Final Range Wide Environmental Impact Statement

July 2001

U.S. Army Yuma Proving Ground

FINAL RANGE WIDE ENVIRONMENTAL IMPACT STATEMENT

U.S. Army Yuma Proving Ground
Yuma and La Paz Counties, Arizona

Prepared for

U.S. Army Yuma Proving Ground

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FINAL RANGE WIDE ENVIRONMENTAL IMPACT STATEMENT U.S. ARMY YUMA PROVING GROUND

LEAD AGENCY: U.S. Army Yuma Proving Ground, Yuma, AZ

TITLE OF PROPOSED ACTION: Diversification of Mission and Changes to Land Use

AFFECTED JURISDICTION: State of Arizona, Yuma and La Paz Counties

TYPE OF STATEMENT: Environmental Impact Statement

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ABSTRACT:

This Final Range Wide Environmental Impact Statement presents the impacts associated with the direct, indirect, and cumulative effects of mission diversification and changes to land use for Yuma Proving Ground. New Department of Defense management and operational concepts and programs require land use changes and the construction of new facilities and ranges. In accordance with Council of Environmental Quality and Army guidance, a range of alternatives has been assessed in the *Draft Range Wide Environmental Impact Statement.* The baseline activity levels (alternative A, the "no action" alternative) are described for evaluation of environmental consequences of existing activities. Impacts and mitigation to impacts for each evaluated alternative and the preferred alternative are presented and compared in accordance with the National Environmental Policy Act.

Situated in southwestern Arizona, the Yuma Proving Ground installation is a desert test and evaluation center with premier facilities for testing military materiel. Diversified operations will benefit Yuma Proving Ground, the City of Yuma, the State of Arizona, and the Nation. However, new mission elements, such as combat systems testing, troop training, and private partnership initiatives are likely to result in significant impacts to the natural and human environment. Further environmental documents addressing specific new mission elements will tier from this environmental impact statement.

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READER'S GUIDE

Welcome to the Yuma Proving Ground Range Wide Environmental Impact Statement (RWEIS). Before you start reading the document, allow the Army a moment to explain the process and some of the concepts used to prepare this analysis.

What's in a Name...

Range Wide Environmental Impact Statement is the title of this document. The "Environmental Impact Statement" (EIS) portion is easy enough to understand, but from where did "Range Wide" come?

Most military test installations are called "test ranges". In this case, that "range" is the entire installation and not one of the individual firing ranges. "Range Wide" then includes all activities inside the boundary **and** everything outside the boundary that falls under **operational control** of the installation.

The Document itself...

Rather than being encyclopedic, this document is intended as a **concise summary** of the analyses that have been performed. The Army has also endeavored to write this document in simple language, with a minimum of acronyms and euphemisms.

The Programmatic Approach...

The goal was to look at the sum of the activities that occur (or are likely to occur) on Yuma Proving Ground over the next 15 years. (Read that as 1999 to 2014.) No one can accurately predict exactly which projects will take place in 2006, or 2010, or 2014.

However, the Army has a very good feel for the **types** of activities that will occur, and has a general feel for the **technology trends** that will establish the test and training workloads 10 or more years from now. So the Army took the **programmatic** approach to this analysis.

To start, existing plans for the installation were examined. Plans provide a framework for decisions. The Army manages resources with plans. The Army manages systems with plans. The Army manages emergencies with plans. Most of the Army's individual subject plans at Yuma Proving Ground combine to form what is known as the **Installation Master Plan.**

Of course, plans are dynamic. They change as appropriate to meet the changing needs of the installation. Even the preparation of this RWEIS has had an effect on the Installation Master Plan. The concept of three "mission-driven" regions was adapted by the Master Plan after being proposed by this analysis.

In many ways, the Installation Master Plan and this RWEIS are sister documents that contribute equally to the decisionmaking process on Yuma Proving Ground.

The RWEIS also looks at programs. We can accurately assume that tomorrow's weapons systems will have greater range than ever before. The Army can assess the impact of that type of test and the demands it may place on the installation, but only at a programmatic level.

Finally, this RWEIS assesses the likely impact that entire categories of actions may have. Throughout the document, you will find references to the "big four" categories of activities:

- **military testing** activities
- **military training** activities
- **public-private partnership** activities
- **other** activities (that do not fit into the first three)

In the discussion of these four activity categories, you will see many **examples.** However, none of them are guaranteed to occur. Some actions and projects very similar to those described will occur, but others will not. They are just examples.

Do not be overly concerned that an individual example is not explained in depth sufficient to evaluate its full impact. All individual actions and projects will receive appropriate additional National Environmental Policy Act evaluation, as required.

Development of Alternatives...

Once the Army settled on the programmatic approach, it needed reasonable (practicable) alternatives to evaluate and compare.

A **"No-Action Alternative"** was created by averaging total activity level for the most recent 5-year period for which we had data (1991 to1995). That became the **baseline** and a basis for comparing the range of alternatives that would be developed. This is Alternative A in the RWEIS.

It was determined that two alternatives would be useful to evaluate the effect of either increasing or decreasing the total military mission of the installation. The Army selected cumulative levels of activity that

would be (on average) 50 percent less than the baseline average and 100 percent more than the baseline average. These are Alternatives B and C in the RWEIS. Under both alternatives, non-military mission activities would remain constant.

The Army also wanted to evaluate the effect of modifying the level of various non-military activities that occur on (and therefore under the jurisdiction of) Yuma Proving Ground. This became Alternative D.

The Army wanted to ensure that we did not prematurely exclude from consideration some activities that were not beyond the limits of practicality. Many activities were considered under this alternative, such as commercial mining, agricultural outleases, outdoor recreation, commercial ventures, and so forth. The only criteria for an activity's consideration, was that **it had to be compatible with the primary military test mission of Yuma Proving Ground.**

The Army also wanted an alternative that **reflected the approach** that could be used to form the Preferred Alternative, after receipt and consideration of public comments. This was Alternative E. Alternative E was formed by selecting individual activity types from each of the other four alternatives.

Once the Draft RWEIS was published, the Army received comments on the Draft RWEIS from everyone (to include general public, agencies, Indian Tribes, and military organizations). All of the comments were carefully considered and the **Preferred Alternative** (Alternative F) was developed. Public input was one of the factors that assisted the Army's decisionmakers at Yuma Proving Ground in selecting activities to consider at the installation between now and 2014.

The final RWEIS reprints concise summaries of Alternatives A through E, and contains a detailed description of Alternative F, the Preferred Alternative, (in Chapter 2). The same approach is used in Chapter 4, describing the effects of the Preferred Alternative and summaries from the Draft RWEIS of each alternative. Keep in mind that the details are described at the **program level**, rather than at the project level.

Public Involvement...

Before the analyses for the RWEIS began the Army prepared a **Public Involvement Plan.** It was published and released to the public. Extensive public involvement was planned throughout the process. Many of the announcements and informational brochures were published in both English and Spanish.

The Army then conducted scoping activities for the Draft RWEIS with agencies, Indian Tribes, and the general public. All public meetings were conducted in an open house format, to facilitate participation.

The resources and issues identified during this scoping process were documented in another report, the **Public Scoping Synopsis**. Copies of this document were distributed to every person and agency that participated, in addition to copies provided to libraries.

The Army's team of resource experts also did exhaustive research to capture any reference material that might be useful to the analysis. One copy of every reference used or considered in the analysis was placed into our **Administrative Record**. The record was and is open to the public.

Once the research phase of the project was largely complete, the Army prepared another public document, **Analysis of Existing Database.** This document identified any gaps in the existing knowledge of the environment at and around the installation. It included the first version of the bibliography for the RWEIS.

As the Draft RWEIS was developed, the Army continued to accept input from agencies, Tribes, and individual members of the public. At no time did the Army stop accepting input from the public because the official comment periods had ended.

The **Draft RWEIS** was published in August 1998. A 45-day public comment period was held and extensions were granted to every agency or individual that requested one. Two public meetings were held.

Every comment received at the public meetings or in writing was considered in the development of the Preferred Alternative and in making corrections to facts contained in the draft document. The collection of these comments and the Army's responses to them is included as **Appendix C-Comment Response Document to the Draft RWEIS** in the Final RWEIS.

The publication and distribution of this **Final RWEIS** does not conclude public involvement in this process. The Army will again solicit comments and collect them in another publicly available document, which will become another part of the public record.

After this RWEIS is complete, the public (including agencies and Tribes) are encouraged to continue participating in the development of subordinate tiered National Environmental Policy Act documents. Yuma Proving Ground welcomes your thoughts and ideas to help the Army perform its mission **...in concert with the environment.**

EXECUTIVE SUMMARY

INTRODUCTION

This Range Wide Environmental Impact Statement (RWEIS) presents the direct, indirect, and cumulative effects of a range of alternatives, including the Preferred Alternative to diversify Yuma Proving Ground (YPG) operations. The Preferred Alternative, if adopted by the U.S. Army (Army) would convert YPG into a multipurpose installation. The new program would incorporate new management practices, update operational concepts, and integrate opportunities for public-private partnerships to meet the demands of a broader customer base. The location of YPG is shown in figure 1.

The RWEIS addresses the general impacts of a broad program (the total YPG mission) to a large geographic area (southwestern Arizona). This RWEIS is therefore a programmatic type of environmental impact statement (EIS) as defined by the National Environmental Policy Act (NEPA). Future actions at YPG will require lower tier documentation under the National Environmental Policy Act. Projects identified in the Preferred Alternative are representative examples and do not represent commitments made by YPG or the Army. The RWEIS is designed to function along with the other planning documents at YPG, such as the *Installation Master Plan*, the *Integrated Natural Resources Management Plan*, and the *Integrated Cultural Resources Management Plan*. If additional Army initiatives result in proposed programs not covered by this RWEIS, then additional NEPA documentation would be prepared, as appropriate.

PURPOSE AND NEED

Defense systems development at YPG requires modern, large, specialized test facilities with advanced data acquisition capabilities. Future mission needs will require changes in the infrastructure and increased capabilities of YPG during the life of this document (1999 to 2014). These changes could result in potentially significant effects to the environment.

The Preferred Alternative identifies potential future mission activities at YPG and the extent of changes needed to support that mission. Changes in future activities on YPG are analyzed in relation to the following activity areas: testing, training, public-private partnership opportunities, recreation, and other activities. The expanded mission is expected to increase troop training, introduce combat systems testing, and involve new customers from the private sector. Training activities at YPG have increased over the five-year period from 1991 through 1995. This continued expansion of training exercises, activities, and diverse participants will increase impacts to the environment. All branches of the military are likely to conduct training activities at YPG within the 15-year life span of this document.

ALTERNATIVES CONSIDERED IN THIS RWEIS

A range of alternatives were developed in relation to the proposed action to direct the future development of YPG. Preparation of this document considered several alternatives. Developmental criteria are shown in the box below.

Alternative A - Baseline Activity Levels (No Action)

Alternative A is the No Action alternative. This alternative considered activities on the installation at levels comparable to those experienced during the five-year baseline period from 1991-1995. Over this baseline period the type and frequency of mission activities fluctuated, as a reflection of changing

DEVELOPMENT CRITERIA FOR ALTERNATIVES CONSIDERED

- **The military mission continues to have top priority.**
- **New activities that are compatible with the military mission will be considered.**
- **Range areas are closed to the public except as specifically authorized. Roads and other facilities routinely available for public use may also temporarily be closed (when required) for security and safety.**
- **The Army and Department of Defense comply with the applicable federal and state regulatory statutes (environmental laws, permits, and licenses).**
- **Valid existing rights and formalized agreements are protected and maintained, as required by law.**
- **The policies and planning of adjacent land owners, managers, and local governments are considered in projects conducted at YPG.**

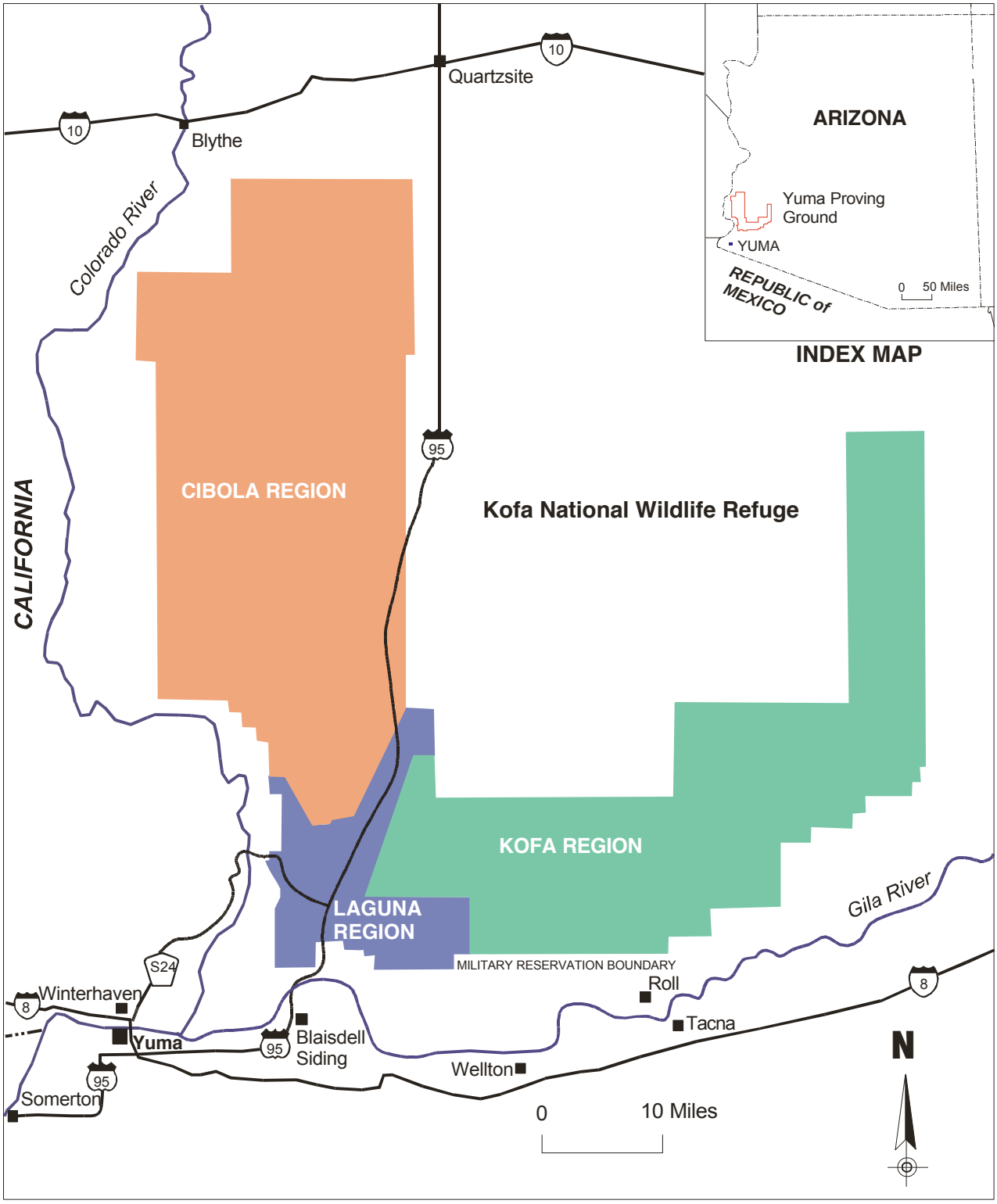

Figure 1. Location and Regions of Yuma Proving Ground.

national defense needs. Therefore Alternative A considered fluctuations in activity levels to be an integral part of operations, and anticipated that similar fluctuations, within the range established, would continue to occur. Support services and maintenance of existing facilities and infrastructure were also expected to continue at levels comparable to those experienced during the baseline period.

Alternative B - Decreased Military Mission

Under alternative B some military operations were evaluated in context of a 50 percent decrease from baseline levels. During development of this alternative, not all areas of the composite mission at YPG were expected to decrease over the next 15 years. Predictions of decreases in mission activities were based on information and knowledge available from the technical divisions at YPG. The development of more advanced technology was considered a key factor when evaluating the potential for an activity to decrease.

Alternative C - Increased Military Mission

Alternative C predicted increases for baseline military mission activity and enhanced the principal mission by incorporating more military activities, such as training. The predicted increases in mission activity levels varied for each functional region, however, installation wide activity was assumed to increase 100 percent above baseline-period activity.

Alternative D – Modified Nonmilitary Mission

Under alternative D military mission activity would have remained consistent with baseline conditions described in Alternative A. However, nonmilitary activities, such as recreational use and private industry partnerships, were predicted to experience increases or be added as new activities. Other nonmilitary activities; such as mining and agricultural outleases, were considered.

Alternative E - Diversified Mission

Under alternative E, enhancement of the military and nonmilitary activities at YPG would occur. Alternative E incorporates parts of alternatives A through D. The emphasis on testing would continue, with new testing activities introduced. Training activities would also increase. Private industry partnerships would be sought that encourage the use of existing facilities, and new facilities constructed in support of a diversified mission. Building state-of-the-art technology and infrastructure to support an expanded private and military customer base would be maximized for the installation land assets.

Alternative F - Preferred Alternative

Alternative F was developed after publication of the Draft RWEIS. This alternative is a synthesis of alternatives A through E, formulated by considering the needs of YPG and the comments received on the Draft RWEIS. Under alternative F, the installation mission would diversify military and nonmilitary activities. Test activities and capabilities will adjust as technology advances and national defense objectives change. Traditional test and evaluation will continue to be a priority. New military activities, such as training, will be added to YPG. Private industry will be encouraged to use existing facilities and construct new facilities in support of a diversified mission. This alternative includes developing partnerships with more military units and other government agencies. Yuma Proving Ground will maintain, remodel, or dispose of existing facilities, as appropriate, to support a diversified mission.

Issues

Comments were solicited from the public, government agencies, Native American tribes, and non-governmental organizations regarding the scope and content of the RWEIS and the future of YPG. Comments received were evaluated, and the ideas were included in the formation of the Preferred Alternative.

Agencies and Tribes expressed concern for biological, cultural, and water resources. They also wanted to clearly establish agency roles and responsibilities with reference to YPG operations. The public commented about concern for biological and cultural resources, land use, and NEPA compliance.

Impacts

Listed in Table S-1 are the potential significant environmental impacts of all of the alternatives. Table S-1 also lists the range of impacts possible for alternative F.

Potentially significant impacts may occur to geology and soils, biological resources, cultural resources, and socioeconomics. The military presence at YPG protects natural resources by limiting access and activities, preventing or mitigating many impacts. The military presence in the Yuma, AZ, region provides positive socioeconomic benefits.

Conclusion

Alternative F, the Preferred Alternative, was developed to fulfill the requirements of the proposed action at YPG. This decision was made based on the YPG mission, the needs of the Defense Department, potential environmental impacts, and by considering input from other government agencies and the public. Alternative F is expected to be the most efficient and sustainable use of Army resources found at YPG. The Army and YPG will make every reasonable effort to minimize environmental impacts through careful planning, best management practices, and mitigation actions.

Tiering and Nepa Documents

This RWEIS will assist decisionmakers in developing future courses of action for the installation. Future environmental documents will be needed, as the courses of action are fully defined. These future environmental documents will tier by reference to this programmatic RWEIS. Documents may include site or program specific Environmental Assessments (EAs), records of environmental consideration (RECs), or regulatory permit applications.

TABLE S-1
COMPARISON OF POTENTIAL ENVIRONMENTAL IMPACTS BY ALTERNATIVE

Alternative Considered	Geological & Soil Resources	Biological Resources	Cultural Resources	Socio-economics
Alternative A 1991-1995 Baseline Military Activities	Test km/yr. driven = 488,267 Rounds fired = 243,450 1-3 construction projects.	<1 km^2/yr vegetation trimmed or removed. 3 vegetation removal projects/yr.	2 test excavations/yr. No sites damaged.	$119 million/yr. to local economy.
Alternative B Decreased Baseline Military Activities	Test km/yr. driven = 244,130 Rounds fired = 121,730 2 construction projects	<1 km^2/yr trimmed or removed. 1 vegetation removal project/yr.	1 excavation/yr. No anticipated sites damaged.	$59 million/yr. to local economy.
Alternative C Increase Baseline Military Activities Introduce New Military Activities	Test km/yr. driven = 976,530 Rounds fired = 486,900 2-6 construction projects	<2 km^2/yr vegetation trimmed or removed. 6 vegetation removal projects/yr.	4 test excavations/yr. No anticipated sites damaged.	$179 million/yr. to local economy.
Alternative D Baseline Military Activities Introduce New Nonmilitary Enterprises	Test km/yr. driven = 537,100 Rounds fired =243,550 2-6 construction projects	<3 km^2/yr vegetation trimmed or removed. 6 vegetation removal projects/yr.	3 test excavations/yr. No anticipated sites damaged.	$119 million/yr. to local economy
Alternative E Increase Baseline Military Activities Introduce New Military Activities and Nonmilitary Enterprises	Test km/yr. driven = 1,025,370 Rounds fired =511,260 2-6 construction projects	<3 km^2/yr vegetation trimmed or removed. 6 vegetation removal projects/yr.	+ 6 test excavations/yr. No anticipated sites damaged.	$200 million/yr. to local economy.
Alternative F Military activity would fluctuate above and below baseline. New activities are added and others are reduced. **New, compatible non-military activities are permitted.**	Test km/yr. driven = 488,270 - 1,025,370 Rounds fired =243,450 - 511,260 1-6 construction projects	<3 km^2/yr vegetation trimmed or removed. 3 - 6 vegetation removal projects/yr.	2 - 6+ test excavations/yr. No anticipated sites damaged.	$119 - $200 million/yr. to local economy.

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1.0 PURPOSE OF AND NEED FOR ACTION

1.1 INTRODUCTION

This Range Wide Environmental Impact Statement (RWEIS) presents the direct, indirect, and cumulative effects of the proposed action to diversify Yuma Proving Ground (YPG) operations. The program proposed to be adopted by the Army will convert YPG into a multipurpose installation. The new program will incorporate new management practices, update operational concepts, and change the mission direction to meet the demands of a broader customer base. The RWEIS addresses the general impacts of a broad program on a large geographic area. This document is a programmatic type of environmental impact statement (EIS), as addressed in Title 40, Code of Federal Regulations 1502.20 (40 CFR 1502.20).

The information and analysis contained in the RWEIS are in accordance with the National Environmental Policy Act (NEPA) of 1969 [42 United States Code (USC) 4321-4347], the President's Council on Environmental Quality (CEQ) regulations [40 CFR 1500-1508], and regulations issued by Department of Defense (DoD) and the Army to implement CEQ regulations. 32 CFR 651 (AR 200-2) requires the integration of environmental considerations into Army planning and decisionmaking. 32 CFR 650 (AR 200-1) describes Army procedures to preserve, protect, and restore the quality of the environment.

Activities anticipated at YPG include mission modification, construction, and proposed land use changes. Areas of activity that will be affected by the proposed action include testing, training, public-private partnership opportunities, and other nonmilitary activities. The Final RWEIS responds to public and agency comments to the Draft RWEIS. The Draft RWEIS analyzed alternatives for developmental options for the future, and their environmental management requirements. The Preferred Alternative (alternative F) was developed after receipt and consideration of public and agency comments during the comment period.

The Preferred Alternative is presented in detail in this document. Other alternatives are summarized. If additional Army initiatives result in proposed programs not covered by this RWEIS, then additional NEPA documentation would be prepared, as appropriate. Lower tier environmental documentation will be required in the future to disclose site-specific impacts, as required by 40 CFR 1502.20. (Throughout this document, the Environmental Sciences Division at YPG is referred to as 'environmental programs.' The name 'Environmental Sciences Division' was correct as of 4 January 1999. However, department titles change over time.)

1.1.1 Location

Yuma Proving Ground is located in southwestern Arizona near the Colorado River. The installation is 37 km (23 miles) northeast of the City of Yuma along U.S. Highway 95, between Interstate Highways 8 and 10 (figure 2). Yuma Proving Ground is approximately 200 km (125 miles) west of Phoenix, AZ and 288 km (180 miles) east of San Diego, CA. Yuma Proving Ground covers 3,380 km^2 (1,300 square miles) of Sonoran Desert.

1.1.2 Background

Testing and evaluating modern military equipment in southwestern Arizona began in 1943 when Yuma Test Branch operated along the banks of the Colorado River. Its mission was to test new bridge designs, boats, and well-drilling equipment for the Allied Armies during World War II. The installation was closed in 1950. The Army reopened the installation in 1951 as the Yuma Test Station. Public Land Order (PLO) 848, dated July 1, 1952, withdrew and reserved certain public lands in Arizona for the use of the Army in connection with the Yuma Test Station, pursuant to Executive Order (EO) No. 10355 of May 26, 1953.

YPG lands are withdrawn from all forms of appropriation under the public land laws, including the mining and mineral leasing laws. Public Land Order 848 provides that YPG lands will be returned to the administration of the DOI when they are no longer needed for the purposes for which they are reserved.

Upon reorganization of the Army in 1962, Yuma Test Station was designated as Yuma Proving Ground. Public Land Order 8476 dated September 28, 1983 withdrew 253 acres in Township 7 and 8S, R21W of the Gila and Salt River Meridian from surface entry and mining for use by the Army for military purposes. The land remains open to mineral leasing. Since 1974, YPG has operated as a major range and test facility for the DoD. Yuma Proving Ground has continued to be ideally suited for testing military equipment, weapons, vehicles, and aviation systems in desert environments.

1.1.3 Ongoing Mission Activities

The principal mission of YPG is to plan, conduct, analyze, and report results of military materiel tests in development and production phases; review plans and monitor developmental testing conducted by developers, producers, and contractors; provide technical support, guidance, and services to Federal agencies and branches of the military; and conduct operational testing and troop training exercises. Typical projects conducted at YPG are shown in the box on page 3.

1.2 PROPOSED ACTION

The proposed action is the conversion of YPG from a traditional Army test installation to a diversified, multipurpose installation. The multipurpose installation will integrate training, private partnerships, and other mission-compatible uses with Research, Development, Test, and Evaluation (RDTE) activities indicated in the Installation Master Plan and other applicable planning documents.

1.3 PURPOSE OF AND NEED FOR ACTION

Defense systems development at YPG requires modern, large, specialized test facilities with advanced data acquisition capabilities. Future mission requirements will dictate what kind of changes to the infrastructure and capabilities of YPG are required during the next 15 years and whether those changes could result in potentially significant effects to the environment.

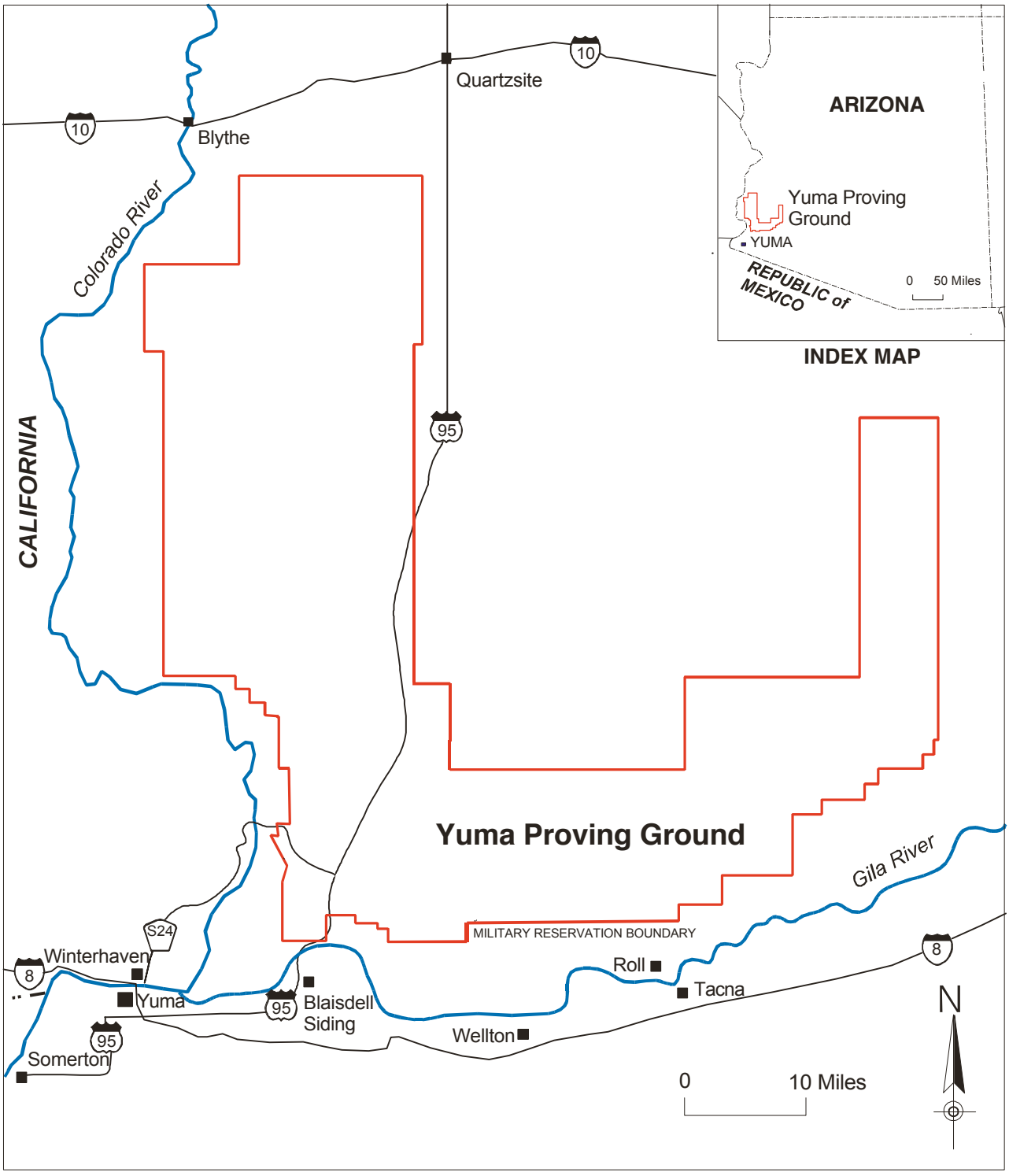

Figure 2. Location Map of U.S. Army Yuma Proving Ground.

