbed. Therefore, impacts to the soil resource would be less than for facilities constructed on the ranges where soils are partially or totally undisturbed. Impacts to soils from those projects requiring excavation or compaction would be similar to those described in the No Action Alternative and Alternatives 1 and 2.

The proposed rail spur could provide unique challenges for the protection of soil resources in the project area. Construction of a rail line requires careful engineering particularly on highly erodible soils to protect the rail line and environment from excessive erosion from rainwater runoff.

No additional demolition of structures is scheduled for Alternative 3. If demolition were to occur under this alternative, impacts and remediation measures would be similar to those described under Alternatives 1 and 2. These actions would not be expected to cause adverse impacts to soil resources.

Environmental Resource Management. Under Alternative 3, environmental resource management activities described under Alternative 1 would continue. Therefore, the same impacts and mitigation actions described for Alternatives 1 and 2 would continue.

5.4.5.3 Cumulative Impacts

Cumulative effects under Alternative 3 would be the same as those described under Alternative 2.

5.4.6 Air Quality

Alternative 3 includes several potential, visionary future uses of capabilities beyond those listed in Alternatives 1 and 2. This section presents potential air quality impacts at Fort Bliss from activities under this alternative only as they differ from impacts already discussed in the preceding three alternatives.

5.4.6.1 Main Cantonment Area and Fort Bliss Training Complex

Mission Activities. There are several mission, mission support, or environmental management categories of activities or projects at Fort Bliss that could occur under Alternative 3, in addition to those discussed in Alternatives 1 and 2.

Comparisons can be made with other activities analyzed earlier to provide reasonable estimates of air quality impacts. As examples of potential air quality impacts, two of the envisioned periodic FTXs will be discussed.

Helicopter Training Complex. The air emissions that would result from the establishment and operation of a helicopter training complex on the McGregor Range would be expected to have an insignificant air quality impact based on a comparison of the air emissions potential of the helicopter training complex to the Roving Sands JTX. The helicopter training complex would require an order of magnitude fewer personnel than for the Roving Sands JTX, and there would be much less heavy equipment and vehicles involved. The other major source of emissions are the helicopter engines. These emissions would be well-dispersed and create no significant impact.

Heavy Division Training Center. This envisioned mission activity would provide training facilities for two brigades (each composed of 3,000 to 5,300 soldiers with approximately 960 wheeled vehicles, 490 tracked vehicles, 30 helicopters, 6 fixed-wing aircraft), and include an annual brigade-on-brigade training exercise for approximately 2 weeks. The primary air emissions from this activity would be fugitive dust, generated principally by the wheeled and tracked vehicles. Significant amounts of PM_{10} would be produced by these vehicles maneuvering on the ranges, particularly during the annual training exercise.

Comparable numbers and types of vehicles envisioned for the Heavy Division Training Center at Fort Bliss are used during monthly "rotations" or field exercises conducted at the Fort Irwin National Training Center (NTC). The NTC has a similar or somewhat drier climate compared to Fort Bliss, so the levels of fugitive dust produced during training exercises at the two facilities would be approximately the same. A network of PM_{10} monitors has been installed and operational for several years along the property boundaries at the NTC (Wales, 1998). These monitors have detected no violations of the NAAQS at the NTC, so the training exercises at NTC have been shown to produce short-term, localized air quality impacts. Consequently, it would be expected that similar activities at the envisioned Heavy Division Training Center would also result in insignificant air quality impacts at the Fort Bliss perimeter.

The new $PM_{2.5}$ standard would probably not cause additional compliance problems. However, since there have been very few $PM_{2.5}$ measurements and there are no emission factors to quantitatively evaluate emissions from these sources, this is only the best available estimate at this time.

Facility Construction and Demolition. Construction can result in temporary increases in air emissions such as fugitive dust from construction and tailpipe emissions from equipment. The magnitude of these emissions depends on the scale of the construction project, but are temporary and result in short-term, localized impacts. Fugitive dust emissions will be minimized during construction activity by watering areas under construction to the greatest extent possible. One potential activity in Alternative 3 would be limited joint use of Biggs AAF with EPIA. This would include the possible construction of a taxiway that would connect Biggs AAF runways with EPIA taxiways. Civilian operations at Biggs AAF would be limited to large commercial aircraft that would improve and increase the freight capacity of EPIA. It is possible that the overall air quality impact from a combined EPIA/Biggs AAF airport complex would be lower because the air quality emissions would be dispersed over a greater network of runways and taxiways.

Training Area Maintenance Improvement Projects. A number of training area improvement projects are being considered that are unique to Alternative 3. Several of these potential projects could have an effect on the air quality. In particular, the unfunded paving projects considered by the installation including: the Sanitary Fill Road north to the McGregor Range Camp Road, the range road between U.S. Highway 54 and War Highway, and 20 miles of range road from the New Mexico state line to Meyer Range. Paving these roads could considerably reduce the fugitive dust emissions produced by traffic.

In addition, a potential rail spur from the UP/SP rail line to McGregor and/or Doña Ana Range camps is being considered as part of this alternative. The use of rail to transport equipment, personnel, and supplies to the Fort Bliss Training Complex could significantly decrease fugitive dust emissions and tailpipe exhaust emissions, by reducing the number of trips by motor vehicles between the Main Cantonment Area and the training complex.

5.4.6.2 Cumulative Impacts

Cumulative effects to regional air quality would be similar to those under Alternative 1.

5.4.7 Water Resources

5.4.7.1 Main Cantonment Area and Fort Bliss Training Complex

Groundwater from the underlying basin-fill deposits of the Hueco Bolson supplies most of the water used by Fort Bliss. Water demand for Fort Bliss under Alternative 3 would exceed that under the No Action Alternative and Alternatives 1 and 2, because of the potential increase in permanent and temporary personnel on the post and potential construction projects. The increase in water use above the 5,700 afy amount projected under the previously discussed alternatives would depend on the size of the personnel increases and which of the construction projects are undertaken. Additional water use at the Main Cantonment Area would result in increased pumpage from the Army well fields. An increase at McGregor Range would result in additional water purchases from El Paso. Construction of a water well at Dona Ana Range Camp will be required for siting a potential training area near the camp; however, additional withdrawals at that location would not be expected to affect distant water levels at the main pumping centers in the Fort Bliss/El Paso area.

5.4.7.2 Cumulative Impacts

Groundwater withdrawals, probably in excess of 150,000 afy, from the Hueco Bolson in the metropolitan El Paso and Ciudad Juarez areas under Alternative 3 will be similar to those under the No Action Alternative and Alternatives 1 and 2. The effect of potential increases in Fort Bliss water use will have little noticeable impact on projected pumping levels and water quality changes that result from cumulative groundwater withdrawals. Even an unlikely 50 percent increase in Fort Bliss water use would represent only a 1.5 percent increase in the cumulative amount. Forecasts of the depletion of fresh water in the aquifer between 2013 and 2025 would remain essentially unchanged.

5.4.8 Biological Resources

5.4.8.1 Main Cantonment Area and Fort Bliss Training Complex

Mission Activities. Impacts to vegetation, wetland habitat, wildlife, and threatened and endangered species under Alternative 3 would be greater than those in the No Action Alternative and in Alternatives 1 and 2.

Vegetation. The impacts to vegetation of No Action (Section 5.1.8) and Alternative 2 (Section 5.3.8) would occur under Alternative 3. In addition, this alternative would result in additional disturbance to vegetation due to increased ORV maneuvers, an increase in surface impacts from weapons strikes, and an increase in fires.

Ground Disturbance. A substantial increase in ORV maneuvers would occur in the South Training Areas. Under other alternatives, the LOU in the training areas would increase from very low to moderate use (see Table 3.3-4) to mostly high use (see Table 3.5-3). As indicated in Section 5.1.8.1, mesquite coppice dunes and sandscrub is the principal plant community that would be impacted. Other military activities on the South Training Areas under Alternative 3 would be at similar levels as the other alternatives.

A substantial increase in ORV maneuvers would also occur in the mesquite coppice dunes and creosotebush plant communities on the Doña Ana Range–North Training Areas due to the deployment of the Heavy Division Training Center. This would result in an increase in the LOU on the training ranges from mostly high and some medium (see Table 3.3-5) to all high (Table 3.5-4). There would also be an increase in activity on any given day and it is estimated that there would be a 50 percent increase in ORV maneuver use on the Doña Ana Range–North Training Areas under Alternative 3 (see Section 3.5.1.2).

Under Alternative 3, there would also be a substantial increase in the amount of land use for weapons firing surface impact (see Figures 3.3-4 and 3.3-2) on the Doña Ana Range–North Training Areas, due to the National Guard Training Center tank gunnery ranges. This would impact the foothills desert shrub and piedmont grassland and to a lesser extent montane shrubland and pinyon/juniper woodlands. There would be an estimated 60 percent increase in surface-to-surface weapons training in the lower elevations of the Organ Mountains under Alternative 3.

Overall, the LOU at the training areas on McGregor Range would increase substantially under Alternative 3, compared to the other alternatives (see Tables 3.3-6 and 3.5-5). This increase would be from mostly very low and low use to high use. The level of ORV use in TA 8 (mesquite coppice dune plant community) would increase from low to high; TA 8 would remain the only area used for ORV training on McGregor Range.

Under Alternative 3, there would be an increase in weapons firing from the Helicopter Training Complex, Combat Aviation Training, and an increase in firings from SHORAD. The number of training areas experiencing weapons surface impacts would increase from six to nine. Otero Mesa (TAs 15 through 23) would experience an increase in LOU from very low to low to mostly high and some of this increase would be due to becoming a SDZ for a proposed tactical target complex. This would indicate that the potential for fire on the mesa from hot missile debris would increase.

Increased maneuver training and increased use of tracked vehicles (not as cross-country maneuver on most of McGregor Range) would result in more intense use of areas designated for ORV maneuver (see Figure 3.5-1 and Table 3.5-2) and less opportunity for residual vegetation to recover. Also, increased maneuver use may result in expanded disturbance of previously undisturbed vegetation within the training areas. Therefore, vegetation cover may decline and erosion rates may increase resulting in a less biologically stable area and faster dune development and movement.

Fire. Wildfires will continue to take place on Fort Bliss under Alternative 3. Since the level of this activity would increase, the number of fires would increase. In addition, other activities proposed under this alternative would likely result in more fires including the combat aviation training, helicopter training complex, Heavy Division Training Center, and National Guard Training Center. Therefore, a substantial increase in the number of fires under Alternative 3 over current conditions is expected. With this increase in fires is the increased probability that areas determined to be important for the maintenance of biodiversity on Fort Bliss would be destroyed by fire. Therefore, Alternative 3 may result in significant adverse impacts to vegetation due to increased ORV maneuvers, weapons strikes, and fires.

Wetland Habitat and Arroyo-riparian Drainages. The impacts to wetlands and arroyo-riparian drainages under No Action Alternative and Alternative 2 would occur under Alternative 3. It is assumed that jurisdictional wetlands would not be impacted under this alternative except for potential impacts due to fire. However, there is a potential for additional impacts to arroyo-riparian drainages from the increase in ORV maneuvers, weapons strikes, and fires.

Ground Disturbance. The substantial increase in ORV maneuvers on the South Training Areas and Doña Ana Range–North Training Areas could result in the disturbance of dry washes (Waters of the U.S.) in the mesquite coppice dune and creosote bush plant communities.

Fire. The increase in ORV maneuver could also result in more fires that could burn through desert arroyo-riparian drainages. Increased weapons firing in the lower elevations of the Organ Mountains could also result in an increase in fires in arroyo-riparian drainages in the plant communities potentially affected by this activity. There is also an increased potential for fire to impact wetland riparian areas along perennial streams in the Organ Mountains. Fires would also likely increase on McGregor Range and burn arroyo-riparian drainages in the Tularosa Basin and on Otero Mesa. Under Alternative 3, there is an increased potential for fire to burn the widely scattered jurisdictional wetlands on McGregor Range.

Therefore, Alternative 3 may result in significant adverse impacts to wetlands and would likely result in significant adverse impacts to arroyo-riparian drainages on Fort Bliss.

Wildlife. The impacts to wildlife of the No Action Alternative and Alternative 2 would also occur under Alternative 3. In addition, Alternative 3 would result in additional negative impacts to wildlife due to: (1) increased disturbance in previously impacted habitat such as mesquite coppice dune areas on the South Training Areas and Doña Ana Range–North Training Areas; (2) new weapons impact areas in the Organ Mountains; (3) increased noise and human activity at ORV maneuver areas, weapons firing ranges on the Doña Ana Range–North Training Areas and McGregor Range, and the new helicopter training facility; (4) increased disturbance in already affected arroyo-riparian drainages and disturbance and damage to previously undisturbed arroyo-riparian drainages, and (5) increased impacts due to fire.

Ground Disturbance. These increases in ORV maneuvers (not as cross-country maneuver on most of McGregor Range) under Alternative 3 would have the greatest impact on wildlife associated with the Chihuahuan Desert shrubland upland and arroyo/riparian habitats (principally mesquite coppice dunes and creosote bush types) in the Tularosa Basin on the South Training Areas, and Doña Ana Range–North Training Areas although, as indicated in Section 5.1.8.1, the amount of arroyo-riparian habitat in the ORV maneuver area is limited. The increase in weapons firing in the Organ Mountains would also affect wildlife in upland and arroyo/riparian habitats in the foothills grassland and shrubland, montane shrubland, and pinyon/juniper habitats. See Section 4.8.3 for a description of wildlife that occur in these upland and arroyo habitat types.

Fire. Fire could occur in these habitat types as well as upland and arroyo/riparian habitats on Otero Mesa and, potentially, conifer forests in the Organ Mountains, foothill grassland and shrubland habitats in the Hueco Mountains, and foothill grassland and pinyon pine/juniper habitats in the Sacramento Mountains foothills.

The potential destruction of woody vegetation in arroyo/riparian habitat as well as in upland habitats would make these areas less desirable for Neotropical migrant and nesting bird species and other wildlife. A general decline in bird species richness may also occur in burn areas in upland and arroyo/riparian areas. A decline in potential nest sites on yuccas for hawks and owls would also likely occur under this alternative. The potential impacts of fire on wildlife is discussed in greater detail in the No Action Alternative. Therefore, this alternative may result in significant adverse impacts to wildlife and wildlife habitat.

Threatened and Endangered Species (sensitive species). The impacts to sensitive species under the No Action Alternative and Alternative 2 would also occur under Alternative 3. Increased military activity on the Doña Ana Range–North Training Areas could threaten the only known population of night blooming cereus on Fort Bliss. Fires posses the greatest threat in the Organ Mountains where numerous species of sensitive plants plus gray vireo and Organ Mountain chipmunk habitat and spotted owl and peregrine falcon potential habitat would be at risk. Fire could also occur in the Hueco Mountains that are also occupied by sensitive plants. As indicated in Section 5.1.8.1, occasional fires associated with the No Action Alternative may not affect aplomado falcon potential habitat. However, if there is a substantial increase in the number of fires on Otero Mesa under Alternative 3, potential habitat for the aplomado falcon may be adversely impacted if fires result in a substantial reduction in potential perch and nest sites or if a reduction in the prey base occurs as was discussed in Section 5.1.8.1.

Based on this, Alternative 3 has the potential to have a significant adverse impact on some sensitive species on Fort Bliss.

Facility Construction and Demolition. Under Alternative 3, more facility construction and demolition projects would take place than under the No Action Alternative (see Section 3.3.4, under Alternative 1). As with the No Action Alternative and Alternatives 1 and 2, many of these projects would take place at the Main Cantonment Area and other built-up areas such as McGregor Range Camp. Most of these activities would result in negligible impacts to vegetation, wetlands and arroyo-riparian drainages, wildlife, and sensitive species because of the already highly disturbed nature of these areas and the high level of human activity.

In addition, implementation of this alternative would result in construction projects in natural plant communities outside the built-up areas (see Section 3.5.4). This would include the development of a MOUT complex consisting of 39 buildings. Three sites are being considered for the construction of these facilities and the number of acres of land that would be used is not known at this time. No new construction projects are being considered for the South Training Areas other than the MOUT complex, which could be built on this range. Other projects could occur on the Doña Ana Range Camp with a pipeline connecting it to the McGregor Range Camp and a 23-mile rail spur from the exiting rail line along U.S. Highway 54 to a point three miles west of the Doña Ana Range Camp. Other construction projects being considered for McGregor Range are a new rail line from the existing rail line along U.S. Highway 54 to the McGregor Range Camp and TA 8, and expansion of the ASP south of the road leading from U.S. Highway 54 to the McGregor Range Camp.

Vegetation. These construction projects would all take place in the Chihuhuan Desert shrublands dominated by the mesquite coppice dune and sandscrub plant community. The number of acres of this and other plant community types that would be disturbed is not known at this time.

Wetlands and Arroyo-riparian Drainages. The land that would be affected by the construction project occurs in the Chihuhuan Desert shrublands in the Tularosa Basin. Wetlands are very widely scattered in this area. It is Fort Bliss policy to avoid impacting wetlands if possible and therefore, it is assumed that the construction projects will not affect wetlands. Construction of linear projects such as a water pipeline or railroad spurs would cross arroyo-riparian drainages, which are Waters of the U.S., mostly in the mesquite coppice dune and sandscrub plant community. The Army would submit a 404 permit application to the USACE, if required, and otherwise work with the USACE to minimize any damage that may result from construction in Waters of the U.S.

Wildlife. The construction projects would result in the displacement of wildlife from the land directly disturbed, as well as affect wildlife in adjacent habitat due to human activity and noise. Wildlife affected by the projects would be species typical of the mesquite coppice dune and sandscrub habitat and other Chihuahuan Desert shrubland habitat such as creosote tarbush. See Section 4.8.3 and Section F.2 in Appendix F for a description of wildlife species that occur in these habitat types.

Threatened and Endangered Species (Sensitive Species). Sensitive species that are known to occur on Fort Bliss and could be affected by the construction projects are the night blooming cereus, Texas horned lizard, western burrowing owl, and loggerhead shrike. Fort Bliss would conduct sensitive species surveys before construction would take place to identify populations of such species as the night blooming cereus and western burrowing owl; if these species or any other sensitive species were identified, measures would be taken to lessen or eliminate impacts. As indicated in Section 4.8.3 and Appendix F, the Texas horned lizard and loggerhead shrike are common and widespread on Fort Bliss, including in the mesquite coppice dune and sandscrub habitat (see Tables F-2 and F-3 in Appendix F). It is assumed that these two sensitive species would be displaced due to elimination of habitat and that noise and human activity may affect loggerhead shrikes residing near the new projects.

Environmental Resource Management. Under Alternative 3, the INRMP would have been implemented and is incorporated as a part of Alternative 3. This land is described in Section 3.3.4 and the potential impacts that result from applying this management strategy are described in Section 5.2.8. Implementation of INRMP may result in a reduction in the intensity of impacts to natural resources that would otherwise occur. However, even with the plan, the implementation of Alternative 3 has the potential to result in adverse significant impacts to biological resources on Fort Bliss.

5.4.8.2 Cumulative Impacts

Under Alternative 3, specific locations for the conceptual projects have not been identified. Future site selections will consider impact upon jurisdictional wetlands on Fort Bliss. Adherence to the plans implemented in Alternative 1 would preclude siting that results in an adverse cumulative impact on jurisdictional wetlands.

Construction, operation, and any fires associated with operation at the proposed facilities would have an adverse impact on Waters of the U.S. Therefore, it is assumed that implementation of Alternative 3 plus activities associated with a tactical target complex and grazing may have an adverse cumulative impact on Waters of the U.S.

Alternative 3 would result in a greater adverse cumulative impact to wildlife due to greater disturbance of wildlife habitat from projects that comprise this alternative. These projects could result in the disturbance of thousands of acres of wildlife habitat with disturbance of additional areas from fire. There would also be much more noise associated with the increased use of fixed-wing aircraft, helicopters, and large wheeled and tracked military vehicles (not as cross-country maneuver on McGregor Range). These activities would result in indirect impacts to habitat surrounding the gunnery ranges and in other areas. Although the amount of wildlife habitat affected cannot be quantified, it has the potential to be substantial. Therefore, Alternative 3 would likely result in significant adverse cumulative impacts to wildlife and their habitat.

As indicated above, Alternative 3 would result in greater impacts to sensitive species than the other alternatives and these impacts have the potential to be significantly adverse to some species. This is principally because there would be a greater potential for military-related fires due to the large increase in military activities. These fires would have the potential to spread into areas considered biologically sensitive on Fort Bliss such as the Organ and Hueco Mountains, as well as burn more frequently in the grasslands on and below the Otero Mesa which could negatively affect potential northern aplomado falcon habitat. The results of increased military activity on Fort Bliss, as well as the increased frequency of military-related fires on sensitive species can not be quantified. However, when these impacts are considered with the impacts of the tactical target complex and grazing, there is a potential for significantly adverse cumulative impacts to sensitive species resulting from the implementation of Alternative 3. These cumulative impacts would be greater than those from the other alternatives.

5.4.9 Cultural Resources

Alternative 3 would entail establishing additional installation capabilities including combat aviation training, a wide range of more intensive field training activities, and the potential design and installation of a geothermal plant.

5.4.9.1 Main Cantonment Area and Fort Bliss Training Complex

Mission Activity. Under this alternative, activities at some of the ranges and training areas would increase in terms of intensity, scope, and duration. Specific locations and acreage figures for some of the actions are not available, so numbers of cultural resources affected cannot be estimated. However, impacts to archaeological resources from ground disturbance are most likely. The settings of TCPs, if any exist, might also be affected. Implementation of the ICRMP would help management of significant cultural resources. Execution of two projects proposing helicopter gunnery ranges would require approximately 182 square miles of land on McGregor Range. The overflights and construction and use of gunnery targets would have the potential to impact known and as yet unidentified cultural resources depending on specific target placement.

The additional training outlined under this alternative would result in increased intensity and duration of use, mainly within the Doña Ana Range–North Training Areas. These activities have the potential to impact cultural resources, particularly archaeological sites and TCPs should any exist. Increased use of the surrounding maneuver areas could result in inadvertent intrusions into Red zones and subsequent damage to sensitive cultural resources. Increased vehicle traffic through the Green zones could also impact cultural resources. The additional TBM target use in training scenarios and Block IB ATACMS missile test activities also have a potential to impact cultural resources on McGregor Range depending upon the specific locations of impact areas and other variables.

Under Alternative 3, mission activities using the installation capabilities could be accomplished while reducing the likelihood of damage to cultural resources through the application of the procedures outlined in the ICRMP. When specific locations are selected, the appropriate procedures will be implemented to reduce the adverse effects, preferably through avoidance. Implementation of the ICRMP could also allow more long-range studies that would identify and evaluate cultural resources on the installation well in advance of mission activities and help reduce conflicts with those activities.

Facility Construction and Demolition. Facility construction under this alternative would include a variety of buildings, roads, railways, and utility work. The construction projects included in this alternative have the potential to affect cultural resources, particularly archaeological resources, whenever there are ground disturbing aspects of the projects.

Demolition projects under this alternative are the same as those included in Alternative 1 and impacts to cultural resources would be similar.

5.4.9.2 Cumulative Impacts

The cumulative effects of Alternative 3 would be similar to those discussed under Alternative 2. However, because of the increased intensity of use of the various ranges under this alternative, the implementation of the ICRMP would play an even more critical role in reducing adverse effects of the various foreseeable projects by introducing better, more consistent, long-term management practices over the No Action Alternative.

5.4.10 Noise

5.4.10.1 Main Cantonment Area and Fort Bliss Training Complex

Activities associated with Alternative 3 with the potential to create noise impacts are addressed in each of the four major activity-related categories identified below.

Mission Activity. Mission-related activities associated with Alternative 3 include all of the activities associated with Alternatives 1 and 2. However, it is possible that some ongoing activities will be expanded in scope, and new activities will be added.

On the Main Cantonment Area and Biggs AAF, noise levels associated with mission activities would be expected to continue as described for Alternatives 1 and 2. Some aspects of this alternative could increase aircraft operations at Biggs AAF, either as a result of airlift support for increased troop training or direct mission support for expanded combat aviation training. However, no increases are anticipated that would surpass the intensity of the surge associated with mobilization. If the noise contours associated with this peak period are considered as a maximum upper boundary, and Noise Zones II and III resulting from them remain on the installation and do not impact current land uses, then the potentially increased noise resulting from expanded mission activity would not be considered significant.

On the training complex, increases in unit training would increase vehicular noise levels. However, these noise sources would be transient, dispersed, and would only occur over brief periods of time. These noise sources would be localized within the training areas that are already used for this purpose, and elevated noise levels would not be expected to occur beyond the range boundaries. Potential noise created by this aspect of Alternative 3 would not be considered significant.

On those ranges and training areas underlying the restricted airspace, increased aviation activity would increase noise levels. The potential use of either Otero Mesa or the Tularosa Basin tactical target complex was discussed in Section 5.1.10. The elevated noise levels localized around the immediate proposed target area of this range would also occur under this alternative. However, several elements of this alternative also have the potential to increase aviation-related noise.

Although detailed operational data on potentially expanded aviation activities are not available, it is still possible to assess the potential capacity of various airspace elements to accommodate increased operations while still remaining at or below a given noise threshold. If aviation activities are assumed to continue using the same relative combination of aircraft, it is possible to mathematically scale the number of current operations producing a known noise level to an increased noise level. This scaling provides a multiplier that can be used to assess the capacity of the airspace to support an expanded level of operations, while still remaining below a threshold noise level. Application of this process to restricted airspace above McGregor Range and the Doña Ana Range–North Training Areas indicates that aircraft operations could be expanded by a factor of 6.3, 7.9, and 3.2 in each of these areas, respectively, and still not exceed L_{dnmr} 55. Computer modeling of noise effects using realistic assumptions indicate expanded helicopter training associated with this alternative does not produce significant noise impacts. This is especially true since the added training is proposed to occur on McGregor Range, where the capacity for expansion is greatest.

One specific mission activity associated with this alternative included developing a helicopter training range. To assess the potential impacts associated with this proposal, a hypothetical 12.4 by 12.4 mile geographic area was described for use by the MRNMAP computer program. The Kiowa Warrior (OH-58D) and Longbow (Apache) (AH-64D) were modeled in this airspace flying 600 annual sorties each, with one-half being day sorties and one-half night. The resultant uniformly distributed noise level was L_{dnmr} 49. If the same capacity assessment described above were performed for this scenario, the 1,200 annual sorties modeled could be increased by a factor of 4 and still not exceed L_{dnmr} 55.

Alternative 3 also considers using Fort Bliss and its associated ranges as a Heavy Division Training Center and a National Guard Training Center. This expansion in training support could result in increases in the use of artillery on the ranges, specifically firing into the impact areas of the Organ Mountains. As with aircraft noise, impulsive noise capacity assessments can also be performed. The results of the assessment indicate that 110 day-equivalent detonations of a 155mm high explosive round could occur per day, at a point 2.6 kilometers from the range boundary and the noise level of 62 CDNL would not extend past the range boundary. Increased training use of the ranges is not anticipated to have significant noise impacts.

Facility Construction and Demolition. Under Alternative 3, representative facility construction would be generally similar to that described under Alternative 1. On Fort Bliss and Biggs AAF, noise associated with construction activities would be localized, of a temporary nature, and would not be expected to create any L_{dn} that would create disturbance to significant numbers of persons exposed to the noise. The proposal to initiate joint use between Biggs AAF and EPIA by constructing a taxiway between the two facilities may result in a slight reduction in aircraft operations from Biggs AAF. However, those operations would simply be shifted to EPIA. Therefore, it is doubtful that any appreciable change to the noise contours for the combined facilities would occur. On the ranges, construction-related noise would also be localized to the construction site, and would not extend beyond range boundaries.

Facility demolition planned under this alternative would be the same as that anticipated under Alternative 1. Noise resulting from demolition activities would be localized, temporary, and would not create any long-term adverse impacts.

Environmental Resource Management. Under this alternative, environmental resources would continue to be managed through ITAM practices, the INRMP, and the ICRMP. As previously discussed under Alternative 1, some management programs could require the use of motorized earth movement equipment that would result in localized, temporary noise in some areas. However, no long-term noise effects would be anticipated to occur.

5.4.10.2 Cumulative Effects

Although there is an increase in activity and the potential for increased noise levels on the training complex under Alternative 3, modeling indicates helicopter noise and artillery firing are unlikely to increase above L_{dnmr} 55 or extend beyond the training area boundaries. Therefore, cumulative effects under Alternative 3 would remain as described for Alternative 1.

5.4.11 Safety

This section assesses safety issues associated with Alternative 3. This alternative includes all of the activities associated with Alternatives 1 and 2, and also takes advantage of the potential Fort Bliss has to expand operations. The elements of this alternative that have the potential to affect safety are evaluated relative to the degree to which they increase or decrease safety risks to military personnel, the public, and property.

5.4.11.1 Main Cantonment Area and Fort Bliss Training Complex

Mission Activity. The mission activities associated with this alternative are additive with Alternatives 1 and 2. The permanently assigned installation personnel strength and equipment levels remain as previously discussed. Although FTXs could increase personnel and equipment levels temporarily, there are no specific safety issues directly associated with these envisioned uses. Although the training areas and ranges would experience more intensive use and have a higher utilization rate than currently, this use would remain consistent with current operations. Detailed safety procedures are in effect, and would continue to be enforced to guide the conduct of training operations.

Consideration is also being given to developing a comprehensive helicopter training complex on McGregor Range. This could include a 62.1- by 124.2-mile training area over Army land using existing Fort Bliss and WSMR airspace. An attack helicopter gunnery range could be developed in the southern area of McGregor Range. This range would be designed to incorporate safety and buffer areas to accommodate the ordnance used. Required safety zone factors exist for the ordnance that would be used and adequate land area and restricted airspace is available. While this increased aviation activity would increase flight hours on the ranges and training areas, and create some increase in the risk of a Class A mishap, these increases are not considered significant.

Another element of this alternative envisions developing tactical ballistic missile targets. If flight and safety data are applied to the missile's proposed trajectory, and are combined with the Patriot's range safety data, and all safety footprints remain within range boundaries, no significant safety issue should be associated with this initiative.

An initiative by WSMR with safety implications involves the proposal to launch an ATACMS from Fort Wingate, New Mexico, to impact on McGregor Range. WSMR currently conducts such launches that terminate in impact areas on WSMR. The safety implications of these activities were assessed in the *Theater Missile Defense Extended Test Range EIS* completed in November 1994. When the launch 122
occurs, coordination is effected with the FAA, land owners potentially impacted are notified, and some residents are evacuated. While adequate areas exist on McGregor Range to develop a safe impact area, the specific trajectory of the missile to a McGregor-target would require specific evaluation. Nevertheless, approved launch processes and procedures that have ensured safety in the past should continue to prove effective in mitigating risk to acceptable levels.

Facility Construction and Demolition. The additional proposed facility construction involved with this alternative includes the potential joint use of Biggs AAF and EPIA, development and expansion of geothermal projects, various mission support, administrative, and infrastructure support facilities projects on the ranges, road paving, and construction of an expansion to the ASP on McGregor Range.

The joint Biggs AAF/EPIA use would be developed by constructing a taxiway between the two airports. This would basically limit the use of EPIA to civil traffic. Military traffic at Biggs AAF may slightly increase. This could contribute to a slightly increased flight risk associated with operations at Biggs AAF but result in an overall decrease in flight risks through distribution of traffic in the Biggs AAF/EPIA area.

The initiative to expand use of geothermal resources on unexplored areas of Fort Bliss creates little risk by itself. However, during exploratory and developmental phases, the potential presence of ordnance and explosive hazards in current and historic impact areas must be recognized, and complete site clean-up would be required before project initiation.

Other facility projects on the ranges create no unusual construction requirements, and pose little risk. Some proposed projects, such as those developing new water supplies and water storage capability, will enhance fire safety in these remote areas. The construction of an additional ammunition supply point will also enhance explosive safety on the range, and further minimize explosive safety risks on Fort Bliss by removing stored ordnance from the Main Cantonment Area.

Under this alternative, no facilities except those specifically identified under Alternative 1 are scheduled for demolition.

Environmental Resource Management. Under this alternative, resources will be managed in accordance with ITAM practices, the INRMP, and the ICRMP. Safety issues associated with these management actions were discussed in Section 5.2.11, and remain unchanged under this alternative.

5.4.11.2 Cumulative Impacts

Cumulative effects under this alternative remain as discussed for Alternative 1.

5.4.12 Hazardous Materials and Items of Special Concern

5.4.12.1 Main Cantonment Area and Fort Bliss Training Complex

Mission Activity

Hazardous Materials

Hazardous Chemicals. Fort Bliss would continue to store and use large quantities of hazardous chemicals during training exercises and installation maintenance. The amounts of hazardous chemicals used would increase significantly due to an increase in the intensity of both new and expanded mission training activities. The amount of ordnance expended on the ranges would increase due to the increase in training activity but the types of ordnance would remain essentially the same as under Alternatives 1 and 2.

Hazardous Wastes. Fort Bliss would continue to generate hazardous wastes during the use of some hazardous materials. The amount of hazardous waste generated would increase significantly because of the increase in the use of hazardous chemicals. The types of hazardous waste would remain essentially the same as under Alternatives 1 and 2.

Items of Special Concern

Medical and Biohazardous Wastes. Medical and biohazardous wastes would continue to be generated under this alternative. The types of waste would remain essentially the same but the amount would increase slightly due to the increased training activity. The increase would not be significant and waste collection, storage, and disposal procedures would be the same as those described for Alternatives 1 and 2.

Low-level Radioactive Waste. The WBAMC would generate the same type of low-level radioactive wastes at essentially the same rate as under the No Action Alternative. The amount of low-level radioactive waste generated in the form of commodities items would increase because of the increased training activity. Waste collection, storage, and disposal processes would be the same as those described for Alternatives 1 and 2.

Asbestos. This alternative does not include additional facility demolition projects. Therefore, there would not be additional environmental impacts related to asbestos-contaminated waste beyond those described for Alternatives 1 and 2.

Lead-based Paint. This alternative does not include additional facility demolition projects. There would not be additional environmental impacts related to lead-contaminated waste beyond those described for Alternatives 1 and 2.

Pesticides. There would be an increase in the amount of pesticides that are applied because of the increased number of facilities. The types of pesticides would remain approximately the same as those currently used. The applicators would continue to be periodically re-certified and the program would be conducted in accordance with the *Pesticide Management Plan*. The increased usage would not cause significant adverse environmental impacts, but would impact the DoD Measure of Merit requiring a 50 percent decrease in the amount of PAI used by CY 00 from a 1993 baseline.

PCBs. The environmental impacts from PCBs under this alternative would be the same as those described for Alternatives 1 and 2.

Petroleum Storage Tanks. Fort Bliss would continue to use both USTs and ASTs. Additional tanks would be installed at new training locations. These new tanks would meet environmental regulations and fire protection codes in effect at the time of construction. The environmental impact from petroleum storage tanks would be insignificant.

Related Management Programs

Installation Restoration Program. The environmental impacts from the IRP under this alternative would be the same as those described for the No Action Alternative.

Pollution Prevention. Fort Bliss would continue the current Pollution Prevention Program as described under the No Action Alternative.

Facility Construction and Demolition. There would be a small increase in the use of petroleum products by construction vehicles and equipment and a small increase in the potential for hazardous chemical spills during servicing of the vehicles and equipment. Existing spill prevention control and countermeasure plans would be adequate to deal with any incidents. Any adverse environmental impacts from facility construction would be short.

The environmental impacts from facility demolition under this alternative would be the same as those described for Alternative 1.

Environmental Resource Management. The environmental impacts from resource management plans under this alternative would be the same as those described for Alternative 1.

5.4.12.2 Cumulative Impacts

The cumulative effects under this alternative are the same as those described for Alternative 1.

5.4.13 Socioeconomics

5.4.13.1 Main Cantonment Area and Fort Bliss Training Complex

Personnel levels during peacetime and mobilization conditions under this alternative are not expected to vary from those anticipated under the No Action Alternative and Alternatives 1 and 2 discussed previously. Since potential socioeconomic effects are derived directly from these personnel levels, the results reported for other alternatives will be replicated here, in addition to the unique aspect of additional TDY personnel.

Under Alternative 3, there would be additional construction and training capabilities developed above those levels associated with other alternatives. The most noticeable change would be the addition of a training exercise involving two brigades. Such an exercise could involve a total of up to 10,000 personnel and have a duration of 2 weeks (or an equivalent of 383 FTE personnel).

Utilizing the programmatic approach presented under Alternative 2, the employment effects associated with such an exercise can be estimated. Assuming that procurements made by the installation in the local economy in support of the exercise have a value of $2 million, there would be a total of 43 jobs generated in the local economy. This expenditure included the provision of contract quarters for personnel. There would be, in addition, TDY expenditures by the personnel participating in the exercise. Assuming that lodgings in the private sector are procured through contracting, expenditures would be for meals. With 10,000 persons each remaining for 10 days, expenditures would amount to about $3.4 million. This level of spending would support 75 full-time jobs, 57 of which would be in the food and beverage sector of the local economy.

Construction of facilities would also generate employment (both direct in the construction sector of the economy and secondary in sectors supporting the construction industry). It is estimated that the expenditure of one million dollars would support 15 jobs in the local economy (eight of which would be in the construction industry).

5.4.13.2 Cumulative Impacts

It is anticipated that implementation of any of the alternatives would result in no in-migration of workers to the region required to fill employment opportunities. Rather, any employment opportunities would be filled by workers from the local labor force. In the absence of such in-migration of workers and their dependents, conditions would be as projected under future baseline conditions.

5.4.14 Environmental Justice

5.4.14.1 Main Cantonment Area and Fort Bliss Training Complex

Land Use. In addition to construction projects, activities, and management plans proposed for Alternative 1, Alternative 3 also includes a range of actions that could occur primarily on the range complex to support expanded training on Fort Bliss. Some actions have been identified which could have potential adverse effects on surrounding areas. Examples of potential off-post land use effects are briefly summarized below.