The Preferred Alternative identifies the future mission activities of YPG and the kind of changes needed to support that mission, as follows: the expanded mission would support increased troop training and introduce combat systems training and new customers from the private sector. Small-scale training activities have increased over the five-year period from 1991 through 1995. This trend of expanded training exercises, activities, and involved participants will increase impacts to the environment. All branches of the military are likely to conduct training activities at YPG within the 15-year life span of this document.

A diversified mission will include modernization and construction of new fiber optic lines, roads, and power line extensions, test areas, and open maneuver areas. Examples of new facilities required to support enhanced mission activities are as follows: smart munitions test range, designated training areas, free-travel areas for vehicle maneuvering, office space, and a new medical center.

Likewise, quality of life issues would influence some changes to facilities and structures on the installation. The Installation Master Plan and other planning documents indicate that construction, demolition, and modification of facilities are needed. Other components of the new mission activities will include new management and operational concepts that require changing the size and composition of the workforce (i.e., the mix of military, civilian, and contractor personnel).

Public-private partnership opportunities, a changing mission direction to attract new nonmilitary customers and markets, will also occur. Non-governmental activities will be allowed and in some cases encouraged as long as activities are compatible with military use of the same lands and environment. Included for consideration are a technology and conference complex, a hot-weather test center, wind tunnel facility, industrial park, and privatized base housing.

Increased on-site civilian population and related support facilities (e.g., markets, service stations, pharmacies, etc.) and infrastructures (e.g., electrical, facilities, water plant, wastewater treatment plant, etc.) will also require land use assessments. Environmental effects of these activities can be significant and must be considered.

TYPICAL PROJECTS CONDUCTED IN 1996

MUNITIONS AND WEAPONS TESTING
- M109A6 Pallidan 155mm Howitzer
- Advanced Field Artillery
- Smart Munitions
- Mines and Mortars

AUTOMOTIVE AND COMBAT SYSTEMS TESTING
- M1A2 Abrams Tank
- M2 Bradley Fighting Vehicle Family
- Light Armored Vehicles
- Foreign Military Vehicles

NATURAL ENVIRONMENT TESTING
- Tropics testing
- Cold regions testing
- Desert climate and terrain

AVIATION SYSTEMS TESTING
- AH-64D Longbow Apache
- RAH 66 Comanche
- Advanced Rocket System
- Guided Precision Air Delivery Systems
- C-17 Aircraft
- Low Altitude Parachute Extraction

OTHER PROJECTS
- Special Forces Operations
- Military Free Fall School
- Army Reserve Operations
- U.S. Marine Corps Operations
- Golden Knights Training

1.4 SCOPE OF THE RWEIS

A draft Environmental Assessment (EA) that evaluated the impact of the YPG mission and associated activities concluded that significant impacts to the environment have resulted, or potentially could result, from current and future activities (U.S. Army Corps of Engineers and Mittlehauser, 1994). Therefore, the Army decided to prepare an EIS in accordance with NEPA, other Federal, and State regulations.

During the formal scoping period, the Army obtained comments from the public and other regulatory agencies on the proposed scope of the RWEIS. Subsequently, a Draft RWEIS was prepared, which analyzed five alternatives.

Agency and public comments were obtained for the Draft RWEIS. The RWEIS assesses environmental implications of the proposed action and focuses on impacts of planned activities on a programmatic level. Future environmental documents will reference information in this programmatic analysis (i.e., tier), while evaluating project and site specific impacts. The Preferred Alternative will create potential significant environmental impacts, and therefore, the RWEIS is needed to fully disclose these associated impacts.

1.4.1 EIS Process

The preparation of an EIS is a multi-step process that begins with formulation of proposed and alternative actions and ends with a Record of Decision (ROD). For this EIS, the first step, formulating alternatives, was based on the YPG military mission and anticipated installation operations. Yuma Proving Ground directorates and staff contributed to development of alternatives and reinforced the need to diversify the installation.

1.4.2 RWEIS Objectives

The RWEIS supercedes the following environmental documents previously completed for YPG: Environmental Impact Assessment (Higginbotham, 1978) and Environmental Assessment (U.S. Army Corps of Engineers & Brandman Associates, Inc., 1987), revised in May 1994 by the U. S. Army Corps of Engineers and Mittlehauser.

The anticipated useful life of the RWEIS is 15 years (1999-2014). The YPG command group used the Draft RWEIS and agency and public comments to develop the Preferred Alternative as a management tool, incorporating the mission activity baseline and a range of alternatives. The RWEIS includes an analysis of the Preferred Alternative, the potential environmental impacts associated with the alternatives considered, including the No Action Alternative. The RWEIS provides the YPG command group, management personnel, and project engineers with the objectives summarized in the box below.

1.4.3 Regulatory Requirements

The Army complies with environmental regulations listed in appendix A. Management plans, permits, licenses, and memoranda of understanding needed to complete mission objectives and remain in compliance with applicable statues are also listed in appendix A.

1.4.4 Public Involvement

Yuma Proving Ground conducted agency and public scoping in 1996. A Public Involvement Plan outlined an intensive effort to reach all parties affected by ongoing operations of YPG, including individuals affected by the Environmental Justice Executive Order (E.O. 12898).

Agency scoping for the RWEIS began before the Notice of Intent (NOI) appeared in the Federal Register (volume 61, number 118, page 30862; June 18, 1996). The YPG environmental programs office sent a letter (dated January 25, 1996) to more than 100 agencies notifying them of the upcoming NOI publication and inviting scoping comments. More than 300 telephone calls were made to agencies and local governments following the letter. The Army also conducted six one-on-one agency scoping meetings at the request of individual agencies.

Public scoping began after publication of the NOI. Scoping included two public meetings held on July 24 and 25, 1996, in the Yuma area. In an effort to reach populations affected by the Executive Order on Environmental Justice, public meetings were announced on the radio in both Spanish and English. Flyers were posted in rural communities surrounding YPG. The flyer was printed and distributed in Spanish and English.

The Scoping Synopsis, a report that summarizes public and agency scoping issues, is available from the YPG environmental programs on request. Throughout the scoping period, 153 individuals (from agencies and the public) participated in scoping - providing comments by way of phone calls, letters, and written comment sheets. Some individuals commented on more than one topic or more than one time.

Subsequent to the distribution of the Draft RWEIS, a Notice of Availability (NOA) was published in the Federal Register on July 16, 1998, and a 45-day public review and comment period began. Public involvement was solicited with announcements on television and radio, press releases to local and regional newspapers, and fliers. Fliers were posted in surrounding communities, with emphasis on areas of lower-income and minority populations. In order to reach non-English speaking communities, announcements, press releases, and fliers were printed in Spanish, as well as English.

During the public review period, interested parties provided written comments to the Army. Fifteen comment letters were received. The Army conducted two public hearings on September 28 and 30, 1998. Written comments were received at these meetings and through the mail. Comments were incorporated into the permanent public record and the RWEIS,

OBJECTIVES OF THE RWEIS

- **A sound basis for informed decisionmaking in managing the direction of YPG and its overall mission.**
- **Information for prioritizing environmental protection investments.**
- **A full and fair discussion of significant environmental impacts (32 CFR 651.28) of ongoing operations.**
- **A baseline analysis of ongoing activities and associated environmental impacts to be used for incorporation by reference or tiering (40 CFR 1502.20 and 40 CFR 1508.28).**
- **Identification of environmental parameters (i.e., soil, climate, terrain) needed to perform specific testing missions, and potential locations for these missions.**

as appropriate. Public comment will also be received after release of this document. Following public distribution of the Final RWEIS, the ROD will be published in the Federal Register. A full description of the public outreach efforts, comments received, and YPG's responses are listed in appendix C: Comment Response Document.

1.4.5 Issues

Commenting Federal agencies were: the Bureau of Indian Affairs (BIA), the Bureau of Land Management - Yuma District (BLM), the U.S. Environmental Protection Agency (EPA) - Region IX, U.S. Army Corps of Engineers (COE) - Los Angeles District - Regulatory Branch, the U.S. Fish and Wildlife Service (USFWS) - Imperial Wildlife Refuge, and Natural Resources Conservation Service (NRCS). State agencies commenting during scoping were the Arizona Department of Public Safety, the Arizona Department of Transportation (ADOT), the Arizona Department of Water Resources, the Arizona Game and Fish Department (AGFD), the Arizona Geological Survey, the Arizona Historical Society, the Arizona State Historic Preservation Office (SHPO), the Arizona State Land Department, the Arizona State Museum (ASM), and the California Department of Fish and Game. The Rincon Indian Reservation also commented. Agencies expressed concern for biological, cultural, and water resources. They also wanted to clearly establish agency roles and responsibilities with reference to YPG operations. The public commented about concern for biological and cultural resources, land use, and NEPA compliance.

1.5 Environmental Issues Analyzed

The RWEIS describes the baseline environment, the effects of the Preferred Alternative, and mitigation to impacts. Environmental issues analyzed are shown in the following box.

- Air Resources
- Water Resources
- Geological and Soil Resources
- Biological Resources
- Cultural Resources
- Socioeconomics
- Land Use
- Noise
- Hazardous Substances and Waste Management
- Radiation
- Aesthetic Values
- Utilities and Support Infrastructure
- Transportation
- Health and Safety

Future tiered environmental documentation is based on the the following concept. "When a broad EIS or EA has been prepared and a subsequent EIS or EA is then prepared on an action included within the entire program or policy (particularly a site-specific action), it need only summarize issues discussed in the broad statement and concentrate on issues specific to the subsequent action" (40 CFR 1502.20).

Future environmental documents will tier from, or incorporate by reference, sections or all of this programmatic RWEIS. Documents may include site or program specific EAs, records of environmental consideration (RECs), or regulatory permit applications. Examples of site-specific analysis to be considered for future projects are illustrated in the following box.

- Air quality conformity analysis
- Cultural resources surveys
- Radiation studies
- Regulatory permits under the Clean Water Act and state water protection laws
- Geologic and soil surveys
- Endangered and protected species and sensitive habitat surveys
- Hydrologic studies
- Noise studies

1.6 Functional Units

The RWEIS divides YPG into five functional units. Figure 3 depicts three of these units as geographic regions: Kofa, Cibola, and Laguna. The other two units are airspace and off-post locations. These are illustrated in chapter 2. Descriptions of the functional units are contained in chapter 2. The division of YPG into functional units was done to aid the analysis of mission impacts.

1.7 Document Organization

Chapter 2 presents an overview of alternatives, and chapter 3 describes the affected environment by resource areas identified during scoping. Chapter 4 is an issue-driven discussion of cumulative impacts.

This RWEIS is organized to facilitate preparation of future, tiered documents required to assess potential environmental impacts from future YPG activities not specifically addressed in this document.

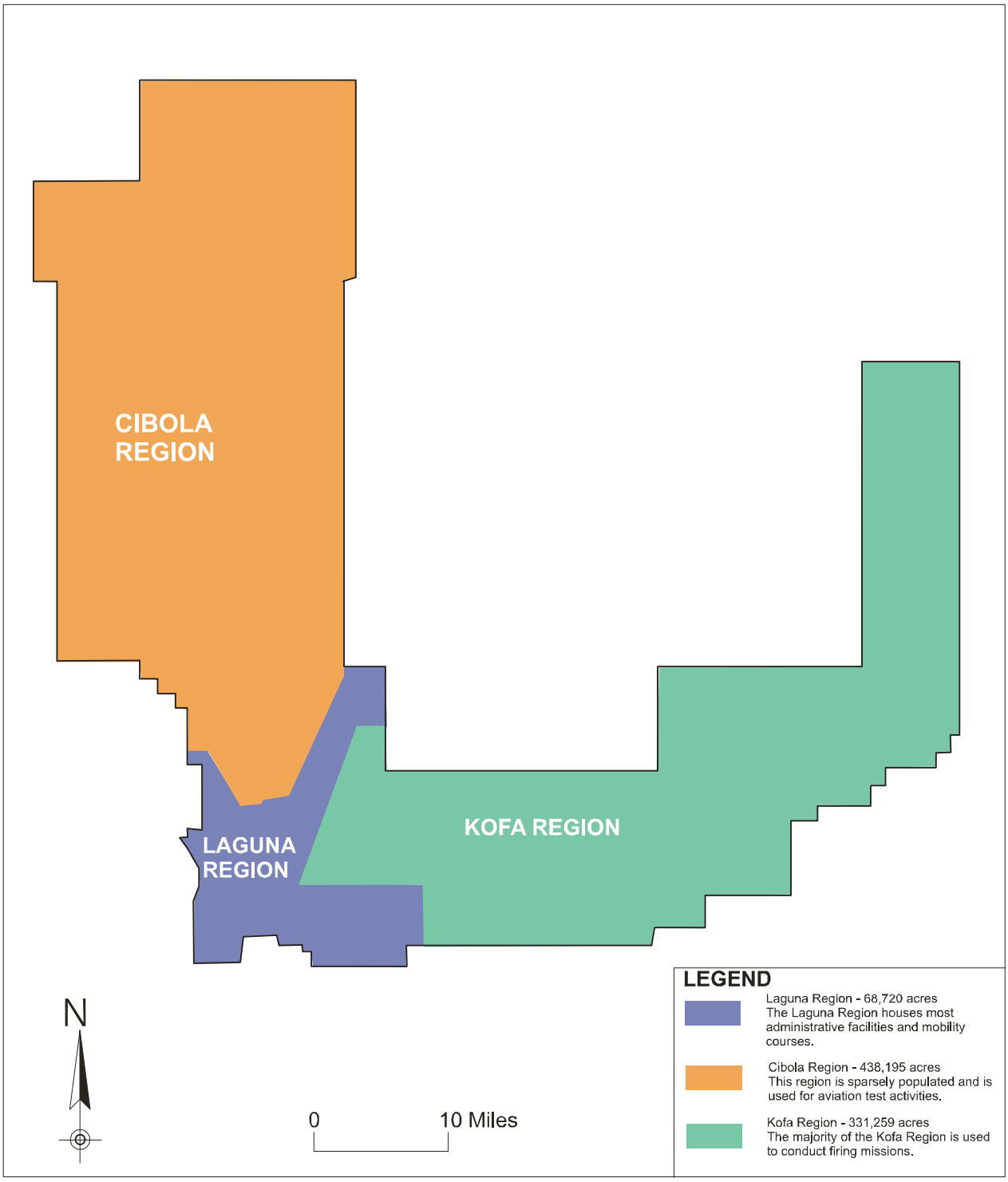

Figure 3. Regions of Yuma Proving Ground.

2.0 ALTERNATIVES CONSIDERED

2.1 INTRODUCTION

This chapter identifies and describes the Preferred Alternative (alternative F). This alternative was developed after careful consideration and analysis of alternatives A through E presented in the Draft RWEIS, input from Federal and State agencies, and comments from the public. The Preferred Alternative includes those elements of the previous alternatives that best meet the mission needs of YPG. A summary of each alternative is also presented in this chapter.

The Preferred Alternative is general in nature, rather than specific. Many examples are given of potential projects under the Preferred Alternative; these are used to illustrate potential future actions and do not reflect commitments by the Army that specific actions will or will not occur. The Preferred Alternative is accurate, however, for its intended purpose of evaluating probable cumulative impacts over the next 15 years.

The other alternatives considered were: A) Baseline Activity Levels (no action); B) Decreased Military Mission; C) Increased Military Mission; D) Modified Nonmilitary Mission; and E) Diversified Mission. The No Action Alternative was used as the baseline against which the action alternatives were analyzed.

2.1.1 Overview of Alternatives

2.1.1.1 Alternative A - Baseline Activity Levels (No Action)

Alternative A is the No Action Alternative. This alternative considered activities on the installation at levels comparable to those experienced during the five-year baseline period from 1991 through 1995. Over this baseline period, the type and frequency of mission activities fluctuated, as a reflection of changing national defense needs. Therefore alternative A considered fluctuations in activity levels to be an integral part of operations, and anticipated that similar fluctuations would continue to occur. Support services and maintenance of existing facilities and infrastructure were also expected to continue at levels comparable to those experienced during the baseline period.

During the baseline period, the Kofa Region was used to test artillery, mines, mortar, and tank and helicopter munitions and systems. To support this mission, the installation maintained more than 400 firing positions in the Kofa Region, with artillery, tank, and mortar direct-and-indirect firing capabilities. Recovery and evaluation of expended munitions were conducted at 29 impact areas or mine fields.

Environmental test facilities were also used to fire weapons in extreme hot and cold conditions. All test directorates used these facilities to conduct a variety of military test missions, including vehicle and equipment performance and durability. Additional testing facilities in the Kofa Region include climatic, dynamic, and X-ray chambers. Fast cook-off and external fire testing is also conducted to accomplish Department of Transportation hazard classification for ordnance.

The Cibola Region has target recognition and direct fire ranges for testing and validating electro-optic targeting devices as part of the military aviation test and evaluation missions.

The Laguna Region is the main administrative support region for the installation mission. The Laguna Region contains administrative offices, military service activities, equipment maintenance facilities, mobility courses, Laguna Army Airfield, Castle Dome Heliport, Materiel Test Area, and the logistics support area for Kofa Firing Range. This area is, in essence, a "safe zone" where no large ordnance is fired. The only ordnance fired in this region is at the small arms firing range in an appropriate unpopulated area near the Castle Dome Heliport.

The Automotive Division and Combat Systems Division use established test courses to test and evaluate tracked and wheeled vehicles and equipment in varying terrain, climate, and operational conditions. Designated test courses comprise approximately 300 km (200 miles) of prepared routes ranging from paved highways to varying terrain, such as sand, mud, rock, dust, gravel, and slopes. Some courses are also used periodically to test and evaluate soldiers' individual equipment. Most of these courses are found in the Laguna Region. A limited number of open-terrain tests, smoke and obscurant testing, and durability tests on equipment, are conducted in the Kofa and Cibola Regions and at off-post locations.

Visiting military units periodically used various areas in the Kofa, Cibola, and Laguna Regions to conduct field training exercises such as combat skills, air operations, troop/ equipment movement, land navigation, logistics exercises, intelligence training, and field repair training (equipment). In addition, special forces units train in several locations on the installation to take advantage of unique terrain features.

Activities include use of roads, power lines, video and communication networks, airfields, buildings, fueling stations, a K-6 school, youth services, housing, medical, entertainment and dining facilities, and ammunition igloos.

Recreational activities available on the installation open to the public are mostly limited to seasonal hunting in designated areas. No recreational or commercial mining was conducted on the installation during the baseline period.

During the baseline period, YPG had extensive use of the restricted military airspace over the installation and Kofa National Wildlife Refuge. Airspace is used primarily for firing munitions, testing fixed- and rotary- wing aircraft, and air delivery of personnel, cargo, and equipment.

Five locations off the installation were used to accomplish some parts of the mission at YPG. These locations were Senator Wash Regulating Reservoir, Blaisdell Railroad Siding, Imperial Sand Dunes, Death Valley, and Oatman Hill.

2.1.1.2 Alternative B - Decreased Military Mission

Under alternative B, some military operations were evaluated in context of a 50 percent decrease from baseline levels. During development of this alternative, not all areas of the composite mission at YPG were expected to decrease over the next 15 years. Prediction of which mission activities could be expected to experience some level of decrease was based on information and knowledge available from the technical divisions at YPG. The development of more advanced technology was considered a key factor when evaluating the potential for an activity to decrease. A decrease in mission activities and associated support services fluctuations in the configuration and composition of the workforce was anticipated to occur. Recreational and private industry activity levels were anticipated to remain consistent with the baseline period (1991 through 1995) as described for alternative A.

Closure or removal of range areas and mission facilities would not have occurred under alternative B. However, the number or frequency of some mission activities in all regions was anticipated to experience some level of decrease over the next 15 years. Clean up and maintenance of the ranges could be expected to result from a decrease in mission activity. Support personnel requirements were also expected to decrease under alternative B.

2.1.1.3 Alternative C - Increased Military Mission

Alternative C predicted increases for baseline military mission activity and enhanced the principal mission by incorporating more military activities, such as training. The predicted increases in mission activity levels differed for each functional region and were considered in relation to an increase of 100 percent above baseline period activity.

Increased activity and modernization of facilities involved several key elements. Operational testing, long-range artillery capability, troop training activities, mine demolition, and counter mine test missions were expected to increase or be incorporated as part of an enhanced principal mission. Other compatible defense testing would have also been incorporated in designated areas.

Under alternative C, the Army would construct facilities and expand capabilities to accommodate advanced and dual use technology and the Virtual Proving Ground (VPG) concept. The VPG concept is centered on the ability to field verify computer simulation technology as it develops. Under alternative C, nonmilitary activities, such as recreational and private industry uses were anticipated to continue at levels comparable to the baseline period.

2.1.1.4 Alternative D - Modified Nonmilitary Mission

Under alternative D, military mission activity would have remained consistent with baseline conditions described in alternative A. However, nonmilitary activities, such as recreational use and private industry partnerships, were predicted to experience increases or be added as new activities.

Before a nonmilitary function was incorporated into alternative D, it was evaluated against the compatibility with, or support of the overall military mission. Under alternative D, military needs would have continued to receive scheduling priority over nonmilitary uses of any facility or location. No nonmilitary activities were considered for off-post locations. Examples of nonmilitary uses considered for introduction into some areas are discussed briefly below. A more detailed description is available for review in the August 1998 DRWEIS (YPG, 1998).

Areas in the Kofa, Cibola, and Laguna Regions were considered for potential access to the public for recreational opportunities such as hunting, camping, and hiking trails, Recreational Vehicle (RV) parks, off-road courses, cultural education programs, and a desert golf course.

Several types of private industry uses were considered under alternative D. Many private industry activities were evaluated on the basis of using existing facilities and resources such as environmental test chambers, mobility courses, airspace, and the small arms range. Consideration was also given to allowing private development of facilities such as: a technology and conference complex, including motel rooms and a desert golf course, and an automotive test center. These types of facilities were also considered for the added value they would bring to YPG's current customer base.

Although mining is excluded under PLO848, which withdrew public land for the installation, the public was given the opportunity to propose these activities. Agricultural outleases were also considered.

2.1.1.5 Alternative E - Diversified Mission

Alternative E was developed to allow for a wider range of military mission and nonmilitary activities over the next 15 years. Test activities and capabilities were expected to experience varying degrees of fluctuation as technology advances and national defense objectives change. In general, activities considered for alternatives A, B, and C were used to predict a practical level of diversification for the installation over the next 15 years. Some areas of the existing military mission were expected to remain at levels consistent with those presented in alternative A. Other areas of the military mission were anticipated to decrease as a result of advancing technology. As workloads decreased in some areas of military test and evaluation, the principal mission of testing would be enhanced to provide a broader spectrum of capabilities, such as expanding troop training activities. This alternative also included developing partnerships with more military units and other government agencies. A greatly enhanced nonmilitary mission is a key element of diversification on the installation. Private industry partnerships would have been sought that encouraged use of existing facilities, and new facilities constructed in support of a diversified mission. Building state-of-the-art technology and infrastructure to support an expanded private and military customer base would have maximized the installation land assets.

Military activities expected to increase in the Kofa Region included long-range artillery programs, smart munitions testing, operational testing, mine demolition, and countermine testing. In addition, consideration was given to the inclusion of 25 mm and 120 mm artillery testing in this region. Continued development of the Combat Systems Test Complex in south Kofa, which includes a firing range and maneuver area, was expected to result in an increased use of this region by the Combat Systems and Automotive Divisions. In the event of a consolidated Army aviation mission at YPG; Aviation Systems was expected to have increased activity in the Kofa Region. Private industry use of the Kofa Region was anticipated to increase as private

companies accomplish more defense testing functions under contract. Some areas of the region were considered for use by the public for recreational purposes. Recreational activities considered included camping, cultural education, and use of designated ranges for sport shooting.

The Cibola Region was anticipated to experience increased usage by all divisions at YPG. The activities considered included testing of aircraft weapons systems, target recognition, obscurant testing, air delivery, training, open-trench detonation, and open maneuvering by tracked and wheeled vehicles. An array of private industry and commercial clients were expected to use the Cibola Region. The unique and rugged terrain found in the Cibola Region presented several opportunities for considering a variety of private industry activities. Commercial test and evaluation of vehicle ride dynamics, tire durability, demolition equipment, tracked and wheeled vehicles, and small arms are examples of some activities considered. The motion picture industry was also considered as a viable customer base for use of the Cibola Region. Expanding areas open to seasonal hunting and opening an access road to Hidden Valley were considered for increased recreational purposes.

Diversified use of the Laguna Region was expected to occur from several sources. Use of and modification to mobility and durability courses located in this region were anticipated to increase. Increased military use and modified nonmilitary use in other regions were expected to result in an increased need for administrative support functions based in the Laguna Region. Troops involved in operational test programs and in training activities would result in an increased use of services such as housing, entertainment, medical, and dining facilities. Private industry use presented the most opportunities for diversification in the Laguna Region. Commercial development of a technology and conference center, including motel rooms and desert golf course, a hot-weather test center, testing facilities for the aviation industry, test and evaluation of alternative energy vehicles, and use of Laguna Army Airfield for private and commercial aircraft landings are examples of the private industry activities considered. Diversification of recreational use was explored for camping, hiking, off-road course, and RV parks.

Support services and infrastructure such as roads, communication networks, fencing, storage and maintenance facilities were expected to be improved or expanded throughout the installation as a result of a diversified mission.

Some off-post locations were expected to experience a decrease in use and others were anticipated to experience modified use to include some recreational activities.

2.1.1.6 Alternative F - Preferred Alternative

Ongoing military operations will diversify and increase or decrease in response to the military mission and privatized partnerships will enhance utilization of YPG. This alternative is described in detail in section 2.2.

2.1.2 Development Criteria for Alternatives Considered

A Summary of development criteria are listed in the following box.

DEVELOPMENT CRITERIA FOR ALTERNATIVES CONSIDERED

- The military mission continues to have priority.
- New military and nonmilitary activities in previously designated land use areas are subject to evaluation for compatibility with baseline or proposed activities in those functional units.
- Range areas are closed to public access except as specifically authorized. Roads and other facilities routinely available for public use may also temporarily be closed (when required) for security and safety.
- Army and DoD policy requires compliance with applicable Federal and State regulatory statutes (environmental laws, permits, and licenses).
- Valid existing rights and formalized agreements are protected and maintained, as required by law.
- The policies and planning of adjacent land owners, managers, and local governments are considered in projects conducted at YPG.
- Decision makers evaluate environmental options and alternatives in terms of mission considerations.

2.1.3 Military Mission and Support Directorates

Yuma Proving Ground supports a diverse mix of testing, evaluation and training activities. For analysis, these activities are grouped by test divisions and other mission driven functions.

2.1.3.1 Munitions and Weapons Division

The Munitions and Weapons Division tests and evaluates military munitions, equipment, and systems. A summary of division activities is listed in the following box.

SUMMARY OF MUNITIONS AND WEAPONS ACTIVITIES

- Long-range artillery test and evaluation
- Artillery delivered munitions/guided weapons systems test and evaluation
- Direct fire and mortar munitions test and evaluation
- Mine demolition and countermunition systems test and evaluation
- Munitions lot acceptance testing

2.1.3.2 Aviation Systems Division

Test and evaluation missions conducted under Aviation Systems Division encompass most airborne activities and some ground-related activities. A summary of division activities is listed in the following box.

SUMMARY OF AVIATION SYSTEMS ACTIVITIES

- Aircraft weapons and fire control systems test and evaluation
- Airborne and ground target acquisition systems test and evaluation
- Unmanned aerial vehicles test and evaluation
- Air delivery systems and techniques test and evaluation

2.1.3.3 Combat Systems Division

This division was established in 1995 to manage some elements of the military test mission including tracked and wheeled vehicles, weapons systems, and evaluating human factors in combat scenarios. A summary of division activities is listed in the following box.

SUMMARY OF COMBAT SYSTEMS RESPONSIBILITIES

- Tracked and wheeled vehicles, including M1A2 Abrams tanks and M2 Bradley fighting vehicles test and evaluation
- Combat vehicle firing equipment and systems test and evaluation
- Small arms and automatic weapons test and evaluation
- Operational test and evaluation

2.1.3.4 Automotive Division

In 1998, this division was reorganized by transferring mission responsibility for tropic tests and cold weather test from the Automotive and Natural Environment Division to other groups/directorates at YPG. The Automotive Division tests and evaluates tracked and wheeled military support vehicles, other mobile and general support equipment, soldier equipment, and Chem-Bio defense equipment. The Automotive Division also assists private industry by providing services and use of test facilities. The Automotive Division provides Human Factors Engineering support to other test commodity areas. A summary of division activities is listed in the following box.

SUMMARY OF AUTOMOTIVE DIVISION ACTIVITIES

- Tactical vehicles tests
- Mobile equipment tests
- Tire testing
- Desert environmental tests
- Hot weather/cooling tests
- Soldier equipment tests
- Integrated Development/Operational Tests
- Chem-Bio defense equipment tests
- Private industry tests

2.1.3.5 Training Activities

Yuma Proving Grounds is used for a variety of training objectives by units from most of the armed forces. Training activities take advantage of the natural terrain and unique physical characteristics of the environment; examples include paratrooper training, night training, and special forces training. A summary of training activities is listed in the following box.

SUMMARY OF TRAINING ACTIVITIES

- Military Free Fall School
- Golden Knights para-training
- Visiting Units training
- Field exercise training
- Night maneuvers training
- Army Reserve training

2.1.3.6 Support Services

These organizations provide all structures and facilities for mission, logistical, and personnel support activities. Mission and logistical support include a variety of services and facilities such as communication networks, data control, vehicle maintenance, safety and environmental support, and fabrication facilities. Personnel and general support include housing, food services, recreation, administrative and medical services, and facilities' maintenance. A summary of support services is listed in the following box.

SUMMARY OF SUPPORT SERVICES ACTIVITIES

- Communication networks and public utilities
- Building and road infrastructures
- Military personnel support services, such as housing, medical, shopping, dining, and educational
- Morale, welfare, and recreational services

2.1.4 Functional Units of Yuma Proving Ground

The installation is subdivided into five functional units. Each unit performs a different function in relation to the mission.

2.1.4.1 Kofa Region

The Kofa Region (figure 4) is approximately 132,503 hectares (331,259 acres). The Kofa Firing Range, located in the Kofa Region, is the largest artillery range in the United States. A licensed Depleted Uranium (DU) firing area is found within the range, along with several other types of impact areas. Kofa Firing Range terrain is primarily a flat basin surrounded by mountains, which provides ideal conditions for artillery firing. The East Arm of YPG is also located in the Kofa Region. The eastern and southern outer boundaries of the Kofa Region border BLM, State, and privately owned lands.

2.1.4.2 Cibola Region

The Cibola Region shown in figure 5 is approximately 175,278 hectares (438,195 acres). It includes the largest portion of YPG, and is west of U.S. Highway 95. The outer boundaries include the western border of YPG and the inner eastern border adjacent to BLM and privately owned lands. This terrain comprises large plains surrounded by mountainous areas. The Cibola Region is primarily used by Aviation Systems Division for air cargo delivery and aircraft armament testing activities. Isolated mountainous areas are used for air-to-ground testing and training.

2.1.4.3 Laguna Region

The Laguna Region (figure 6) is approximately 27,488 hectares (68,720 acres). Included in this region are the Main Administrative Area, Materiel Test Area, Laguna Army Airfield, Castle Dome Heliport, and the Air Cargo Complex. The Kofa Firing Front is located in the Laguna Region. This area on the west side of Firing Front Road provides support for the Kofa Firing Range, located on the east side of firing front road. The majority of mobility courses are in the Laguna Region. The Laguna Region is bordered on the west and south by BLM and privately owned lands.

2.1.4.4 Airspace

This region includes restricted military airspace over the YPG installation land area and over most of the Kofa National Wildlife Refuge, as shown in figure 7. In addition, YPG extends airspace over portions of the land adjacent to the western boundary of the Cibola and Laguna regions. Marine Corps Air Station Yuma (MCAS) schedules YPG airspace. The majority of YPG airspace is used for test missions and is designated restricted. Yuma Proving Ground requests activation of restricted airspace when required for mission purposes.

2.1.4.5 Off-Post Locations

Yuma Proving Ground uses areas outside its boundaries to conduct or support a variety of military test missions. These areas are shown in figure 8. Off-post locations used to conduct mission-related activities include Senator Wash Regulating Reservoir (Imperial County, CA), Blaisdell Railroad Siding (Yuma County, AZ), Imperial Sand Dunes (Imperial County, CA), Death Valley (Inyo County, CA), and Oatman Hill (Mohave County, AZ). Navajo Army Depot (Yavapai, AZ), that already has NEPA documentation, and Prescott Airport (Yavapai County, AZ) are considered to be potential test areas.

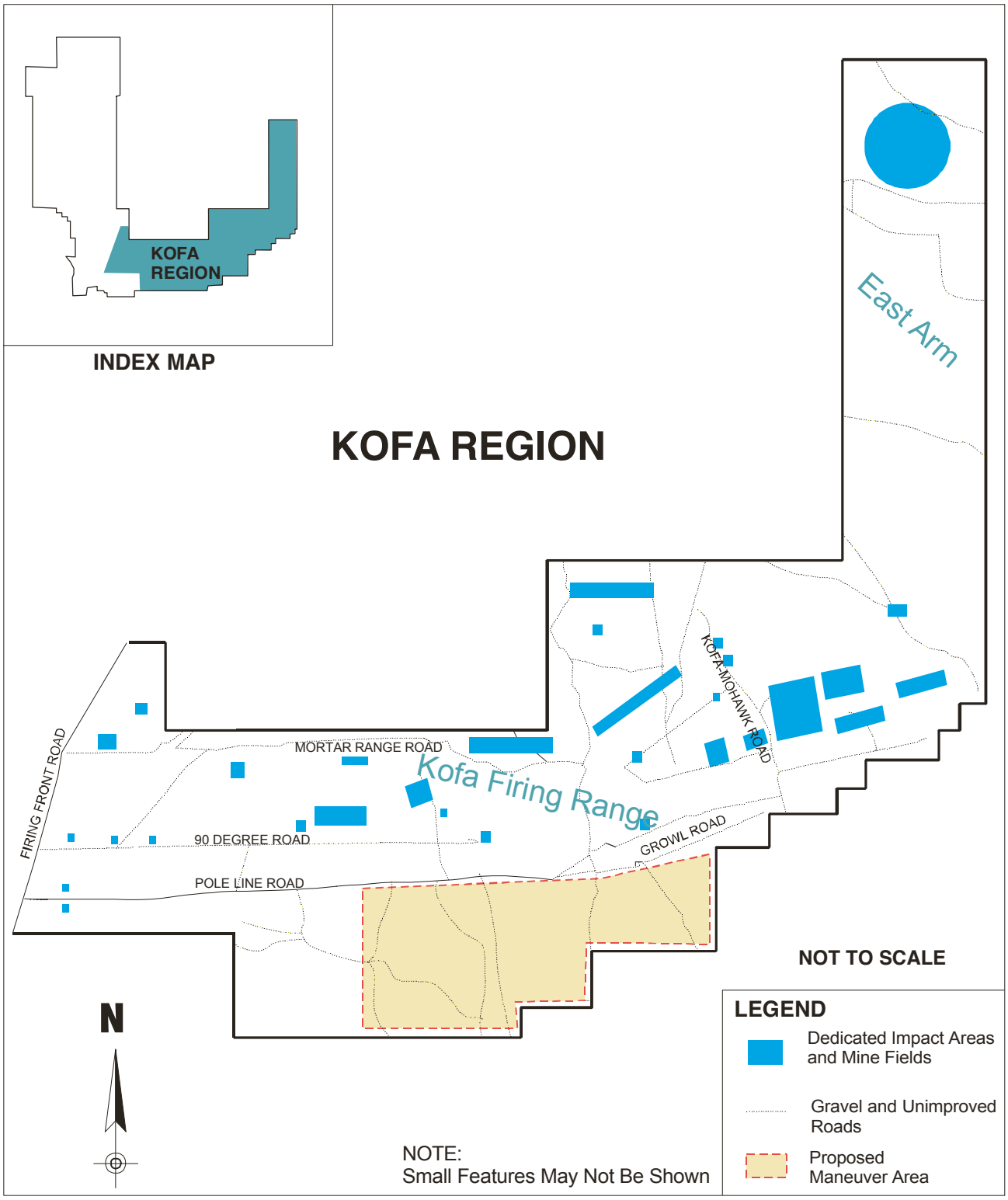

Figure 4. Site Map of Kofa Region.

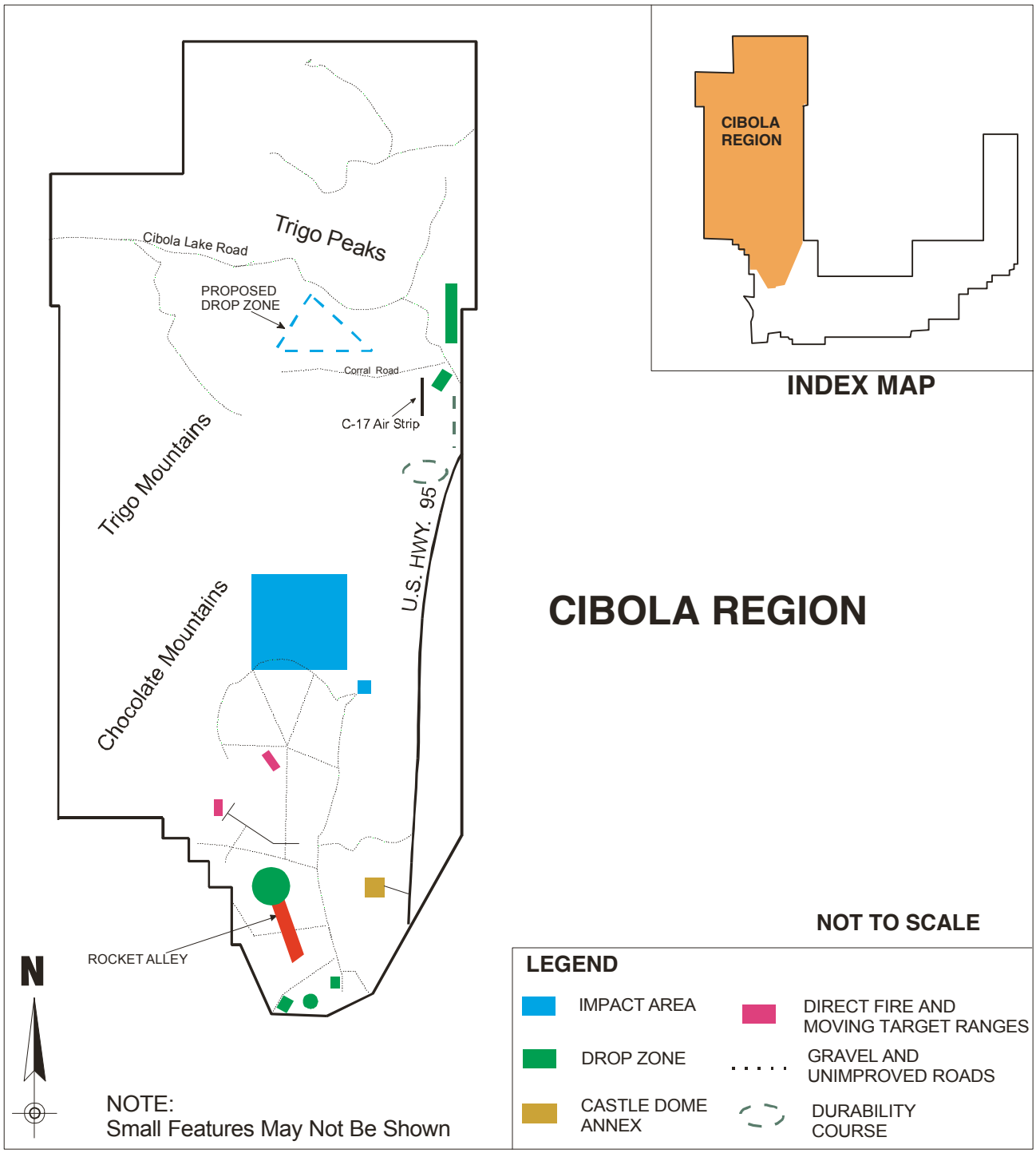

Figure 5. Site Map of Cibola Region.

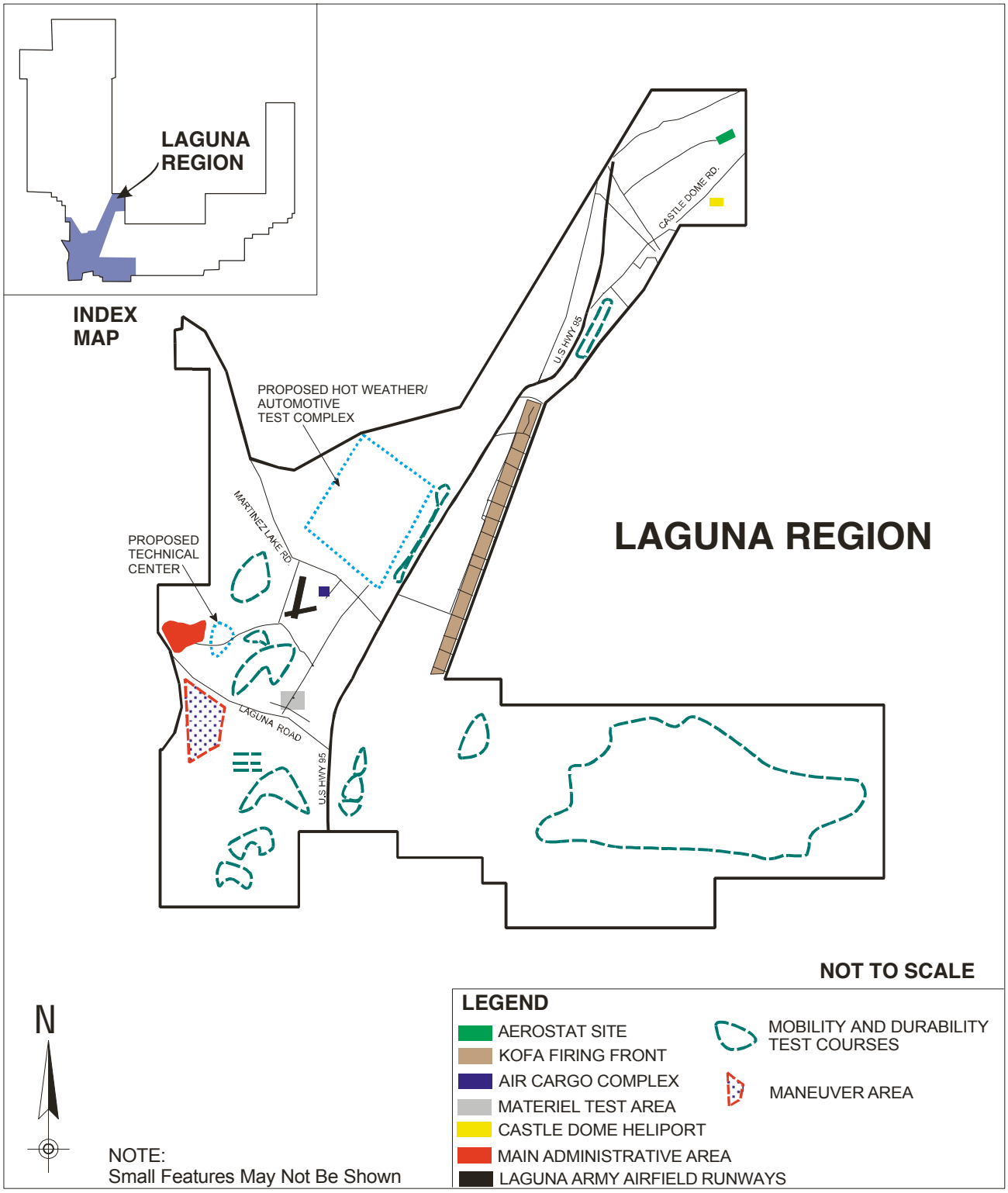

Figure 6. Site Map of Laguna Region.

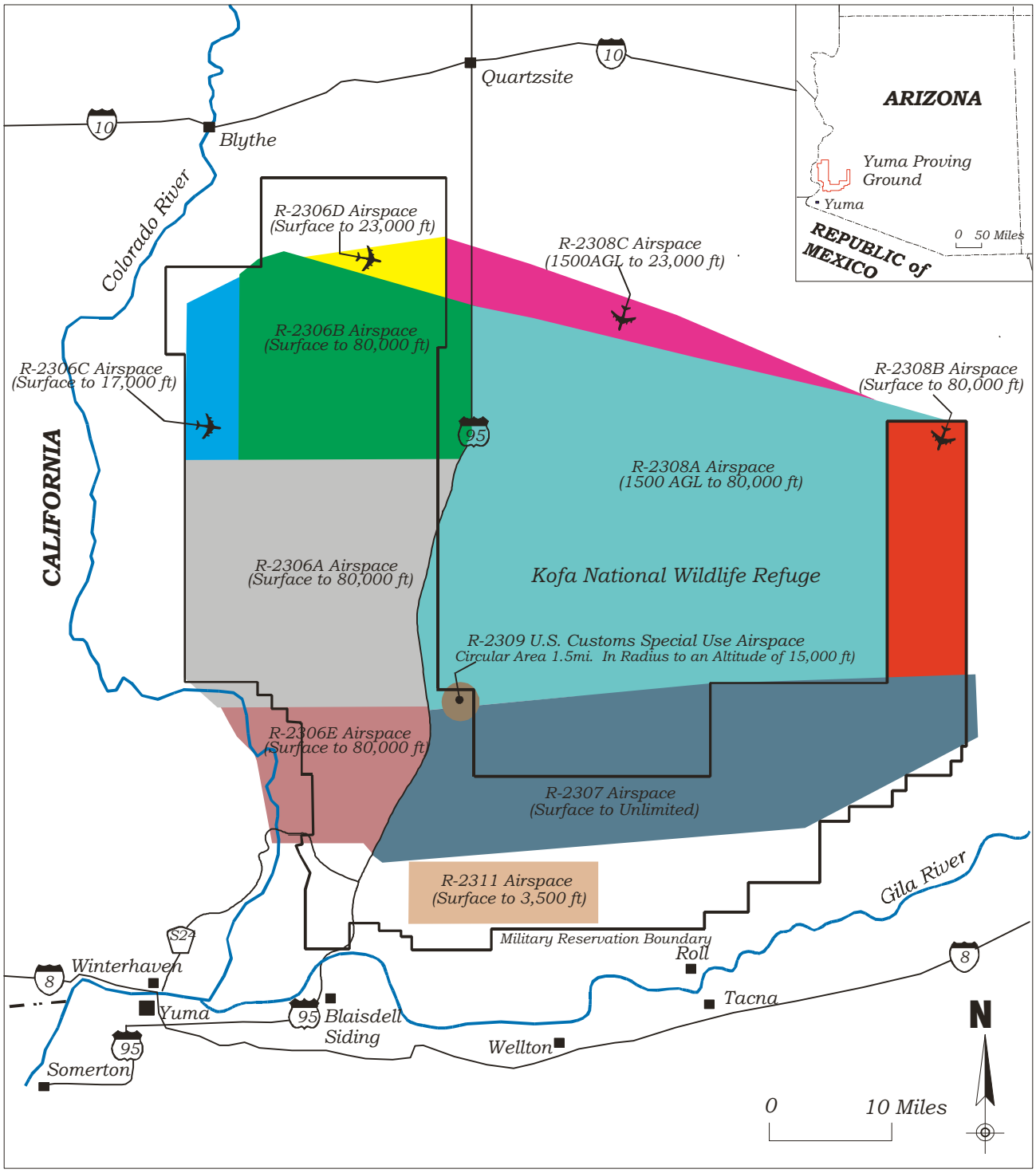

Figure 7. Restricted Airspace Used by Yuma Proving Ground.

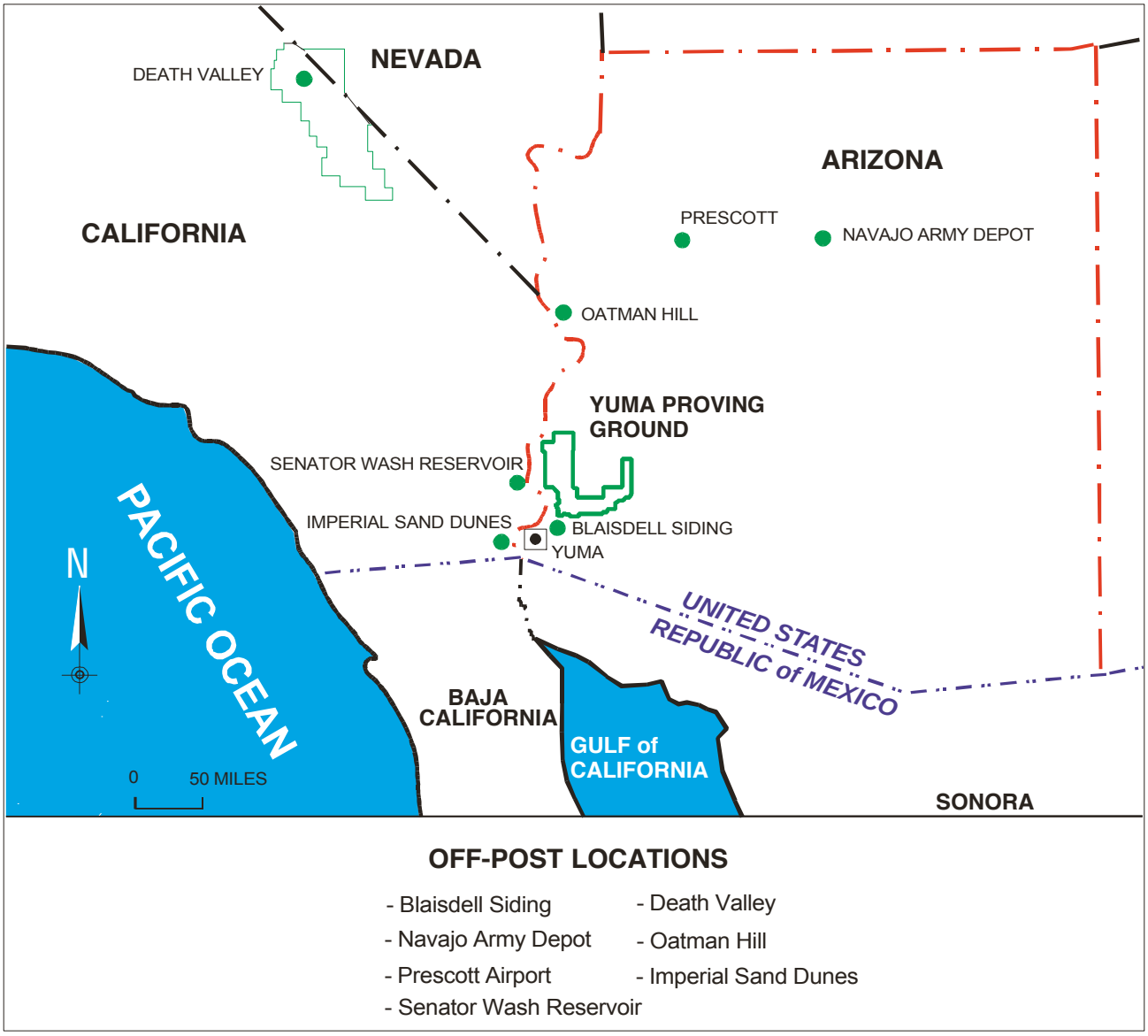

Figure 8. Map of Off-post Locations Used by Yuma Proving Ground.

2.2 ALTERNATIVE F - PREFERRED ALTERNATIVE

The installation mission will diversify both its military and nonmilitary activities. Test activities and capabilities will adjust as technology advances and national defense objectives change. Traditional test and evaluation will continue to be a priority. However, the installation will maximize land assets by building state-of-the-art technology and infrastructure to support an expanded private and military customer base.

Yuma Proving Ground will construct facilities and expand capabilities to accommodate advanced and dual use technology, and the VPG concept. The VPG concept enables verification of computer simulations. As workloads decrease in some areas of military test and evaluation, the principal mission will be enhanced to provide a broader spectrum of capabilities. Private industry will be encouraged to use existing facilities and construct new facilities in support of a diversified mission.

This alternative will include developing partnerships with more military units and other government agencies. Yuma Proving Ground will maintain, remodel, or dispose of existing facilities, as appropriate, to support a diversified mission. Examples of activities associated with alternative F are shown in table 2-1.

TABLE 2-1
ESTIMATED ACTIVITIES UNDER THE PREFERRED ALTERNATIVE

ACTIVITY	RANGE OF ACTIVITIES	
	LOW	HIGH
Rounds Fired [1]	243,450	511,260
Air Drops [2]	8,850	18,590
Test Sorties [3]	6,980	14,650
Test Miles [4]	303,460	637,270
Airspace Hours Used	9,290	19,510
Kofa Range Clearance [5]	33,490	70,330
Cibola Range Clearance	13,840	29,060
Aircraft Landings and Takeoffs	5,770 [6]	12,120
Military Personnel in Training	1,910 [7]	3,820
Acreage Open to Recreation [8]	135,000	148,500 [10]
Pre-existing Patented Mines [9]	163 ha (410 acres)	163 ha (410 acres)

1 - Rounds fired include all munitions fired for military and nonmilitary, excluding recreational firings.
2 - Airdrops include personnel training and equipment test missions by military and nonmilitary.
3 - Test sorties include assorted missions by military and nonmilitary in Kofa and Cibola regions.
4 - Test miles include miles for tracked and wheeled vehicles for both military and nonmilitary.
5 - "Range Clearance" is a term used at YPG to allow and track access to potentially active range area.
6 - Landing and takeoff baseline average is for military and nonmilitary aircraft.
7 - Number of personnel training average is compiled from 1994 and 1995 data.
8 - Includes hunting areas, Camp Laguna, Explorer's Camp, and travel camp (Kerns, 1997).
9 - Figures taken from the 1995 YPG Real Property Report.
10 - Average acreage open to recreation to 10% above existing baseline.

Under the Preferred Alternative, military mission needs will have priority over recreational and private industrial uses of any facility or location. Military test activities will normally continue to have priority over other military (non-test) activities. Some areas will not be opened to public access due to the presence of Unexploded Ordnance (UXO). The potential for increased activities and modernization of facilities is centered on several key elements, as described in the box below.

Examples of nonmilitary activities under consideration are identified in the box at the right.

PREFERRED ALTERNATIVE
INCREASED ACTIVITIES AND FACILITIES MODERNIZATION

- Increased use of YPG's long-range firing capability.
- Incorporating integrated testing methods.
- Anticipated development of the Combat Systems Test Complex and Smart Munitions Test Range.
- Increased troop training activities.
- Munitions testing abilities development.
- Increased use of the Dynamometer Course.
- Increased use of airspace over Kofa National Wildlife Refuge.
- Establishing ground-maneuvering and free-travel areas.
- Expanding operational testing opportunities.
- Enhancing mine demolition and countermunition abilities.

PREFERRED ALTERNATIVE
EXAMPLES OF NONMILITARY ACTIVITIES

- Maintain or modify hunting and other recreational activities.
- Eliminate or reduce public access to sensitive habitat, conservation areas, or hazardous sites.
- Develop partnerships with private industry.
- Maintain the solar electric power plants.
- Make existing test facilities available to private industry for testing tracked and wheeled vehicles, small arms, and alternative energy vehicles.
- Make UXO decontamination research and airworthiness test facilities available for private industry activities.

2.2.1 Kofa Region

The primary use of the Kofa Region will continue to be for testing of artillery, mines, mortars, and tank and helicopter munitions and systems. During the baseline period, most of the Kofa Region (figure 4) was an artillery firing range and impact area. The nature of the military mission limits public access in this region. Under the Preferred Alternative, this type of military use will continue.

2.2.1.1 Military Activities

Military mission activities will increase in this region and will continue to have priority in scheduling use of locations and facilities. The budgeted capacity, measured in hours of military usage, for the Kofa Range is 20,000 hours annually for the baseline period. In 1995, a total of 13,318 hours was used. A 67 percent utilization rate for Kofa Range is reported in the Resource Utilization Measurement Systems Report (Fisher, 1995).

In 1994, the Army transferred the ammunition production acceptance program from Jefferson Proving Ground to YPG. This transfer consolidated most of the army munitions and weapons RDTE and production acceptance missions at a single installation. Additional testing facilities in the Kofa Region include climatic, dynamic, and x-ray chambers. Department of Transportation hazard classification for ordnance is conducted to develop data on the stability and sensitivity of explosives and propellants. These activities will continue under alternative F.

MUNITIONS AND WEAPONS TESTING

The installation maintains more than 400 firing positions in the Kofa Region, with artillery, tank, and mortar direct-and-indirect firing capabilities. Evaluation and recovery of expended munitions are conducted at 29 impact areas or mine fields.

The mine demolition and countermunitions detection test facilities, located in the Kofa Region, are considered premier mine test facilities with highly instrumented ranges.

Capabilities will accommodate testing improved long-range artillery platforms. The eastern edge of the Kofa Firing Range will be used to support testing of long-range munitions. In addition, the East Arm will be used more extensively to support firing long-range artillery. Existing flat terrain at the east end of the Kofa Firing Range could be used as new, unprepared impact areas for testing of long-range munitions. Long-range artillery may also be fired from off-post locations to impact zones in the Kofa Region. Use of gun positions may also increase because of additional long-range munitions testing.

Yuma Proving Ground will seek a modification of the Nuclear Regulatory Commission (NRC) license to expand the current DU range an additional 4.5 km (2.7 miles) in length. This expansion enables developmental and operational testing to use the DU range.

The Kofa Firing Range will be used for firing at various targets from alternate positions during "shoot and scoot" operations. These activities will require ground-to-ground telemetry and possibly a wireless Local Area Network (LAN).