Census tracts located off-post adjacent to Fort Bliss generally have minority and low-income population percentages that are similar to or greater than the general population of El Paso County (see Section 4.14). Relocation of aviation training activities requiring night use of Biggs AAF could have adverse affects on residential areas both on post and southwest of the Main Post. Joint use of Biggs AAF and EPIA could increase use of Biggs AAF runway for some commercial aircraft and may, depending upon mix and distribution of aircraft, expose new residential areas and other noise sensitive uses (such as hospitals) to the southwest of Main Post to additional noise, possibly reducing noise in other locations. While it is possible that some of these areas would experience increased effects from use of Biggs AAF, effects in other locations could be correspondingly reduced. However, as discussed in the following section on environmental justice impacts, impacts from noise are not expected.

Tracked vehicle operations in training areas along the southern boundary of the Doña Ana Range–North Training Areas may generate dust that reduces air quality in Chaparral, New Mexico. These short-term, localized impacts could occur near the community. The Chaparral area has 52.4 percent minorities and 26.5 percent of its population below the poverty level. Overall, land use impacts from the proposed action would not be expected to cause disproportionately high and adverse human health and environmental effects on low-income and minority populations. Therefore, these could be short-term environmental justice impacts.

Infrastructure. Changes in ground transportation, utilities, and related infrastructure in the Main Cantonment Area and training areas would be similar to Alternatives 1 and 2. No significant adverse effects have been identified and no environmental justice effects are expected.

Airspace. Airspace considerations under Alternative 3 primarily relate to mission activities additional to those addressed in Alternative 1 and to limited joint use of Biggs AAF and EPIA. No changes to the McGregor Range/R-5103B/C or Doña Ana Range/R-5107A airspace areas are proposed. Impacts on airspace and air traffic operations are not expected to have environmental justice impacts.

Earth Resources. Facility construction would be greater than under Alternatives 1 and 2, but most new facilities would be constructed in the cantonment area or in range camps where most soils have been previously disturbed. Impacts to geology and soils would have no environmental justice impacts.

Air Quality. Qualitative analysis of potential air quality impacts using conceptual project examples such as a proposed helicopter training complex, Heavy Division Training Center, and range improvements including roadway pavement projects and a proposed rail spur, indicate either beneficial impacts or no potentially significant adverse air quality impacts. However, many projects are in conceptual phases only. An example of an environmental justice impact from potential changes in air quality was discussed under *Land Use*, above.

Water Resources. Water resource impacts would be similar to those described under Alternatives 1 and 2. No environmental justice impacts have been identified.

Biological Resources. Impacts to biological resources would not have adverse impacts on human populations in the project area and would not cause environmental justice impacts.

Cultural Resources. Overflights, construction, and use of gunnery targets have the potential to impact unidentified cultural resources, including TCPs, located within McGregor Range. Additional training on the Doña Ana Range–North Training Areas could impact cultural resources, particularly archaeological and traditional resources. Projected mission activities could be accomplished while reducing the likelihood of damage to cultural resources through the application of the ICRMP.

As with the other alternatives, the Army is coordinating with Native American groups regarding the development of the ICRMP, and Native American groups were contacted as part of the environmental justice outreach mailing effort. Similar to the other alternatives, overflights may have potentially adverse impacts to the setting of TCPs valued by Native Americans living in the project area. No significant traditional Native American resources have been identified under the restricted airspace. Noise may affect TCPs in a variety of ways. Auditory impacts to other, presently unidentified, Native American resources beneath the airspace are possible, but probably would be infrequent.

Noise. As described in Section 5.3.10, if noise contours associated with peak period use of Biggs AAF from expanded mission activities are similar to the maximum contours produced by current surge requirements, and remain on the installation, no significant adverse noise effects are anticipated. In addition, if increased operations and use of airspace, increased use of artillery on the ranges, and development of a proposed helicopter training range do not exceed upper parameters identified in the noise section, and significant noise levels remain within the boundaries of the ranges, no significant noise impacts are anticipated. Under the above conditions, no noise-related environmental justice effects are expected.

Safety. In general, mission activities associated with this alternative would be additive to Alternatives 1 and 2. New projects such as expanded use of geothermal resources on WSMR would require consideration of the presence of ordnance and explosive hazards and related safety procedures. No environmental justice impacts are expected in connection with potential increases in safety risks.

Hazardous Materials and Items of Special Concern. Under this alternative, there would be a significant increase in the procurement, storage, and use of hazardous materials and the generation of hazardous wastes due to the increase in the intensity of new and expanded mission training activities. The types of hazardous materials and hazardous waste would remain essentially the same as under Alternatives 1 and 2. No additional facility demolition is proposed under this alternative. No significant environmental or health effects have been identified for hazardous materials and hazardous waste and no environmental justice impacts are anticipated.

Socioeconomics. Personnel levels under this alternative are not expected to vary substantially from those of the No Action Alternative. Socioeconomic impacts would benefit the local economy and the general population, including low-income and minority populations living in the area.

5.4.14.2 Cumulative Impacts

There would be no cumulative environmental justice impacts from implementation of Alternative 3.

5.5 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

The NEPA requires that environmental analysis include identification of "...any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented" (Sec. 102 (C) (v). Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources, and the effects that the use of these resources may have on future generations. Irreversible effects primarily result from use or destruction of specific resources (e.g., energy and minerals) that cannot be replaced within a reasonable timeframe. Irretrievable resource commitments involve the loss in value of affected resources that can not be restored as a result of the action (e.g., extinction of a threatened or endangered species or the disturbance of a cultural site).

For alternatives proposed under this programmatic environmental analysis, the majority of resource commitments are neither irreversible nor irretrievable. Most impacts are either short-term, temporary, or can be mitigated through appropriate measures. The following sections summarize this analysis for each resource area described in this document.

5.5.1 Land Use

Land use changes would occur throughout the Main Cantonment Area and the Fort Bliss Training Complex under provisions of each alternative, and could result in substantial changes to the man-made and natural environment. Although these changes and their associated environmental effects could be long-term, they would not necessarily be irreversible.

5.5.2 Main Cantonment Infrastructure

Since there are no adverse impacts to this resource area, no irreversible and irretrievable commitment of resources would occur.

5.5.3 Training Area Infrastructure

Since there are no adverse impacts to this resource area, no irreversible and irretrievable commitment of resources would occur.

5.5.4 Airspace Use

Since there are no adverse impacts to this resource area, no irreversible and irretrievable commitment of resources would occur.

5.5.5 Earth Resources

Geological Resources. To the extent that geothermal energy is a finite resource, developing and utilizing it on Fort Bliss is irretrievable, although development is not likely to deplete the resource in the foreseeable future. (The design and possible construction to utilize geothermal resource is in the conceptual stage.) Construction and maintenance activities will consume limited quantities of aggregate sand and gravel. Regardless of the alternative selected, consumption of oil, gas, steel, concrete, and other primary materials will occur.

Soils. The impact of military activities on vegetation may have caused irreversible changes to the composition of plant communities. This change has exposed soils to increased gully erosion and irretrievable loss of soil by wind. Although these impacts would likely continue regardless of which alternative is selected, some alternatives would impact the soil more than others. By following installation management practices and avoiding highly erodible soils, these impacts can be minimized.

5.5.6 Air Quality

There are generally no irreversible and irretrievable commitments of air quality resources at a site, because the nearly continuous motion of the atmosphere results in dilution and downwind transport of air pollution. Because of this dilution and transport, the atmosphere has a natural ability to clean itself very quickly after any sources of pollution have been removed.

5.5.7 Water Resources

Groundwater withdrawals from the Hueco Bolson in the Fort Bliss region presently exceed recharge rates, creating a permanent and growing deficit. Declining regional groundwater levels and deteriorating water quality are overwhelmingly due to nonmilitary activities. Nevertheless, groundwater pumping at Fort Bliss contributes marginally to the irreversible depletion of this resource.

5.5.8 Biological Resources

Within the Fort Bliss Training Complex training areas (particularly McGregor Range), existing (No Action Alternative), Alternative 1 (also existing activities), and proposed mission-related activities (Alternatives 2 and 3) pose a high probability of an irretrievable commitment of vegetation. This commitment would be the result of continuing vegetative disturbance and gradual ecological change of existing training areas where vehicle maneuvers, weapons strikes, fires, and soil erosion occur.

Additional impacts and irretrievable commitments of natural vegetative cover would occur under Alternative 3, above that described for the other alternatives. These commitments would occur as a result of increased cross-country vehicle maneuvers, weapons strikes, and fires. Similar vegetation commitments could be expected on the South Training Areas where cross-country vehicle maneuvers would increase. On Doña Ana Range–North Training Areas, irretrievable vegetation commitments could be expected as a result of envisioned training initiatives such as a National Guard Training Center and an increase in the amount of land used for weapons firing surface impact. The vegetation commitments would take place primarily in foothill desert shrub, piedmont grassland, montane shrubland, and pinyon/juniper woodland.

5.5.9 Cultural Resources

Certain training activities proposed under the alternatives have the potential for irreversible or irretrievable impacts to cultural resources such as Native American TCPs. Training activities such as tracked and wheeled vehicle maneuvering, emplacement excavation, and bivouacs, constitute the greatest source of direct and indirect impacts to prehistoric and historic cultural resources. Cultural resources are non-renewable; once they are destroyed or altered, they cannot be replaced. Activities, such as ground disturbance from training activities, can irreparably damage artifacts and intact features, destroy data, and disturb site integrity. Within developed areas on Fort Bliss, facility construction and demolition may also cause irreversible or irretrievable impacts to historic buildings and districts. While implementation of data recovery or other measures under existing or proposed management plans can reduce adverse effects, the loss of any significant cultural resource can be considered irreversible and irretrievable.

5.5.10 Noise

There are no noise issues or actions under any alternative that involve irreversible and irretrievable commitment of resources.

5.5.11 Safety

There are no safety issues or actions under any alternative that involve irreversible and irretrievable commitment of resources.

5.5.12 Hazardous Materials and Items of Special Concern

There are no hazardous materials and items of special concern issues or actions under any alternative that involve irreversible and irretrievable commitment of resources.

5.5.13 Socioeconomics

There are no socioeconomic issues or actions under any alternative that involve irreversible and irretrievable commitment of resources.

5.5.14 Environmental Justice

There are no environmental justice issues or actions under any alternative that involve irreversible and irretrievable commitment of resources.

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Mitigation and Summary of Environmental Consequences

6.0

6.0 MITIGATION AND SUMMARY OF ENVIRONMENTAL CONSEQUENCES

This chapter presents the Fort Bliss monitoring effort to identify impacts and mitigation measures to reduce potentially adverse impacts to the environment from implementation of the programs described in Alternatives 1, 2, and 3. Mitigation measures for adopting the various planning actions are themselves programmatic, as they address broad potential impacts from implementing the proposed revisions to RPMP components; adoption of the INRMP, ICRMP, and TADC; and other installation initiatives as described in Chapter 3. The extent of implementing the following mitigation measures is subject to future funding availability. Appropriate mitigation for specific future projects will be determined in NEPA documentation.

Monitoring is an integral part of any system that provides a way to examine an environmental mitigation. Fort Bliss will continue to develop its Comprehensive Landscape Monitoring Program as described in Appendix B. This system monitors the Main Cantonment Area, the Fort Bliss Training Complex, and Castner Range to assess training, grazing, and natural impacts on natural and cultural resources. This monitoring system is a five-part process consisting of satellite remote sensing reconnaissance, site inspections, plot sampling, GIS analysis, and adaptive management to review and revise operations and training as necessary. The Army will develop a *Mitigation Action Plan* that will provide for annual reports to the public regarding the mitigation actions adopted in the ROD for the *Fort Bliss Mission and Master Plan PEIS*.

The CEQ regulations for implementing NEPA (40 CFR Parts 1500 to 1508) recognize five means of mitigating an environmental impact. The regulations also apply to specific project NEPA documents tiered from this programmatic analysis of land use and environmental resource management actions and conceptual installation capabilities and initiatives. 40 CFR 1508.20 defines mitigation to include:

- <u>Avoidance.</u> This method avoids environmental impact by not performing certain actions or parts of actions.

- <u>Limitation of action.</u> This method limits the degree or magnitude of the action in order to reduce the extent of an impact.

- <u>Restoration of the environment.</u> This method attempts to restore the affected environment to its previous condition or better.

- <u>Preservation and maintenance operations.</u> This method designs the action to reduce its adverse environmental effects.

- <u>Replacement.</u> This method compensates for the impact by replacing the resource or environment that will be impacted by the action.

Each of these categories is reflected in the land use planning actions as proposed in this PEIS.

1. Avoidance. The RPMP and the TADC are management actions that specify land uses on the main cantonment and the Fort Bliss Training Complex, respectively. While implementation of these land use plans is not mitigation, the plans consolidate similar and supporting uses and avoid or minimize impacts to environmental resources in these areas. This includes, for example, designating areas for specific training activities such as ORV maneuvers. This restriction would reduce the effects on soils, vegetation, and wildlife habitat that could result from random access within the Fort Bliss Training

Complex. Restriction and avoidance of certain land uses is also intended to allocate land for specific training activities, including their type, frequency, duration, and intensity, based upon the capacity of Fort Bliss to sustain these uses. Routine management actions to avoid impacts to the environment are described in Section 3.0, *Description of the Proposed Action and Alternatives*.

Avoidance mitigation activities specific to broad impacts associated with this analysis include:

<u>Impacts on Water Resources.</u> Fort Bliss will continue to actively participate in a water conservation and facility retrofit program. The program includes retrofitting of low-flow toilets and showerheads; reduction of turf areas in family housing; limitation of watering hours; desert landscaping; water-thrifty design of new construction; and repair, upgrade or replacement of old water mains and laterals. The program will be continued and expanded where feasible. Active enforcement and public education programs will be a major part of the installation water conservation effort. The installation will participate in regional water reuse initiatives.

2. Limitation of action. The development of the TADC considered the management actions that limit environmental impacts through the installation's *SOPs for Weapons Firing and Maneuver Area Use* (U.S. Army, 1996f). These procedures:

   - prescribe general safety requirements and precautions;
   - outline the administrative and logistical support to units using the Fort Bliss Training Complex;
   - provide scheduling requirements for use of the ranges and training areas;
   - prescribe aviation usage of the restricted airspace;,
   - describe the range control system used for the Fort Bliss Training Complex; and
   - specify the responsibilities and measures for the protection of the environment and historic resources on the Fort Bliss Training Complex.

   These procedures influence the extent of an impact by limiting the degree, magnitude, or location of specific training action. For example, missile or artillery firing scenarios may be limited in such a way that the target intercept point or impact area is located to avoid or minimize impacts to cultural or natural resources, or to maintain SDZs within installation boundaries.

   No programmatic mitigation measures are required that limit the implementation of the proposed plans and initiatives.

3. Restoration of the environment. Examples of ongoing Army management programs for restoration include ITAM and actions following major training exercises that evaluate and rehabilitate training lands to conditions that contribute to training and maintain or improve environmental conditions. Activities under the IRP also contribute to restoration of the environment. Restoration and rehabilitation activities will continue to be implemented to the maximum extent possible within funding constraints.

   No programmatic mitigation measures are required to restore environmental conditions resulting from implementation of the proposed plans and initiatives.

4. Preservation and maintenance operations. The design of the RPMP, ICRMP, INRMP, and TADC considers preservation and maintenance operations to minimize adverse impacts on environmental resources while supporting the training mission. Examples of management practices incorporated into each alternative are described in Section 3.0, *Description of the Proposed Action and Alternatives.*

5. Replacement. The programmatic evaluation of Alternatives 1, 2, and 3 indicates regional water resources will be impacted by cumulative effects to such an extent that replacement mitigation is appropriate. A mitigation action to assist in addressing this regional condition is to continue the Army's exploration program for geothermal resources at Davis Dome near McGregor Range Camp (see Section 4.7.1.2). The geothermal water has the potential to produce 3 megawatts of electric power that could be used to operate a desalination plant producing approximately 7 mgd of potable water from the saline aquifer. This source would be used to augment or replace water currently pumped from the Hueco Bolson.

Table 6-1 summarizes the proposed mitigation for potential impacts of the No Action Alternative and Alternatives 1, 2, and 3, for each resource. The side-by-side comparison of environmental consequences of the alternatives and related mitigation actions reveals the differences and similarities among the resources, with regard to the impacts identified in the PEIS.

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Table 6-1. Proposed Mitigation for Potential Impacts of Alternatives by Resource

Resource	*No Action Alternative*		*Alternative 1*		*Alternative 2*		*Alternative 3*	
	Impact	*Mitigation Action*	*Impact*	*Mitigation Action*	*Impact*	*Mitigation Action*	*Impact*	*Mitigation Action*
LAND USE								
Land Use Planning								
Main Cantonment	Adverse planning impacts result from perpetuating existing functional incompatibilities in land use designations. **Industrial and airfield development on Biggs AAF and the EPIA could have cumulative adverse noise and traffic effects on residential land uses of Biggs AAF.**	Address incompatibilities on a project-by-project basis.	**The RPMP, INRMP, and ICRMP would result in positive direct and cumulative environmental impacts by providing a planning framework that would improve land use relationships in the main cantonment and compatibility with land uses near the main cantonment.**	No mitigation required. Buffering would be incorporated into site design where adjacent uses are incompatible.	**Same as Alternative 1.**	Same as Alternative 1.	**Same as Alternative 2** except that siting a MOUT training complex near Biggs AAF would conflict with existing land use due to use of smoke/obscurants.	Same as Alternative 2 except need additional project-specific NEPA evaluation and mitigation determination by project proponent.
Fort Bliss Training Complex	Adverse planning impacts from perpetuating general land use designations of the training complex. **Potential conflict between military training and public use of the training areas on Otero Mesa portion of McGregor Range.** **USAF tactical target complex development will adversely affect public use access and grazing on certain portions of McGregor Range.**	Address incompatibilities on a project-by-project basis. Scheduling practices to minimize conflicts and enhance notification of military use. Increase scheduling notification and coordination efforts regarding grazing and BLM, and public access.	**The INRMP, ICRMP, and TADC would result in positive direct and cumulative environmental impacts by providing an improved framework for managing land use, considering a wide range of resources.**	No mitigation required.	**Same as Alternative 1 except there would be minor, additional impacts to public use and BLM-administered grazing and resource programs at new controlled access FTX sites.**	Increase scheduling notification use of FTX sites and coordination efforts regarding BLM and public access.	**Same as Alternative 2 except:** • **Surrounding land use would be affected by noise from increased aircraft operations throughout the training complex and from rail activities on Doña Ana Range–North Training Areas.** • **Growth in adjacent communities and military operations requiring currently unused installation capabilities may result in growing land use incompatibilities.**	Same as Alternative 2 except need additional project-specific NEPA evaluation and mitigation determination by project proponent.