Other test activities anticipated to increase in this region during the period 1999 to 2014, include expanding the live fire range located north of Red Bluff Mountain to 7,000 meters (23,000 feet) in length and increasing mine demolition and countermunition testing. A state-of-the-art munitions test range is located near the base of the East Arm.

AVIATION SYSTEMS TESTING

Due to the extensive firing missions conducted at the Kofa Region, flight operations are limited to periodic high explosive firing missions.

Consolidation of the Army's aviation mission at YPG will result in an overall increase of aviation-related projects in the Kofa Region. Impact Area Eve, used for mine testing, will receive more frequent use for testing long-range missiles.

COMBAT SYSTEMS TESTING

Combat Systems Division uses several gun positions in the Kofa Region during test and evaluation missions. An area south of Pole Line Road is used during operational tests conducted by this division (figure 4).

Use of this region by the Combat Systems Division will continue to be centered in the portion of Kofa Region south of Pole Line Road where the Combat Systems Test Complex is expected to be constructed. Placement of a moving target range in this area is being considered as part of overall enhancement of this region. Combat Systems Division will increase use of the area between gun positions 15 and 20.

In addition, the Army may move the 25 mm and 120 mm artillery test program from Aberdeen Proving Ground, MD to the Kofa Range. A ground-maneuvering and free-travel area could be established to offer a wider range of open-terrain test and evaluation parameters for combat vehicles.

AUTOMOTIVE TESTING

The Automotive Division did not use the Kofa Region extensively during the baseline period. Activities in the Kofa Region by this division are limited to a number of open-terrain tests, and smoke and obscurant testing.

The Combat Systems Test Complex will be used for tracked and wheeled vehicle testing. A free-travel area will also provide enhancements to the Automotive Division mission similar to those for Combat Systems Division. Areas in the Kofa Region will be used to support an increase in testing of smoke and other obscurant materials.

TRAINING ACTIVITIES

Visiting military units periodically use areas in the southern Kofa Region. Use of these areas is expected to increase. The Combat Systems Test Complex and free-travel areas may also be used to support an increased training mission. Special forces units train in other areas of the region to take advantage of unique terrain features.

Additional areas in the Kofa Region and the East Arm may also be used to support an increased training mission.

SUPPORT SERVICES

Infrastructure in the Kofa Region includes gun positions, observation, tracking systems, roads, power lines, video and communication networks, water wells, and ammunition igloos. Yuma Proving Ground is paving Pole Line Road in sections, and will accelerate this process with available funding. Other existing roads will be used more heavily.

Increasing the number of impact areas in the East Arm will require direct power and communication networks. An improved road to support buildings at the Smart Munitions Test Range will be constructed. A designated site to conduct sensitivity and stability tests on explosives and propellants will be established to accomplish hazard classification evaluations in a central location.

Increased aviation and Combat Systems Division projects in the Kofa Region will require construction of ground-to-ground and air-to-ground telemetry relay sites. A fiber optic cable will be installed throughout the Kofa Region to support a diversified mission.

2.2.1.2 Business Partnership Opportunities

Private industry uses of the Kofa Region are mainly related to testing activities. Private industry testing has increased in the last few years and will continue to increase during the next 15 years. Testing includes long-range missile and artillery work for foreign governments and private industry. Research in remediation of UXO will be conducted on several range areas. Tracked and wheeled vehicle testing by private industry may be incorporated in areas already used by military tracked and wheeled vehicles. Private industry testing of small arms may also be conducted in the Kofa Region.

Commercial mining was evaluated under the alternatives considered and rejected by decisionmakers as incompatible with the YPG mission. Agricultural and forestry outlease programs may be considered for limited areas.

2.2.1.3 Recreational and Other Activities

Seasonal hunting takes place in the Kofa Region in a designated section of the East Arm located northeast of the Kofa Firing Range. The power line along the southern boundary has been proposed as bounding the hunting areas, to eliminate confusion over areas where hunting is permitted. No recreational mining is conducted in the region. White Tanks, a cultural resource conservation area in the East Arm, may be opened for activities such as camping or cultural education. These activities will be managed by environmental programs under special use permits. Emergency communication networks, such as those used along interstate highways, may support increased public recreational use of the Kofa Region, once they are developed.

2.2.2 Cibola Region

During the baseline period, the Cibola Region was primarily used for military aviation test and evaluation missions. Mobility test projects are performed periodically in this region. Limited areas of the Cibola Region were open to public access for seasonal hunting. Five public access right-of-way roads exist in this region (Cibola Lake Road, Martinez Lake Road, Highway 95, Red Cloud Mine Road, and North Cibola Road).

The budgeted capacity in usage hours for Cibola Range was 18,000 hours annually. In 1995, there were 9,006 hours used. This resulted in a 50 percent utilization rate for Cibola Range (Fisher, 1995). The primary use of the Cibola Region will continue to be target recognition and related testing.

2.2.2.1 Military Activities

A variety of military equipment, methods, and systems are tested in the Cibola Region. Visiting military units also conduct specialized training on a small scale in the Cibola Region. Military mission activities will increase for all divisions and these activities will continue to have priority in scheduling use of locations and facilities.

MUNITIONS AND WEAPONS TESTING

Munitions and Weapons Division did not have established uses or activities in the Cibola Region during the baseline period. Increased use of this region by Munitions and Weapons Division will involve expanding the occurrence of open-trench demolition tests. These demolition projects involve the excavation of open trenches for placement and burial of explosives. The explosives are detonated to create terrain barriers prior to testing hostile vehicles traversing the terrain. New gun positions will be established in the Cibola Region to support firing of long-range artillery to target areas in the Kofa Region.

AVIATION SYSTEMS TESTING

Target recognition and direct fire ranges for testing and validating targeting devices are located in the Cibola Region. The military uses these devices to evaluate weapons and fire control systems for aviation equipment. Rocket Alley, an impact area in south Cibola Region, is used to test 2.75 inch rockets, ZUNI rockets, and other advanced rocket systems. In addition, Cibola has several drop zones, extraction zones, and landing zones to support the Air Cargo and Air Delivery mission.

Aviation activities expected to increase in the Cibola Region include aircraft and gun systems development, and testing of missiles, sensors, and munitions. A new target recognition range and acoustic scoring range are anticipated as part of diversified activities in the Cibola Region. Red phosphorous testing will be conducted on the horizontal scoring range and at the north end of Rocket Alley. The target array will be moved from between Red Hills Road and East Target Road to the area between East Target Road and CM Access Road. A new drop zone for guided parachutes is planned north of Corral Road.

COMBAT SYSTEMS TESTING

Combat Systems Division uses various areas of the Cibola Region to conduct tracked and wheeled vehicle and operational testing. Combat Systems Division uses the direct-fire range to conduct periodic test and evaluation missions on combat vehicles' weapons systems. The United States Marine Corps (USMC), as a tenant operation, uses Castle Dome Annex to test and evaluate light armored vehicles (LAV). In addition, the USMC LAV unit uses the moving target range. (Note: As of 1999, the MCAS LAV is no longer a tenant operation at the Castle Dome Annex).

A free-travel area may be designated in this region and will increase Combat Systems Division use of the region. This type of open maneuver area will enhance the testing and evaluation of tracked and wheeled vehicles in open-terrain situations.

AUTOMOTIVE TESTING

A limited number of open-terrain performance tests on tracked and wheeled vehicles and tires are conducted in a variety of areas on the Cibola Region. Tracked and wheeled vehicle test and evaluation activities will increase in some areas of Cibola Region, such as use of a free-travel area. Automotive Division testing will increase as operational testing increases.

TRAINING ACTIVITIES

The Military Free Fall School uses drop zones in the Cibola Region for training activities. Other troop training exercises conducted in the Cibola Region include combat skills, air operations, troop/equipment movement, land navigation, logistics exercises, intelligence training, field repair training (equipment), and preparation of troops for the National Training Center at Fort Irwin, CA. Special forces, USMC and Arizona and California National Guard and reserve units also train in the Cibola Region.

The Military Free Fall School and Golden Knights training activities may increase in the Cibola Region. In addition, more visiting military units will conduct specialized training in the northern portion of Cibola to take advantage of unique terrain features. Examples of the type of field training that will occur in established areas include free-travel, forward operating base, force-on-force, special forces operations, and night operation maneuvers. Training units vary from squad (10 people) to battalion (up to 1000 people) in size.

SUPPORT SERVICES

Cibola Region support infrastructure and facilities include Castle Dome Annex, the C-17 (cargo and transport aircraft) air strip, roads, laser sites, security posts, and a communications network.

A fiber optic communications loop will be installed in the Cibola Region. An electric power line will be extended to the CM1 and north pad areas. Additional office space will be constructed to support the unmanned aerial vehicle program. Increased aviation and Combat Systems Division projects in the Cibola Region will require construction of ground-to-ground and air-to-ground telemetry relay sites.

2.2.2.2 Business Partnership Opportunities

Few private industrial or commercial activities were conducted in the Cibola Region during the baseline period. A private automotive company used the region to perform tire testing, and firing ranges were used by police agencies to test ammunition. Under alternative F, private partnership use of the region will increase.

The Cibola Region affords opportunities to an array of private industrial and commercial clients. The motion picture industry could take advantage of the unique and rugged terrain features. Private aviation companies could use existing facilities and services to test and evaluate commercial and private aircraft. The automotive industry could use existing unimproved roads to test and evaluate their products.

Private industrial and commercial testing of small arms, track pads, tracked and wheeled vehicles, ride dynamics, and tires could be conducted in the Cibola Region. Testing of demolition equipment and techniques has potential as a customer base, especially in the north Cibola Region.

Commercial mining in the Cibola Region was evaluated under alternatives considered and rejected by decisionmakers as incompatible with the YPG mission. Agricultural and forestry outleasing in the Cibola Region is not part of the Preferred Alternative.

2.2.2.3 Recreational and Other Activities

Three areas in the Cibola Region are open to public use during seasonal hunting: Arrastra Hunting Area, Highway 95 Hunting Area, and Cibola Hunting Area. Cibola Lake Road is open to public access for travel to and from Cibola Lake when there is no conflict with ongoing military missions. No other recreational activities were allowed in the Cibola Region during the baseline period. However, some periodic trespass is known to occur by hunters and 'sightseers.' Sightseeing is allowed from public access roads.

The hunting area in north Cibola may be expanded as far south as Crazy Woman Wash in the western portion of the area. The area north of Cibola Lake Road may be opened for general recreation (e.g., driving, hiking, and sightseeing).

2.2.3 Laguna Region

During the next 15 years, the Laguna Region will serve as the main support region for the installation mission. The Laguna Region contains administrative offices, military service activities, equipment maintenance facilities, mobility courses, Laguna Army Airfield, Castle Dome Heliport, Materiel Test Area, and the logistics support area for Kofa Firing Range. This area is a "safe zone" where no large ordnance is fired. The only ordnance fired in this region is at the small arms firing range at Castle Dome Heliport. This facility is not near any heavily populated areas.

2.2.3.1 Military Activities

Most test divisions use the Laguna Region and associated services and infrastructures to support their missions. In addition, this area provides most administrative support functions. The Laguna Region contains an environmental test facility used to fire weapons in extreme hot and cold conditions. All test divisions use these facilities to conduct a variety of military test missions, including vehicle and equipment performance and durability, and use of the climatic chamber for durability tests on equipment, tracked and wheeled vehicles, and tires.

Military mission activities will diversify in this region for most divisions, and military activities will have priority in scheduling.

MUNITIONS AND WEAPONS TESTING

Munitions and Weapons Division uses the climatic and environmental chambers located in the Laguna Region. The division does not anticipate establishing any other activities in the Laguna Region.

AVIATION SYSTEMS TESTING

The air delivery section of Aviation Systems Division uses the Air Cargo Complex to store and prepare equipment for military test and evaluation missions. The two runways at Laguna Army Airfield are primary sites for aircraft takeoffs and landings during military test and evaluation missions.

Yuma Proving Ground could be considered for an increase in aviation activities. Use of the Laguna Army Airfield, Castle Dome Heliport, and associated facilities will increase in the event the Army decides to expand its aviation program.

COMBAT SYSTEMS TESTING

Combat Systems Division uses Laguna Region mobility test courses (listed in the following box) to perform tests and evaluations on tracked and wheeled vehicles.

MOBILITY TEST COURSES USED BY COMBAT SYSTEMS DIVISION

- Tank Hill Courses
- Tank Gravel Course
- Sand Dynamometer Course
- Mobility Slopes (Vertical and Slide)
- Vapor Lock Course
- Middle East Cross Country Course
- Tank Level Cross Country Course
- Mud Course
- Paved Dynamometer Course
- Water Fording Basin
- Kofa and Muggins Dust Courses
- Portions of U.S. Highway 95 and
- Old U.S. Highway 95

AUTOMOTIVE TESTING

Automotive Division uses test courses in the Laguna Region, as shown the following box, to test and evaluate tracked and wheeled vehicles and mobile equipment in varying terrain, climate, and operational conditions. Established test courses comprise approximately 320 km (200 miles) of prepared routes ranging from paved highways to varying terrain, such as sand, mud, rock, dust, gravel, and slopes. Some courses also are used periodically to test and evaluate soldier individual equipment.

Use of the Kofa Dust Course is expected to increase. Additionally, a new dust course is anticipated to be added adjacent to the existing dust course in the next five to 10 years. Turnaround loops will be added to the east and west ends of the Middle East Cross Country Course. This will enable testers to run half the course instead of the entire course.

Use of all existing test courses is expected to increase. Enhancement of test capabilities continues as test requirements expand to gain more information on vehicle mobility performance and durability.

Partial Listing of Mobility Test Courses Used by Automotive Division

- Tire Test Course
- Truck Level Cross Country Courses
- Sand Dynamometer Course
- Mobility Slopes (Vertical and Slide)
- Vapor Lock Course
- Kofa and Muggins Dust Courses
- Soldier Individual Equipment Course
- Standard Obstacle Courses
- Ride and Handling Courses
- Evasive Maneuvers Course
- Skid Pad
- Truck Hill Courses
- Mud Courses
- Paved Dynamometer Course
- Water Fording Basin
- Truck Gravel Courses
- Middle East Cross Country Course
- Portions of U.S. Highway 95 and
- Old U.S. Highway 95
- Desert Gravel Course
- Rock Ledge Access Course
- Rock Ledge Course

TRAINING ACTIVITIES

Training exercises take place at Training Area Bravo, Laguna Army Airfield, Castle Dome Heliport, and at Cox Field located in the Main Administrative Area. Cox Field and Laguna Army Airfield will be used increasingly for the Military Free Fall School and Golden Knights training activities. Castle Dome Heliport and Laguna Army Airfield will be used for simulated airfield siege training. Training Area Bravo will be used for increased field training activities. Additional areas of this region could be used to conduct more field training activities.

SUPPORT SERVICES

Several populated areas in the Laguna Region provide support services.

The Main Administrative Area, also known as the cantonment area, is a fenced complex comprising 390 hectares (965 acres). This area contains general support functions, such as base housing, commissary, Post Exchange, medical services, and Morale, Welfare, and Recreation (MWR) services. Administration services and facility maintenance support are also located in the cantonment area.

The Materiel Test Area, also known as the mobility test area, is approximately 390 hectares (964 acres). This area houses the command group, Materiel Test Directorate, and related test mission personnel. This area includes several buildings and facilities that provide support to the Automotive Division and Combat Systems Division test missions.

Laguna Army Airfield can accommodate C-5A's and smaller aircraft. Laguna Army Airfield has office space, an aircraft wash facility, the fire and crash rescue department, 2,970m^2 (33,000 square feet) of hangar and maintenance space, and a 240,000 L (64,000 gallons) of fuel storage. Laguna airfield is 1500 m (5,000 feet) in length. Laguna Army Airfield is used for training (paratroopers) and aviation testing activities.

Castle Dome Heliport is approximately twelve kilometers north of Laguna Army Airfield and is an aviation facility for special or large helicopter programs. Castle Dome Heliport maintains 3,403 m^2 (37,809 square feet) of hangar space; 1,044 m^2 (11,600 square feet) of office space; and a 45,400 L (12,000-gallon) fuel tank. The Castle Dome Heliport is used for aviation testing activities.

The Air Cargo Complex stores and supports testing of hazardous items, including ammunition loads of 11,000 kg (5,000 lbs.) net explosive weight or less. It includes a parachute pack/maintenance and airdrop rigging facility, which contains office and maintenance space. Air drop tests and other air cargo is loaded onto aircraft here.

The area west of Firing Front Road is referred to as Kofa Firing Front. This area provides logistical support for Kofa Firing Range. Facilities include test vehicle and equipment maintenance facilities, a fire and emergency response station, engineering and administrative support offices, communication networks, storage areas, climatic and environmental test chambers, and target fabrication facilities.

Increased training activities will result in increased use of existing support services and facilities at the Main Administrative Area. Improvements to or expansion of the Castle Dome Heliport will support increased aviation activities. Improvements to Laguna Army Airfield will include fencing the airfield; constructing storage and an open-air command center for support of forward operating base missions, and improving an existing road to the Main Administrative Area. Fiber optic cable is also being installed throughout the Laguna Region. This cable will link with fiber optic cable being installed in the Kofa and Cibola Regions.

2.2.3.2 Business Partnership Opportunities

An Australian film company used the Castle Dome Heliport for filming a science and technology program. A private automotive manufacturer has tested vehicles using existing test courses on several occasions. During the baseline period, these were the only private industry activities that occurred in the Laguna Region.

Opportunities for private industry use of facilities and services in the Laguna Region will include testing automotive products, aviation systems and maintenance, commercial air cargo, and commercial conference facilities. Developments will enhance the capabilities of the installation to research and develop military technology and enhance quality of life for personnel stationed at the installation.

The Army may approve a privately developed hot weather automotive test complex, to be placed at Roadrunner Drop Zone. Automotive crash survival and testing of alternative energy vehicles are examples of private industry activity that may be conducted at the Laguna Region. All test courses are adaptable for private industry use. Automotive activities will increase for commercial and foreign military customers. Testing of tracked and wheeled vehicles such as earth moving equipment, ride dynamics, and tires are potential areas for increased private industry projects.

A privately developed technology and conference complex is being considered for siting adjacent to the Main Administrative Area. This complex will be open to the public and provide services and support to the installation community and diversified mission. The Laguna Army Airfield may be used for private and commercial aircraft landings.

2.2.3.3 Recreational and Other Activities

Several recreational/educational areas exist in the Laguna Region. A nature trail and Brooks Exhibit (static display) are areas open to the public; a cadet camp for junior police, developed by MWR and YPG Security, is near Martinez Lake Road; and a travel camp with 42 established camping spaces is located on 2.4 ha (6 acres) at the Main Administrative Area. No recreational mining was conducted in the Laguna Region during the baseline period. Hunting is permitted in the Martinez Hunting Area.

Public recreational uses may be modified to include camping, designated hiking areas, an off-road racing course, and a RV Park. Portions of the Laguna Mountains may be opened to hunting and other recreational uses, such as hiking and rock collecting.

The JAWS program (Juveniles at Work) implemented in 1996 to initiate juvenile offenders to a weekend boot camp experience, uses YPG facilities and soldiers.

Commercial mining was evaluated under the alternatives considered and rejected by decision-makers as incompatible with the YPG mission. Agricultural and forestry outlease programs may be considered.

2.2.4 Airspace

During the baseline period, MCAS Yuma scheduled YPG airspace (figure 7). Yuma Proving Ground activates restricted military airspace when required during testing. When restricted airspace is not in use for testing, it is released to the controlling agency, MCAS Yuma. Additionally, YPG uses airspace over the Kofa National Wildlife Refuge and lands adjacent to the Cibola and Laguna Regions under an existing Federal Aviation Administration (FAA) permit.

2.2.4.1 Military Activities

Each test division conducts specialized military test and evaluation missions within established portions of the airspace. Military use of airspace will increase for some divisions and remain at baseline levels for others.

MUNITIONS AND WEAPONS TESTING

The Munitions and Weapons Division uses restricted airspace to conduct artillery firing missions, and as safety zones over mine fields. Increased use of airspace over Kofa National Wildlife Refuge will result from expanded firing missions into the East Arm. Long-range artillery firing from remote locations into YPG airspace may increase.

AVIATION SYSTEMS TESTING

The Aviation Systems Division uses airspace in a variety of ways. The aircraft armament section uses airspace to perform tests on fixed- and rotary-wing aircraft weapons systems, lasers, munitions, and advanced rocket systems. In addition, personnel, cargo, and vehicles are air dropped to specific drop zones during air delivery tests. Airspace is also used to test unmanned aerial vehicles, remote sensing equipment, and navigational equipment (global positioning system).

Increased use of airspace will result from consolidation of the Army aviation mission. Use of airspace over the Kofa National Wildlife Refuge will continue to increase during the next 15 years.

COMBAT SYSTEMS TESTING

The Combat Systems Division uses the airspace over the Kofa and Cibola Regions to conduct periodic firing missions. More Combat Systems Division fire missions will involve increased use of restricted airspace.

AUTOMOTIVE TESTING

Automotive Division does not have or anticipate an established use of airspace. However, a function of restricted airspace is to provide a measure of security to sensitive projects conducted by all divisions. Airspace occasionally will be closed for this purpose.

TRAINING ACTIVITIES

The Military Free Fall School, Golden Knights, and special forces use airspace to conduct high-altitude low-opening, high-altitude high-opening, and other training missions. Other visiting units use YPG airspace to conduct a variety of training missions including artillery firing, ambush, air support, assault training, and parachute jumps and drops. Increased air-related training programs, such as the Military Free Fall School and the Golden Knights will result in increased use of YPG airspace.

SUPPORT SERVICES

Communication networks, laser trackers, and radar use the airspace indirectly through electromagnetic emissions. No direct use of airspace is associated with increased use of support services and infrastructure. Installation of fiber optic

cable will reduce spectrum utilization (microwave transmission). However, increased aviation and ground-related missions will increase use of air-to-ground and ground-to-ground microwave frequencies.

2.2.4.2 Business Partnership Opportunities

Modified nonmilitary activities may involve private industry use of existing airspace to test commercial and private aircraft and aviation systems. Development of personal aircraft and airworthiness testing are potential industries for incorporation into airspace areas. Airworthiness testing may initially be located at Castle Dome Heliport, and later moved to Laguna Army Airfield.

2.2.4.3 Recreational and Other Activities

Due to safety risks inherent to the military mission, no recreational use of airspace is considered as part of this alternative.

2.2.5 Off-Post Locations

2.2.5.1 Military Activities

During the next 15 years, YPG will use areas outside its boundaries to conduct or support a variety of military test missions. Off-post locations that are used to support military test missions are discussed below. Nonmilitary activities under the operational control of YPG are not conducted at off-post locations.

Locations that are used in northern Arizona include the Navajo Army Depot where automotive and combat systems test and evaluation projects are conducted at 2,100 m (7,000 feet) elevation; and the Prescott Airport where similar tests occur at 1,500 m (5,000 feet) elevation. In addition, The Automotive Division and Combat Systems Division will experience a slight increase in the number of projects conducted at the Navajo Army Depot and Prescott Airport in northern Arizona.

Munitions and Weapons Division may establish new firing positions at off-post locations to support long-range missiles and artillery test missions.

Senator Wash Regulating Reservoir is used under a U.S. Bureau of Reclamation (BOR) use agreement to test and evaluate amphibious vehicles. This area is also used as a drop zone for training and evaluating personnel in airdrop skills and procedures. The BLM manages recreational use at the reservoir. Active and reserve military training activities will increase at the reservoir over the next 15 years.

The Blaisdell Railroad Siding area comprises approximately 16 hectares (40 acres) located south of the installation along U.S. Highway 95 (BLM right-of-way 30293). This location is used for railroad shipping and receiving and to evaluate equipment loads under different railway transport conditions.

Imperial Sand Dunes, an area about 60 km (40 miles) long and three to 10 km (2-6 miles) wide, is part of the California Desert Conservation Area managed by the BLM. This area, approximately 100 km (60 miles) west of YPG along Interstate Highway 8, is occasionally used to conduct vehicle and equipment testing projects and some troop training activities.

Death Valley, located approximately 640 km (400 miles) northwest of YPG in California, will be used periodically for automotive testing because terrain features and temperature extremes vary from those available at YPG.

Oatman Hill, located approximately 320 km (200 miles) north of YPG, is an 18-km (11-mile) section of highway outside Oatman, AZ. It is used under a special permit to conduct performance tests on trucks exceeding the maximum size and weight limits for public roads. Automotive testing conducted at Oatman, AZ, will decrease. An alternate location is being sought to accomplish grade testing performed at Oatman.

2.2.5.2 Business Partnership Opportunities

No public-private partnership opportunities under the control of YPG are associated with off-post locations.

2.2.5.3 Recreational and Other Activities

No recreational activities under the control of YPG are associated with off-post locations.

2.2.6 Management, Monitoring, and Mitigation

2.2.6.1 Military Activities

Yuma Proving Ground accomplishes environmental management and monitoring through implementation of plans including the following: *Land Use Plan*; *Integrated Natural Resources Management Plan*; I*ntegrated Cultural Resources Management Plan*; *Installation Spill Contingency Plan* (ISCP); *Pollution Prevention Plan*; and *Spill Prevention, Control and Countermeasures Plan* (SPCCP). Environmental programs are responsible for implementation of these plans.

All management plans, and applicable Federal, State, local, and military laws and regulations are listed at appendix A. Extensive project planning efforts avoid or minimize adverse environmental impacts. When unexpected adverse impacts occur, mitigation is implemented to compensate for or repair the resource.

The YPG Safety Program ensures the overall safety of the human environment at the installation.

2.2.6.2 Business Partnership Opportunities

Impacts for all private partnership projects will be assessed on a site specific basis. Private developers will be responsible for implementing any mitigation of impacts required as a result of project or site specific analysis and documentation. Some industries will use existing military facilities. The Army will be responsible for ensuring management, monitoring, and mitigation measures are implemented. All private partnerships must comply with all Federal, State, and Army regulations and requirements.

2.2.6.3 Recreational and Other Activities

Management, monitoring, and mitigation of recreational activities are accomplished through the same plans used to manage military activities.

2.3 Alternatives Eliminated from Detailed Analysis

2.3.1 Nuclear, Biological, and Chemical Activities

Nuclear, biological, and chemical testing activities are not considered for development under this RWEIS. Other DoD facilities are used to accomplish this mission. Should DoD policies or priorities change, these actions would be assessed through appropriate environmental documentation at that time.

2.3.2 Discontinued Use of Yuma Proving Ground as a Military Proving Ground

YPG has not been identified for closure under any of the Base Realignment and Closure Acts through 1995. Therefore, closure of YPG is not considered as an alternative for analysis in this programmatic EIS. Closure would be a major Federal action requiring a separate EIS.

2.4 Comparison of Alternatives Considered and Environmental Consequences

Potential environmental impacts exist for each alternative considered. A summary of these consequences is presented in table 2-2. Environmental issues analyzed in detail in chapter 4 of this document are air resources, water resources, geological and soil resources, biological resources, socioeconomics, land use, noise, hazardous substances and waste management, radiation, aesthetic values, utilities and support infrastructure, transportation, and health and safety. Potential effects to biological resources and cultural resources are addressed in a broad sense and will require more detailed analyses in future program or site specific environmental documentation.

Table 2-2 reports environmental consequences of each alternative for each environmental issue by reporting compliance data compared to regulatory thresholds or standards. For example, air emissions reported to the State of Arizona are listed in alternative A and are projected for each of the other alternatives. Potentially significant impacts are defined by the criteria for each resource area listed in chapter 4.

TABLE 2-2
SUMMARY OF ENVIRONMENTAL CONSEQUENCES FOR ALTERNATIVES CONSIDERED

ENVIRONMENTAL ISSUE (ACROSS)		Air			Water		
ALTERNATIVE (DOWN)		Potential Significant Impacts	Emissions	Sources	Potential Significant Impacts	Availability	Quality
Alternative A 1991-1995 Baseline Military Activities		**NO**	3.85 tpy CO 15.89 tpy NO_X 1.58 tpy SO_X 1.02 tpy PM_{10} 6.28 tpy VOCs No Pb violations 0.22 tpy HAPs	Test km/yr = 488,267 PM_{10} = 41 tpy 243,450 rounds fired/year 1-3 Construction projects/yr	**NO**	Groundwater withdrawal rates do not exceed availability or usage Annual usage = 1,367 acre ft/yr No permanent surface water. 55 acre ft/yr withdrawal from Colorado River	1,800 x 200 ft confined POL plume of benzene (43 ppm) and TPH (>7,000 ppm) 4 road crossings/yr (Section 404)
Alternative B Reduce Baseline Activities		**NO**	<3.85 tpy CO <15.89 tpy NO_X <1.58 tpy SO_X <1.02 tpy PM_{10} <6.28 tpy VOCs No Pb violations anticipated <0.11 tpy HAPs	Test km/yr = 244,130 PM_{10} = 20 tpy 121,730 rounds fired/year 2 Construction projects/yr	**NO**	Groundwater withdrawal rates do not exceed availability or usage Annual usage = 683.5 acre ft/yr No permanent surface water. 55 acre ft/yr withdrawal from Colorado River	1,800 x 200 ft confined POL plume of benzene (43 ppm) and TPH (>7,000 ppm) 2 road crossings/yr (Section 404)
Alternative C Increase Baseline Activities Introduce New Military Activities		**YES**	7.71 tpy CO 31.78 tpy NO_X 3.178 tpy SO_X 2.056 tpy PM_{10} 12.54 tpy VOCs No Pb violations anticipated 0.44 tpy HAPs	Test km/yr = 976,530 PM_{10} = 82 tpy 486,900 rounds fired/year 2-4 Construction projects/yr	**YES**	Groundwater withdrawal rates do not exceed availability or usage Annual usage = 3,800 acre ft/yr No permanent surface water. Potential doubling of 55 acre ft/yr withdrawal from Colorado River	1,800 x 200 ft confined POL plume of benzene (43 ppm) and TPH (>7,000 ppm) 8 road crossings/yr (Section 404)
Alternative D Baseline Activities Introduce New Nonmilitary Enterprises		**NO**	4.24 tpy CO 17.47 tpy NO_X 1.73 tpy SO_X 1.12 tpy PM_{10} 6.9 tpy VOCs No Pb violations anticipated 0.24 tpy HAPs	Test km/yr = 537,100 PM_{10} = 45 tpy 267,905 rounds fired/year 2-4 Construction projects/yr	**NO**	Groundwater withdrawal rates do not exceed availability or usage Annual usage = 1,900 acre ft/yr No permanent surface water. Potential increase over 55 acre ft/yr withdrawal from Colorado River	1,800 x 200 ft confined POL plume of benzene (43 ppm) and TPH (>7,000 ppm) 8 road crossings/yr (Section 404)
Alternative E Increase Baseline Activities New Military Activities New Nonmilitary Enterprises		**YES**	8.09 tpy CO 33.36 tpy NO_X 3.36 tpy SO_X 2.15 tpy PM_{10} 13.18 tpy VOCs No Pb violations anticipated 0.48 tpy HAPs	Test km/yr = 1,025,370 PM_{10} = 86 tpy 511,260 rounds fired/year 2-6 Construction projects/yr	**YES**	Groundwater withdrawal rates do not exceed availability or usage Aquifer = 50 million acre ft/yr No permanent surface water. Potential increase over 55 acre ft/yr withdrawal from Colorado River	1,800 x 200 ft confined POL plume of benzene (43 ppm) and TPH (>7,000 ppm) 8 road crossings/yr (Section 404)
Alternative F PREFERRED DIVERSIFIED MISSION	**LOW**	**NO**	3.85 tpy CO 15.89 tpy NO_X 1.58 tpy SO_X 1.02 tpy PM_{10} 6.28 tpy VOCs No Pb violations 0.22 tpy HAPs	Test km/yr = 488,270 PM_{10} = 41 tpy 243,450 rounds fired/year 1-3 Construction projects/yr	**NO**	Groundwater withdrawal rates do not exceed availability or usage Annual usage = 1,367 acre ft/yr No permanent surface water. 55 acre ft/yr withdrawal from Colorado River	1,800 x 200 ft confined POL plume of benzene (43 ppm) and TPH (>7,000 ppm) 4 road crossings/yr (Section 404)
	HIGH	**YES**	.09 tpy CO 33.36 tpy NO_X 3.36 tpy SO_X 2.15 tpy PM_{10} 13.18 tpy VOCs No Pb violations anticipated 0.48 tpy HAPs	Test km/yr = 1,025,370 PM_{10} = 86 tpy 511,260 rounds fired/year 2-6 Construction projects/yr	YES	Groundwater withdrawal rates do not exceed availability or usage Annual usage = 3,800 acre ft/yr No permanent surface water. Potential increase over 55 acre ft/yr withdrawal from Colorado River	1,800 x 200 ft confined POL plume of benzene (43 ppm) and TPH (>7,000 ppm) 8 road crossings/yr (Section 404)

TABLE 2-2
SUMMARY OF ENVIRONMENTAL CONSEQUENCES FOR ALTERNATIVES CONSIDERED

ENVIRONMENTAL ISSUE (ACROSS)		Geological & Soil			Biological				
ALTERNATIVE (DOWN)		Potential Significant Impact	Surface Erosion	Contaminated Sites	Potential Significant Impact	T & E Species	Habitat Preservation	Vegetation Treatments	Aircraft Noise Impact
Alternative A 1991-1995 Baseline Military Activities		**NO**	Test km/yr = 488,267 Rounds fired = 243,450 1-3 construction projects/yr	5	**YES**	No Section 7 ESA consultations	3 EAs/yr	<1 km^2/yr trimmed or removed 3 projects/yr	Airspace hr/yr = 9,290
Alternative B Reduce Baseline Activities		**NO**	Test km/yr = 244,130 Rounds fired = 121,730 2 construction projects/yr	5	**YES**	No Section 7 ESA consultations	2 EAs/yr	<1 km^2/yr trimmed or removed 1 projects/yr	Airspace hr/yr = 4,650
Alternative C Increase Baseline Activities Introduce New Military Activities		**YES**	Test km/yr = 976,530 Rounds fired = 486,900 2-6 construction projects/yr	5	**YES**	No Section 7 ESA consultations	6 EAs/yr	<2 km^2/yr trimmed or removed 6 projects/yr	Airspace hr/yr = 18,580
Alternative D Baseline Activities Introduce New Nonmilitary Enterprises		**YES**	Test km/yr = 537,100 Rounds fired =243,550 2-6 construction projects/yr	5	**YES**	No Section 7 ESA consultations	+6 EAs/yr	<3 km^2/yr trimmed or removed 6 projects/yr	Airspace hr/yr = 9,290
Alternative E Increase Baseline Activities New Military Activities New Nonmilitary Enterprises		**YES**	Test km/yr = 1,025,370 Rounds fired =511,260 2-6 construction projects/yr	5	**YES**	No Section 7 ESA consultations	+6 EAs/yr	<1 km^2/yr trimmed or removed 3 projects/yr	Airspace hr/yr < 19,510
Alternative F PREFERRED DIVERSIFIED MISSION	**LOW**	**NO**	Test km/yr = 488,270 Rounds fired = 243,450 1-3 construction projects/yr	5	**YES**	No Section 7 ESA consultations	3 EAs/yr	<1 km^2/yr trimmed or removed 3 projects/yr	Airspace hr/yr = 9,290
	HIGH	**YES**	Test km/yr = 1,025,370 Rounds fired =511,260 2-6 construction projects/yr	5	**YES**	No Section 7 ESA consultations	+6 EAs/yr	<3 km^2/yr trimmed or removed 6 projects/yr	Airspace hr/yr < 19,510

TABLE 2-2
Summary of Environmental Consequences for Alternatives Considered

ENVIRONMENTAL ISSUE (ACROSS)		Socioeconomics		Land Use				Cultural		
ALTERNATIVE (DOWN)		**Potential Significant Impact**	Effects on local economy	**Potential Significant Impact**	Range Entries	Recreational area	Airspace	**Potential Significant Impact**	Preservation Section 106	Cleared SHPO surveys (small projects)
Alternative A 1991-1995 Baseline Military Activities		**NO**	$119 million/yr Constant employment No effect on Environmental Justice	**NO**	Kofa = 33,490 Cibola = 13,840	54,630 hectares	9,290 airspace hr/yr	**YES**	10 SHPO consultations/yr 2 test excavations/yr No sites damaged	10/yr
Alternative B Reduce Baseline Activities		**YES**	$59 million/yr Decrease employment Potential negative effect on Environmental Justice	**NO**	Kofa = 16,745 Cibola = 6,920	54,630 hectares	4,645 airspace hr/yr	**YES**	5 SHPO consultations/yr 1 test excavations/yr No sites damaged	5/yr
Alternative C Increase Baseline Activities Introduce New Military Activities		**YES**	$179 million/yr Increase employment Potential positive effect on Environmental Justice	**NO**	Kofa = 66,980 Cibola = 27,680	54,630 hectares	18,580 airspace hr/yr	**YES**	20 SHPO consultations/yr 4 test excavations/yr No sites damaged	20/yr
Alternative D Baseline Activities Introduce New Nonmilitary Enterprises		**NO**	$119 million/yr Increase employment No effect on Environmental Justice	**NO**	Kofa > 66,980 Cibola > 27,680	60,100 hectares	>18,580 airspace hr/yr	**YES**	15 SHPO consultations/yr 3 test excavations/yr No sites damaged	>25/yr
Alternative E Increase Baseline Activities New Military Activities New Nonmilitary Enterprises		**YES**	$200 million/yr Increase employment Potential positive effect on Environmental Justice	**NO**	Kofa > 66,980 Cibola > 27,680	54,630 hectares	>18,580 airspace hr/yr	**YES**	+25 SHPO consultations/yr +6 test excavations/yr No sites damaged	>25/yr
Alternative F PREFERRED DIVERSIFIED MISSION	**LOW**	**NO**	$119 million/yr Constant employment No effect on Environmental Justice	**NO**	Kofa = 33,490 Cibola = 13,840	60,100 hectares	9,290 airspace hr/yr	**YES**	10 SHPO consultations/yr 2 test excavations/yr No sites damaged	10/yr
	HIGH	**YES**	$200 million/yr Increase employment Potential positive effect on Environmental Justice	**NO**	Kofa > 66,980 Cibola > 27,680	60,100 hectares	>18,580 airspace hr/yr	**YES**	+25 SHPO consultations/yr +6 test excavations/yr No sites damaged	>25/yr

TABLE 2-2
Summary of Environmental Consequences for Alternatives Considered

ENVIRONMENTAL ISSUE (ACROSS)		Noise		Hazardous Substances & Waste Management				Radiation		
ALTERNATIVE (DOWN)		**Potential Significant Impact**	ICUZ exceedances & Complaints	**Potential Significant Impact**	Regulatory Violations	Waste Disposal	Waste Sites	**Potential Significant Impact**	DU range size and recovery rate	Radars & Lasers
Alternative A 1991-1995 Baseline Military Activities		**NO**	No reported ICUZ exceedances or complaints	**NO**	No violations	Propellant = 23,376 kg/yr Explosives = 1,227 kg/yr	2 managed RCRA sites 1 satellite site	**NO**	51 km^2 90%	59/28
Alternative B Reduce Baseline Activities		**NO**	No anticipated exceedances or complaints	**NO**	No violations anticipated	Propellant =11,688 kg/yr Explosives = 614 kg/yr	2 managed RCRA sites 1 satellite site	**NO**	55.5 km^2 90%	59/28
Alternative C Increase Baseline Activities Introduce New Military Activities		**NO**	No anticipated exceedances or complaints	**NO**	No violations anticipated	Propellant= 46,751 kg/yr Explosives = 2,455 kg/yr	4 managed RCRA sites >1 satellite site	**NO**	55.5 km^2 90%	96/44
Alternative D Baseline Activities Introduce New Nonmilitary Enterprises		**NO**	No anticipated exceedances or complaints	**NO**	No violations anticipated	Propellant = 25,713 kg/yr Explosives = 1,350 kg/yr	4 managed RCRA sites >1 satellite site	**NO**	55.5 km^2 90%	86/28
Alternative E Increase Baseline Activities New Military Activities New Nonmilitary Enterprises		**NO**	No anticipated exceedances or complaints	**NO**	No violations anticipated	Propellant = 49,089 kg/yr Explosives =2,577 kg/yr	4 managed RCRA sites >1 satellite site	**NO**	55.5 km^2 90%	96/44
Alternative F PREFERRED DIVERSIFIED MISSION	**LOW**	**NO**	No anticipated exceedances or complaints	**NO**	No violations anticipated	Propellant = 23,376 kg/yr Explosives = 1,227 kg/yr	2 managed RCRA sites 1 satellite site	**NO**	55.5 km^2 90%	59/28
	HIGH	**NO**	No anticipated exceedances or complaints	**NO**	No violations anticipated	Propellant = 49,089 kg/yr Explosives =2,577 kg/yr	4 managed RCRA sites >1 satellite site	**NO**	55.5 km^2 90%	96/44

TABLE 2-2
Summary of Environmental Consequences for Alternatives Considered

ENVIRONMENTAL ISSUE (ACROSS)		Aesthetic Values			Utilities & Infrastructure				
ALTERNATIVE (DOWN)		**Potential Significant Impact**	Impact to visibility	Degradation to values	**Potential Significant Impact**	Energy consumption cost	Communication	Housing occupancy Family BOQ	Solid waste management
Alternative A 1991-1995 Baseline Military Activities		**NO**	Moderate - temporary	None	**NO**	$0.85 to 1 million	Adequate	93% 100%	Adequate - landfill closure 2020
Alternative B Reduce Baseline Activities		**NO**	Low - temporary	None anticipated	**NO**	$0.39 to 0.54 million	Adequate	73% 50%	Adequate - landfill closure 2044
Alternative C Increase Baseline Activities Introduce New Military Activities		**NO**	Moderate - temporary	None anticipated	**YES**	$1.7 to 2 million	New systems required	>100% >100%	Inadequate - landfill upgrade
Alternative D Baseline Activities Introduce New Nonmilitary Enterprises		**NO**	Moderate - temporary	None anticipated	**NO**	$1.2 to 1.4 million	New systems required	93% 100%	Inadequate - landfill upgrade
Alternative E Increase Baseline Activities New Military Activities New Nonmilitary Enterprises		**NO**	Moderate - temporary	None anticipated	**YES**	$1.2 to 2 million	New systems required	>100% >100%	Inadequate - landfill upgrade
Alternative F PREFERRED DIVERSIFIED MISSION	**LOW**	**NO**	Moderate - temporary	None anticipated	**NO**	$0.85 to 1 million	Adequate	93% 100%	Adequate - landfill closure 2020
	HIGH	**NO**	Moderate - temporary	None anticipated	**YES**	$1.2 to 2 million	New systems required	>100% >100%	Inadequate - landfill upgrade

TABLE 2-2
SUMMARY OF ENVIRONMENTAL CONSEQUENCES FOR ALTERNATIVES CONSIDERED

ENVIRONMENTAL ISSUE (ACROSS)		Transportation			Health & Safety
ALTERNATIVE (DOWN)		**Potential Significant Impact**	Highway level of service	Airport Level of service Landings & takeoffs/yr	**Potential Significant Impact**
Alternative A 1991-1995 Baseline Military Activities		**NO**	Acceptable	Acceptable 5,770	**NO**
Alternative B Reduce Baseline Activities		**NO**	Acceptable	Acceptable 2,890	**NO**
Alternative C Increase Baseline Activities Introduce New Military Activities		**YES**	New roads required	Improvements required 11,540	**NO**
Alternative D Baseline Activities Introduce New Nonmilitary Enterprises		**YES**	New roads required	Acceptable 6,350	**NO**
Alternative E Increase Baseline Activities New Military Activities New Nonmilitary Enterprises		**YES**	New roads required	Improvements required 12,120	**NO**
Alternative F PREFERRED DIVERSIFIED MISSION	**LOW**	**NO**	Acceptable	Acceptable 5,770	**NO**
	HIGH	**YES**	New roads required	Improvements required 12,120	**NO**

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3.0 AFFECTED ENVIRONMENT

3.1 INTRODUCTION

Topics discussed in this chapter are climate, topography, air, water, geology and soils, biology, cultural resources, socioeconomics, land use, noise, hazardous substances and waste management, radiation, aesthetic values, utilities and support infrastructure, transportation, and health and safety. Their descriptions provide a baseline of the natural and human environment for identification and evaluation of potential environmental changes resulting from each of the alternatives. Additionally, the baseline information provided is intended to be used for tiering in future NEPA documentation. Laws, regulations, permits, and licenses applicable to environmental activities at YPG are listed in appendix A. References provided in each section are listed in appendix B, Bibliography. Consult these reference sources for a more thorough treatment of each subject. This chapter includes issues of concern identified by the public and agencies during scoping (listed in the Scoping Synopsis, available upon request).

3.1.1 Climate

Yuma Proving Ground is located in the Sonoran Desert, a low-elevation, hot, and arid desert. Clear skies, low relative humidity, slight rainfall, and large, daily temperature variations characterize the climate. According to meteorological records, the average daily temperatures range from 27°C (80° F) to more than 38° C (100° F) during summer months, and from 4.3°C (40° F) to 19°C (65 °F) during winter months. The all-time record high temperature is 51° C (124° F) which occurred on July 28, 1995. The all-time record low temperature is -8.4° C (23°F) which occurred on January 8, 1971. A profile of average temperature ranges, based on a 33-year history (1954 through 1986) of desert conditions in southwestern Arizona (Woodcock, 1992), is shown in table 3-1.

The wind speed averages six kph (3 knots) during September through February. From March through August the average wind speed is seven to nine kph (4 to 5 knots). The windiest time of the year is in the spring and summer with normally more than 10 days per month having wind gusts of over 37 kph (20 knots) (Woodcock, 1992).

The prevailing direction is from the north-northwest from late autumn until early spring. As temperatures warm, winds shift to a more southerly direction. Winds associated with the summer monsoons shift toward the southeast (Woodcock, 1992).

3.1.2 Topography

Features of the Sonoran Desert Basin and Range physiographic province (U.S. Bureau of Reclamation, 1989) are the result of block-faulting that occurred about 15 million years ago. Typical features include broad basins or valleys, and steep, block-faulted mountain ranges that formed basin/valley boundaries (U.S. Bureau of Reclamation, 1976). Sediments above the structural basin bedrock are typically composed of conglomerate (rocks cemented together from debris of surrounding mountains). Finer-grained basin fill and alluvial deposits formed the remaining basin deposits (U.S. Bureau of Reclamation, 1976). The thickness of sediments may change abruptly from a few hundred feet to several thousand feet. The center area of a typical basin contains thick deposits. However, deposits on the bedrock shoulder are thin. The shoulder area, where the mountain has been worn away, may extend several miles into the existing topographical basin (U.S. Bureau of Reclamation, 1976).

The maximum elevation of 857 m (2,822 feet) msl (mean sea level) occurs in the Chocolate Mountains and the lowest elevation, 59 m (195 feet) msl, is found just south of the Main Administrative Area. Surface drainage in the western portion of YPG flows west into the Colorado River while the remainder flows south into the Gila River. Most of the surface flow occurs on lowland washes that generally have slopes on the order of 1 to 3 percent and are dry except during occasional periods of intense rainfall (Entech Engineers, 1987).

TABLE 3-1
CLIMATOLOGY SUMMARY [1]

Month	Precipitation		Monthly Average Temperature	
	millimeters	inches	maximum	minimum
January	12.19	0.48	20° C (68° F)	6° C (42° F)
February	7.87	0.31	22° C (73° F)	8° C (46° F)
March	8.64	0.34	25° C (78° F)	10° C (50° F)
April	3.30	0.13	29° C (85° F)	13° C (56° F)
May	1.02	0.04	36° C (93° F)	17° C (64° F)
June	1.27	0.05	39° C (103° F)	22° C (72° F)
July	6.10	0.24	41° C (106° F)	26° C (80° F)
August	13.72	0.54	40° C (104° F)	26° C (80° F)
September	10.92	0.43	37° C (100° F)	23° C (73° F)
October	9.65	0.38	31° C (89° F)	16° C (61° F)
November	6.35	0.25	24° C (76° F)	10° C (49° F)
December	9.65	0.38	20° C (68° F)	6° C (43° F)
Total	**90.68**	**3.57**		

[1] Based on 33 years of data (Woodcock, 1992).

3.2 AIR RESOURCES

The Clean Air Act (CAA), PL 88-206 as amended, establishes National Ambient Air Quality Standards (NAAQS) for the control of criteria air pollutants to prevent adverse effects to national air resources and to protect human health and the environment. The Arizona Department of Environmental Quality (ADEQ) has adopted these Federal standards as the Arizona Ambient Air Quality Standards (AAAQS). The Arizona Department of Environmental Quality is the regulating and enforcing agency of Arizona air standards.

The size and topography of the air basin, prevailing meteorological conditions, and type and amount of pollutants emitted into the atmosphere determine air quality. Both the Central Meteorological Office and Atmospheric Sciences Laboratory have documented meteorological conditions for the years 1954 through 1986 (Woodcock, 1992). This information is useful to the assessment of air quality at YPG.

3.2.1 Installation Ambient Air Quality

Air emissions tracked on the installation consist of criteria air pollutants, volatile organic compounds (VOCs), hazardous air pollutants (HAPs), ozone-depleting chemicals (ODCs), and smokes and obscurants. One of the criteria pollutants is airborne particulate matter 10 microns or less in diameter (PM_{10}). Because of the importance of the PM_{10} nonattainment area, this air pollutant is examined separately. A nonattainment area is a location that does not meet Federal air quality standards.

Yuma Proving Ground is considered a synthetic minor source of air emissions by ADEQ. Under the synthetic minor program, YPG has agreed to reduce the potential to emit below the major source cutoff by accepting a federally enforceable limit. In addition, YPG is required to accept restrictions in the State Implementation Plan (SIP) or during new source review which limit certain operations or activities to below specified levels.

Some installation activities that could impact air quality are vehicle maintenance, dust course maneuvers, smoke testing, construction projects, open burning, and generator usage. Air quality is analyzed based on regulated air emissions such as chlorofluorocarbons (CFCs) and halogen gases, as well as sulfur oxides (SO_X), nitrogen oxides (NO_X), and particulates. Airborne lead concentration has not been assessed but is under assessment consideration.

Yuma Proving Ground has explored and implemented ways to minimize its impact on air quality. Environmental programs works cooperatively with ADEQ to remain in compliance with air quality regulations. Activities that could contribute to air quality degradation are avoided as much as possible by the proactive management activities of YPG environmental staff.

Best management practices and preventive measures, such as training and coordination between testers and environmental programs, are implemented to ensure the least impact to air quality by installation activities.

3.2.1.1 PM_{10}

In arid regions such as southern Arizona, PM_{10} is naturally higher due to low soil moisture, low humidity, and wind. Human activities in populated areas and agricultural practices add airborne particles to the air. Yuma Proving Ground is a minor contributor to PM_{10} in Yuma County (Arizona Department of Environmental Quality, 1994b).

Table 3-2 reviews historic PM_{10} data in Yuma County. This represents the nearest available historical information since no data were collected on YPG. Yuma County and YPG are sparsely populated areas with only a minor industrial base. Although Yuma County and a small portion of the Laguna Region in YPG are considered nonattainment for PM_{10}, data from ADEQ for 1991-1995 do not show exceedances of the AAAQS.

TABLE 3-2
PM_{10} CONCENTRATIONS IN YUMA COUNTY
ANNUAL AVERAGES FOR 1990 TO 1995

SITE/YEAR	1990	1991	1992	1993	1994	1995
Yuma (**F**g/m^3)	57	48 [a]	29	31	32 [b]	35

[a] Sampler type changed.
[b] Invalid annual average due to insufficient number of samples.
Annual standard = 50 µg/m^3
Note: A number of sites appear to have higher monitored concentrations in 1990 and 1991 than in subsequent years. This is an anomaly in the database caused by two factors. One factor was a change from high volume samplers to dichotomus samplers in 1990 and 1991. The other factor was a QA/QC problem in operating the high volume samplers prior to 1992.
Source: Arizona Department of Environmental Quality, 1996, 1995d, 1994c, 1993, 1992.

Figure 9 shows the area of YPG that is in a nonattainment area. The primary sources of the 5,300 metric tons (5,800 tons) per year of PM_{10} in Yuma County are from agricultural tilling, vehicles, and construction. Agricultural tilling activity is a major contributor to the PM_{10} nonattainment area, while the installation is a minor contributor (Arizona Department of Environmental Quality, 1994b). Additionally, 1995 air quality data for Yuma County is presented in table 3-3 from ADEQ, OFR 96-26, 1995. The pollutants of concern are ozone and PM_{10}. Available ozone data are below AAAQS. No exceedances were shown by PM_{10}.

Emission reduction measures for this area are set forth in the SIP. In this plan, a six percent reduction in dust emissions (produced mainly by motor vehicle traffic and agricultural activities outside YPG) is required to reduce annual PM_{10} to the EPA standard of 50 g/m^3 (Arizona Department of Environmental Quality, 1994b). Yuma Proving Ground is not entirely responsible for this reduction. A Memorandum of Understanding (MOU) between ADEQ and YPG is described in the 1994 SIP. It requires the installation to surface some open lands with concrete and to use dust palliatives on others. An annual report to ADEQ summarizes YPG's activities in implementing dust control measures.

Dust dispersion rates are high in the region of the installation (U.S. Army Corps of Engineers and Mittlehauser, 1994). Most dust remains localized, although smaller particulate matter remains suspended and may drift several kilometers. Dust clouds sometimes affect visibility along U.S. Highway 95. Temperature inversions sometimes occur in the evening. In combination with a test, temperature inversion may cause a dust cloud to hang over the entire test course and perhaps extend across U.S. Highway 95 (Dailey, 1997). Trucks and tanks operating on old Highway 95 may also cause dust clouds across U.S. Highway 95 due to prevailing westerly winds and close proximity to the highway. Helicopters generate dust when departing and landing on bare soil. The cryptogamic crust (surface crust made of living organisms) is blown off, and soil is then exposed to wind, creating airborne dust.

Another source of dust is the tracked and wheeled vehicles operating on unpaved roads. A preliminary calculation based on test miles driven suggests this source contributes 41 tons per year (tpy) (37 metric tons) of particulate matter. This value is tenuous, given limited information regarding vehicle types and emission factors. The basis for this estimate is EPA Compilation of Air Pollution Emission Factors AP-42 and Maricopa and Pima counties air documentation applicable to Arizona (U.S. Environmental Protection Agency, 1985).

3.2.1.2 Ozone-depleting Chemicals

The Army is required to eliminate or minimize emissions of ozone-depleting chemicals (ODCs) according to the Montreal Protocol on Substances that Deplete the Ozone Layer, as amended, and the CAA. Halons were to be phased out by January 1994. Carbon tetrachloride and 1,1,1-trichloroethane or chlorofluorocarbons (CFCs) were to be phased out by 1996. The Environmental Protection Agency issued a phase out on the domestic production of CFCs and halons (U.S. Environmental Protection Agency, 1988b). Ozone-depleting chemicals will eventually be eliminated due to the phase out process. Department of Defense Directive 6050.9 requires the military to regulate and phase out the use of ODCs. The DoD prioritizes categories for this phase out process. The Ozone-Depleting Chemical Annual Report was established by the DoD to track quantities and use of ODCs.

Locations of ODCs at YPG include fire fighting equipment, air conditioners, refrigeration units, and environmental chambers. Yuma Proving Ground pollution prevention program requires recycling of refrigerants containing ODCs, replacing these refrigerants with alternate coolants as they become available, and retrofitting or replacing existing equipment. Ozone-depleting chemicals must be recovered before turning equipment over to the Defense Reutilization and Marketing Office (DRMO) or a contractor.

The installation does not reclaim or dispose of solvents having Class I ODCs listed in Title VI of the CAA. A contractor delivers new solvent and picks up spent solvent. The CAA requires manufacturers to eliminate ODCs in solvent formulas.

TABLE 3-3
YUMA COUNTY AIR QUALITY

Substance	AAAQS	24-hr Average Emission Rate	Averaging Time Emission Rate
Ozone [a]	235 $\mu g/m^3$	0.09 ppm	0.11 ppm (1-hr)
PM_{10}	150/50 $\mu g/m^3$	75 $\mu g/m^3$	35 $\mu g/m^3$ (24-hr)

[a] Source: Ozone Concentrations in Phoenix, Tucson, and Yuma in ADEQ, OFR 96-26, figure 7.

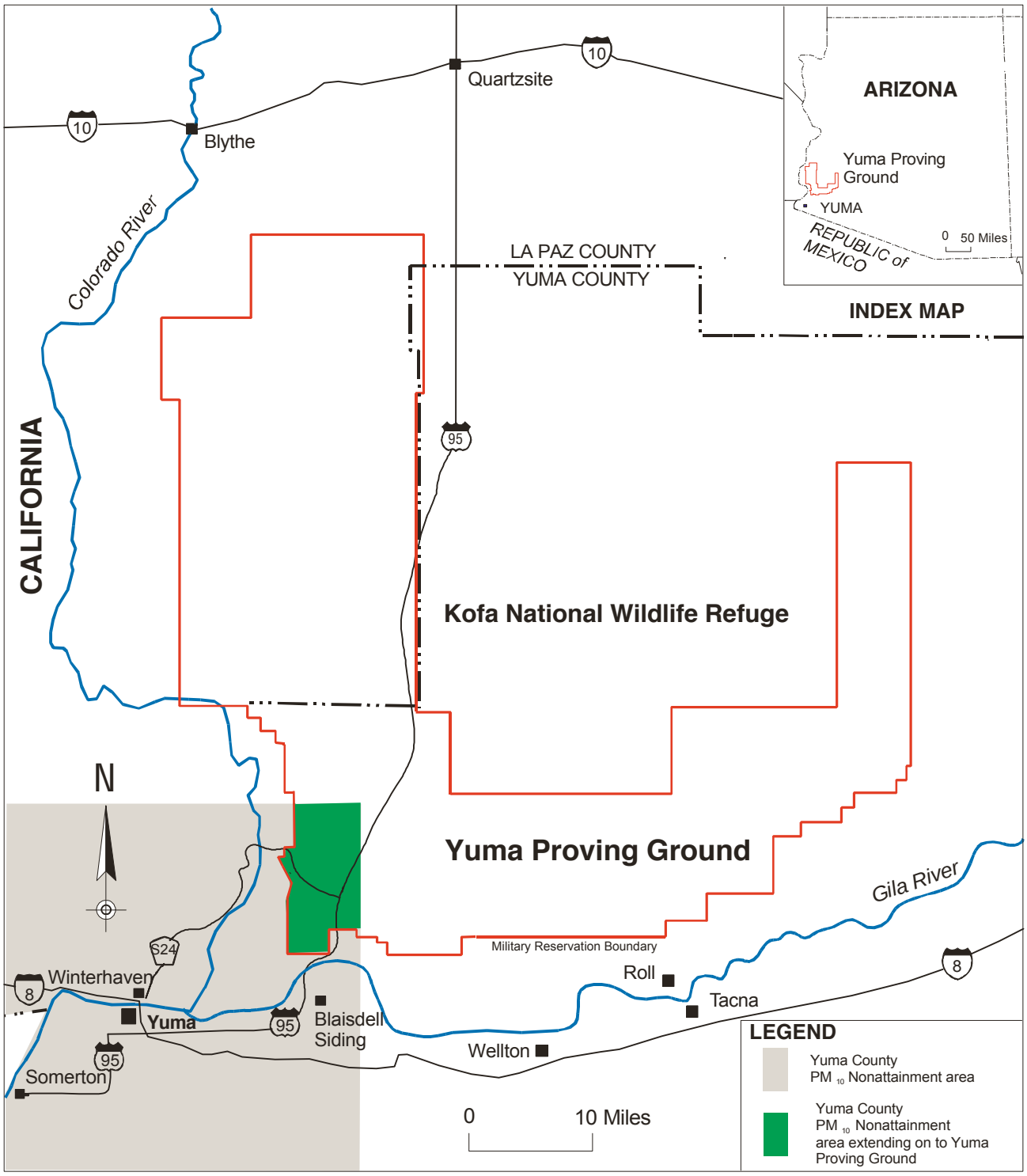


Figure 9. PM_{10} Nonattainment Area at Yuma Proving Ground.