Note: Direct and indirect environmental impacts are show in this text style. **Cumulative environmental impacts are shown in this text style.**

Table 6-1. Proposed Mitigation for Potential Impacts of Alternatives by Resource (Continued)

Resource	*No Action Alternative*		*Alternative 1*		*Alternative 2*		*Alternative 3*	
	Impact	*Mitigation Action*	*Impact*	*Mitigation Action*	*Impact*	*Mitigation Action*	*Impact*	*Mitigation Action*
Land Use Planning (Continued)								
Fort Bliss Training Complex (Continued)							• **Expansion of military capabilities may potentially restrict some activities on or access to portions of Fort Bliss. The primary nonmilitary uses that would be affected are grazing and public recreation.** • Increased probability of debris deposition from TBM targets and resulting impacts on land use. • Road improvements on McGregor Range would benefit public access and fire protection. • Firing of IB ATACMS would affect existing safety buffers on/off installation, requiring extension into incompatible land uses.	

Note: Direct and indirect environmental impacts are show in this text style. **Cumulative environmental impacts are shown in this text style.**

Table 6-1. Proposed Mitigation for Potential Impacts of Alternatives by Resource (Continued)

Resource	*No Action Alternative*		*Alternative 1*		*Alternative 2*		*Alternative 3*	
	Impact	*Mitigation Action*	*Impact*	*Mitigation Action*	*Impact*	*Mitigation Action*	*Impact*	*Mitigation Action*
AESTHETICS AND VISUAL RESOURCES								
Main Cantonment and Fort Bliss Training Complex	Potential adverse impacts on the Main Cantonment Area may occur if resources are removed from areas adjacent to or within historic districts without consideration of the visual context of replacement construction as sited in accordance with RPMP and IDG objectives.	Address incompatibilities on a project-by-project basis.	The ICRMP would result in a positive environmental impact by providing an improved framework for considering and reviewing projects within and adjacent to historical districts.	No mitigation required.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 2 except that potential changes in visual context from construction of a rail spur would be inconsistent with VRM objectives.	Same as Alternative 2 except need additional project-specific NEPA evaluation and mitigation determination by project proponent.
EARTH RESOURCES								
Soils								
Main Cantonment and Fort Bliss Training Complex	**Erosion due to impacts of construction, training complex maintenance, or ground disturbing environmental resource management activities on highly erodible soil.**	Finish survey of soil erosion. Monitoring with satellite imagery.	**Same as No Action Alternative.**	Same as No Action Alternative.	**Same as Alternative 1 except level of use within designated controlled access FTX sites could increase compaction of soils and possible increased erosion at FTX sites on susceptible soils.**	Same as Alternative 1 except need additional project-specific NEPA evaluation and mitigation determination by project proponent.	**Same as Alternative 2 except additional potential increases in the level of use within areas designated for off-road training would occur.**	Same as Alternative 2 except: • Apply INRMP and project siting according to TADC land use designations to reduce soil erosion. • Need additional project-specific NEPA evaluation and mitigation determination by project proponent.

Note: Direct and indirect environmental impacts are show in this text style. **Cumulative environmental impacts are shown in this text style.**

Table 6-1. Proposed Mitigation for Potential Impacts of Alternatives by Resource (Continued)

Resource	*No Action Alternative*		*Alternative 1*		*Alternative 2*		*Alternative 3*	
	Impact	*Mitigation Action*	*Impact*	*Mitigation Action*	*Impact*	*Mitigation Action*	*Impact*	*Mitigation Action*
WATER RESOURCES								
Main Cantonment and Fort Bliss Training Complex	**Demand for direct (2.4 percent) and indirect (5.3 percent) military use for all purposes is about 7.7 percent of all cumulative water demand supplied to the El Paso-Cuidad Jaurez region from the Hueco Bolson, the Mesilla Bolson, and the Rio Grande. The City of El Paso currently obtains 44 percent of its water from the Hueco Bolson, which could be substantially depleted by 2025; the remainder comes from the Mesilla Bolson and the Rio Grande. Fort Bliss withdraws approximately 3.6 percent of the total annual pumpage from the Hueco Bolson. This results in a slight acceleration of the decline in groundwater levels from regional cumulative water use. While the effects of pumpage of wells at Fort Bliss on the El Paso metropolitan area are slight, water conservation remains a major concern on Fort Bliss.**	Participate in regional water planning with regional water authorities.	**Same as No Action Alternative.**	Same as No Action Alternative.	**Same as Alternative 1.**	Same as Alternative 1.	**Same as Alternative 2 except that water demand for Fort Bliss would exceed that under previous alternatives. Size of increase would be dependent on personnel increases and construction projects selected. Additional use at cantonment would require increase pumpage from Army wells; however, the impact on regional water resources continues to be slight, relative to regional water demand.**	Same as Alternative 2 except need additional project-specific NEPA evaluation and mitigation determination by project proponent.

Note: Direct and indirect environmental impacts are show in this text style. **Cumulative environmental impacts are shown in this text style.**

Table 6-1. Proposed Mitigation for Potential Impacts of Alternatives by Resource (Continued)

Resource	*No Action Alternative*		*Alternative 1*		*Alternative 2*		*Alternative 3*	
	Impact	*Mitigation Action*	*Impact*	*Mitigation Action*	*Impact*	*Mitigation Action*	*Impact*	*Mitigation Action*
BIOLOGICAL RESOURCES								
Fort Bliss Training Complex	Disturbance to ecosystems from military activities such as off-road vehicle training, fire, ordnance or debris impact, and soil erosion. **Cumulative impacts to Fort Bliss ecosystem from nonmilitary use on co-use lands and by trespass grazing elsewhere in the training complex.** **Impacts resulting from inconsistent coordination due to the use of a specific unit rather than a broader fire management plan.**	Monitoring with satellite imagery. Cooperate with and share available information with BLM and USFS grazing managers. Address fire management inconsistencies on a case-by-case basis.	**Same as No Action Alternative except cumulative impacts would be similar to those under the No Action Alternative, but would be reduced somewhat by implementation of the INRMP.**	Same as No Action Alternative.	**Same as Alternative 1 except there would be direct disturbance and cumulative impacts to ecosystems resulting from additional land designated for controlled access FTX sites.**	Same as Alternative 1 except need to determine site-specific mitigation through additional NEPA evaluation and implementation of appropriate mitigation by project proponent.	**Same as Alternative 2 except:** • **Cumulative impacts from increase in the level of use for off-road training in designated areas.** • **Increased impact in ungrazed grassland below Otero Mesa.**	Same as Alternative 2 except need to determine site- specific mitigation through additional NEPA evaluation and implementation of appropriate mitigation by project proponent.
CULTURAL RESOURCES								
Main Cantonment and Fort Bliss Training Complex	**Off-road maneuver, surface impact, construction and demolition, facility maintenance, and development of a tactical target complex may impact cultural resources.**	Manage effects on cultural resources on a case-by-case basis.	**Same as No Action Alternative except that implementation of the ICRMP would result in positive environmental impacts resulting from the enhanced cultural resource management.**	No mitigation required.	**Same as Alternative 1 except:** • **Greater cumulative impacts than the No Action Alternative or Alternative 1.** • Development of additional con-trolled access FTX sites would adversely impact archaeological resources within the site.	Same as Alternative 1 except need to determine site-specific mitigation through additional NEPA evaluation and implementation of appropriate mitigation by project proponent.	**Same as Alternative 2 except increased level of land use and potential cumulative impacts on cultural resources as the Fort Bliss Training Complex capabilities are more fully utilized.**	Same as Alternative 2 except need proponent determination of site-specific mitigation through additional surveys to support NEPA evaluation and implementation of appropriate mitigation by project proponent.

Note: Direct and indirect environmental impacts are show in this text style. **Cumulative environmental impacts are shown in this text style.**

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7.0

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PEIS Contribution: Principal Investigator–Land Use; Aesthetics and Visual Resources

Gordon, Carol, Fort Bliss, Directorate of Resource Management
M.S. Accounting
B.A. Acounting
Years of Experience: 28
PEIS Contribution: DOPAA, Installation Initiatives

Gross, Lorraine, Senior Archeologist, SAIC
M.A. Anthropology
B.A. Anthropology
Years of Experience: 19
PEIS Contribution: Cultural Resources

Gunter, Diane, Graphic Artist, SAIC
Years of Experience: 20
PEIS Contribution: Development and Production of Graphics

Gwinn, Leslie J., Environmental Scientist, SAIC
M.S. Interdisciplinary Studies–Environmental Science
B.S. Computer Science
Years of Experience: 12
PEIS Contribution: SAIC Fort Bliss Liaison, Public Involvement Support

Hall, David, Fort Bliss, Directorate, Plans, Training, Mobilization, and Security,
Chief, ITAM
M.S. Business Administration/Human Relations
B.A. Geology
Years of Experience: 30
PEIS Contribution: DOPAA, ITAM

Hamilton, Vicki, Fort Bliss, Mission and Master Plan PEIS Project Manager, DOE
M.S. Arch.
B.S. Arch.
Years of Experience: 25
PEIS Contribution: Project Management, DOPAA, ICRMP, Cultural Resources

Hanley, Teresa, Land Use Planner, BLM
M.A. Anthropology
B.A. Anthropology
Years of Experience: 11
PEIS Contribution: Reviewer and Interagency Coordination

Howard, Mike, Wildlife Management Biologist, BLM
M.S. Wildlife Management
B.S. Range Animal Science
A.S. Wildlife Management
Years of Experience: 19
PEIS Contribution: Reviewer: Biology, Grazing

Hughes, Marian, Fort Bliss, Directorate of Resource Management
Years of Experience: 16
PEIS Contribution: DOPAA, Socioeconomics

Ingram, Campbell, Fort Bliss, DOE
B.S. Natural Resources Planning
Years of Experience: 4
PEIS Contribution: DOPAA, NEPA Coordination

Jackson, Terry, Senior Technical Editor and Production Manager, SAIC
B.S. Technical Communication
Years of Experience: 15
PEIS Contribution: Editing, Document Production

Jentgen, Russel, Geologist, BLM
B.S. Geology
Years of Experience: 29
PEIS Contribution: Reviewer: Geology and Minerals

Kemp, James, Fort Bliss, Chief, Master Planning Division, DPWL
Years of Experience: 30
PEIS Contribution: DOPAA, RPMP Land Use

Kiezer, A.J., LTC, Fort Bliss, Director, Plans, Training, Mobilization, and Security,
Former Commander, USACASB
M.B.A.
B.A. Political Science
Years of Experience: 23
PEIS Contribution: DOPAA, TADC

Lenhart, Lilia, Fort Bliss
B.S. Civil Engineering
Years of Experience: 16
PEIS Contribution: Infrastructure, Solid Waste Disposal

Locke, Brian, Fort Bliss, Mission and Master Plan PEIS Deputy Project Manager, DOE
Ph.D. Biology
M.S. Forest Wildlife
B.S. Fisheries and Wildlife Science
Years of Experience: 20
PEIS Contribution: Project Management, DOPAA, INRMP, Biological Resources

Luna, Ronald, Fort Bliss, Energy Coordinator, DPWL
PEIS Contribution: Renewable Energy Manager

Marshall, Amy, Fort Bliss, Archaeological Resources Team
M.A. History/Archaeology
Years of Experience: 19
PEIS Contribution: Cultural Resources, ICRMP

Mathis, Joe E., Fort Bliss, Energy Coordinator, DPWL
M.E. Mechanical Engineering
Years of Experience: 34
PEIS Contribution: Utilities, Water Resources

McCreary, Janet, Word Processor, SAIC
Years of Experience: 6
PEIS Contribution: Word Processing

McDonald, Bob, Fort Bliss, USACASB
PEIS Contribution: DOPAA, Range Operations, Airspace

Morris, Robert W., Transportation Analyst, SAIC
M.S. Management Science/Operations Research
B.S. Mathematics
Years of Experience: 5
PEIS Contribution: Principal Investigator–Transportation/Traffic Analysis

Oakes, Edward, Senior Geologist, SAIC
M.S. Geology
B.S. Geology
Years of Experience: 21
PEIS Contribution: Principal Investigator–Earth Resources

Offutt, Jean, Fort Bliss, Public Affairs Officer
PEIS Contribution: Public Involvement

Page, Scott, Senior Environmental Scientist, SAIC
B.S. Physical Geography
Years of Experience: 20
PEIS Contribution: Integration

Paul, John R., Fort Bliss, USACSB
M.A. Human Resource Development
B.A. Psychology
Years of Experience: 12
PEIS Contribution: DOPAA, Range Safety

Phillips, Tom, Rangeland Management Specialist, BLM
Years of Experience: 14
PEIS Contribution: Reviewer: Grazing and Vegetation

Raines, John, Project Manager, SAIC
M.S. Economics
M.S. Management Engineering
B.S. General Engineering
Years of Experience: 34
PEIS Contribution: Project Manager, DOPAA

Reece, Jeff, Senior Chemical Engineer, SAIC
M.S. Civil/Sanitary Engineering
B.S. Chemical Engineering
Years of Experience: 23
PEIS Contribution: Socioeconomic Modeling

Roach, Wilson D., Fort Bliss, USACASB
Years of Experience: 13
PEIS Contribution: DOPAA, Range Operations

Rudolph, James L., Senior Archaeologist, SAIC
Ph.D. Anthropology, 1994
M.A. Anthropology
B.A. Anthropology
Years of Experience: 22
PEIS Contribution: Principal Investigator–Cultural Resources

Sanchez, Joe, Natural Resource Specialist, BLM
B.S. Range Management
Years of Experience: 23
PEIS Contribution: Reviewer: Recreation, Visual Resources, and Wilderness

Sanders, Tim, Acting Assistant Field Manager, BLM
M.S. Agricultural Economics
B.S. Wildlife Biology
Years of Experience: 20
PEIS Contribution: Reviewer and Management Oversight

Smith, Robert W., Senior Program Manager, SAIC
B.A. Psychology
Years of Experience: 30
PEIS Contribution: Quality Assurance

Spainhoward, Michael T., Document Production Staff, SAIC
M.A. Theology
B.A. History
Years of Experience: 6
PEIS Contribution: Word Processing, Document Production

Springer, Lisbeth A., Senior Planner, SAIC
M.C.R.P. Planning
B.A. Sociology
Years of Experience: 16
PEIS Contribution: Principal Investigator–Environmental Justice

Stewart, Carrie E., Environmental Scientist, SAIC
B.S. Geology
Years of Experience: 9
PEIS Contribution: Integration

Stewart, John E., Fort Bliss, Chief, Transportation Division, DPWL
PEIS Contribution: Transportation

Stovall, Rusty, Geographer, BLM
M.S. Geography
B.S. Geography
B.S. Planning
Years of Experience: 5
PEIS Contribution: Reviewer: Remote Sensing/GIS

Sweet, Carol F., Environmental Scientist, SAIC
B.S. Geology
Years of Experience: 26
PEIS Contribution: References

Tibbit, James, Fort Bliss, Director of Resource Management
Years of Experience: 37
PEIS Contribution: DOPAA

Tipton, William, Fort Bliss, Chief, Real Property Branch, DPWL
B.S. Management
Years of Experience: 30
PEIS Contribution: DOPAA, Land Use, Realty

Van Tassel, Robert, Program Manager, SAIC
M.A. Economics
B.A. Economics
Years of Experience: 24
PEIS Contribution: Program Coordination

Vliet, Andrew J., Program Manager, Fort Bliss, McGregor Range Renewal
D.Phil. Zoology
B.S. Wildlife Biology
Years of Experience: 12
PEIS Contribution: DOPAA

Vogel, Douglas J., Fort Bliss, Chief, Mobilization Branch, DPTMS
B.B.A. Management and Economics
Years of Experience: 12
PEIS Contribution: DOPAA

Winkel, Von, Range Scientist, SAIC
Ph.D. Range Management
M.S. Wildlife and Range Resources
B.S. Wildlife and Range Resources
Years of Experience: 13
PEIS Contribution: Earth Resources

Worsham, Eric, Fort Bliss, DOE
PEIS Contribution: ITAM, Earth Resources

Wilcox, William, Fort Bliss, Office of the Staff Judge Advocate General J.D. Law
Years of Experience: 7
PEIS Contribution: Environmental Law Review

Wuest, William A., Senior Environmental Scientist, SAIC
M.A. Public Administration
B.S. Political Science
Years of Experience: 34
PEIS Contribution: Principal Investigator–Noise and Safety

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Persons Consulted

8.0

8.0 PERSONS CONSULTED

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Aguirre, Julie, 1996-1997. Personal communications with Julie Aguirre, Range Clerk, BLM, Las Cruces Field Office.

Alarcron, Waldo, 1997. Personal communication with Waldo Alarcron, El Paso County Clerk's Office, El Paso, Texas.

Ball, J., 1997. Telephone communication with J. Ball, NMED, Air Quality Bureau, Santa Fe, New Mexico.

Bankston, George, 1996-1997. Personal communications with George Bankston, Chief of Range Safety and Security, McGregor Range.

Bash, Dallas, 1997. Personal communication with Dallas Bash, Fort Bliss, Texas.

Blough, Kelly, 1997. Personal communication with Kelly Blough, Environmental Restoration Company.

Bowman, James, 1997. Personal communication with James Bowman, Archaeologist, Cultural and Natural Resources Division, DOE, USAADACENFB, Fort Bliss, Texas.

Christensen, James, 1996-1997. Personal communication with James Christensen, Range Management Specialist, McGregor Range Grazing Program Manager, BLM, Las Cruces Field Office.

Chudnoff, Mustaffa, 1997. Personal communication with Mustaffa Chudnoff, Hydrologist, NMSEO.

Collins, Tom, 1997. Personal communication with Capt. Tom Collins, PAO, Fort Bliss, Texas.

Corral, Rafael, 1997. Personal communication with Rafael Corral, Botanist, DOE, Fort Bliss, Texas.

Crawford, Ron, 1997. Personal communication with Ron Crawford, Director of Military Personnel/Adjutant General, Directorate of Military Personnel/Adjutant General, Fort Bliss, Texas.

Creager, Bernie, 1996. Personal communication with Bernie Creager, Real Estate Specialist, BLM, Las Cruces Field Office.

Cushing, Elsa, 1997. Written communication with Elsa Cushing, Environmental Engineer, DOE, USAADACENFB.

DePlata, John, 1997. Personal communication with John DePlata, Housing Engineer, Housing Division, DPWL, Fort Bliss, Texas.

Dominguez, Martha, 1997. Ysleta ISD, El Paso , Texas.

Escobar, 1997. Personal communication with Mr. Escobar, Family Housing Branch, Housing Division, DPWL, Fort Bliss, Texas.

Felix, D., 1997. Personal communication with D. Felix, Compliance Division, DOE, Fort Bliss, Texas.

Goodwin, Max, 1997-1998. Personal communications with Max Goodwin, Sacramento Ranger District Manager, Lincoln National Forest.

Goodwin, Warden W., 1997. Personal communication with Warden Goodwin, Deputy Provost Marshal, Provost Marshal Office, Fort Bliss, Texas.

Grossenheim, Capt., 1997. Personal communication with Capt. Grossenheim, McGregor Range, Range Control, USACASB.

Hannon, Ron, 1997. Personal communication with Ron Hannon, Land Management Planner, Lincoln National Forest.

Hargrove, Stephanie, 1997. Personal communication with Stephanie Hargrove, Mimbres Resource Area Manager, BLM, Las Cruces Field Office.