3.2.1.3 Smokes and Obscurants

Smokes and obscurants are employed at YPG to mask both troop and mechanized equipment movements during training. Smoke testing includes the use of fog oil, graphite particles, kaolin, and red and white phosphorus. Initial classroom training to familiarize troops with smoke environments is standard; however, full-scale training is conducted outdoors. A training exercise usually requires making smoke for approximately two hours (Muhly, 1983).

During smoke and obscurant testing, noncombusted petroleum-based smokes containing particulates and hydrocarbons in fog oil aerosol and exhaust emissions are primary pollutants that may not comply with emission standards as defined in 40 CFR parts 85-87. However, these short burst emissions are not as severe as the continuous emissions of pollutants by industry. The volatile nature of fog oil suggests that any releases would be rapidly attenuated in the environment (Driver, et al., 1993). Sites for smoke generation trials are located as far as possible from ecologically sensitive areas, installation boundaries, and populated areas (Muhly, 1983).

The new CAA Amendments of 1990 do not identify graphite as a specifically regulated pollutant. However, graphite flake aerosols used as obscurants fall under the NAAQS PM_{10} standards. Airborne concentrations may exceed safe short-term limits for humans within several kilometers of the source (Driver, et al., 1993).

Kaolin, white, hydrous aluminum silicate clay, is also utilized in smoke testing. Kaolin is not toxic, and its use is not expected to cause any adverse effects (U.S. Army Corps of Engineers, 1993b).

Smoke testing at YPG also involves the use of white phosphorus. White phosphorus will spontaneously oxidize when exposed to air. The environmental fate of white phosphorus is oxidation to phosphates. Phosphates resulting from testing will act as nutrients to soil. The impact of phosphorus munitions on the environment is typically short term and reversible (Yon, et al., 1983).

3.2.1.4 Criteria Air Pollutants, VOCs, and HAPs

Other relevant air pollutants are briefly discussed here. A 1996 air emissions inventory indicated criteria pollutants levels were well below established Federal and State regulatory standards (Gutierrez-Palmenberg, Inc., 1997e). Calculated pollutant levels are reported to ADEQ on an annual basis.

CRITERIA AIR POLLUTANTS

Carbon monoxide (CO) is a colorless, odorless, tasteless gas formed primarily by incomplete combustion of fossil fuels. General observations indicate ambient air CO levels are attributed to vehicle exhausts and generators.

Lead is a heavy metal that was previously used as a gasoline additive and is found in some industrial emissions. Heavily populated industrial areas generate the greatest potential for air pollution problems occurring from lead. Studies for the airborne concentration of lead have not been performed but are under consideration.

Nitric oxide (NO) and nitrogen dioxide (NO_2) are two critically tracked air pollutants. In the United States, the major source of nitrogen oxides is fossil fuel combustion. Many fuels contain nitrogen compounds which, oxidize to form nitrous oxides upon combustion.

Ozone is a highly reactive molecule made of three oxygen atoms. Ozone is not emitted directly into the air but is the result of chemical reactions in ambient air. Table 3-3 presents 1995 ozone data for Yuma County.

Sulfur oxides (SOx) usually result from combustion of fuels, mainly sulfur coal. The main contaminants formed are sulfur dioxide (SO_2) and sulfur trioxide (SO_3). Reacting in the atmosphere SO_2 can sometimes produce sulfuric acid.

VOLATILE ORGANIC COMPOUNDS

All Volatile Organic Compounds (VOCs) contain carbon, the basic chemical element found in living organisms. Volatile chemicals escape into the air easily. Volatile organic compounds are released from evaporating or burning fuel (e.g., gasoline, oil, wood, coal, natural gas, etc.), solvents, paints, glues, and other products. Cars are an important source of VOCs. Many VOCs are also hazardous air pollutants. Efforts to control smog target VOCs for reduction (U.S. Environmental Protection Agency, 1997).

HAZARDOUS AIR POLLUTANTS

Hazardous air pollutants (HAPs), also known as toxic air pollutants, are those pollutants known or suspected to cause cancer or other health effects, such as birth defects or reproductive effects. Examples of toxic air pollutants include dioxins, benzene, arsenic, beryllium, mercury, and vinyl chloride. The Clean Air Act currently lists 189 hazardous air pollutants to be regulated by EPA.

They are emitted from all types of sources, including motor vehicles and stationary sources, such as manufacturing plants.

Control of HAPs differs in focus from control of the criteria pollutants for which EPA has established NAAQS. For the criteria pollutants, a variety of control strategies are used in geographic areas where national air quality standards have been violated. In contrast, for HAPs, EPA has focused on identifying all major industrial sources that emit these pollutants and developing national technology-based performance standards to significantly reduce their emissions. The objective is to ensure that major sources of HAPs are well controlled regardless of geographic location (U.S. Environmental Protection Agency, 1996).

3.2.2 Air Quality Monitoring

The Army calculates the extent and generation of particulate matter at the installation (section 3.2.1.1). An air quality monitoring plan is being considered. This study will help identify the amount of particulate matter generated by YPG activities and determine if activities are a contributing factor to the nonattainment status of the area. Vehicle test courses have calculated particulate matter generation, and are considering future air monitoring. Some mobility courses are designed specifically to test the effects of dust on military vehicles. The dust courses are located away from populated areas where monitoring would take place.

Open burning and open detonation (OB/OD) activities of excess and expired propellants and explosive items are conducted at Kofa OB/OD Management Unit. The ADEQ Air Quality Division evaluated operations at the site and issued an air permit (Arizona Department of Environmental Quality, 1995c). Permitted OB/OD operations are limited to approved burn times and to quantities. During approved burn times, winds do not carry smoke or residue beyond YPG boundaries (Gutierrez-Palmenberg, Inc., 1997a).

A 1993 Air Pollution Emission Statement presented results of an installation-wide air emissions inventory conducted by Geomet Technologies, Inc. The results were used in the Operating Air Permit Application (Gutierrez-Palmenberg, Inc., 1995c). Some sources in the inventory were deemed permitted sources by ADEQ and required to be included in the annual air emissions inventory. Permitted sources (degreasers and generators) are regulated under the permit. The rest of the activities were categorized by ADEQ as insignificant activities. Insignificant activities include boilers/ heaters, fuel stored in underground storage tanks (USTs) and aboveground storage tanks (ASTs), paint, pesticides and herbicides, carpentry and woodworking, painting, abrasive blasting operations, and mobile sources (Arizona Department of Environmental Quality, 1995b). Yuma Proving Ground monitors insignificant activities to ensure emissions remain comparable to baseline levels (table 3-4).

The 1996 air emissions inventory indicated levels of criteria air pollutants, VOCs, and HAPs were well below established Federal and State regulatory standards (Gutierrez-Palmenberg, Inc., 1997e).

TABLE 3-4
1995 AIR EMISSIONS FOR PERMITTED SOURCES

Primary Air Pollutants	Arizona Ambient Air Quality Standard	1995 Air Emission Inventory Amounts Reported for Permitted Sources at YPG (Degreasers & Generators)
Carbon Monoxide (CO)	100 tons per year (tpy)	3.857 tpy
Nitrogen Oxides (NOx)	40 tpy	15.89 tpy
Sulfur Oxides (SOx)	40 tpy	1.589 tpy
Particulate Matter	25 tpy	----
PM_{10}	15 tpy	1.028 tp
Volatile Organic Compounds (VOCs)	40 tpy	6.287 tpy
Lead (Pb)	0.06 tpy	----
Hazardous Air Pollutants (HAPs)	Varies by individual substance	0.2286 tpy (HAPs are shown as total for all permitted sources)

3.3 WATER RESOURCES

Surface water resources include rivers, desert washes, and water tanks. Groundwater is found in hydrologic basins located below the ground surface. Primary laws protecting water resources include the Clean Water Act (CWA) and the Safe Drinking Water Act (SDWA). Wastewater treatment lagoons are permitted and monitored under the National Pollutant Discharge Elimination System (NPDES) program (Section 402 of the CWA) and the Aquifer Protection Permit (APP) program administered by the State of Arizona. The NPDES program also requires a spill prevention plan. Regulatory authority for NPDES is with ADEQ. The COE, Los Angeles District, Arizona Section, regulates section 404 of the CWA. Drinking water is regulated through ADEQ. Primary drinking water standards are enforceable by Federal regulation. EPA recommends secondary drinking water standards, but each state may choose how to enforce the standards. Environmental programs submit ongoing monitoring and reports to ADEQ and EPA.

3.3.1 Surface Water

The Army maintains surface water quality at YPG through environmental programs. To maintain sustainable use of land resources including surface water, the Army developed the Integrated Training Area Management (ITAM) program. This program is discussed in more detail under the section entitled Geological and Soil Resources. Additional protection of surface water from accidental hazardous substance spills is through the environmental programs, Compliance Program. It reports the location and management of hazardous substances to ADEQ per the SPCCP (Gutierrez-Palmenberg, Inc., 1994, revised 1997c).

3.3.1.1 Colorado and Gila Rivers

Several permanent water sources exist outside YPG boundaries. Two major rivers flow through the adjacent desert. The Colorado River traverses a generally north-south direction to the west of the proving ground. Surface drainage on the western part of YPG flows into the Colorado River. The Gila River traverses an east-west direction to the south of YPG. Surface drainage on the central and eastern parts of YPG flow into the Gila River. Both rivers have breached their banks during wet years and caused property damage. However, upstream dams and reservoirs, such as Mittry Lake, Martinez Lake, Squaw Lake, Imperial Dam, Ferguson Lake, and Senator Wash Reservoir (all located along the Colorado River west of YPG) and Painted Rock Dam (on the Gila River) have decreased the severity of recent flood events. Major drainage features are shown in figure 10.

Surface runoff from storm events is drained into the Colorado and Gila rivers. The U.S. Geological Survey (USGS) regularly collects Colorado River water samples at Imperial Dam. The river water is high in sodium and calcium and conductivity ranges from 1,100 to 1,700 S/cm (microseimens). That water quality is somewhat constant. On the other hand, water quality of the Gila River varies over a wide range. During flooding, the river water is very good quality with lower sodium, calcium, and conductivity. But during low flow, the drainage ditches add water from the farmland to the river, bringing the conductivity up as high as 9,000 S/cm and adding fertilizer and pesticide residues to the water. Water from YPG arrives at both rivers during flood events when the river water is of better quality. The additional runoff during these flooding periods is minimal compared to the total river flow. Thus, YPG's contribution of good quality floodwater is hardly noticed (U.S. Geological Survey, 1994).

3.3.1.2 Desert Washes

Infrequent rainfall produces localized flash-flooding and temporary surface water, especially during thunderstorms in August and September. Rainfall averages 8.9 cm (3.5 inches) per year, and the evaporation pan rate is 272 cm (107 inches) per year. The combination of low precipitation and high evaporation prevents surface water from infiltrating deeply into the soil. Thus, most of the year, desert washes are dry. But during heavy rainstorms, these washes drain surface water (Entech Engineers, Inc., 1987). Washes vary in size, from less than a meter in width and depth, to more than a kilometer in width and 10 meters in depth. Each wash contains numerous smaller channels that change course during major flood events (figure 10).

SURFACE WATER IN THE KOFA REGION

Runoff in this region generally tends to have characteristics of sheet flow. Only a few large washes are located in this region and principally are fed by sheet flow and smaller washes. This region drains south toward the Gila River.

- Castle Dome Wash is located on the western edge of the Kofa Region. The wash, fed by several smaller washes originating in the Kofa Mountains, drains to the south-southwest.
- Big Eye Wash is located in the central portion of the Kofa Region. The wash, fed by several smaller washes originating in the Kofa Mountains, drains south-southwest.
- Vinegarroon Wash is located in the southwest corner of the Kofa Region. The wash, fed by several smaller washes, drains south and west.

SURFACE WATER IN THE CIBOLA REGION

There are several wash systems located in the Cibola Region. These systems drain toward the Colorado River.

- McAllister Wash drains south-southwest through the south Cibola Region.
- Indian Wash drains south-southwest through the Cibola Region.
- Los Angeles Wash, fed by numerous smaller washes, drains south-southwest through the south Cibola Region.
- Yuma Wash drains south in the western Cibola Region.
- Gould and Mohave washes, located in the northern part of Cibola, drain north-northwest.

SURFACE WATER IN THE LAGUNA REGION

There are two main washes in the Laguna Region. These systems drain toward the Gila River.

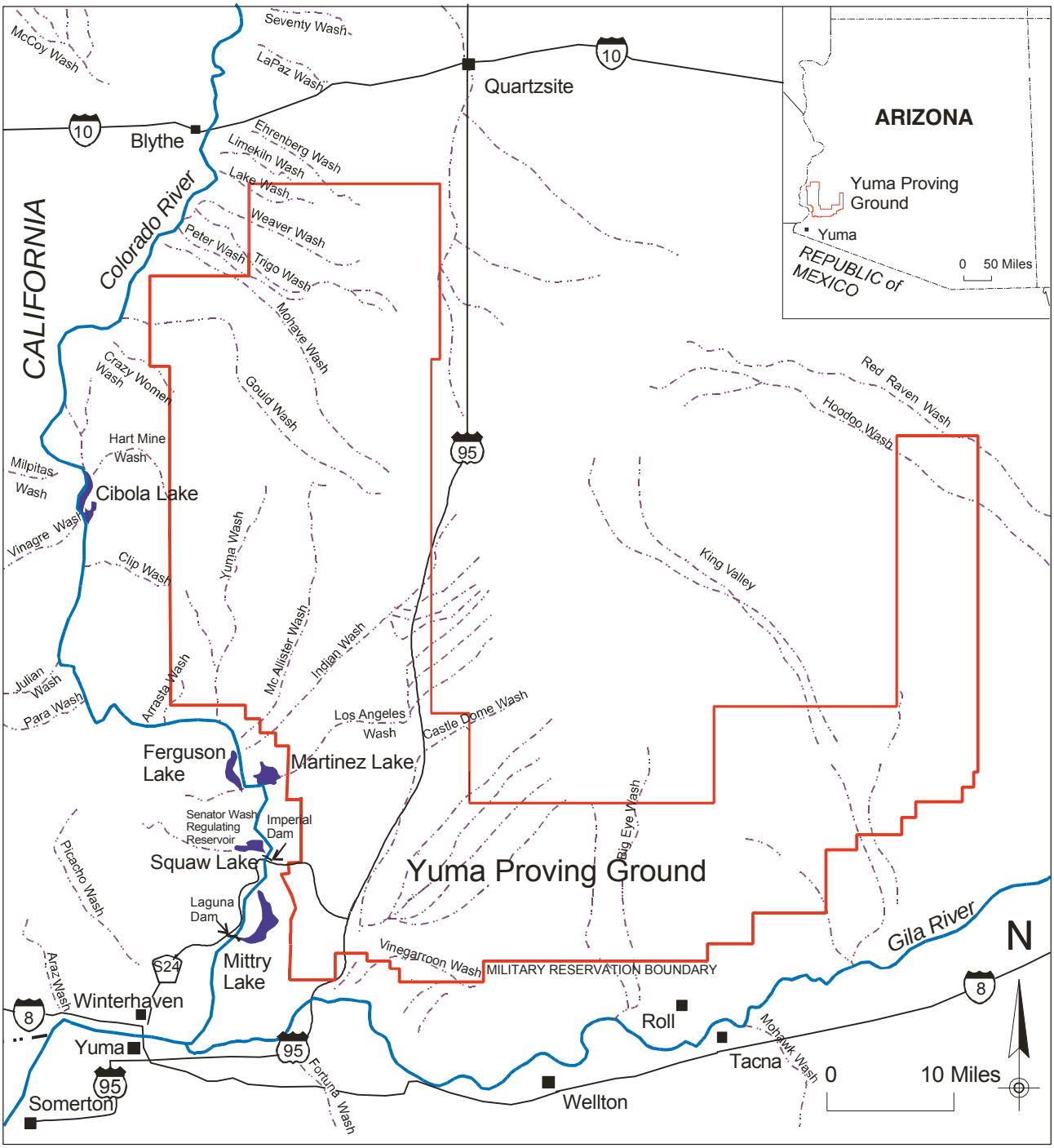


Figure 10. Major Drainage Features of Yuma Proving Ground and Surrounding Area.

- Castle Dome Wash drains southwest and then south through Laguna Region, located through the middle of the Laguna Region.
- Vinegarroon Wash originates in the Muggins Mountains and drains both southwest and southeast. It is located in the southeast portion of the Laguna Region.

3.3.1.3 Natural and Artificial Water Tanks

Yuma Proving Ground has few natural, year-round sources of water. Some natural water tanks have been modified to provide year-round water to wildlife. Palmer (1986) identified four types of water sites described below used by wildlife:

- Tinajas are naturally occurring, bowl-shaped cavities scoured out of bedrock. Tinajas are usually found at the base of waterfalls where the bedrock formation that created the waterfall changes from harder to softer rock. Rocks trapped in the cavity increase scouring. Tinajas are usually located in the mountain canyons.
- Enhanced Tinajas are tinajas that have been artificially improved to increase and prolong water storage capacity. Most should retain water throughout the year.
- Water Catchments are storage tanks, sized from 5,700-132,500 L (1,500 to 34,500 gallons), constructed by AGFD. These tanks are located in Cibola and Kofa Regions.
- Other Artificial Water Sources have developed over the years as a result of leaking landscape irrigation pipes, excess water released by stand pipes, or by pumping water into impoundments (Morrill, 1990). Two of these impoundments are described below.

Lake Alex is a well-pumped impoundment near Pole Line Road and north of Red Bluff Mountain in the eastern Kofa Region.

Ivan's Well is a well-pumped impoundment near Growl Road and Kofa Mohawk Road in the Kofa Region.

3.3.1.4 Senator Wash Regulating Reservoir

Senator Wash Regulating Reservoir is located on the California side of the Colorado River upstream from Imperial Dam (figure 10). Water is pumped from the Colorado River for storage.

3.3.1.5 Surface Water Quality

The CWA protects surface water by establishing effluent guidelines, water quality standards, and controlling discharges of oil and hazardous substances into surface water. Section 404 of the CWA prohibits dredging or discharges of fill material into waters of the United States without a permit. On YPG, section 404 applies primarily to desert washes. General permits may be required for any activity discharging fill material in a desert wash including road crossings, bank protection, channelization, and for new construction.

Containment basins trap discharges of fuel and prevent discharges to surface water. Two aboveground fuel storage tank areas located at the Kofa Firing Front are confined in concrete containment basins. The Laguna Region has eight aboveground fuel storage areas, most of which are confined in concrete containment basins. These tank areas are monitored and visually inspected for leakage by the environmental programs and Logistics offices.

In the Kofa Region, surface water is protected from the possibility of DU contamination by trapping runoff in an evaporative lagoon designed for a 100-year flood event. Minimal amounts of DU have been found in washes adjacent to the NRC-licensed DU impact area. Low annual rainfall, inadequate gradient of desert pavement, and high density of uranium limit the transport of DU to washes. Insufficient rainfall also limits the flow in washes, thereby limiting the probability of transporting DU off-post to the Gila or Colorado River (Ebinger, et al. 1995).

3.3.2 Groundwater Resources

The Army uses well water for domestic and industrial operations. Groundwater supplied by most wells is nonpotable because of high fluoride levels (Entech Engineers, Inc., 1987). Drinking water is either imported in bottles or treated. The main water yielding units are alluvial deposits (Click and Cooley, 1967).

3.3.2.1 Groundwater Aquifer

Geologic history is essential to understanding the groundwater basin. Years ago, water entered closed basins and formed salty lakes because there was no exit route for a river to drain the lake. (This condition still exists at the Great Salt Lake in Utah.) As time progressed, the lakes evaporated and developed layers of evaporite (salts). Little information is known about the YPG basin because few wells have extended beyond the upper alluvium (sediment deposited by moving water). However, the presence of highly mineralized water deep in the basin suggests a salty lake condition early in its history. Evaporites exist in part of the basin. Probably, the basin was not always closed but instead was drained at times by nearby rivers.

The Colorado and Gila Rivers replenish the groundwater in the Yuma region. Local precipitation and runoff are minor sources of groundwater recharge. The groundwater reservoir under YPG has two water-bearing units. The lower water-producing unit is within Tertiary (65 million to three million years ago) rock. The groundwater from this unit is generally mineralized or too deep to be of significance. The second water-producing unit is the Quaternary (three million years ago to present day) alluvium.

The Bureau of Reclamation conducted a soil and groundwater study at the petroleum, oil, and lubricant (POL) bladder test spill site from 1992 to 1996. The groundwater gradient was found to be nearly flat, with depth to groundwater at about 44 m (145 feet) (U.S. Bureau of Reclamation, 1993b). The study found the younger alluvium to be the water-producing unit. According to USGS, the estimated recoverable groundwater in the aquifer of the basin is 50 million-acre feet. The estimated annual inflow and outflow to the aquifer is 65 thousand-acre feet (Freethey and Anderson, 1986).

3.3.2.2 Groundwater Quality

A groundwater investigation was conducted to compile existing data, evaluate potential for contamination of surface and groundwater, and make recommendations (Entech Engineers, Inc., 1987). The study concluded that groundwater at the installation is typically sodium chloride or sodium fluoride (salt) rich. However, wells near the Colorado River have higher sulfate concentrations. Groundwater from wells meets primary Federal drinking standards except for fluoride, but fails to meet secondary drinking water standards except for water from the Colorado River vicinity.

Runoff water at the DU catchment facility is prevented from entering the groundwater because the evaporative lagoon is lined according to specifications in the APP (see section 4.13, Utilities and Support Infrastructure). Containment structures are also used at the OB/OD site. Since depth to groundwater is estimated between 80 m and 228 m (265 feet and 750 feet) around the OB/OD site, contaminating groundwater from heavy metal residues of burned and detonated ordnance is unlikely. Potential sources of contamination to groundwater are found at sanitary landfill operations, wastewater treatment lagoons, and hazardous materials storage areas.

According to the Yuma Proving Ground Hydrologic and Pollution Investigation Study, Cibola and Kofa Ranges (1987), contamination of groundwater by leachate or spilled substances is unlikely (Entech Engineers, Inc., 1987). This is because evaporation at YPG exceeds precipitation and rainfall is evaporated instead of percolating deeply. Thus, small surface spills have a limited potential to reach groundwater. However, USTs or other sources with slow leaks over a long time can potentially contaminate groundwater.

The sanitary landfill does not accept hazardous substances or liquids. It is unlikely the landfill would contaminate groundwater due to the depth to groundwater and lack of precipitation.

The Hazardous Waste Storage Facility (HWSF) is located at the Materiel Test Area (Gutierrez-Palmenberg, Inc., 1997c). The facility has a Spill Contingency Plan to guide emergency situations. Containment structures reduce the likelihood of groundwater contamination.

At the POL bladder test spill site, located in the southeast corner of the Materiel Test Area, localized groundwater has been impacted. The preliminary site assessment (Bureau of Reclamation, 1993b) found groundwater contamination from petroleum spills. One well had benzene content of 43 parts per billion (ppb). The threshold limit for groundwater is 5 ppb. A site geologic and groundwater investigation conducted by BOR determined that the contaminant plume has spread slowly over the last 30 years; the total length of the plume is no longer than 550 m (1,800 feet). Environmental programs monitor groundwater. The site characterization report is available from environmental programs.

Underground storage tanks at two old service stations may have locally impacted the groundwater at the Materiel Test Area. Three USTs were removed from the old service station #2 and five were removed from the old service station #3. Contaminated soils were found at the time (Gutierrez-Palmenberg, Inc., 1994c). Service station #2 has a site characterization report (Gutierrez-Palmenberg, Inc., 1997d) available at environmental programs, while service station #3 awaits investigation. Also, two service stations are under investigation by YPG at the Main Administrative Area where groundwater may have been impacted.

3.3.2.3 Water Supply

Groundwater wells supply water for potable and nonpotable uses to five separate water distribution systems in the Kofa, Laguna and Cibola regions. One to four wells and a separate pumping, storage, and distribution system serve each complex (i.e., Mobility Test Area, Kofa Firing Range, Laguna Army Airfield, Castle Dome Heliport, and Main Administrative Area).

Yuma Proving Ground has the capacity to pump 10,718 acre feet of water annually with the addition of two new wells drilled in the Main Administrative Area by BOR (Marler, 1998). In 1996, water pumped from wells exceeded 1,367 acre feet. In 1995, more than 1,158 acre feet were pumped. Based on the increased mission and number of people residing and working at YPG, a projected use of over 1,900 acre feet will be required from wells and the Colorado River by 2006.

According to surface area maps by the BOR and USGS, four wells (designated w, x, y, and z) are now presumed to be pumping Colorado River water. In 1996, these wells pumped 1,154 acre feet of water (Yuma Proving Ground, 1997). It is estimated that approximately 75 percent of the water used is for turf irrigation. The contracted amount of Colorado River water entitlement at YPG has flucuated depending on the accounting measures used to determine the source of water used, but actual use has been consistent. Discussions are in progress to insure that the contracted amount reflects YPG's historic use and resulting entitlement.

3.3.2.4 Drinking Water

An electrodialysis reversal unit provides potable water to the Main Administrative Area in the Laguna Region, and a reverse osmosis system provides drinking water to the Castle Dome Annex (light armored vehicle test area) in the Cibola Region. Additionally, bottled drinking water is supplied to many areas. Wells and water distribution systems are tested regularly in compliance with Arizona Drinking Water Regulations, the Safe Drinking Water Act of 1974, and corresponding EPA drinking water regulations (40 CFR 141). Testing is done monthly, quarterly, or yearly depending on regulatory requirements. The State of Arizona specifies that those water systems using only groundwater sources must perform inorganic chemical analysis once every three years (Haygood, 1996).

3.3.2.5 Water Uses

As for any residential or commercial area, water is consumed for a variety of purposes. Wells on YPG supply water for residential, and office use, visitors, irrigating parks, and grounds, maintaining gravel roads, and test courses, heating, and air conditioning, services such as laundromats or clinics, construction, and direct test support (mud courses and fording basin).

Yuma Proving Ground operates six wastewater facilities. The Environmental Compliance Program must obtain an APP and a Notice of Discharge (NOD) from ADEQ for all facilities that discharge industrial and domestic wastewater on the installation. The facilities are listed and described in section 3.13.4.

3.4 Geological and Soil Resources

Geology and soils are discussed in this section, including physiography, geology, geologic resources, and soils.

3.4.1 Geologic Description

Yuma Proving Ground is situated in the basin and range physiographic province. The physiography of this area after block faulting was quite different from its present condition. The original high mountains have been worn down by wind and water erosion. At the same time, basins were filled to present levels by erosional sediments from mountain ranges. The mountain ranges within and surrounding YPG are composed of igneous rocks (formed from molten rock), including extrusive (volcanic rock), and intrusive (granite and related chrystalline rocks); sedimentary rocks (cemented and consolidated sediments), and metamorphic rocks (changed by heat and pressure).

The Palomas and Tank Mountains contain mostly extrusive igneous rocks with lesser amounts of metamorphic rocks. Intrusive igneous rocks are also found in the southern part of the Palomas Mountains. The Muggins Mountains are made up of metamorphic and extrusive igneous rocks with some sedimentary rocks. The Middle Mountains are composed of mostly extrusive igneous rocks with metamorphic and sedimentary rocks. The Trigo and Chocolate Mountains are largely extrusive igneous rocks with some metamorphic rocks.

The basins or lowlands between mountain ranges are composed of alluvium as shown in figure 11. The alluvium is typically sand, silt, and clay layers. The age of the alluvium is Quaternary.

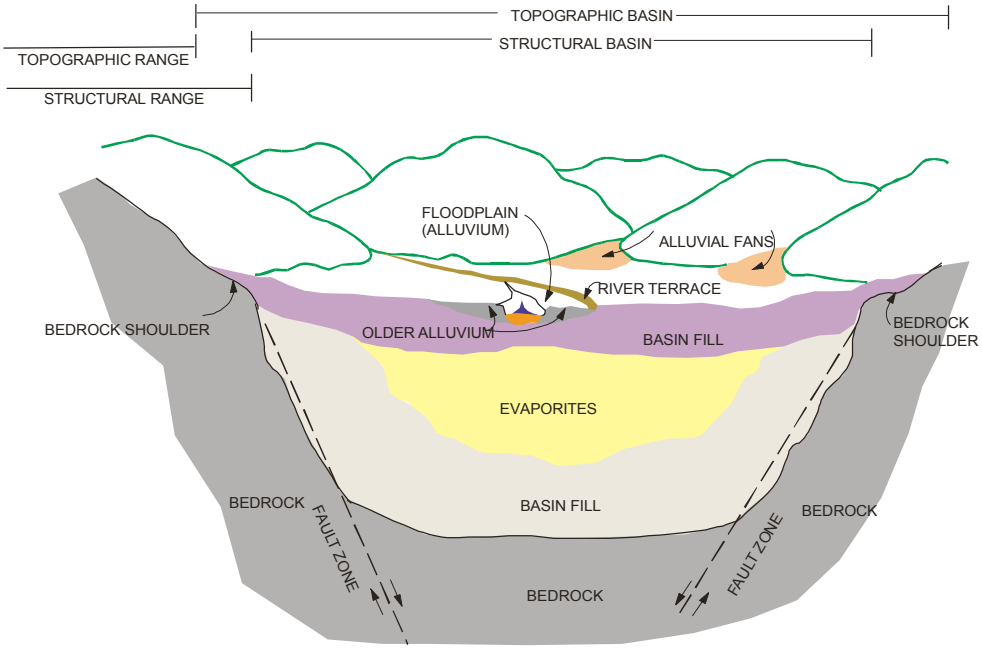
The depth of the sediments is not known; however, wells 400 m (1,300 feet) in depth have not reached the basin's bedrock floor (Entech Engineers, Inc., 1987).

Sand dunes are visible features along the base of some mountains in the YPG vicinity. Also, there is evidence in the Materiel Test Area that sand dunes existed in the geologic past. Cross-bedded sands, indicating the presence of buried sand dunes, were found by the BOR (1994-1996) in soil borings at the POL bladder test spill site.

3.4.2 Geologic Resources

Yuma Proving Ground has proven mineral deposits. Several mines were operating on what is now YPG before the land was set aside for military testing. During the late 1800's, hundreds of mines existed in the Yuma region, and a few are still producing today. Some yielded large amounts of minerals, including gold, silver, lead, and mercury.

Metals that have been mined in the area include antimony, beryllium, copper, gold, lead, manganese, mercury, selenium, silver, titanium, uranium, and zinc. Nonmetallic mineral resources include basalt and granite. Larger ore producers included the following: the Cinnabar Mine, in the northeastern



SOURCE: *Bureau of Reclamation, Geology and Groundwater Resources Report, Maricopa and Pinal Counties* (coverpage drawing). 1977

Figure 11. Cross Section of Yuma Proving Ground Generalized Geology.

corner of YPG; Red Cloud Mine, in the Trigo Mountains; Castle Dome Mine, Flora Temple Mine, William Penn Mine, and Caledonia Mine, and King of Arizona Mine in the Kofa National Wildlife Refuge (U.S. Bureau of Reclamation, 1989). In addition, active mines in California have similar geology (Fellows, 1996). These abandoned mines and others, yet to be developed, could have economic value. This is a good "target area" for low grade copper and gold (Coggin, 1996). Petrified wood is abundant on the installation, but collecting it is discouraged by YPG. Arizona Geological Survey geologists have recently completed detailed geologic maps of the rocks and alluvium on portions of YPG. The geologists have not finished the installation's mapping.

3.4.3 Soil Descriptions

Soils of YPG were mapped and described by the NRCS (Cochran, 1991). The survey describes soils encountered on the installation and provides guidance on the use and management of this resource. Included in this report is an assessment of land capability classification, rangeland, recreation, wildlife habitat, and engineering considerations for planning and design. Soil names, area, and percent area are listed in table 3-5.

The soils on Yuma Proving Ground are protected from erosion by the presence of cryptogamic crusts, desert pavement, and vegetation. Soil type, along with elevation and climate, help determine the composition of natural vegetation. Disturbances to these protective mechanisms can occur during military RDTE operations such as grading surfaces for constructing roads and buildings, driving on unsurfaced roads and tracks, landing helicopters in open-terrain, or disturbing soil at artillery impact zones and test sites. These activities can destroy cryptogamic crusts, disrupt living organisms vital to soil health, deplete soil nutrients, and disrupt desert pavement. Once the natural stability of the soil is changed, soil erosion can be very rapid, especially on sloping areas. This can cause a condition inconducive to plant life.

Past and present Army activities have extensively disturbed some areas at YPG. Vehicle maneuvering and troop training can be destructive to soil stability, accelerating the rate of natural erosion. Water erosion may redeposit topsoils downstream, changing upland soils and downstream hydrology. Military activities introduce materials such as UXO to soils in impact areas. Soil contamination is generally localized to the impact area. Other potential sources of soil

TABLE 3-5
AREA AND PROPORTIONATE EXTENT OF SOILS

Soil Name	Area	Extent (%)
(1) Riverbend family - Carrizo family complex, 1 to 3 percent slopes	52,685 ha (130,118 ac)	15.5
(2) Cristobal family - Gunsight family, gypsiferous substratum complex, 1 to 15 percent slopes	84,464 ha (208,604 ac)	24.9
(3) Chuckawalla family - Gunsight family complex, 1 to 15 percent slopes	10,600 ha (26,179 ac)	3.1
(4) Gunsight family - Chuckawalla family, gypsiferous substratum, 5 to 45 percent slopes	56,484 ha (139,502 ac)	16.6
(5) Superstition family - Rositas family complex, 1 to 15 percent slopes	5,376 ha (13,278 ac)	1.6
(6) Carsitas family - Chuckawalla family complex, 1 to 30 percent slopes	3,962 ha (9,785 ac)	1.2
(7) Tucson family - Tremant family - Antho family complex, 1 to 2 percent slopes	7,937 ha (19,603 ac)	2.3
(8) Gilman family - Harqua family - Glenbar family complex, 0 to 2 percent slopes	19,917 ha (49,190 ac)	5.9
(9) Lithic Torriorthents and Typic Torriorthents soils, 15 to 60 percent slopes, rocky	98,170 ha (242,455 ac)	28.9
Total	**339,595 ha (838,714 ac)**	**100.0**

contamination include incidental POL spills from vehicles, equipment, and storage areas. Soil contamination from military activities is anticipated to be minimal, and it is easily preventable through implementation of standard operating procedures.

Environmental programs works cooperatively with the NRCS to protect soils as a resource. Environmental programs coordinates with testers to arrange conditions under which tests are conducted with proper management of soils. Engineers and scientists consult the soil survey completed by NRCS during design and construction of facilities (Cochran, 1991). EPA, ADEQ, and the NRC regulate soil contamination.

The Army has developed the ITAM program to address environmental concerns on training areas. The objective on this program is to maintain realistic training conditions while protecting natural resources. The ITAM program consists of four elements: Land Condition Trend Analysis (LCTA), Training Resource Integration (TRI), Land Rehabilitation and Maintenance (LRAM), and Environmental Awareness (EA). Although some ITAM components are in the developmental phases at YPG, their purpose is actively practiced through research and coordination. These ITAM components are described in section 4.4.2, Mitigation Measures.

3.4.4 Soil Erosion

Natural wind and water erosion and deposition of sediments are continually shaping hillsides, terraces, dunes, and flood plains. Soils from weathered mountain areas are transported to valleys by meandering stream channels and are deposited as alluvial fans. The coarse material settles first, leaving finer particles to be deposited further downstream. The result of centuries of natural erosion is a surface cover of gravelly material that stabilizes these soils in the present-day climate.

Natural plant cover density is low enough that it has little effect on water erosion. Even though washes have more plant life than the surrounding areas, vegetation alone does not prevent channel cutting and stream-bank erosion.

The Natural Resources Conservation Service recognizes that soil erosion is naturally occurring in arid regions, and human factors accelerate this erosion. Mitigation is applied to areas to bring the erosion level back to the recognized acceptable level (T factor).

The LCTA survey monitors soil erosion based upon the Revised Universal Soil Loss Equation. Results for survey years 1991 - 1993 (4.39, 3.76, 3.78) were all below T factor levels (Bern, 1994).

On sandy sites, desert grass and shrubs stabilize dune areas and retard wind erosion. Sand dunes are made up of windblown (eolian) deposits from the Colorado River flood plain. These sandy soils are so permeable that runoff and water erosion are not considered a problem.

Soils recover from disturbance, but it may take a long time. For example, desert pavements require from 2,000 to 10,000 years to produce the gravelly surface and well developed silty layers beneath the surface (Richard, 1996). Other soils may have a much shorter recover time.

Environmental programs strive to avoid soil erosion by confining military activities to existing test tracks and roads to the extent possible. Soil erosion caused by vehicles occurs through direct mechanical abrasion from vehicle tracks or wheels. Accelerated removal of soil by wind and water can then occur in the tracks or ruts left by a vehicle's passing. Incorrectly designed or maintained roads also contribute to accelerated runoff and subsequent erosion. Wind erosion can be a problem in arid lands. Vehicle traffic has occurred in nearly all of the valley areas. This results in confined damage to the fragile cryptogamic surface crusts and desert pavement, disruption of the hydrology of bottoms, and destruction of vegetation in sandy areas allowing wind erosion to occur (Cochran, 1991). Water erosion can also be a problem in these areas when subjected to heavy rains (Wilshire, et al., 1977).

In spite of this disturbance, most of the present day plant communities, which indicate soil health, are near the potential for the range (Cochran, 1991).

3.4.5 Seismicity

To refine existing earthquake zones (zones used to design bridges); the Arizona Department of Transportation contracted a seismic study based on accumulated earthquake and geological data (Euge, Schell, and Lam, 1992). The study located YPG in a nearly stable block between more active regions to the northeast and southwest. This zone has very little seismic activity because the basin and range block faulting have been inactive for several million years. Few faults exist, and the rare earthquakes experienced have small magnitudes. While there are few faults in the Sonoran seismic source zone, the San Andreas-San Jacinto Fault system of southern California and fault systems in Mexico contribute to the probability of earthquakes. The City of Yuma is located in the Salton Periphery seismic source zone that is closer to these sources of seismic activity and has a greater potential for earthquakes. In the Sonoran zone, the average rate of repetition is one event every 25,000 years. The estimated maximum credible earthquake for the zone as a whole is a magnitude of 6.5 and would rarely occur (Euge, Schell, and Lam, 1992).

There are two fault zones close to YPG. The Sheep Mountain Fault southwest of Wellton, in Yuma County, AZ, is about 35 miles from the installation. The fault zone is about six miles long with the longest segment being about two miles long. Another Sonoran fault zone, the Lost Trigo, is located about four miles south of Cibola, AZ. The fault zone is about six miles long. The two other nearest fault zones occur in the Salton periphery zone. The Cargo Muchacho zone is six miles northwest of Yuma and is about one mile long. The Algodones fault zone, in the southwest corner of Arizona, is about seven miles long (Euge, Schell, and Lam, 1992).

3.4.6 Geological and Soil Resources by Region

3.4.6.1 Kofa Region

The Kofa Firing Range is situated on a broad alluvial plain containing soils that are moderately permeable, having a moderate to low water-holding capacity, and a pH of between 7.9 and 9.4 (Entech Engineers, Inc., 1988). The soil environment of the Kofa Firing Range has received considerable input from a long series of testing programs beginning in 1954. Test firing of DU rounds continues to

this date in the NRC-licensed area (section 3.11). As required in the NRC license SMB-1411, soil from the area is frequently sampled. Results from soil samples are evaluated against action standards that control the radiological hygiene of the test range. The three action standards are discussed by Ebinger et al. (1995).

The accumulation of waste materials including UXO, impact debris, and DU residue from downrange firing continues to occur. The DU residue is only found in the NRC-licensed artillery impact areas. Impact debris and UXO are recovered to the maximum extent possible. Desert pavement has been disturbed in many areas as a result of personnel and vehicles traversing the downrange areas to retrieve ordnance and perform surveys. In addition, ordnance disturbs desert pavement and cryptogamic crusts when it impacts the ground surface. These disturbances can result in increased local soil erosion by wind and water. The East Arm of the Kofa Region is largely undisturbed.

3.4.6.2 Cibola Region

As described in section 2.2.2, most of the operations in Cibola Region are training and aircraft armament operations. Although some surface areas in the Cibola Region contain UXO, most of the region does not. Training operations have the potential for the incidental release of fuels and other substances found in vehicles and equipment, such as generators. Wash bottoms can be the most rapid points of groundwater contamination by POL. This is not a frequent occurrence as determined in the SPCCP and ISCP (Gutierrez-Palmenberg, Inc., 1997c).

Most of the Cibola Region has not been disturbed by military activity (Sanborn, 1996). In some areas, training, testing, and firing activities have disturbed the integrity of the soil surface cryptogamic crust or desert pavement (Cochran, 1991).

Yuma Wash is in the southern half of the Cibola Region. The watershed of Yuma Wash, which drains to the Colorado River, consists of approximately 186 km^2 (72 square miles) of rugged mountains and relatively steep valley floors. The use of Yuma Wash for vehicular traffic has been of minimal impact in the past. Travel has been primarily restricted to the channel, but some off-road vehicular activity has and does occur throughout the watershed. Most of this off-road traffic is by single four-wheel drive vehicles. These vehicles have caused some damage such as tire imprints and tracks in the desert pavement, damage or destruction of some low vegetation, and the creation of small, eroded, and gully tracks on steep hill slopes. This type of traffic has increased recently because of survey work required for future development of the area (Ayres and Associates, 1996).

Recent training maneuvers (summer 1995) involving many tracked and wheeled vehicles in the East Fork basin of Yuma Wash have caused soil impacts. As a result, some areas are now barren of any vegetative cover or desert pavement. These relatively unrestricted types of maneuvers have the potential to impact both the biotic communities, as well as changing the erosion and sedimentation characteristics of the wash. The Yuma Wash study suggests that military maneuvering on upland soils and desert pavement can cause damage downstream. If these areas are disturbed and eroded, sedimentation of downstream channels can occur (Ayres and Associates, 1996).

3.4.6.3 Laguna Region

The only ordnance fired in the Laguna Region is at the small arms firing range at Castle Dome Heliport. No other areas within this region are contaminated with ordnance. The potential for soil contamination from spills of fuels and other fluids from vehicles and equipment during training and testing exercises exists. This is not a frequent occurrence as determined in the SPCCP and ISCP (Gutierrez-Palmenberg, Inc., 1997c). At the POL bladder test spill site, located in the southeast corner of the Materiel Test Area, localized soil has been contaminated. The preliminary site assessment (Bureau of Reclamation, 1993) found soil and groundwater contamination from petroleum spills. According to a site geologic and groundwater investigation conducted by BOR, the soil contaminant plume is contained within the fenced site area. The site characterization report is available from the environmental programs. Standard operating procedures minimize the incident of spills.

Underground storage tanks at two old service stations may have locally impacted the soil at the Materiel Test Area. Three USTs were removed from the old service station #2 and five were removed from the old service station #3. Contaminated soils were found at that time (Gutierrez-Palmenberg, Inc., 1994). Service station #2 has a site characterization report (Gutierrez-Palmenberg, Inc., 1997d) available at the environmental programs while service station #3 awaits investigation. Also, two service stations are under investigation by YPG at the Main Administrative Area where soil may have been impacted.

Established test courses comprise more than 200 km (125 miles) of varying conditions from paved highways to terrain such as sand, mud, rock, and gravel. Mobility and durability test course exercises require certain parameters in soil particles such as type and size (i.e. dust testing). If vehicular movement greatly modifies soil particle size, the dust course may be of limited use. New dust courses are established if the particle size in baseline dust courses is not acceptable based on test requirements. A dust course can become depleted of desired particle sizes in as little as 10 years.

3.4.6.4 Off-Post Locations

Activities at off-post locations result in little soil disturbance. The Imperial Sand Dunes and Death Valley are the two off-post locations with the greatest potential for soil disturbance from vehicle and equipment testing projects, troop training activities, and automobile testing. In Death Valley automotive testing has occurred and the extent of the disturbance has not been evaluated. At Imperial Sand Dunes, dust produced by maneuvering vehicles is quickly dispersed. However, there could be an increase in sand dune movement if military activities remove stabilizing vegetation. Contamination could result from an incidental release of fuels or oils from vehicles and equipment. No firing activities take place, therefore, no soil contamination associated with firing activities (e.g., UXO, impact debris) in off-post locations occurs. For the most part, minimal disruptions occur to soil resources associated with Oatman Hill, Blaisdell Railroad Siding, and the Senator Wash Regulating Reservoir. These locations involve testing on paved highway, railways, and a body of water, respectively. Travel to off-post locations over unpaved areas, as well as new roads and periodic use of the Senator Wash Regulating Reservoir, could result in soil disturbance and an increased potential for soil erosion.

3.5 BIOLOGICAL RESOURCES

The Army manages biological resources according to environmental law and Army regulations. Management of natural resources is outlined in the Integrated Natural Resources Management Plan (Yuma Proving Ground, 1995a). This plan, required under the Sikes Act (16 U.S.C. section 670 et seq.), sets forth agency responsibilities and guidelines for complying with laws applicable to natural resources. The plan also manages Army properties with the intent of preserving and protecting the natural environment to the extent possible within the constraints of the Army mission. Arizona Game and Fish Department (AGFD) shares responsibility for hunting and general wildlife management, while U.S. Fish and Wildlife Service (USFWS) is responsible for the Endangered Species Act and migratory birds. Responsibilities of the two agencies are outlined in part 4 of the Integrated Natural Resources Management Plan, a tri-party agreement among the installation, AGFD, and USFWS. Yuma Proving Ground environmental programs continues to research and document natural resources.

3.5.1 Vegetation

Vegetation in the Yuma area is within the Lower Colorado Valley Subdivision of the Sonoran Desert, the largest and most arid portion of the desert. Figure 12 shows vegetative provinces of the Sonoran Desert. The extreme aridity characterizing this region is reflected in open plains covered sparsely with drought-tolerant shrubs, grasses, and cacti. Most common is the creosote bush, found in widespread stands, or mixed with combinations of ocotillo, bursage, teddy bear cactus, and foothills paloverde trees, depending on landform features (Turner and Brown, 1994; Shreve and Wiggins, 1964).

Sandy soil formations support big galleta grass plant communities along with foothill paloverde trees, honey mesquite trees, or bursage. Hillsides support brittlebush in various combinations with other plants such as cacti, especially the saguaro cactus. Foothills and mountains provide habitat for mixed shrubs. Desert washes and channel banks support many trees and shrubs, including the paloverde, ironwood, smoke tree, mesquite, and catclaw acacia. Vegetation found on the highest mountain slopes appears similar to Arizona Upland Subdivision portions of the desert. Exposed rocky slopes provide habitat for saguaros, cacti, agaves, beargrass, and paloverde trees.

Several vegetation studies have been conducted at the installation through Army environmental management programs and agreements with AGFD. The most recent vegetative study, which includes terrain mapping with satellite imagery, is the LCTA (Bern, 1994). A thorough checklist of plants accompanies the floristic survey conducted during the LCTA (Bern, 1995). For a treatment of scientific names of plants, refer to Bern (1995). Additional vegetation studies were conducted by the AGFD in conjunction with wildlife surveys of North Cibola and the East Arm (deVos and Ough, 1986; Ough and deVos, 1986). Palmer (1986) also surveyed vegetation during a special status species survey. The above-referenced AGFD studies include regional vegetation maps. A vegetation map for the entire installation has not been completed. Open terrain areas used for testing are covered with the creosote-bursage vegetative type. Plants are sometimes cleared during construction of new testing areas or before construction of buildings and roads. Creation of new impact zones may require clearing and leveling vegetation to facilitate projectile recovery. Sometimes trees and shrubs are pruned to create a clear line of site to targets from gun positions.

3.5.2 Wildlife

Wildlife management focuses on conservation, enhancement, and restoration of wildlife resources and habitats. The most common types of wildlife include big game mammals, small game birds and mammals, predatory and fur-bearing mammals, and migratory and resident birds. The Integrated Natural Resources Management Plan (YPG, 1995a) addresses the protection and management of wildlife. In cooperation with AGFD, the Army allows hunting of big game and small game animals.

Large game animals are desert bighorn sheep and mule deer. Predatory and fur-bearing mammals include the coyote, kit fox, gray fox, ringtail, badger, spotted skunk, striped skunk, mountain lion, and bobcat. At least 16 species of bats are known to occur on the installation (Castner, Snow, and Noel, 1995).

Names of wildlife species observed during wildlife and natural resources surveys are compiled and listed in various sources such as the Integrated Natural Resources Management Plan (Yuma Proving Ground, 1995a), Ough and deVos (1986), deVos and Ough (1986), Palmer (1986), and Bern (1994). Reptiles and amphibians observed during field surveys are typical of the Sonoran Desert (LaDuc, 1992). A recent bat survey found the designated sensitive California leaf-nosed bat (Castner, Snow, and Noel, 1995). Birds observed on the installation are common residents and migrants to the Sonoran Desert. The Breeding Bird Atlas, a nationwide survey, includes survey plots on YPG to determine which species nest in the region. A checklist of expected birds is being compiled for the installation, but requires field verification (Kerns, 1996). The diversity (numbers of types) of birds is extremely high in comparison to other ecological regions in the country, such as tundra, forests, or woodlands.

Noise, present to varying degrees in all regions, originates from artillery firing and resultant ground penetration of shells, and from low-flying aircraft (fixed wing and helicopters) (section 4.9). The effect of these noise sources on wildlife has never been studied at YPG specifically. Busnel (1978) recognizes that different animal species develop learned responses to particular noises. The effect of noise generated by aircraft was studied on desert bighorn sheep and mule deer indicating that these two big game animals have become habituated to simulated jet noise (Weisenberger, et al., 1993).

Few jets are flown from YPG, although the airspace is used periodically by high-speed aircraft from MCAS Yuma and other installations. However, Hervert (1996) believes that low-flying helicopter noise may frighten bighorn sheep because the animals can be seen running as far as two miles in advance of approaching helicopters. The effect this may have on the animals is unknown, but could be especially harmful during lambing (when bighorn sheep give birth to lambs). Helicopters are used by AGFD during big game surveys and by the Army for materiel testing. When airspace is released to MCAS Yuma, Marines use the area to fly helicopters and jets during routine exercises.

Figure 12. Vegetative Provinces of the Sonoran Desert.

At other sites, the effect of jet aircraft overflights on nesting peregrine falcons is not associated with reproductive failure (Ellis, et al., 1991). Peregrine falcons are not known to nest on YPG. Likewise, red-tailed hawks consistently exposed to low-level helicopter overflights appear to be habituated to the noise. However, naive (meaning unhabituated to noise) red-tailed hawks or other species may respond negatively.

Animals may have benefited from closure (to anything but testing and evaluation) of large expanses of Kofa Region. Some species, such as white-winged doves and mourning doves, appear to have become habituated to artillery testing disturbances while on YPG. Due to remoteness and isolation, they experience very little contact with humans. Likewise, coyotes are present on large tracts of undisturbed land at testing ranges where they can move about freely, away from human disturbance.

Exposure of mammals to radiation was studied by Ebinger et al. in relation to the presence of DU at the NRC-licensed area. Data collected by Ebinger (1995) supported little if any adverse effect on the ecosystem as a whole. However, this research indicates individual ecosystem components, such as pocket mice and kangaroo rats in particular, show possible effects of chemical toxicity in kidneys. Additional studies are underway to determine if kangaroo rats specifically are adversely affected by DU at the NRC-licensed area and if so, at what concentrations damage occurs.

3.5.3 Threatened and Endangered Species and Wildlife of Concern

As of December 1998, no plants or resident animal species with protection under the Federal Endangered Species Act are known to exist on YPG. The installation, in coordination with the U.S. Fish and Wildlife Service, has determined that past activities have not required consultation under section 7 of the Endangered Species Act. The most current discussion of endangered and threatened species is in the Integrated Natural Resources Management Plan, Part 6 - Endangered Species Management Plan (Yuma Proving Ground, 1995a). Table 3-6 lists plants and animals tracked by USFWS and AGFD.

Nichol's Turk's head cactus, a small barrel shaped cactus listed as endangered by the USFWS, was reported to have been photographed by Colorado State University during a floristic inventory (Bern, 1994) on YPG property. However, subsequent field surveys by the photographer, contract personnel, and YPG staff have failed to find the plant growing at the suspected locality within YPG boundaries (Rebman, 1996). The closest known populations of Nichol's Turk's head cactus are near Casa Grande, AZ.

Migratory waterfowl and raptors are prevalent in wetland and riparian habitats along the Colorado River at the nearby Imperial National Wildlife Refuge and Cibola National Wildlife Refuge. Occasionally a federally protected bird will stray from these areas during storms. For example, the federally threatened southwestern bald eagle, endangered peregrine falcon, and endangered California brown pelican have been observed on the installation and identified as transient species (50 CFR Part 17).

Other rare birds, such as the osprey, are sometimes observed within the boundaries of YPG. Yuma Proving Ground lacks suitable habitat for long-term survival of these birds.

The BLM reports that the federally endangered razorback sucker has been in Senator Wash Regulating Reservoir since the creation of the reservoir in the early 1960s. The lake was gill netted prior to the introduction (U.S. Department of the Interior, 1998). Additional stockings have occurred, such as in 1988 by California Fish and Game Department (Hayes, 1997). In December 1995, 32 adult fish were captured and released into the mainstream of the Colorado River, which is designated critical habitat from Parker, AZ to Imperial Dam (50 CFR Part 17; Fitzpatrick, 1997). As many as 300 adult razorbacks may be living in Senator Wash (Hayes, 1997).

Arizona Game and Fish Department recognizes rare wildlife in Arizona in its draft Wildlife of Special Concern (Arizona Game and Fish Department, 1996). The list includes the California leaf-nosed bat, which resides at the installation for at least part of the year in abandoned mine shafts. The Sonoran desert tortoise, another species recognized by AGFD, occurs in low density populations along foothills, chiefly in volcanic soils. The tortoise is monitored, but is not currently endangered (Rorabough, 1996). Ground surveys were recommended by the AGFD to identify desert tortoise habitat in a special status species report (Palmer, 1986). Additionally, AGFD recommended the Army conduct more surveys of abandoned mine shafts and natural caves to verify the presence of bats and their habitats on installation lands (Castner, Snow, and Noel, 1995).

Four plants generally considered to be rare are found on YPG: desert night blooming cereus, California snakewood, spiny sand spurge, and Hall shrub spurge (Yuma Proving Ground, 1995a).

The environmental program staff monitors vegetation removal or pruning. The installation voluntarily complies with the Arizona Native Plant Law (A.R.S. Title 17) by performing plant salvage activities during development of new test sites and facilities. Pursuant to this law, rare plants, cacti, succulents, and trees are categorized according to protection status. Subject plants are tagged and relocated before construction begins on a site. Some of the plants are used for landscaping in the Laguna Region. Because YPG is a Federal facility, it is not required to comply with this law, but maintains an active program in cooperation with the NRCS. Wherever possible, plants which are endemic (restricted or peculiar to a locality or region) or rare are protected in place. Activities are designed to avoid their populations.

3.5.4 Sensitive Habitats

Even though the landscape may appear barren, a wide variety of habitats support sensitive species. These sensitive habitats include sand dunes, mountain ranges, wildlife watering sites, desert washes, abandoned mines, and natural caves.

TABLE 3-6
PLANTS AND ANIMALS AT YPG LISTED AS FEDERALLY PROTECTED OR ARIZONA WILDLIFE OF SPECIAL CONCERN

Species Name/Common Name	Status	Comments
Echinocactus horizonthalonius var. *nicholii* Nichol's Turk's head cactus	endangered	photographed, not relocated
Falco peregrinus anatum Peregrine falcon	endangered wildlife of special concern	observed migrant, winters along Colorado River
Gopherus agassizii Desert tortoise (Sonoran)	threatened wildlife of special concern	observed, uncommon resident, threatened by similarity of appearance to Mohave desert tortoise
Haliaeetus leucocephalus Bald eagle	threatened wildlife of special concern	observed, migrant, winters along Colorado River
Lasiurus xanthius Western yellow bat	wildlife of special concern	likely observation
Macrotus californicus California leaf-nosed bat	wildlife of special concern	observed, part-time resident
Pelecanus occidentalis californicus California brown pelican	endangered	observed, not expected other than accidental
Plecotus townsendii Townsend's big eared bat	wildlife of special concern	likely observation
Uma scoparia Mohave fringe-toed lizard	wildlife of special concern	observed in unique habitat
Xyrauchen texanus Razorback sucker	endangered wildlife of special concern	adults observed in Senator Wash Regulating Reservoir

Sources: Federally threatened and endangered status, 50 CFR Part 17; Wildlife of Special Concern, Arizona Game and Fish Department, public review draft, October 14, 1996.

3.5.4.1 Sand Dunes

Sand dune habitats are among the most sensitive and unusual habitats in the low deserts of southwestern Arizona. They host a broad diversity of plants and wildlife, many of which occur in no other habitat (Kennedy, 1996a). The dunes provide habitat for species such as galleta grass, which specializes in sandy habitats. A chain of dunes is present on the La Posa Plain of north Cibola, nestled on the southwestern edge of a mountain slope. The Mojave fringe-toed lizard was observed in these dunes (Palmer, 1986). This rare lizard is restricted to sandy areas of southeast California, with a limited distribution near Parker, AZ, and the Bouse Wash drainage.