Hardgrove, Wally, 1997. Personal communication with Wally Hardgrove, El Paso County Auditor, El Paso, Texas.

Howell, D., 1997. Personal communication with D. Howell, Biologist, DOE, Fort Bliss, Texas.

Hughes, Marion, 1997. Personal communication with Marion Hughes, Directorate of Resource Management, Fort Bliss, Texas.

Hunter, Carol, 1997. Personal communication with Carol Hunter, City Clerk, City of El Paso, Texas.

Joy, Ron, 1997. Personal communication with Ron Joy, PAO, WBAMC, Fort Bliss, Texas.

Kemp, Jim, 1997. Personal communication with Jim Kemp, Engineering Plans and Services Division, DPWL, Fort Bliss, Texas.

Kern, J., 1997. Personal communication with J. Kern, Chief, Fort Bliss Fire Department, Fort Bliss, Texas.

Killebrew, N.C., 1997. Personal communication with N.C. Killebrew, Head, Housing Division, DPWL, Fort Bliss, Texas.

King, D., 1997. Personal communication with D. King, Airspace Manager, HAFB, New Mexico.

Landis, M., 1997. Personal communication with M. Landis, Chief Water Programs, DOE, Fort Bliss, Texas.

Lenhart, L., 1997. Personal communication with L. Lenhart, Alternate Team Leader, Pollution Prevention, EPCRA, Solid Waste, Acts and Spill Response Team, Multimedia Division, DOE, Fort Bliss, Texas.

Lenhart, Robert, 1997. Personal communication with Robert Lenhart, Team Leader, Compliance Division, DOE, USAADACENFB, Fort Bliss, Texas.

Litzau, Jim, 1997. Personal communication with Jim Litzau, DPWL, Fort Bliss, Texas.

Madsen, Mark, 1997. Personal communication with Mark Madsen, Wildlife Biologist, NMDGF.

Marshall, Amy, 1998. Personal communication with Amy Marshall, Archaeological Resources Team, DOE, Fort Bliss, Texas.

Marquez, A., 1997. Personal communication with A. Marquez, DOE, Fort Bliss, Texas.

Mathis, Joe, 1997. Personal communication with Joe Mathis, Energy Coordinator and Utility Sales Officer, DPWL, Fort Bliss, Texas.

McKenzie, Wayne, 1997. Personal communication with Wayne McKenzie, Hazardous Waste Team, Compliance Division, DOE, USAADACENFB, Fort Bliss, Texas.

McKernan, Pat, 1997. Personal communication with Pat McKernan, DOE, USAADACENFB, Fort Bliss, Texas.

Navarro, Irma, 1997. Personal communication with Irma Navarro, El Paso County Sheriff's Office, El Paso, Texas.

Newman, Rick, 1998. Personal communication with Rick Newman, USFS, Sacramento District.

Ontiveros, Jose, 1997. Personal communication with Jose Ontiveros, Assistant Superintendent, El Paso ISD, El Paso, Texas.

Orr, Brennan, 1997. Personal communication with Brennan Orr, Hydrologist, USGS.

Ortega, Ramon, 1997. Personal communication with Ramon Ortega, Assistant Fire Chief, Fort Bliss, Texas.

Phillips, Tom, 1998. Personal communication with Tom Phillips, Rangeland Management Specialist, BLM, Las Cruces Field Office, Las Cruces, New Mexico. 128

Pino, J., 1997. Personal communication with J. Pino, Safety Office (Aviation Safety), Fort Bliss, Texas.

Price, Helen, 1997. Personal communication with Helen Price, City of El Paso Police Department, El Paso, Texas.

Price, Judith, 1997. Personal communication with Judith Price, Director of Community Development, Doña Ana County.

Rivera, 1997. Personal communication with Mr. Rivera, Operations Branch, DPWL, Fort Bliss, Texas.

Roach, Wilson, 1997. Personal communication with Wilson Roach, Range Scheduling Office, Fort Bliss, Texas.

Roberts, Ruby, 1996. Personal communication with Ruby Roberts, Realtor and resident, Timberon, New Mexico.

Sanders, T., 1996-1998. Personal communications with T. Sanders, BLM, Las Cruces Field Office, Las Cruces, New Mexico.

Sepulveda, Shawn, 1997. Personal communication with Shawn Sepulveda, Chief Controller, Biggs AAF ATCT.

Shahriyar, S., 1998. Personal communication with S. Shahriyar, Compliance Division, DOE, Fort Bliss, Texas.

Sims, P., 1997. Personal communication with P. Sims, Environmental Services Division, Department of Logistics, Directorate of Health Services, WBAMC, Fort Bliss, Texas.

Sperka, Roger, 1997-1998. Personal communications with Roger Sperka, Geologist EPWU.

Tarango, Raul, 1997. Personal communication with Raul Tarango, City of El Paso Fire Department, El Paso, Texas.

Thal, A.J., 1997. Personal communication with A.J. Thal, Director, Southwest Center for Resource Analysis, Western New Mexico University, Silver City, New Mexico.

Thornhill, Lee, 1998. Personal communication with Lee Thornhill, USFS, Guadalupe District.

Tipton, Billy, 1995-1998. Personal communications with Billy Tipton, Chief of Real Property Management Branch, Fort Bliss, Texas.

Tressler, P., 1997. Personal communication with P. Tressler, Safety Office (Explosive Safety), Fort Bliss, Texas.

Upton, Pauline, 1997. Personal communication with Pauline Upton, Housing Officer, Housing Division, DPWL, Fort Bliss, Texas.

Vallejos, Ramona, 1997. Personal communication with Ramona Vallejos, Dona Ana County, Grants Administration.

Wachtel, Bill, 1997. Personal communication with Bill Wachtel, El Paso ISD, El Paso, Texas.

Wales, Richard, 1998. Personal communication with Ralph Wales, Engineer, Mojave Desert Quality Management District, Victorville, California.

Ybarra, Richard, 1997. Personal communication with Richard Ybarra, Billeting Officer, Housing Division, DPWL, Fort Bliss, Texas.

Agency Consultation

9.0

9.0 AGENCY CONSULTATION

Consultation meetings and correspondence with agencies of federal, American Indian, state, and local government, beginning with notification of the scoping meetings and continuing through an ongoing process, are a part of this environmental impact analysis process. Coordination with agencies also was conducted as part of the development of the INRMP and ICRMP that are evaluated in this PEIS. Concurrent development of the McGregor Range LEIS also provided opportunity for agency coordination and consultation relative to that portion of Fort Bliss. The following agencies were notified of the EIS process:

Federal Government
Advisory Council on Historic Preservation
National Radio Astronomy Observatory
U.S. Air Force
U.S. Border Patrol
U.S. Bureau of Land Management
U.S. Bureau of Reclamation
U.S. Department of Agriculture
U.S. Department of Interior
U.S. Environmental Protection Agency
U.S. Fish and Wildlife Service
U.S. Forest Service
U.S. Geological Survey
U.S. National Park Service
U.S. Soil Conservation Service

American Indian
Mescalero Apache Tribe
Tigua Tribal Government
Piro-Manso-Tiwa Indian Tribe

State of New Mexico
New Mexico Department of Health
New Mexico Economic Development Department
New Mexico Department of Game and Fish
New Mexico Energy, Minerals and Natural Resources Department
New Mexico Environment Department
New Mexico Highway and Transportation Department
New Mexico State Engineer's Office
New Mexico State Historic Preservation Officer
New Mexico Department of Tourism

State of Texas
Texas Air Control Board
Texas Department of Health
Texas Department of Transportation, Public Transportation Division
Texas Forest Service
Texas General Land Office
Texas Historical Commission
Texas Natural Resource Conservation Commission
Texas Parks and Wildlife Department
Texas State Historical Preservation Officer
Texas State Preservation Board
Texas State Soil and Water Conservation Board
Texas Water Commission

County Governments
Doña Ana County, NM
El Paso County, TX
Otero County, NM

City Governments
City of Alamogordo, NM
City of El Paso, TX
City of Las Cruces, NM

Councils of Governments
Rio Grande Council of Governments, El Paso, TX
South Central New Mexico Council of Governments, Las Cruces, NM

9.1 COOPERATING AGENCIES

The Army contacted two federal agencies in January 1997 regarding service as cooperating agencies in accordance with Title 40 CFR Parts 1501.5, *Lead Agencies*, and 1501.6, *Cooperating Agencies*. The Army sought their cooperation and expertise to help identify potential impacts as a result of implementing its land use planning alternatives relative to public and withdrawn lands administered under

MOAs for co-use with the Army and these agencies. The Las Cruces Field Office, BLM and Lincoln National Forest, USFS initially requested cooperating agency status. However, in December 1997, the BLM declined to enter into a cooperating agency agreement and reserved the right to reconsider at a later time. During a meeting between the Army and the Lincoln National Forest on February 10, 1998, the USFS stated it would not seek cooperating agency status. The BLM requested cooperating agency status in July 1998. Both agencies provided land use plans, NEPA documents, other documents and maps and data to assist in the analysis throughout the process.

9.2 OTHER MEETINGS

Coordination with the ACHP and the Texas and New Mexico SHPOs in regard to the ICRMP began on April 11, 1995. Informal consultation (Section 7 of the *Endangered Species Act*) for the Mission and Master Plan PEIS began on September 25, 1997. Personnel from Fort Bliss DOE and McGregor Renewal Offices spent the day at the New Mexico Field Office of the USFWS, discussing the biological resources of Fort Bliss. The primary focus was to discuss results of inventory and monitoring projects for threatened and endangered species. GIS map products and aerial photography were reviewed during this meeting.

In addition to data collection efforts with organizational elements of many of those agencies listed above, ongoing coordination on the day-to-day functioning of the missions and programs at Fort Bliss described in this PEIS continues through letters, e-mail, telephone conversations, and meetings. Informal contacts have occurred between Fort Bliss personnel and both USFWS and NMDGF personnel, mostly by phone, but some informal discussion have occurred by chance as a result of personnel being present at other job-related meetings.

Fort Bliss will continue informal consultation and preparation of a biological assessment for review by the USFWS. The first letter attached to this section describes the approach to consultation proposed by the Army. The second letter is the response from the USFWS to the Army.

DEPARTMENT OF THE ARMY
HEADQUARTERS, U. S. ARMY GARRISON COMMAND
1733 PLEASONTON ROAD
FORT BLISS, TEXAS 79916-6816

April 9, 1999

REPLY TO
ATTENTION OF:

Directorate of Environment

Ms. Jennifer Fowler-Propst, Supervisor
New Mexico ES Field Office
2105 Osuna Road, NE
Albuquerque, NM 87113

Dear Ms. Fowler-Propst;

Fort Bliss is currently developing two Environmental Impact Statements (EIS). This letter documents our desire to conduct one consultation to cover both NEPA actions.

The first EIS is the Fort Bliss, Texas and New Mexico, Mission and Master Plan Programmatic Environmental Impact Statement (MMPEIS). The MMPEIS analyzes the impacts of the military mission on the 1.2 million acres that comprise Fort Bliss, including McGregor Range. The decisionmaker for the MMPEIS is the Army who will issue a Record of Decision at the completion of the process.

The second EIS is the McGregor Range Military Land Withdrawal Legislative Environmental Impact Statement (LEIS) which analyzes the impacts of different potential border configurations for McGregor Range. The LEIS supports an application to renew the withdrawal of McGregor Range by the Executive branch to Congress. Therefore the decisionmaker for the LEIS is Congress, which will issue their decision on any future land withdrawal through legislation.

All environmental impacts due to military mission activities are covered programmatically in the MMPEIS, which includes implementation of the Draft Integrated Natural Resource Management Plan. As the allocation of public lands to specific users proposed by the LEIS does not, in itself, have environmental impact, we see no reason to conduct two separate consultations.

A consultation number (2-22-98-I-095) was assigned to the withdrawal process based on the Army's Notice of Intent to prepare the LEIS. Fort Bliss has been conducting informal consultation on both documents with your office since 1997, explaining the different purposes of the two documents and environmental considerations involving Ft Bliss.

Fort Bliss anticipates that the New Mexico Field Office will coordinate the consultation because of the lack of listed species in the Texas portion of Fort Bliss. Approximately 10% of acreage of Fort Bliss is located in Texas.

The point of contact for this action is Brian Locke, 915-568-3016, lockeb@emh10.bliss.army.mil

Sincerely,

G. Keith Landreth
Director
Directorate of Environment

Andy Vliet, PPhil
Program Manager
McGregor Renewal

Cc: Field Supervisor, Texas Field Office

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New Mexico Ecological Services Field Office
2105 Osuna NE
Albuquerque, New Mexico 87113
Phone: (505) 346-2525 Fax: (505) 346-2542

June 14, 1999

Cons. #2-22-98-I-095

G. Keith Landreth, Director
Directorate of Environment
U.S. Army - Fort Bliss Military Reservation
1733 Pleasonton Road
Fort Bliss, Texas 79916-6816

Dear Mr. Landreth:

This responds to your letter dated April 9, 1999, regarding Fort Bliss' intent to conduct one consultation under the Endangered Species Act of 1973, as amended, for the military activities described within two Environmental Impact Statements (EIS). The first EIS is the Fort Bliss Mission and Master Plan that covers the impacts of the military mission on Fort Bliss. The other EIS (a Legislative EIS) addresses the impacts of an application for Congressional action for the continued withdrawal of McGregor Range (the preferred alternative) from public use for a period of 50-years beginning in 2001.

McGregor Range currently comprises approximately 608,000 acres on Otero Mesa, located in Otero County, New Mexico, and also occurs within the Fort Bliss military actions area. Both environmental documents involve Otero Mesa, a unique, biologically sensitive area that contains federally-listed as well as other important fish and wildlife resource concerns. As part of the recently developed "Southwest Strategy," opportunities to batch consultations such as described above should be explored wherever appropriate. Batching can be pursued for situations where the proposed activities are occurring within a common geographic area and/or are similar actions/projects within a single agency. Therefore, we agree that your intent is appropriate.

Please be advised that concerns involving the adequate analysis of impacts (with respect to federally-listed species) for both documents should be adequately addressed in the biological assessment. For example, the planning horizons for both documents, which are from 20 to 50 years respectively, should be included within the assessment, as per a U.S. Department of the Interior/Office of Environmental Compliance letter to your agency dated January 28, 1999. In addition, we recommend that conservation planning for these time periods be consistent with 50 CFR §402.01, which directs Federal agencies to utilize their authorities to carry out conservation programs for federally-listed species.

If you have any questions or if we can be of further assistance, please contact Chris Perez of my staff at the letterhead address above or at telephone extension 119.

Sincerely,

Jennifer Fowler-Propst
Field Supervisor

cc:

Field Supervisor, Fish and Wildlife Service Field Office, Austin, Texas
Dave Dall, Fish and Wildlife Service, Regional NEPA coordinator, Albuquerque, New Mexico
Director, New Mexico Department of Game and Fish, Santa Fe, New Mexico
Director, New Mexico Energy, Minerals, and Natural Resources Department, Forestry and Resources Conservation Division, Santa Fe, New Mexico

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List of Repositories and Distribution List

10.0

10.0 LIST OF REPOSITORIES AND DISTRIBUTION LIST

10.1 LIST OF REPOSITORIES

This section lists repository libraries and agency offices where the public may have access to this PEIS. The revised *Long-range Component of the Fort Bliss Real Property Master Plan*, the *Integrated Natural Resources Management Plan*, the *Integrated Cultural Resource Management Plan*, and the *Training Area Development Concept* also have been placed in the following libraries:

El Paso Public Library	501 North Oregon St.	El Paso	TX	79901
Irving Schwartz Public Library	1865 Dean Martin Dr.	El Paso	TX	79936
Branigan Memorial Library	200 E Picacho Ave.	Las Cruces	NM	88001
Library	20 Curlew Place	Cloudcroft	NM	88317-9998
Library	110 North Main St.	Dell City	TX	79837
Library	920 Oregon	Alamogordo	NM	88310
New Mexico State University, Branson Library	Williams & Frenger Streets	Las Cruces	NM	88003
New Mexico State University, Roswell, Library	52 University Blvd.	Roswell	NM	88202-6000
University of Texas at El Paso, Library	500 West University Ave.	El Paso	TX	79968
Westside Branch Library	125 Belvidere St.	El Paso	TX	79912

10.2 PUBLIC AGENCIES, INTERESTED ORGANIZATIONS, AND PRIVATE INDIVIDUALS

10.2.1 Public Agencies

U.S. Congress

Jeff Bingaman
U.S. Senator
703 Hart Senate Office Bldg.
Washington, DC 20510

Jeff Bingaman
U.S. Senator
148 Loretto Towne Centre
Las Cruces, NM 88001

Henry Bonilla
U.S. Representative
1427 LHOB
Washington, DC 20515-4323

Henry Bonilla
U.S. Representative
4400 N. Big Spring, Ste. 211
Midland, TX 79705

Pete V. Domenici
U.S. Senator
328 Hart Senate Office Bldg.
Washington, DC 20510-3101

Pete V. Domenici
U.S. Senator
6255 Silver SW, Ste. 120
Albuquerque, NM 87102

Phil Gramm
U.S. Senator
370 Russell Senate Office Bldg.
Washington, DC 20510-4302

Phil Gramm
U.S. Senator
310 N. Mesa #318
El Paso, TX 79901

Kay Bailey Hutchison
U.S. Senator
283 Russell Senate Office Bldg.
Washington, DC 20510

Kay Bailey Hutchison
U.S. Senator
500 Chestnut St., Ste. 1570
Abilene, TX 79602

Silvestre Reyes
Congressman
310 N. Mesa, Ste. 400
El Paso, TX 79901

Silvestre Reyes
Congressman
514 Cannon House Office Bldg.
Washington, DC 20515

Joe Skeen
U.S. Representative
2367 Rayburn
Washington, DC 20515-3102

Joe Skeen
U.S. Representative
Attention: Donna McClanahan
1065-B South Main, Ste. A
Las Cruces, NM 88005

U.S. Department of Agriculture

Lincoln National Forest
U.S. Forest Service
Attention: Forest Supervisor
1101 New York Ave.
Alamogordo, NM 88310-6992

NRCS-Field Office
Dan Abercrombie
2920 N. Whitesands Blvd.
Alamogordo, NM 88310

NRCS-Field Office
John Allen
2507 N. Telshor St.
Las Cruces, NM 88001

U.S. Forest Service
Max Goodwin, District Manager
P.O. Box 288
Cloudcroft, NM 88317

U.S. Department of Defense

U.S. Army Aviation & Missile Command
Attention: AMSAM-RA-EMP (Aletha Turner)
Bldg. 112, Room 114
Redstone Arsenal, AL 35898-5270

U.S. Army Environmental Center
NEPA Repository
Horn Engineering Services Inc.
Attention: Kathy Stroud
2750 Prosperity Ave., Ste. 450
Fairfax, VA 22031

U.S. Army Forces Command
CDR, FORSCOM
Personnel & Installation Management
Attention: AFPI-ENE (Mr. Stuart Cannon)
1777 Hardee Ave., SW
Ft. McPherson, GA 30330-1062

U.S. Army Forces Command
Personnel & Installation Management
Attention: AFPI-ENE (Rebecca Wagner)
Bldg. 200
1777 Hardee Ave., SW
Ft. McPherson, GA 30330-1092

U.S. Army Training & Doctrine Command
CDR, TRADOC
Attention: ATBO-SE
5 North Gate Rd.
Fort Monroe, VA 23651-5000

U.S. Army White Sands Missile Range
Attention: STEWS-ES-E (Bob Andreoli)
Bldg. T-150, Room 202
WSMR, NM 88002-5048

U.S. Army White Sands Missile Range
Attention: STEWS-NRES-E (Bob Burton)
Bldg. 163
WSMR, NM 88002-5048

U.S. Army White Sands Missile Range
Commanding General
Attention: STEWS-CG (Harry D. Gatanos)
Bldg. 100
WSMR, NM 88002-5048

U.S. Army White Sands Missile Range
MEVATEC
Attention: David Ussery
P.O. Box 399
WSMR, NM 88002

U.S. Army Corps of Engineers
Fort Worth District
Attention: CESWF-PL-RE (Arver Ferguson)
819 Taylor St.
Fort Worth, TX 76102-0300

U.S. Army Corps of Engineers
Savannah District
Environmental Resources Branch
Attention: CESAS-PD-E, (Win Seyle)
100 W. Oglethorpe Ave.
Savannah, GA 31402-0889

U.S. Army National Guard
Attention: MAJ Brad Jorgensen
10011 So. GeoMason Dr.
Arlington, VA 22204-1382

U.S. Air Force
HQ ACC/CEPU
Attention: Chief, Environmental Analysis,
Branch (Alton Chavis)
129 Andrews St., Ste. 102
Langley AFB, VA 23665-2769

U.S. Air Force
46th Test Wing/XPE
Attention: Tom Hefferman
101 West D Ave., Ste. 222
Eglin AFB, FL 32542

U.S. Air Force
49 FW/CC
Attention: Commander, HAFB
490 1st St., Ste. 1700
Holloman AFB, NM 88330

U.S. Air Force
49 CES/CEV
Attention: Chief, Environmental Division
(John Poland)
550 Tabosa Ave.
Holloman AFB, NM 88330-8458

U.S. Navy
Southwest Division
Naval Facility Engineering Command
Attention: 523 AR (Ann Rosenberry)
1220 Pacific Highway
San Diego, CA 92132-5178

U.S. Department of Interior

Bitter Lake National Wildlife Refuge
Refuge Manager
P.O. Box 7
Roswell, NM 88202-0007

Bureau of Indian Affairs
Environmental Coordinator
P.O. Box 26567
Albuquerque, NM 87125-6567

Bureau of Land Management
Michele Chavez, State Director
1474 Rodeo Rd.
Sante Fe, NM 87505

Bureau of Land Management
James Christensen, Range Conservationist
28 Derbyshire
Tularosa, NM 88352

Bureau of Land Management
Jim McCormick, Acting Asst. Field Manager
Renewable Resources
1800 Marquess St.
Las Cruces, NM 88005

Bureau of Land Management
Linda Rundell, Field Office Manager
1800 Marquess St.
Las Cruces, NM 88005

Bureau of Land Management
Tim Sanders, Acting Asst. Field Manager
Multi-Resources
1800 Marquess St.
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Department of Interior
Office of Environmental Affairs
P.O. Box 649
Albuquerque, NM 87103

National Park Service
Guadalupe Mountain National Park
Superintendent
HC 60, Box 400
Salt Flat, TX 79847-9400

National Park Service
Guadalupe Mountain National Park
Bruce Malloy, Frijole District Manager
HC 60, Box 400
Salt Flat, TX 79847

National Park Service
White Sands National Monument
Attention: Bill Conrod
P.O. Box 1086
Holloman AFB, NM 8830-1086

U.S. Fish & Wildlife Service
P.O. Box 756
Las Cruces, NM 88004

U.S. Fish & Wildlife Service
Jennifer Fowler-Propst, Field Supervisor
2105 Osuna NE
Albuquerque, NM 87113

U.S. Fish & Wildlife Service
Daniel C. Frederick, Field Supervisor
10711 Burnet Rd., Room 200
Austin, TX 78758

U.S. Fish & Wildlife Service
Nancy M. Kaufman, Regional Director
500 Gold Ave., SW
Albuquerque, NM 87102

U.S. Fish & Wildlife Service
Mary Orms, Biologist
10711 Burnet Rd., Room 200
Austin, TX 78758

Independent Federal Agencies

Advisory Council on Historic Preservation
Carol Gleichman
12136 West Bayard Ave., Ste. 330
Lakewood, CO 80228

Environmental Protection Agency
Oscar Ramirez
Department Division Director
1445 Ross Ave., 6WQ-A
Dallas, TX 75202

Native Americans

Mescalero Apache Tribe
Fred Peso
P.O. Box 227
Mescalero, NM 88340

Mescalero Apache Tribe
Dona Stern-McFadden
P.O. Box 227
Mescalero, NM 88340

Piro-Manso-Tiwa Indian Tribe
Joe (Tito) Rivera, 2nd War Captain
1230 E. Ridgetop Ave.
Las Cruces, NM 88001

Piro-Manso-Tiwa Indian Tribe
Andrew Roybal, Coordinator
P.O. Box 16243
Las Cruces, NM 88004

Piro-Manso-Tiwa Indian Tribe
Frank Roybal Sanchez, Vice President
3542 W. Picacho
Las Cruces, NM 88005

Tigua Indian Nation
Ysleta del Sur Pueblo, Ysleta Station
Elias Torres, Governor
P.O. Box 17579
El Paso, TX 79917

State of Texas

Department of Antiquities Protection
James E. Bruseth, DSHPO
P.O. Box 12276
Austin, TX 78711-2276

General Land Office
Karen Coster, Deputy
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Austin State Office Bldg., Room 620
1700 N. Congress Ave.
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General Land Office
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Office of Budget & Planning
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Office of the Governor
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Texas Forest Service
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Texas Forest Service
Oscar S. Mestas
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Texas Historical Commission
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Texas Parks & Wildlife Department
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City of El Paso
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El Paso City Council, District 3
Larry Medina
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El Paso City Council, District 5
Presi Ortega
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El Paso City Council, District 6
Barbara Perez
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New Mexico Border Health Office
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Box 30001, Department 3BHO
Las Cruces, NM 88011

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Ken Smith, District Manager
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Air Quality Bureau
Cecelia Williams, Chief
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John Nixon, Supervisor
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Ray Powell, Commissioner
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Santa Fe, NM 87504-1148

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Mary Helen Garcia
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3245 E. University Ave.
Las Cruces, NM 88011

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903 New York Ave.
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New Mexico State Representative
William E. Porter
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Las Cruces, NM 88001

New Mexico State Representative
J. Paul Taylor
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Mesilla, NM 88046

New Mexico State Representative
Gloria C. Vaughn
503 E. 16th St.
Alamogordo, NM 88310-6606

New Mexico State Representative
Delores C. Wright
150 West Lisa
Chaparral, NM 88021

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Attention: Dianna J. Duran
909 8th St.
Tularosa, NM 88352

New Mexico State Senate
Attention: Timothy Z. Jennings
Box 1797
Roswell, NM 88202

New Mexico State Senate
Attention: Fernando R. Macias
Box 1155
Mesilla, NM 88046

New Mexico State Senate
Attention: Cynthia Nava
3002 Broadmoor
Las Cruces, NM 88001

New Mexico State Senator
Mary Jane Garcia
Box 22
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New Mexico State Senator
Don Kidd
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New Mexico State Senator
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Box 996
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Office of the Governor
Gary Johnson
1120 Paseo de Peralta
State Capital Bldg., Room 400
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State Historic Preservation Officer
Dr. Lynn Sebastian
228 East Palace
Santa Fe, NM 87503

University of New Mexico
Government Information Department
Albuquerque, NM 87131-1466

County Agencies (New Mexico)

Doña Ana County Commissioner;s Office
180 W. Amador
Las Cruces, NM 88001

Doña Ana County Commissioner's Office
Gilbert Apodaca
180 W. Amador
Las Cruces, NM 88001

Doña Ana County Commissioner's Office
Enrique Gonzales
180 W. Amador
Las Cruces, NM 88001

Doña Ana County Commissioner's Office
Dora Harp
180 W. Amador
Las Cruces, NM 88001

Doña Ana County Commissioner's Office
Lalo Medina
180 W. Amador
Las Cruces, NM 88001

Doña Ana County Commissioner's Office
Ken Miyagishima
180 W. Amador
Las Cruces, NM 88001

Doña Ana County Commissioner's Office
John (Tony) Schaefer
180 W. Amador
Las Cruces, NM 88001

Doña Ana County Planning Department
Judy Price, Director
430 S. Main
Las Cruces, NM 88001

Otero County Commission
1000 New York Ave., Room 101
Alamogordo, NM 88310-6935

Tim McGinn, Otero County Commissioner
1000 New York Ave. Room 101
Alamogordo, NM 88310-6935

Ronny D. Rardin, Otero County Commissioner
1000 New York Ave., Room 101
Alamogordo, NM 88310-6935

Richard L. Zierlein, Otero County Commissioner
1000 New York Ave., Room 101
Alamogordo, NM 88310-6935

Bob Fisk
Otero County Public Land Use Committee
1000 New York Ave.
Alamogordo, NM 88310-6935

South Central New Mexico Council of Governments
Elizabeth Bernol, Executive Director
P.O. Box 7385
Las Cruces, NM 88006

Cities (New Mexico)

Donald E. Carroll, Mayor
City of Alamogordo
1376 E. Ninth St.
Alamogordo, NM 88310

Sharon Few, City Planner
City of Alamogordo
1376 E. 9th St.
Alamogordo, NM 88310

Tracy Johnson, City Commissioner
City of Alamogordo
753 Stafford Ave.
Alamogordo, NM 88310

Patrick McCourt, City Manager
City of Alamogordo
1376 E. 9th St.
Alamogordo, NM 88310

Lee Morton, City Commissioner
City of Alamogordo
3912 Baswood
Alamogordo, NM 88310

Office of Mayor & City Commission/Council
City of Alamogordo
1376 E. 9th St.
Alamogordo, NM 88310

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City of Alamogordo
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Alamogordo, NM 88310

Roger B. Powell, City Commissioner
City of Alamogordo
2510 Jeane Court
Alamogordo, NM 88310

David C. Venable, Mayor
City of Cloudcroft
P.O. Box 554
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Pete Connelley, Acting City Manager
City of Las Cruces
P.O. Box 20000
Las Cruces, NM 88004

Ted Morris, Airport Manager
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Las Cruces, NM 88004

Office of Mayor & City Council
City of Las Cruces
200 N. Church St.
Las Cruces, NM 88001

Ruben A. Smith, Mayor
City of Las Cruces
200 N. Church St.
Las Cruces, NM 88001

Tommy Tomlin, Council Member
City of Las Cruces
200 N. Church St.
Las Cruces, NM 88001

Jack Valencia, Council Member
City of Las Cruces
200 N. Church St.
Las Cruces, NM 88001

Bruno Zaldo, City Manager
City of Las Cruces
P.O. Drawer 20000
Las Cruces, NM 88004

Schools & Colleges

New Mexico State University
V.W. Howard, Jr.
P.O. Box 30003 - Department 4901
Las Cruces, NM 88003-8003

University of Texas at El Paso
David Carmichael
Department of Sociology & Anthropology
University Ave. at Hawthorne St.
El Paso, TX 79968-0558

10.2.2 Interested Organizations

Alamogordo Chamber of Commerce
Colene Van Winkle, Executive Director
1301 N. White Sands Blvd.
Alamogordo, NM 88311-0518

All American Pipeline Co.
P.O. Box 40160
Bakersfield, CA 93384-0160

Centennial Museum
Scott Cutler
University Ave. & Wiggins Rd.
El Paso, TX 79902

Doña Ana County Associated Sportsmen, Inc.
Noel Cooley
935 Delta Dr.
Las Cruces, NM 88001

Doña Ana County Associated Sportsmen, Inc.
Tony Popp, President
455 El Prado
Las Cruces, NM 88005

El Paso Archaeological Society
Marguerite Davis, President
P.O. Box 4345
El Paso, TX 79924

El Paso Archaeological Society
Mary Russell
9208 Salisbury
El Paso, TX 79924

El Paso Chamber of Commerce
10 Civic Center Plaza
El Paso, TX 79901

Foster-Schwartz Development Co.
1790 N. Lee Trevino Dr. Ste. 601
El Paso, TX 79936-4525

Franklin Mountain Coalition
John Sproul
601 West Yandell #25
El Paso, TX 79902-3867

GeoMarine
Mr. J. Kaskey
550 E. 15th St.
Plano, TX 75074

GSRC
Chris Ingram
9441 Common St., Ste. C
Baton Rouge, LA 70884

Holland & Hart
Murry Feldman
101 South Capital Blvd., Ste. 1400
Boise, ID 83702

Hot Wells Cattle Co.
Albert Estrada
7321 N. Loop Rd.
El Paso, TX 79915-2523

Human Systems Research
Meliha S. Duran
P.O. Drawer 728
Las Cruces, NM 88004-0728

Human Systems Research
Peter Eidenbach
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JRV Properties
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P.O. Box 99
El Paso, TX 79941

Hat Ranch Inc.
P.O. Box 149
Alamogordo, NM 88311-0149

Heritage & Preservation Office
Lisa Meyer, Historic Preservation Specialist
P.O. Box 227
Mescalero, NM 88340

Hispanic Chamber of Commerce
Cindy Ramos-Davidson
2829 Montana St., Ste. B100
El Paso, TX 79903

Hispano Chamber of Commerce
Nusie Hernandez, President
134 S. Downtown Mall, Ste. D
Las Cruces, NM 88001-1218

Hurd Enterprises
C.W. Hurd, Jr.
250 Thunderbird #5
El Paso, TX 79912

Las Cruces Chamber of Commerce
Joe Beidron, President
P.O. Drawer 519
Las Cruces, NM 88004

Molzen-Corbin Associates
Sara Rhoton
880 S. Telshor, Ste. 200
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Molzen-Corbin & Associates
Adrienne Widmer
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Montana Vista Fire Rescue, Inc.
13978 Montana Ave.
El Paso, TX 79938

National Radio Astronomy Observatory
Frequency Coordinator
P.O. Box O
Socorro, NM 87801-0387

Nature Conservancy of New Mexico
Jennifer Atchley, Biologist
4010 Oleta Dr. # A
Las Cruces, NM 88001

New Mexico Justice Council
Floyd William Hornback
P.O. Box 1586
Alamogordo, NM 88310

New Mexico Native Plant Society
John Freyermuth, President
Las Cruces Chapter
734 N. Reymond
Las Cruces, NM 88005

New Mexico Natural Heritage Program
Geoffrey Carpenter
Southern New Mexico Office
7 Orchard Rd.
La Luz, NM 88337

New Mexico Natural Heritage Program
Patricia Mehlhop, Director
851 University Blvd., Ste. 101
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New Mexico Wilderness Coalition
Robert Tafanelli
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NP2 South
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Rio Grande Chapter of the Sierra Club
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Sierra Club
Jim Winder
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Sierra Club, El Paso Group
Sally Savage
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Southwest Consolidated Sportsmen
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University Park, NM 88003

Southwest Center for Biodiversity
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Southwest Environmental Center
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Sunland Breeding & Training Farms
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Sunland Park, NM 88063

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T & E, Inc.
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El Paso, TX 79901

Area Media – Newspaper

Alamogordo Daily News
Lisa Turner
518 24th St.
Alamogordo, NM 88310-6104

El Paso Herald Post
Guy H. Lawrence
P.O. Box 20
El Paso, TX 79999

El Paso Times
Sito Negron
P.O. Box 20
El Paso, TX 79999

Las Cruces Sun-News
Harold R. Consland
P.O. Box 1749
Las Cruces, NM 88004

Las Cruces Sun-News
Steve Ramirez
256 W. Las Cruces Ave.
Las Cruces, NM 88005

Mountain Monthly
Gary Wood
306 Burro Ave.
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Media – Radio

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Glossary

12.0

12.0 GLOSSARY

100-year flood. A flood event of such magnitude that it occurs, on average, every 100 years. This equates to a 1-percent probability of occurring in any given year.

Acre-foot (af). The volume of water that covers 1 acre to a depth of 1 foot; approximately 326,000 gallons.

Activity. Throughout this PEIS, the terms "activity" and "activities" may refer to a mission activity such as a training exercise, a Master Plan project, or natural or cultural resource management practice.

Air defense. All defensive measures designed to destroy attacking enemy aircraft or missiles in the earth's envelope of atmosphere, or to nullify or reduce the effectiveness of such attack.

Air defense artillery (ADA). Weapons and equipment for actively combating air targets from the ground.

Airspace management. The coordination, integration, and regulation of the use of airspace of defined dimensions.

Alluvial fan. A pattern of sediment deposit caused by running water. Fan- or cone-shaped mass of sediment deposited at a point along a stream at which there is a sharp decrease in gradient, such as between a mountain front and a plane. Two or more adjacent alluvial fans that are growing or have grown together are **coalescing alluvial fans**.

Alluvium. Any stream-laid sediment deposit.

Ambient Air Quality Standards (AAQS). Standards established on a state or federal level that define the limits for airborne concentrations of designated criteria pollutants (NO_2, SO_2, CO, $PM_{10,}$ O_3, and Pb) to protect public health with an adequate margin of safety (primary standards) and to protect public welfare, including plant and animal life, visibility, and materials (secondary standards).

Ambient. Surrounding or background conditions in the absence of an identifiable source.

Ambient air. That portion of the atmosphere, outside of buildings, to which the general public has access.

Aquifer. A body of rock that contains enough saturated permeable material to transmit groundwater and to yield significant quantities of groundwater to wells and springs.

Archaeological and Historic Preservation Act. Law that declares all federal agencies managing construction programs are responsible for any damages to scientific, prehistoric, and historic resources and are authorized to fund recovery, protection, and preservation of significant archaeological data and materials (enacted 1974).

Archaeological Resource Protection Act (ARPA). Law that strengthens preservation and protection laws through civil and criminal felony-level penalties for the destruction of resources and sites (enacted 1979).

Army Stationing and Installation Plan (ASIP). A DA-level document which gathers from all official sources within the DoD projections for the number of authorized positions for the following 6 years. It is used as a planning document for mission support. The ASIP does not predict the actual funding or guarantee that all positions will be funded in the out years.

Asbestos. Any of several minerals (e.g., chrysotile) that readily separate into long flexible fibers suitable for use as a noncombustible, nonconducting, or chemically-resistant material. Asbestos has been used in the construction of floor tile, wall panels, brake pads in vehicles, ceiling tile, pipe material, and as insulating material around pipes and buildings. Inhalation of asbestos fibers can cause lung cancer.

Attainment area. A region that meets the NAAQS for a criteria pollutant under the CAA.

Attenuation of sound. Any noise level is diminished with distance from the source in a mathematically predictable manner. Under normal conditions, distance alone reduces the noise level by 6 dB for each doubling of the distance from the source. For example, a noise source that produces an 80 dB noise level at a distance of 50 meters would produce 74 dB at 100 meters. Absorption of sound energy by the atmosphere reduces noise levels even further.

Average annual daily traffic (AADT). For a 1-year period, the total volume passing a point or segment of a highway facility in both directions divided by the number of days in the year.

Ballistic missile. Any missile which does not rely upon aerodynamic surfaces to produce lift and consequently follows a ballistic trajectory when thrust is terminated.

Baseline. The initial environmental conditions against which the environmental consequences of various alternatives are evaluated.

Basin. A drainage or catchment area of a stream or lake.

Battalion task force. A force generally organized by combining tank and mechanized infantry elements under a single battalion commander to conduct specific operations. A battalion task force may be tank-heavy, mechanized infantry-heavy, or balanced, depending on the concept and plan of operation.

Biodiversity. Different life forms or species within a defined area.

Bolson. An intermontane basin extending from the divide of one block-faulted mountain to the divide of the adjacent mountain, generally with no external drainage, but may be transected by regional streams.

Bradley Stinger Fighting Vehicle (BSFV). Weapon system designed to enhance air defense protection in the forward area on the battlefield; its primary weapon being the Stinger missile. The BSFV also uses a 25mm automatic gun, TOW missile, and 7.62mm coaxial machine gun.

Candidate species. Species for which the USFWS has on file sufficient information on biological vulnerability and threat(s) to support the issuance of a proposed rule to list, but issuance of the proposed rule is precluded.

Cantonment. Housing quarters for personnel.

Capacity (traffic). The maximum rate of flow at which vehicles can be reasonably expected to traverse a point or uniform segment of a lane or roadway during a specified time period under prevailing roadway, traffic, and control conditions.

Census block. Cluster of blocks within the same census tract. Census blocks do not cross county or census tract boundaries and generally contain between 250 and 550 housing units.

Chaparral. A short-range, low-altitude, surface-to-air Army ADA system; designated as MIM-72.

Chronometrics. Data used to determine the age of archaeological sites and to understand changes in settlement, subsistence, and other aspects of prehistoric human behavior.

Combat service support. The essential capabilities, functions, activities, and tasks necessary to sustain all elements of operating forces in theater at all levels of war. It includes the functions of supply, transportation, field services, maintenance, health service support, personnel, and facilities. Combat service support encompasses those activities at all levels of war that produce sustainment to all operating forces on the battlefield.

Combat support elements. Those elements whose primary missions are to provide combat support to the combat forces and which are a part, or prepared to become a part, of a theater, command, or task force formed by combat operations.

Component Plans. Those documents that, when taken together, comprise the RPMP of a military installation. This series of documents consists of the LRC, CIS, SRC, and MC. **248**

Confined aquifer. An aquifer sealed above and below by impermeable material resulting in the water in the aquifer being under hydraulic pressure—also known as an artesian aquifer.

Controlled access FTX sites. FTX sites where military access is subject to increased control and restricted to activities with limited ground-disturbing effects. Examples include training involving wheeled vehicle movement off-road limited to entering and exiting the site, no site improvements, no clearing of vegetation on the site, and no digging on the site.

Coniferous. Evergreen trees or shrubs that bear cones and are members of the order *Coniferales*.

Coppice dunes. Coppice dunes are sand dunes characterized by a thicket of woody vegetation.

Criteria pollutants. The CAA required the EPA to set air quality standards for common and widespread pollutants after preparing criteria documents summarizing scientific knowledge on their health effects. Today there are standards for six criteria pollutants: (NO_2, SO_2, CO, PM_{10}, O_3, and Pb).

Cultural. The system of behavior, beliefs, institutions, and objects human beings use to relate to each other and to the environment.

Cumulative impact. Cumulative impact is the environmental impact resulting from the incremental impact from a particular activity when added to other past, present, or future activities. Cumulative impacts may be individually insignificant, but collectively, the individually insignificant activities may become significant.

Day-night average sound level (L_{dn}). A-weighted sound-pressure levels averaged over a 24-hour period with 10 dBA added for events occurring between 10 p.m. and 7 a.m.

Decibel, A-weighted (dBA). Adjusted unit of sound measurement that corresponds to the relative sensitivity of the human ear at specified frequency levels. This represents the loudness as perceived by humans.

Decibel (dB). A standard unit of measuring sound-pressure levels based on a reference sound pressure of 0.0002 dynes per square centimeter. This is the smallest sound a human can hear.

Detritus. Material derived from the mechanical breakdown of rock by the processes of weathering and erosion.

Direct effects. Beneficial or detrimental impacts which are caused by an action and occur at the same time and place.

Direct fire. Gunfire delivered on a target, using the target itself as a point of aim for either the gun or the director.

Direct impact. Effects resulting solely from the proposed program.

Diversity. A measure of the richness of species in a community relative to the number of individuals of each species.

Drag road. Roads typically constructed at Border Patrol checkpoints that are periodically smoothed and later inspected for signs of fast traffic related to smugglers and illegal aliens.

Effluent. A gas or fluid discharge into the environment.

Emplacement. (1) A prepared position for one or more weapons or pieces of equipment, for protection against hostile fire or bombardment, and from which they can execute their tasks. (2) The act of fixing a gun in a prepared position from which it may be fired.

Endangered Species Act. An act of the U.S. Congress of 1972; 16 USC 1531-1543. The Act requires federal agencies to ensure that their actions do not jeopardize the existence of endangered or threatened species.

Endangered species. A plant or animal species that is threatened with extinction or serious depletion in its range and is formally listed as such by the USFWS.

Engagement. An attack with guns or air-to-air missiles by an interceptor aircraft, or the launch of an air defense missile by ADA and the missile's subsequent travel to intercept.

Environmental Impact Statement (EIS). A detailed written statement that helps public officials make decisions that are based on understanding of environmental consequences and to take actions that protect, restore, and enhance the environment.

Eolian. Applied to deposits arranged by the wind; wind blown.

Ephemeral. Lasting only a brief period of time; applied to a stream or lake that contains water only after rain or snowmelt.

131 **Ephemeral stream.** A stream or reach of a channel that flows only in direct response to precipitation in the immediate locality, whose channel is at all times above the zone of saturation.

Equivalent sound level (L_{eq}). A single number representing the fluctuating sound level in decibels over a specified period of time; the average of a fluctuating level of sound energy.

Erosion. The set of all processes by which soil and rock are loosened and moved downhill or downwind.

Escarpment. A long, usually continuous cliff or steep slope facing in one general direction, separating two level or gently sloping surfaces, and produced by erosion or faulting.

Evapotranspiration. The loss of water from the soil both by evaporation and by transpiration from the plants growing there.

Explosive ordnance. All munitions containing explosives, nuclear fission, or fusion materials and biological and chemical agents. This includes bombs and warheads; guided and ballistic missiles; artillery, mortar, rocket, and small arms ammunition; all mines, torpedoes, and depth charges; pyrotechnics; clusters and dispensers; cartridge-and propellant-actuated devices; electro-explosive devices; clandestine and improvised explosive devices; and all similar or related items or components explosive in nature.

Field artillery. Equipment, supplies, ammunition, and personnel involved in the use of cannon, rocket, or surface-to-surface missiles launchers. Field artillery cannons are classified according to caliber as:

- **Light**–120mm and less;
- **Medium**–121mm to 160mm;
- **Heavy**–161mm to 210mm;and
- **Very heavy**–greater than 210mm.

Field training exercise (FTX). An exercise conducted in field training areas under simulated war conditions in which troops and armament of one side are actually present, while those of the other side may be imaginary or in outline.

Field training areas. Areas with appropriate terrain characteristics used for assembly, training, communication, command, and control exercises, that are designed to maintain combat readiness for military deployment and air defense operations. 132

Fill. A sediment deposited so as to fill or partly fill a valley or other low place.

Fire control. The control of all operations in connection with the application of fire on a target.

Fire. (1) The command given to discharge a weapon(s). (2) To detonate the main explosive charge by means of a firing system.

Firing fan. The fan-shaped area encompassing all firing scenario directions and their associated SDZs.

Floodplain. The relatively flat land lying adjacent to a river channel that is covered by water when the river overflows.

Fugitive dust. Particulate matter composed of soil. Fugitive dust may include emissions from haul roads, wind erosion of exposed soil surfaces, and other activities in which soil is either removed or redistributed.

Geologic. Any natural process acting as a dynamic physical force on the earth; i.e., faulting, erosion, and mountain-building resulting in rock formations.

Groundwater recharge. Water that infiltrates the land surface and is not lost to evaporation or consumed by plants can percolate downward and replenish the groundwater aquifers. This deep percolation is called recharge.

Groundwater. Subsurface water within the zone of saturation.

Guided missile. An unmanned vehicle moving above the surface of the earth whose trajectory or flight is capable of being altered by an external or internal mechanism.

Habitat type. A land area capable of supporting a given plant association at climax. It represents a mature vegetation association and is usually characterized by two indicator species.

Hawk. A mobile air defense artillery, surface-to-air missile system that provides non-nuclear, low- to medium-altitude air defense coverage for ground forces; designated as MIM-23. (Originally an acronym—**H**oming **A**ll the **W**ay **K**iller—now used as a nickname and written with initial capital letter.)

Hazardous material. Any substance or material in a quantity or form that may be harmful to humans, animals, crops, water systems, or other elements of the environment if accidentally released. Hazardous materials include explosives, gases (compressed, liquefied, or dissolved), flammable and combustible liquids, flammable solids or substances, oxidizing substances, poisonous and infectious substances, radioactive materials, and corrosives.

Hazardous waste. Wastes that are designated as hazardous by the EPA or state regulations. Hazardous waste, defined under RCRA is waste from production or operation activities that poses a potential hazard to human health or the environment when improperly treated, stored, or disposed; hazardous wastes that appear on special EPA lists or possess at least one of the four following characteristics: ignitability, corrosivity, reactivity, and toxicity.

Herbicide. A chemical used to kill or inhibit the growth of plants.

Historic properties. Included in or eligible for inclusion in the NRHP.

Hydraulic conductivity. The ability of rock, alluvium, or sediment to permit water to flow through it. Technically, it is the volume flow rate of water through a unit cross-sectional area of a porous medium under a unit hydraulic gradient (**formerly permeability**).

Hydric soils. Soils that are saturated to the surface sometime during the growing season.

Hydrology. A science dealing with the properties, distribution, and circulation of water on and below the earth's surface and in the atmosphere.

Impact. The terms "impacts" and "effects" are synonymous as used in the NEPA. Impacts may be beneficial or adverse, and may apply to the natural, aesthetic, historic, cultural, and socioeconomic resources of the installation and the surrounding communities. Where applicable, impacts may be classified as direct or indirect.

Impact area. The area of land space which serves as a containment area for fired, launched, or set explosives.

Indirect effects. Impacts which are caused by an action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.

Indirect impact. An indirect impact is caused by a proposed activity but is later in time or farther removed in distance, but still reasonably foreseeable. Indirect impacts may include land use changes or population density changes and the related effects these changes will have on air, water, and other natural or social systems.

Informally specified land use. A land use that is managed in accordance with existing facilities and 221
SOPs as opposed to a land use for an area that is formally specified in the RPMP.

Infiltration. Water that falls on the land surface that does not run off but percolates into the ground. Some of this water evaporates, some is used by plants, and some percolates downward to the groundwater.

Infrastructure. Utilities and other physical support systems needed to operate a laboratory or test facility. Included are electric distribution systems, water supply systems, sewage disposal systems, roads, and so on.

Intermittent stream. An intermittent stream is a stream or reach of a channel that flows only during 133
certain times of the year (e.g., when it receives water from springs or seeps).

Isopach map. Subsurface geologic map showing thickness of a unit, such as a formation, aquifer, or fresh-water zone, throughout a geographic area, by means of contour lines that join points of equal thickness (isopachs).

Launch. The transition from static repose to dynamic flight of a missile.

Launcher. A structural device designed to support and hold a missile in position for firing.

Launching site. Any site or installation with the capability of launching missiles from surface-to-air or surface-to-surface.

Level of service (LOS) (public services). A measure describing the amount of public services (e.g., fire protection and law enforcement services) available to community residents, generally expressed as the number of personnel providing the services per 1,000 population.

Level of service (LOS) (traffic). A qualitative measure describing operational conditions within a traffic stream and how they are perceived by motorists and/or passengers.

Long-term impacts. Long-term impacts are neither temporary nor reversible. They may occur either during the construction or operational phases of an activity. For example, the construction of a new building may create long-term impacts during both the construction and operational phases. Draining of a wetland for the construction of a new building will create long-term and permanent impacts on biological resources. Likewise, once operational, the new building may create additional long-term impacts such as increased population density, waste generation, etc.

Low-altitude flight. Less than 300 feet above the ground.

Material. All items (including tanks, self-propelled weapons, aircraft, etc., and related spares, repair parts, and support equipment, but excluding real property, installations, and utilities) necessary to equip, operate, maintain, and support military activities without distinction to its application for administrative or combat purposes.

Military training route (MTR). A route developed for the high-speed (greater than 250 knots) low-altitude training of tactical aircrews. Instrument flight rules MTRs are mutually developed by the FAA and the DoD. Visual flight rules MTRs are developed by the DoD. MTRs are published on aeronautical charts. Each MTR has its own unique number consisting of either three or four digits. Three digits indicate that at least one segment of the route is 1,500 feet agl, and four digits indicate that the entire route is at or below 1,500 feet agl. The number is preceded by either IR or VR, specifying instrument flight rules (IR) or visual flight rules (VR), respectively. Since routes are one way, the same route flown the opposite direction will have a separate, distinct number.

Missile intercept zone. That geographical division of the destruction area where surface-to-air missiles have primary responsibility for destruction of airborne objects.

Mission. (1) The task, together with the purpose, which clearly indicates the action to be taken and the reason therefor. (2) The dispatching of one or more aircraft to accomplish one particular task.

Mitigation. Mitigation generally includes: avoiding the impact altogether by stopping or modifying the proposed action; minimizing impacts by limiting the degree or magnitude of the action and its implementation; rectifying the impact by repairing, rehabilitating, or restoring the affected environment; reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; compensating for the impact by replacing or providing substitute resources or environments.

Nap-of-the-Earth (NOE). Flight as close to the surface as possible.

National Ambient Air Quality Standards (NAAQS). Section 109 of the CAA requires the EPA to set nationwide standards for widespread air pollutants. Currently, six pollutants are regulated: NO_2, SO_2, CO, PM_{10}, O_3, and Pb.

National Historic Preservation Act (NHPA). Law that states that the Federal Government will cooperate with other governments (including state and local), Indian tribes, and private organizations and individuals to ensure that prehistoric and historic resources are properly preserved for present and future generations (enacted 1966).

National Register of Historic Places (NRHP). Document containing those resources deemed to be important in American history, architecture, anthropology, engineering, or culture, and associated with significant past events or persons and/or representing distinctive construction or high artistic value.

Native American Graves Protection and Repatriation Act (NAGPRA). Law that states that any remains of American Indians (and associated objects) must be professionally curated and made available to any descendents for a traditional tribal burial (enacted 1990).

Native American. A generalized term referring collectively to individuals, tribes, bands, or organizations that trace their ancestry to indigenous populations of North America.

Neotropical migrants. Birds that breed in the temperate zone and then migrate in winter to tropical zones.

Nitrogen dioxide (NO_2). Gas formed primarily from atmospheric nitrogen and oxygen when combustion takes place at high temperature. Nitrogen dioxide emissions contribute to acid deposition and formation of atmospheric ozone (see Criteria pollutants).

Nitrogen oxide (NO_x). Gases formed primarily by fuel combustion, which contribute to the formation of acid rain. Hydrocarbons and nitrogen oxides combine in the presence of sunlight to form O_3, a major constituent of smog.

No impact. "No impact" implies that a particular activity creates neither a direct nor indirect impact, does not have long- or short-term implications, and is neither beneficial nor negative.

Noise. Any sound that is undesirable because it interferes with speech and hearing or is intense enough to damage hearing.

Nonattainment area. An area that has been designated by the EPA or the appropriate state air quality agency as exceeding one or more national or state AAQS.

Nonpotable. Water that is unsafe or unpalatable to drink because it contains pollutants, contaminants, minerals, or infective agents.

Obscurant. A substance used to simulate extreme weather conditions or battlefield settings such as explosive-generated smoke and dust.

Off-road vehicle (ORV). Any motorized vehicle designated for cross-country travel over any type of natural terrain.

Ordnance. Explosives, chemicals, pyrotechnic and similar stores; for example, bombs, guns, ammunition, flares, and smoke.

Ozone O_3 (ground level). A major ingredient in smog. O_3 is produced from reactions of hydrocarbons and nitrogen oxides in the presence of sunlight and heat.

Particulate. Fine liquid or solid particles such as dust, smoke, mist, fumes, or smog, found in air or emissions.

Partner unit. Military organizations participating in the Army Performance Improvement Criteria Concept. This concept connects elements of combat power in the TOE unit with support from TDA organizations to improve overall Army performance. 221

Patriot. Air defense missile system designed to counter air threat within the very low- to very high-altitude boundaries. (Originally an acronym—**P**hased **A**rray **Tr**acking to **I**ntercept **o**f **T**arget—now used as a nickname.)

Peak hour (traffic). The hour of highest traffic volume on a given section of roadway.

Pesticide. Chemical used to kill or inhibit growth of undesirable species.

Playa. A dry, vegetation free, flat area at the lowest point of an undrained basin.

Polychlorinated biphenyl (PCB). A class of toxic, nonflammable, nonvolatile chlorinated oils used in transformers, capacitors, and fluorescent ballasts. PCBs are potential carcinogens and are regulated under the *Toxic Substances Control Act*.

Potentiometric surface. A surface defined by the level to which groundwater in a confined aquifer rises in wells or boreholes.
Precambrianage. A geologic era extending from 4,700 million years ago to 570 million years ago.

Radiation. The emissions, either electromagnetic or particulate, resulting from the transformation of an unstable atom or nucleus.

Recharge. Percolation of rainwater and snowmelt through the soil unsaturated zone to the groundwater table.

Reconnaissance. A mission undertaken to obtain, by visual observation or other detection methods, information about the activities and resources of an enemy or potential enemy; or to secure data concerning the meteorological, hydrographic, or geographic characteristics of a particular area.

Record of Decision (ROD). A public document that explains which alternative will be selected.

Real estate outgrant. Leases, licenses, easements, permits, use agreements, and other arrangements that change government control of real property by conferring property rights to another governmental agency or private party.

221 **Real Property Environmental Overlays.** A system of drawings delineating the natural and man-made environmental features within which development of the installation occurs.

Remotely Piloted Vehicle. An unmanned air vehicle capable of being controlled from a distant location through a communications link. It is normally designed to be recoverable.

Riparian. Of or pertaining to the banks of a body of water.

Scoping. Process in the beginning stages of an EIS during which the public and federal and state agencies may voice concerns they wish the study to address.

Seismicity. The worldwide or local distribution of earthquakes in space and time; a general term for the number of earthquakes in a unit time.

Short-term impacts. Short-term impacts are temporary and either direct or indirect. Short-term impacts usually occur during the construction phase of the activity.

Significance. Significance requires consideration of the context and intensity of the impact or effect, under consideration. Significance can vary in relation to the context of the proposed action. At Fort Bliss, the significance of the proposed actions may include consideration of the effects on a national, regional, and local basis. Both short- and long-term effects may be relevant. Impacts may also be evaluated in terms of their intensity or severity.

Sound. (1) A physical disturbance in a medium (e.g., air) that is capable of being detected by the human ear. (2) The hearing sensation excited by a physical disturbance in a medium.

Specific yield. The volume of water released by a falling water table from a given volume of fully saturated rock, usually expressed as a percentage (see "Storage coefficient").

Stakeholders. Interested and/or affected people or groups.

Storage coefficient. The volume of water given up per unit horizontal area of an aquifer and per unit drop of the water table or potentiometric surface, expressed as a ratio always less than one. It is equal to the specific yield in unconfined aquifers but depends on the elastic compression of confined aquifers and is usually less 10^{-3}.

Stratigraphic. Division of geology dealing with the definition and description of rocks and soils, especially sedimentary rocks.

Subsurface. A zone below the surface of the earth whose geologic features are principally layers of rock that have been tilted or faulted and are interpreted on the basis of drill hole records and geophysical (seismic or rock vibration) evidence. Generally, it is all rock and solid materials lying beneath the earth's surface.

Succession. The process of gradual replacement of one community or ecosystem by another, involving a series of changes in the plant and animal life.

Surface danger zone (SDZ). That area which is endangered by projectiles, fragments, or explosions and the associated peripheral safety areas.

Surveillance. A systematic observation of airspace or surface areas by visual, aural, electronic, photographic, or other means.

Survey cultural resources. The archaeological exploration of an area to obtain samples from each culture phase contained, conducted under various field techniques.

Tertiary. A geologic time period extending from 65 million years ago to 2 million years ago.

Threatened species. A species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Tiering. Process of covering general materials in a broad-scoping document, with further narrow-scoping documents to cover more precise information through reference.

Total dissolved solids (TDS). The concentration of solid materials that are dissolved in a sample of water; determined as the weight of the residue of a water sample upon filtration and evaporation divided by the volume of the sample.

Total suspended particulate (TSP) matter. Finely-divided solids or liquids up to 50 microns in diameter, which comprise the bulk of particulate matter in the atmosphere.

Traditional Cultural Properties (TCP). A legal term; refers to properties, regions, or locales used by peoples of Native American heritage in religious, sacred, or ceremonial activities.

Training complex. Firing ranges and weapons training facilities designated for firing ammunition and explosives, heavy rockets, and guided missiles for training and target practice, and nonlive-fire sites for maneuver exercises and operations.

Transmissivity. The ease with which groundwater is transmitted through an aquifer. Technically, it is the rate at which groundwater is transmitted through a unit width of an aquifer under a unit hydraulic gradient and corresponds to the hydraulic conductivity multiplied by the saturated thickness of an aquifer.

Trip generation. A determination of the quantity of trip ends associated with a parcel of land.

Unconfined aquifer. An aquifer in which the water table defines the upper limit of the aquifer—also known as a water-table aquifer.

Underground storage tank (UST). Typically used to contain gasoline or other petroleum fuels; buried beneath the ground surface.

Unemployment rate. The number of civilians, as a percentage of the total civilian labor force, without jobs but actively seeking employment.

Unexploded explosive ordnance. Explosive ordnance which has been primed, fused, armed, or otherwise prepared for action, and which has been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installations, personnel, or material, and remains unexploded either by malfunction or design or for any other cause.

Vadose. The area between the surface of the ground and the water table.

Water table. The sustainable volume of water discharged from a well per units of time, often expressed in gpm.

Waters of the U.S. A legal term; refers to instrastate lakes, rivers, streams, (including intermittent streams), mud flats, sand flats, wetlands, playa lakes, and tributaries to such features.

Well yield. The sustainable volume of water discharged from a well per unit of time, often expressed in gpm.

Wetlands. An area that is regularly saturated by surface water or groundwater and subsequently supports vegetation that is adopted for life in saturated soil conditions.

Woodland. Plant community characterized by a generally open growth of small trees.

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List of Acronyms

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14.0 LIST OF ACRONYMS

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LIST OF ACRONYM

AAA	Anti-aircraft Artillery
AAARTC	Anti-aircraft Artillery Replacement Training Center
AADT	Annual Average Daily Traffic
AAF	Army Airfield
AAFES	Army and Air Force Exchange Systems
AAM	Annual Arithmetic Mean
AAQS	Ambient Air Quality Standards
AC	Asbestos Concrete
ACC	Air Combat Command
ACEC	Area of Critical Environmental Concern
ACHP	Advisory Council on Historic Preservation
ACMs	Asbestos-containing Materials
ACR	Armored Cavalry Regiment
ACS	Administrative and Community Support
ADA	Air Defense Artillery
ADATS	Air Defense Anti-tank System
ADNL	A-weighted Day-Night Average Sound Level
ADT	Average Daily Traffic
af	Acre Feet
AFB	Air Force Base
AFGL	Air Force Geophysical Laboratory
AFHC	Army Family Housing Construction
AFI	Air Force Instruction
afy	Acre Feet per Year
agl	Above Ground Level
AGM	Annual Geometric Mean
AIRFA	American Indian Religious Freedom Act
ALCM	Air-launched Cruise Missiles
AM	Amplitude Modulation
AMRAAM	Advanced Medium-range Air-to-Air Missile
ANSI	American National Standards Institute
APM	Asbestos Program Manager
APOE	Aerial Port of Embarkation
APZ	Accident Potential Zone
AR	U.S. Army Regulation
ARAACOM	Army Anti-aircraft Command
ARC	Anthropology Research Center
ARPA	Archaeological Resources Protection Act
ARTEP	Army Training and Evaluation Program
ASIP	Army Stationing and Installations Plan

ASMP	Army Strategic Mobility Program
ASP	Ammunition Supply Point
AST	Above Ground Storage Tank
ATACMS	Army Tactical Missile System
ATC	Air Traffic Control
ATCT	Air Traffic Control Tower
AUM	Animal Unit per Month
AUTODIN	Automatic Digital Network
BACT	Best Available Control Technology
BAT	Brilliant Anti-tank
BBER	Bureau of Business and Economic Research
BCS	Biggs Community Support
BFI	Browning-Ferris Industries
BLM	Bureau of Land Management
BN	Battalion
BNSF	Burlington Northern and Santa Fe
BOD	Biochemical Oxygen Demand
BRAC	Base Realignment and Closure
BSFV	Bradley Stinger Fighting Vehicle
CAA	Clean Air Act
CAAA	Clean Air Act Amendments
Cal	Caliber
CAS	Combined Arms Support
CBR	Chemical, Biological, Radiological
CCC	Civilian Conservation Corps
CDNL	C-weighted Day-Night Average Sound Level
CDP	Census Designated Places
CDR	Commander
CEQ	Council on Environmental Quality
CERL	Construction Engineering Research Laboratory
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFCs	Chlorofluorocarbons
CFR	Code of Federal Regulations
CIS	Capital Investment Strategy
CO	Carbon Monoxide
CPO	Civilian Personnel Office
CTF	Collective Training Facility
CTMC	Consolidated Troop Medical Clinic
CX	Categorical Exclusion
CY	Calendar Year
CZ	Clear Zone
DA	U.S. Department of the Army
dB	Decibel
dBA	A-weighted Decibel
dBC	C-weighted Decibel

dBP	Peak Unweighted Sound Pressure Level
DERP	Defense Environmental Restoration Program
DFIRS	DoD Fire Information Reporting System
DINAH	Desktop Interface Network to the AUTODIN Host
DIVAD	Division Air Defense
DoD	U.S. Department of Defense
DOE	Directorate of the Environment
DOI	U.S. Department of the Interior
DOL	Director of Logistics
DOPAA	Description of the Proposed Action and Alternatives
DOT	U.S. Department of Transportation
DPEIS	Draft Programmatic Environmental Impact Statement
DPTMS	Director of Plans, Training, Mobilization, and Security
DPWL	Directorate of Public Works and Logistics
DRMO	Defense Reutilization and Marketing Office
DSERTS	Defense Site Environmental Restoration Tracking System
DSN	Defense Switched Network
DZ	Drop Zone
EA	Environmental Assessment
EBS	Environmental Baseline Survey
EE/CA	Engineering Evaluation/Cost Analysis
EIS	Environmental Impact Statement
EM	Electromagnetic
EMT	Emergency Medical Technicians
EO	Executive Order
EOD	Explosive Ordnance Disposal
EPA	U.S. Environmental Protection Agency
EPAS	El Paso Archaeological Society
EPCRA	Emergency Planning and Community Right-to-Know Act
EPCWID	El Paso County Water Improvement District #1
EPEC	El Paso Electric Company
EPGC	El Paso Gas Company
EPIA	El Paso International Airport
EPWU	El Paso Water Utilities
°F	Degrees Fahrenheit
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulation
FAW	Forward Area Weapons
FCG	Facility Category Group
FFAR	Folding-fin Aerial Rocket
FICON	Federal Interagency Committee on Noise
FICUN	Federal Interagency Committee on Urban Noise
FIREX	Fire Exercise
FLPMA	Federal Land Policy and Management Act
FM	Frequency Modulation
FONSI	Finding of No Significant Impact
FORSCOM	U.S. Army Forces Command
FTE	Full-time Equivalent
FTX	Field Training Exercise
FUDS	Formerly Used Defense Site
FWPCA	Federal Water Pollution Contract Act
FY	Fiscal Year
GAF	German Air Force
GEC	Gulf Engineers and Consultants, Inc.
GIS	Geographic Information System
GLAADS	Gun Low-altitude Air Defense System
gpd	Gallons per Day
gpm	Gallons per Minute
GPS	Global Positioning System
GSA	General Services Administration
HAFB	Holloman Air Force Base
HAP	High Accident Potential
HazMart	Hazardous Material Pharmacy
HAZMIN	Hazardous Substance Minimization
HE	High Explosive
HEI	High Explosive Incendiary
HET	Heavy Equipment Transport
HIMAD	High-to-medium-altitude Air Defense
HMTP	Historic Bulidings and Structures Material Treatment Plan
HMX	High-melting Explosive
HPP	Historic Preservation Plan
HQ	Headquarters
HSMS	Hazardous Substance Management System
HSWA	Hazardous and Solid Waste Amendments
HUD	U.S. Department of Housing and Urban Development
HVAC	Heating Ventilation and Air Conditioning
Hz	Hertz
I-[10]	Interstate [10]
ICRMP	Integrated Cultural Resources Management Plan
ICUZ	Installation Compatible Use Zone
ID	Identification
IDG	Installation Design Guide
IFR	Instrument Flight Rules

INRMP	Integrated Natural Resources Management Plan
IPPP	Integrated Pollution Prevention Plan
IRP	Installation Restoration Program
ISD	Independent School District
ISDN	Integrated Switch Digital Network
ITAM	Integrated Training Area Management
ITU	International Telecommunications Union
JTF	Joint Task Force
JTF-6	Joint Task Force-Six
JTX	Joint Training Exercies
kHz	Kilohertz
kV	Kilovolt
kVA	Kilovolt-amperes
kWh	Kilowatt-hours
LAW	Light Assault Weapon
LCTA	Land Condition Trend Analysis
L_{dn}	Day-Night Average Sound Levels
L_{dnmr}	Onset Rate-adjusted Monthly Day-Night Average Sound Level
LEIS	Legislative Environmental Impact Statement
L_{max}	Maximum Sound Level
LOS	Level of Service
LOU	Level of Use
LPG	Liquid Petroleum Gas
LPST	Leaking Petroleum Storage Tank
LRAM	Land Rehabilitation and Maintenance
LRC	Long-range Component
MAC	MOUT Assault Course
MACT	Maximum Achievable Control Technology
MAILS	Multiple Aircraft Instantaneous Line Source
MC	Mobilization Component
mcf	Million Cubic Feet
MCL	Maximum Containment Level
MCP	Military Construction Program
MEDEVAC	Medical Evacuation
mg	Million Gallons
mgd	Million Gallons per Day
mg/l	Milligrams per Liter
MHz	Megahertz
MIBN (LI)	Military Intelligence Battalion (Low-intensity)
MICOM	U.S. Army Missile Command
$\mu g/m^3$	Micrograms per Cubic Meter
MLRS	Multiple Launch Rocket System
MLWA	Military Lands Withdrawal Act
mm	Millimeter
MOA	Memorandum of Agreement
MOS	Military Operations Specialty
MOU	Memorandum of Understanding
MOUT	Military Operations in Urbanized Terrain
mph	Miles per Hour
MPRC-H	Multi-purpose Range Complex-Heavy
MRNMAP	MOA/Range NOISEMAP
MSA	Mutual Support Agreement
MSAR/CPC	Multi-purpose Small Arms Range and Combat Pistol Course
MSGP	Multi-sector General Permit
msl	Mean Sea Level
MSWLF	Municipal Solid Waste Landfill
MTR	Military Training Route
MUIR	Map Unit Interpretation Record
MVA	Megavolt-amperes
MW	Megawatts
NAAQS	National Ambient Air Quality Standards
NAFR	Nellis Air Force Range
NAGPRA	Native American Graves Protection and Repatriation Act
NASA	National Aeronautics and Space Administration
NATO	North Atlantic Treaty Organization
NBC	Nuclear-Biological-Chemical
NCA	National Conservation Area
NCO	Non-commissioned Officer
NEPA	National Environmental Policy Act
NESHAPS	National Emission Standards for Hazardous Air Pollutants
NHPA	National Historic Preservation Act
NLR	Noise Level Reduction
nm	Nautical Miles
NMBMMR	New Mexico Bureau of Mines and Mineral Resources
NMDEMNR	New Mexico Department of Energy, Minerals, and Natural Resources
NMDGF	New Mexico Department of Game and Fish
NMED	New Mexico Environment Department
NMSEO	New Mexico State Engineer's Office
NMSU	New Mexico State University
NMWQCC	New Mexico Water Quality Control Commission
NO_2	Nitrogen Dioxide
NOAA	National Oceanic and Atmospheric Administration
NOE	Nap-of-the-Earth
NOI	Notice of Intent
NOTAM	Notice to Airmen

NO_x	Nitrogen Oxide
NPDES	National Pollution Discharge Elimination System
NPL	National Priorities List
NPS	National Park Service
NRAO	National Radio Astronomy Observatory
NRC	U.S. Nuclear Regulatory Commission
NRCS	National Resource Conservation Service
NRHP	National Register of Historic Places
NSPS	New Source Performance Standards
NTC	National Training Center
O_3	Ozone
OD	Open Detonation
ORV	Off-road Vehicle
OSHA	Occupational Safety and Health Administration
P3	Power Projection Platform
PAI	Pounds of Active Ingredients
PAO	Public Affairs Office
Pb	Lead
PCB	Polychlorinated Biphenyls
PCS	Permanent Change of Station
PEIS	Programmatic Environmental Impact Statement
phv	Peak Hour Volume
PL	Public Law
PLO	Public Land Order
PM_{10}	Particulate Matter Less tan 10 Micrometers in Diameter
$PM_{2.5}$	Particulate Matter Less tan 2.5 Micrometers in Diameter
POLs	Petroleum, Oils and Lubricants
ppm	Parts per Million
PRGs	Preliminary Remediation Goals
PSD	Prevention of Significant Deterioration
PX	Post Exchange
QAM	Quarterly Arithmetic Mean
RA	Resource Area
RCAT	Radio-controlled Aerial Target
RCRA	Resource Conservation and Recovery Act
RDX	Trinitrotrimethylenetriamine
REC	Record of Environmental Consideration
RES	Residential
RFI	RCRA Facility Investigations
RFMSS	Range Facility Management Support System
RIMS	Regional Input/Output Modeling System
RMP	Resource Management Plan
RMPA	Resource Management Plan Amendment
RN	Roaded-natural
ROD	Record of Decision
ROI	Region of Influence
ROW	Right-of-Way
RPMP	Real Property Master Plan
RUSLE	Revised Universal Soil Loss Equation
SAAD	Small Arms Air Defense
SAIC	Science Applications International Corporation
SARA	Superfund Amendments Reauthorization Act
SDZ	Surface Danger Zone
SEL	Sound Exposure Level
SHORAD	Short-range Air Defense
SHPO	State Historic Preservation Office(r)
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
SOP	Standard Operating Procedure
SPCCP	Spill Prevention Control and Countermeasure Plan
SPM	Semiprimitive, Motorized
SPNM	Semiprimitive Nonmotorized
SPOE	Sea Port of Embarkation
SRC	Short-range Component
STLS	Stinger Launch System
STRACNET	Strategic Rail Corridor Network
SWMU	Solid Waste Management Units
TA	Training Area
TAB	Tabulation of Existing and Required Facilities
TAC	Tactical Air Command
TADC	Training Area Development Concept
TAOC	Tactical Air Operations Center
TBM	Tactical Ballistic Missile
TCC	Telecommunications Center
TCP	Traditional Cultural Properties
TDA	Table of Distribution and Allowances
TDS	Total Dissolved Solids
TDY	Temporary Duty
TEXCOM	Test and Experimentation Command
TGO	Touch-and-Go
THAAD	Theater High-altitude Area Defense
TNRCC	Texas Natural Resources Conservation Commission
TNT	Trinitrotoluene
TOE	Table of Organization and Equipment

TOM	Training, Operations, and Maintenance
TOW	Tube-launched, Optically-tracked, Wire-guided
TPCSDS-T	Target Practice, Cone-stabilized, Discarding Sabot Tracer
TPWD	Texas Parks and Wildlife Department
TRADOC	U.S. Army Training and Doctrine Command
TRC	TRC Mariah Associates, Inc.
TRH	Troop Housing
TRI	Toxic Release Inventory
TRI	Training Requirements Integration
TSCA	Toxic Substance Control Act
TSP	Total Suspended Particulates
TWDB	Texas Water Development Board
UASA	Unique and Sensitive Areas
UAV	Unmanned Aerial Vehicle
UCMJ	Uniform Code of Military Justice
UOES	User Operational Evaluation System
UP/SP	Union Pacific/Southern Pacific
USAADACENFB	U.S. Army Air Defense Artillery Center and Fort Bliss
USACASB	U.S. Army Combined Arms Support Battalion
USACE	U.S. Army Corps of Engineers
USAF	U.S. Air Force
USBR	U.S. Bureau of Reclamation
USC	U.S. Code
USDA	U.S. Department of Agriculture
USDOE	U.S. Department of Energy
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
USJCS	U.S. Joint Chiefs of Staff
UST	Underground Storage Tank
UTM	Universal Transverse Mercator
VFR	Visual Flight Rules
VHF	Very High Frequency
VLA	Very Large Array
VLBA	Very Long Baseline Array
VOC	Volatile Organic Compound
vph	Vehicles per Hour
vphpl	Vehicles per Hour per Lane
VQO	Visual Quality Objective
VRM	Visual Resource Management
WAN	Worldwide Area Network
WAP	Waste Accumulation Points
WBAMC	William Beaumont Army Medical Center
WSA	Wilderness Study Area
WSMR	White Sands Missile Range