3.5.4.2 Mountain Ranges

Mountain ranges provide habitat for desert bighorn sheep. North facing slopes of mountain ranges harbor plant and animal species which otherwise would not survive on the arid plains of lower elevations. Plant species, such as agaves, bear grass, cacti, and shrubs benefit from increased shade, lower temperatures, and increased humidity. These plants are common to the higher-elevation Arizona Upland Subdivision of the Sonoran Desert. Some plants and animals have persisted from the Mojave Desert, especially in mountainous habitats. These are called relicts.

3.5.4.3 Wildlife Watering Sites

The Water Resources section in this chapter describes tinajas and catchments. Desert bighorn sheep utilize high-elevation tinajas and catchments. Mule deer drink from lower-elevation watering sites. Mammals, bats, and birds also depend on these water sources. White-winged doves are commonly observed watering during summer. The effects of man-made water developments on big game populations is somewhat controversial (Broyles, 1995).

3.5.4.4 Desert Washes

Desert washes are protected by regulation under Section 404 of the CWA. Construction of roads in washes is a regulated activity if earth moving and paving vehicles discharge dredged or fill material below the ordinary high water mark of the watercourse. Road crossings built in Arizona before the CWA regulated them appear to have deprived ironwood trees of surface water flows in washes and adjacent flood plains.

Desert washes are extremely important habitat for vegetation and wildlife. Trees line the flood plain and banks of the wash channels and, together with shrubs, form the thickest vegetative cover on the installation. Ironwood, mesquite, paloverde, catclaw acacia, and smoketree are the primary trees growing in and along the washes. The ironwood, known to live for 800 years, is an important component of wash complexes. This hardwood tree flourishes in active channels and becomes green after summer rainstorms cause surface water to penetrate the soil and root zone. Trees contribute to wetland functions and values such as providing nutrient cycling, sediment stabilization, slowing of flow velocities, and bank protection.

Nearly every wildlife species utilize tree-lined desert washes for some portion of the life cycle (Kennedy, 1996a). For example, bighorn sheep and mule deer use washes for cover, forage, and as migratory corridors. The paloverde-smoketree plant association has notably high value for wildlife (Palmer, 1986). Predators at YPG, such as bobcats, are found almost exclusively in washes.

Results from recent bird and bat surveys (Castner, Snow, and Noel, 1995) in Sonoran desert washes indicate how important this habitat is to bats and neotropical migratory birds (NTMBs). In otherwise inhospitable environs, NTMBs and bats use desert washes extensively for foraging, resting, shade, cover, and (for some bird species) nesting (Kennedy, 1996b).

3.5.4.5 Abandoned Mines and Natural Caves

Bats roost and whelp in abandoned mine shafts (Kennedy, 1996b). Many of the bats use abandoned mines at least part of the year (Castner, Snow, and Noel, 1995). Ringtail and fox enter horizontal mine shafts for shelter. Natural caves provide habitat for bats and other wildlife.

3.5.5 Wild Horses and Burros

The Bureau of Land Management estimates there are between 100 and 150 wild horses and 600 to 700 wild burros using YPG as part of their habitat. These animals are managed by the BLM in accordance with the Wild Free-Roaming Horse and Burro Act of 1971, Public Law 92-195, and Cooperative Management Agreement updated in September 1989. During the day, the animals typically rest in the upper reaches of the drainage basins, moving out to graze and water at night. Use on YPG is highest during the winter months when cooler temperatures and annual vegetation are available. During the hotter summer months, the animals typically do not move farther than three miles from permanent water sources. During the summer, the major concentration areas are near the Colorado River and farm lands north of the Gila River (Acheson, 1997).

Areas that receive the greatest use by horses include Kofa Firing Range and Martinez Lake Road area. Wild burro populations are highest within the Trigo Mountain area (Acheson, 1996). In accordance with Federal law, the BLM is authorized to remove wild horses and burros within established herd management areas, or when they venture out of these areas. The BLM can also relocate wild horses or burros within established herd management areas.

3.6 CULTURAL RESOURCES

Archaeological research indicates important cultural resources exist on the installation (Miller and Smithwick, 1995a and 1995b; and Bentley, 1996e). The YPG Draft Resource Management Plan, Historic Preservation Plan (1995) sets forth specific goals, policies, and procedures to identify, nominate, and protect archaeological sites and other historic properties that are eligible or potentially eligible for nomination to the National Register of Historic Places.

Environmental programs at YPG is currently writing an Integrated Cultural Resources Management Plan, which will supercede the Draft Resource Management Plan, Historic Preservation Plan. The Integrated Cultural Resources Management Plan will be finalized in July 1999. The following section discusses conditions that can be found in the study area for cultural resources.

3.6.1 Cultural Overview

The cultural history of the YPG area is not well documented, despite the potential preservation offered by this desert region. (Good preservation is generally associated with dry climates.) Several explanations for this lack of good information have been proposed over the years. It may be due to relatively lower densities of prehistoric peoples in the area or to a lack of interest on the part of archaeologists since no pueblos have been found (Hoffman, 1984; Gauna, 1996; Martin and Plog, 1973; McGuire and Schiffer, 1982; Marmaduke and Dosh, 1994; Dosh and Marmaduke, 1992a, 1992b, 1992c; Dosh, 1993a, 1993b, 1993c, 1994a, 1994b, 1994c). Efforts by YPG to document regional cultural history are discussed above in 3.6. Research issues pertaining to YPG are addressed in documents cited in this section.

3.6.2 Archaeological Research

During prehistoric and historic times, humans have tended to gravitate toward locations deemed favorable for hunting, foraging, quarrying, etc. Groups of people seek out sources of water, vegetation, wild game, minerals, and other resources. In doing so, they change the environment. Access into their lives, customs, and social values is gained by examining environmental disturbances.

Archaeological sites on YPG are likely to be located near water sources. Tinajas, seeps, and washes provided many essential elements of life support conducive to human settlement, such as potable water, food, hygiene, and defense. Base camps were apparently located near wash systems, and small camps or activity sites were located in wash areas, high ridge areas, and on desert flatland (Marmaduke and Dosh, 1994).

Mountain bases and hilltops are also topographical indicators of site locations. Most sites are located at elevations of 60 to 250 meters (200 to 800 feet). Rock overhangs and caves offered shelter from the elements, protection from animal and hostile outsiders, or served as lookout. Table 3-7 depicts the distribution of cultural resource sites by topography, soil, and vegetation on YPG.

TABLE 3-7
CULTURAL RESOURCE SITES BY ASSOCIATED TOPOGRAPHY, SOIL, AND VEGETATION

Topography	# Sites	Percent	Soil	# Sites	Percent
Terrace	455	38	Sand, silt, gravel	235	58
Ridge	353	30	Desert pavement	155	38
Flats near wash	209	18	Gravel, cobbles	17	4
Mountain base	61	5			
Riparian zone	4	0.5	**Vegetation**	**# Sites**	**Percent**
Hilltop	32	3	Desert scrub	366	45
Flood plain	24	2	Creosote-bursage w/cacti	188	23
Basin	3	0.1	Creosote-bursage w/ trees & cacti	128	16
Desert tank	2	0.1	Creosote-bursage	128	16
Unknown	51	4	Riparian zone	4	0.5

Source: Yuma Proving Ground Cultural Resource Management Database (1995).

Most archaeological sites at YPG are designated "no cultural affiliation" as no diagnostic artifacts are found at these sites. There appears to be no specific evidence of PaleoIndian or Achaic period sites on YPG, although sites of the Archaic have been identified in the vicinity. Numerous prehistoric sites have been designated "no ceramic" sites, and little has been done to date these sites. Sites having ceramics are generally associated with the Patayan.

Patayan refers to a ceramic-bearing prehistoric culture centered in the Gila and lower Colorado River drainage. The Patayan culture is dated between AD 700 and 1900 and divided into three periods, Patayan I, II, and III. Due to a lack of excavated sites, the dating of the Patayan age cannot be confirmed but is based primarily on pottery types, particularly changes in the Lower Colorado Buffware (Waters, 1982).

Patayan sites and extensive trail systems occur on YPG. Refer to the YPG Draft Resource Management Plan, Historical Preservation Plan (1995) for a substantive discussion of YPG prehistoric archaeology.

3.6.3 The Historic Period

3.6.3.1 Historic Native American Groups

The first European explorers into the lower Colorado River area documented a fairly sedentary lifestyle for the Patayan III Yuman-speaking peoples. These groups apparently were living in rancherias along the Colorado and Gila rivers, and were exploiting the river terraces, and flood plain. They made limited excursions into the uplands for hunting and gathering (Marmaduke and Dosh, 1994). Architectural features were generally low, semi-subterranean wattle-and-daub structures with earthen roofs. Their houses appear to have supported more than a simple nuclear family. Ramadas were also noted and appear to have been the habitations of choice during summer months (Marmaduke and Dosh, 1994).

The economic cycle of the early Yuman-speakers was reconstructed in detail by Castetter and Bell (1951) and the social organization and leadership roles by Forde (1931) and Kroeber (1925). For more information, refer to those sources.

3.6.3.2 Europeans and Euro-Americans

The Spanish built two military colonies near the confluence of the Gila and Colorado rivers in 1780. Both colonies were destroyed in 1781 by an uprising of the Quechan people (Santiago, 1998). Very few Spaniards ventured into interior desert areas (Ross, 1923; Hoffman, 1984; Trafzer, 1974; 1975).

Mexico won independence from Spain in 1822. Mexican soldiers seeking Apache raiders made brief sojourns into the Arizona Territory, and hunters and trappers explored the area for bounty (Trafzer, 1975). Otherwise, little exploration into Arizona was conducted under Mexican jurisdiction. No permanent settlements were established during this time.

In 1846, the United States declared war on Mexico, and some military expeditions passed through the area on their way to California. Two years later, by the Treaty of Guadalupe Hidalgo, Mexico ceded to the United States all of Arizona north of the Gila River. Government survey teams quickly entered the area. Disputes arose over precise boundaries, and it was not until the Gadsden Purchase in 1853, that the area south of the Gila River became part of the United States.

After the United States acquired the Arizona Territory, several expeditions were sent to survey the area. One, led by Edward Fitzgerald Beale in the 1850's, convinced the U.S. Congress that camels would save time and money in moving goods across the desert.

Camels and two Egyptian camel drivers were imported, and the expedition set out across the YPG area. Camels continued to be used until the Civil War, when they were auctioned off (Trafzer, 1974).

The first major group to settle the YPG area was miners. Gold was discovered in California in 1849, and many forty-niners settled in Arizona instead. Fort Yuma was established in 1849 at Yuma Crossing, on the California side. Fort Yuma, originally named Camp Calhoun, and subsequently Camp Independence, provided a haven for settlers and protection for travelers to the gold fields. It was abandoned in 1851, and reoccupied (and renamed Fort Yuma) in 1852. The area encompassed today by YPG, however, still had no permanent settlements (Hoffman, 1984).

The most intense occupation of the area occurred during the late 1800's. Hundreds of mines existed, and a few (located adjacent to YPG) are still producing today (Hoffman, 1984). Some yielded large amounts of minerals, including gold, silver, lead, and mercury. Names and ownership of mines changed frequently, so records of many area mines are difficult to trace or are no longer in existence.

The military presence began with establishment of the California-Arizona Maneuver Area (CAMA) by General George Patton in 1942. By that time, the War Department already had an Engineer Board Desert Test Section in place at Yuma, with testing occurring near Laguna Dam. Later in 1942, Camp Laguna was established on present-day YPG, along Laguna Road, west of U.S. Highway 95. Camp Laguna, and other CAMA camps, were used as desert training areas during World War II. Laguna Army Airfield was established at this time. In 1943, the Yuma Test Branch, under the operation of the COE, began formal testing at Imperial Dam. Testing operations at Laguna Dam were halted at this time. The Yuma Test Branch tested bridges and other river crossing and drilling equipment. The Yuma Test Branch also employed an Italian Service Unit, made up of former Italian prisoners of war.

3.6.4 Cultural Resources Activities

The Army manages two classifications of cultural resources: prehistoric and historic. Evidence of prehistoric site activity at YPG includes features, tools, and associated debris used by Native Americans. Prehistoric resources include isolated artifacts and sites. Isolated historic finds and sites address artifacts and evidence of activity that occurred after 16th-century European contact. Post-Spanish contact activity evidence and traditional Native sites, as well as non-Native American cultural resources are classified historic. Evidence of military and civilian activity from Spanish contact to present is also classified historic.

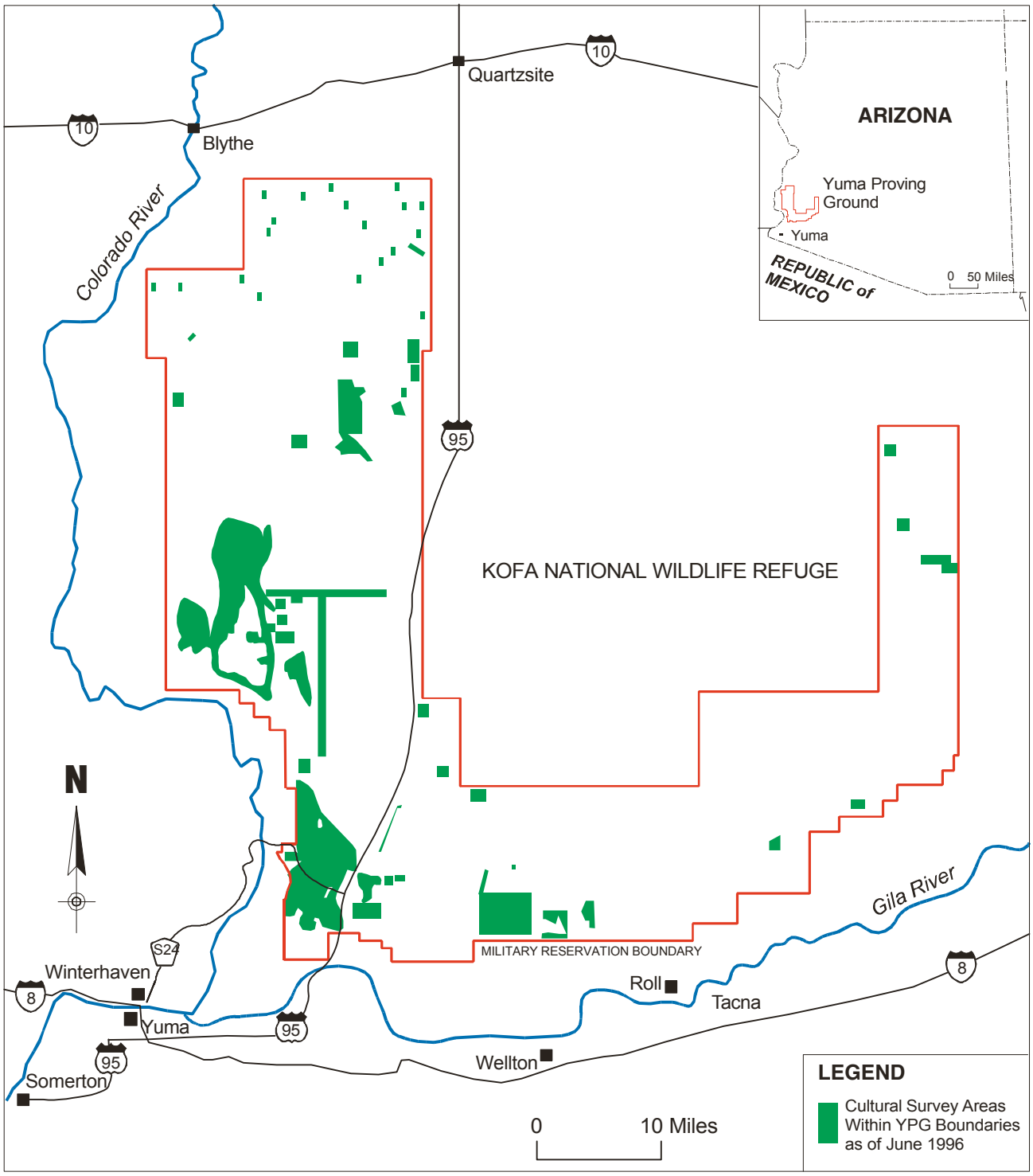


Figure 13. Areas Surveyed for Cultural Resources at Yuma Proving Ground.

Since 1984, there have been 36 cultural resource management activities, covering 29,483 hectares (73,708 acres), or approximately 8.8 percent of the installation area. Surveyed areas are shown in figure 13. Surveyed areas did not necessarily include areas of high site densities. Environmental programs maintain an inventory of sites and site specific information. As of 1995, the YPG Cultural Resources Database contained 1,240 site records. The content of each site record included general survey information, site location, environmental data, site contents, and assigned culture and period. Although none have been specifically identified, traditional cultural sites may exist within the installation's boundaries. Hopi elders believe their ancestors include prehistoric residents of this area.

3.6.5 Native American Cultural Concerns

Arizona is located within the desert southwest, the most diverse of the Native American culture areas. Tribes within this region are categorized into subgroups according to language and cultural similarities. While several Native American groups may have lived or traveled through the YPG area in the past, presently three Indian reservations are located within the vicinity of YPG. These are the Colorado River Indian Reservation, the Fort Yuma Indian Reservation, and the Cocopah Indian Reservation. The Colorado River Indian Reservation is located north of YPG near Parker, AZ. It is composed of Hopi, Navajo, Mojave, and Chemehuevi peoples. Fort Yuma Indian Reservation, located along the Colorado River north of Yuma, AZ, is set aside for Quechan Indians. The Cocopah Indian Reservation is located along the river near Somerton, AZ, south of Yuma. Thirty-one Native American Tribes were sent letters about the RWEIS and invited to public scoping meetings. Cultural resources concerns were documented during scoping and are addressed in this RWEIS. Native American cultural concerns included differing opinions on artifact curation and the archaeological process at YPG.

Yuma Proving Ground strives to involve all concerned Tribes with the protection of cultural resources on the installation. Consultation with the Tribes is through the environmental programs office. Yuma Proving Ground recognizes the sovereign status of the native communities, and contact is conducted in a government-to-government relationship.

Yuma Proving Ground has access procedures in place in accordance with Executive Order 13007. Tribes are invited to participate in the consultation process concerning cultural resources found on YPG.

3.7 SOCIOECONOMICS

Yuma Proving Ground is one of the largest employers in Yuma County. The combined socioeconomic stability of the City of Yuma and Yuma County is affected by YPG activities. This section discusses the Yuma County socioeconomic environment, including the social and economic setting, environmental justice concerns, and the influence of YPG personnel.

3.7.1 Social Setting

After the formation of La Paz County from northern Yuma County in 1983, YPG became centered in both counties. The City of Yuma is the largest urban center in the region. More than 99 percent of the YPG civilian population resides in Yuma County. Only 0.8 percent live in California (Wullenjohn, 1996).

Table 3-8 shows population demographics for the State of Arizona and major cities and towns in Yuma County. In 1994, the population in Yuma County was 119,650 persons. From the period of 1990 to 1994, Yuma County grew by 10.67 percent or 12,755 persons. During the same time, the City of Yuma grew by 8.7 percent or 5,227 persons.

3.7.2 Economic Setting

Three important economic factors in Yuma County are agriculture, tourism, and military installations. The Federal Government contributes approximately a third of the local economy through its 13 agencies operating in the region (Arizona Department of Commerce, 1995).

Tourist business, composed of Mexican visitors, winter residents/visitors, and cross-country travelers, also adds substantial revenues.

Before 1973, the predominant source of employment in Yuma County was agriculture (40 percent), followed by the Federal Government (31 percent), and then wholesale/retail employment (29 percent). Winter visitors flocked to Yuma in large numbers beginning in 1973, due to the energy crisis and availability trends related to goods and services. These winter visitors substantially contributed to the area economy.

After 1986, wholesale/retail employment (31 percent) began outdistancing Federal Government dominance (27 percent) in the employment roles. Since 1986, the trend has grown wider, and wholesale/retail growth rates in 1996 average 9.7 percent annually. The biggest increase in local economy has been in taxable sales of items purchased by Mexican visitors and winter residents/visitors. Table 3-9 shows the contribution of the tourist dollar to the local economy. These data reflect May 1994 through April 1995 statistics. During this period, 15 percent of Yuma County taxable retail sales originated from Mexican visitors, comprising 42.6 percent of total tourist dollars (Norton Consulting, 1995). Visiting military are classified within the tourist category.

The proving ground is an energetic consumer in the local economy. It purchases both standard goods and services and high technology items and services related to its mission. The installation employs 6.4 percent of the Yuma County workforce. Federal impact funds are provided to the local community to help defray educational costs for dependents of civilian and military employees. Over $178,000 in Federal impact funds supplement state and county funds to operate Yuma County schools. Higher education has also benefited from YPG full-time students via tuition and supply costs as well as state funds. Yuma Proving Ground maintains an extremely effective working/living partnership with the community through its participation in numerous local events and activities. The wages of military and civilian employees contribute greatly to the local economy through taxes, hiring costs, and purchases. In FY95, 32 percent of YPG purchases were made from Arizona businesses, and 18 percent were made from Yuma County businesses. The total economic impact of YPG on the community was assessed at $119.7 million in FY95 (Wullenjohn, 1996).

TABLE 3-8
REGIONAL POPULATION

Area	1980	1990	1994
Arizona	2,716,546	3,665,228	4,071,650
Yuma County	76,205	106,895	119,650
Major Communities			
San Luis	1,946	4,212	7,910
Somerton	3,969	5,282	5,970
Wellton	911	1,066	1,075
Yuma	42,481	54,923	60,150

(Source: Norton Consulting, 1994)

TABLE 3-9
TOURIST DOLLAR IMPACT

Tourism Component	Dollars	Percent
U.S. Military (Army and Marine)	$5,807,861	1.5
Mexican visitors	$162,065,913	42.6
Winter residents/visitors	$154,381,650	40.6
Other tourists	$58,212,747	15.3
Total	**$380,468,171**	**100.0**

(Source: Norton Consulting, 1995)

3.7.3 Environmental Justice

Executive Order 12898, Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations, requires identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of Federal programs, policies, and activities on minority populations and low-income populations.

Based upon Census Bureau projections for 1994, 119,650 individuals are residents of Yuma County, represented by all races. Over 40 percent of the population claimed Hispanic heritage. Based on 1990 census data, 20% of the population of Yuma County was at or below the poverty level.

3.7.3.1 Native American Communities

There are three Native American Indian Reservations along the Lower Colorado River in the vicinity of Yuma, AZ, and Parker, AZ. These are the Cocopah Indian Reservation, Fort Yuma Indian Reservation, and Colorado River Indian Reservation.

The Cocopah are a Yuman-speaking people from the Colorado River Delta. Today the Cocopah community straddles two countries and four states: Arizona and California in the United States and Sonora and Baja California in Mexico. The Cocopah Tribal roll for 1995 was 799 members (Arizona Department of Commerce and Cocopah Tribe, 1996). Most of the Cocopah in the United States now live on three small reservations in the Somerton area that were given to the Tribe by President Wilson in 1917. A chairman, a vice chairman, and three council members govern the community.

The Quechan Tribe is located on the Fort Yuma Indian Reservation. The Tribal roll of 1995 contained 2,593 members. The original social and religious patterns of the Quechan have been affected by government and missionary activities, by intertribal and interracial marriage, and by proximity to Yuma, AZ, which has grown rapidly in the past several decades. A president, a vice-president, and a general council of five members govern the Tribe. The Quechan language remains the favored means of communication in the over-60 age group, though almost all in this group are bilingual. A majority of those in the 40 to 60 age group remain fluent in Quechan, and a number of those in their 30's, as well as some in their 20's, are fluent to a usable degree.

The Colorado River Indian Reservation is home to four Native American Tribes: the Mohave, the Chemehuevi, the Hopi, and the Navajo. The largest of the four nations on the reservation is the Mohave. The reservation is situated in a valley along the California-Arizona border (in La Paz County, AZ, and San Bernardino and Riverside Counties, CA). The combined Tribe is governed by a council of nine members and overseen by a Tribal chairman, secretary, and treasurer who come from the council members. The Tribal roll showed 3,278 members as of April1997 (Make-Yeahquo, 1997). Various languages are spoken on the reservation. The Mohave speak a dialect of the Yuman language. The Chemehuevi speak a dialect of Shoshone. Navajo and Hopi are spoken by members originating from these two Tribes, respectively.

3.7.4 Yuma Proving Ground Personnel

As of September 1995, there were 1,963 personnel employed at YPG. (Fiscal year summaries are found in table 3-10.) The workforce is divided among military, civil servants, contractors, and others. The military population encompasses soldiers and marines permanently stationed at YPG and a joint services cadre in the Military Free Fall School. Soldiers assigned to YPG include those designated as soldier operator-maintainer test and evaluators (SOMTE), who play a critical role in testing as cannoneers, armored vehicle drivers and gunners, airdrop specialists, and mechanics.

Yuma Proving Ground also hosts diverse tenant populations, among them the Marine Corps Light Armored Vehicle Test Directorate (LAV-TD) and the Military Free Fall School, a part of the John F. Kennedy Special Warfare Center at Fort Bragg, NC. The installation is also the winter home for the Army's Golden Knights precision parachute team. In addition, it provides training areas, facilities and support for numerous other Army and Marine Corps units throughout the year. Fluctuations in personnel statistics are attributable to changes in mission objectives, testing workload, command organization, specific tasking, and fiscal budgetary constraints.

Many military and civilian retirees and their families reside in the county to take advantage of the services available at YPG. About 800 military and civilian retirees live in Yuma County.

TABLE 3-10
YPG PERSONNEL CLASSIFICATION

Classification	FY 1991	FY 1993	FY 1995
Active Duty Military	264	308	347
Civil Service	1,117	941	970
Contractors	749	681	646
Total	**2,130**	**1,930**	**1,963**

Note: People on temporary assignment not included in these figures.
(Source: U.S. Army YPG Military and Civilian Strength Reports for FY91, FY93, FY95)

3.8 LAND USE

Figure 14 shows land use surrounding YPG. The land base of YPG is dedicated to military testing and evaluation that requires most land to be reserved for firing ranges, impact areas, mobility test courses, and drop zones. These types of activities require large open areas with associated safety and buffer zones. Compared to the enormous size of the military operation areas, the four cantonment areas of the Laguna Region (i.e., Main Administrative Area, Materiel Test Area, Laguna Army Airfield, and Kofa Firing Front) use only a small portion of the land. With few exceptions, real estate under the control of YPG has the potential for military use (Hermann Zillgens Associates, 1992). No proposed land acquisitions or land disposals are associated with this EIS.

Potential conflicts arise in land use compatibility within the installation. A significant impact would occur if land were to be degraded to the point that it would be rendered unusable for its current or planned use. Thus, the 200,000 hectares (500,000 acres) of ranges and impact zones have not been considered for any other use. Developing technology is inadequate for rehabilitating these lands for alternate uses (i.e., low density housing, mobile home parks, grazing).

The management of land use at YPG is guided by three goals: to promote the most efficient and cost effective land use plan; to promote compatible and future coordinated land use decisions by Federal, State, county, and local agencies; and to maximize the well-being and quality of life for installation personnel and neighboring residents. Yuma Proving Ground also manages land use through the Installation Compatible Use Zone (ICUZ) noise management program. The ICUZ program seeks to achieve compatible land use in areas around military installations. The ICUZ program has been replaced with the Environmental Noise Management Program (ENMP), per 1997 revision to AR 200-1.

Yuma Proving Ground encompasses 339,377 hectares (838,174 acres), of which 339,211 hectares (837,764 acres) are controlled by the Army (table 3-11). There are 166 hectares (410 acres) of patented mines that are neither leased nor controlled by the Army. In addition, the installation leases 3,062 hectares (7,562 acres) of state-owned land, and 130 hectares (320 acres) of privately-owned land. Off-post land available to YPG totals 248 hectares (612 acres). This land, available under various use permit arrangements, consists of about 6 hectares (40 acres) at the Blaisdell Railroad Siding Site and 6 hectares (40 acres) of electric transmission line and other easements (YPG, 1995b).

Yuma Proving Ground also has airspace rights over 69,204 hectares (171,000 acres) of land within the Kofa National Wildlife Refuge, in addition to airspace over all acreage within the installation boundaries.

There are 29 unpatented mining claims under condemnation action in which no acreage is involved. Based on action initiated in 1977 by the COE, the BLM has determined that the claims have no mineral value and are invalid. Final BLM action is pending the outcome of the appeals (Marler, 1996).

A land use study found that YPG activity is generally compatible with surrounding land use (Hermann Zillgens Associates, 1992). The scattering of facilities, which is common to all built-up areas, has created vast open spaces. Land use plans should consider open spaces. Land use designations ensure only compatible activities develop in these open spaces. Civilian use of the installation does not

TABLE 3-11
TOTAL LAND UNDER CUSTODY AND CONTROL OF YPG

Type of Transfer to Army Use	Hectares	Acreage [1]
Public domain withdrawal (dated July, 1952 and October, 1983) [2]	336,185	830,292
Public domain temporary use permit - Department of Interior	69,277	171,096
Land in-lease (State of Arizona)	3,062	7,562
Land in-lease (Private Ownership)	134	332
License or use permit from other agencies (state and county)	9	23
Easements (purchase and condemnation)	4	9
TOTAL	**408,671**	**1,009,314**

[1] Rounded to the nearest whole acre.
[2] Five unpatented mining claims are contained within the reservation boundary and included in total public domain withdrawal acreage.

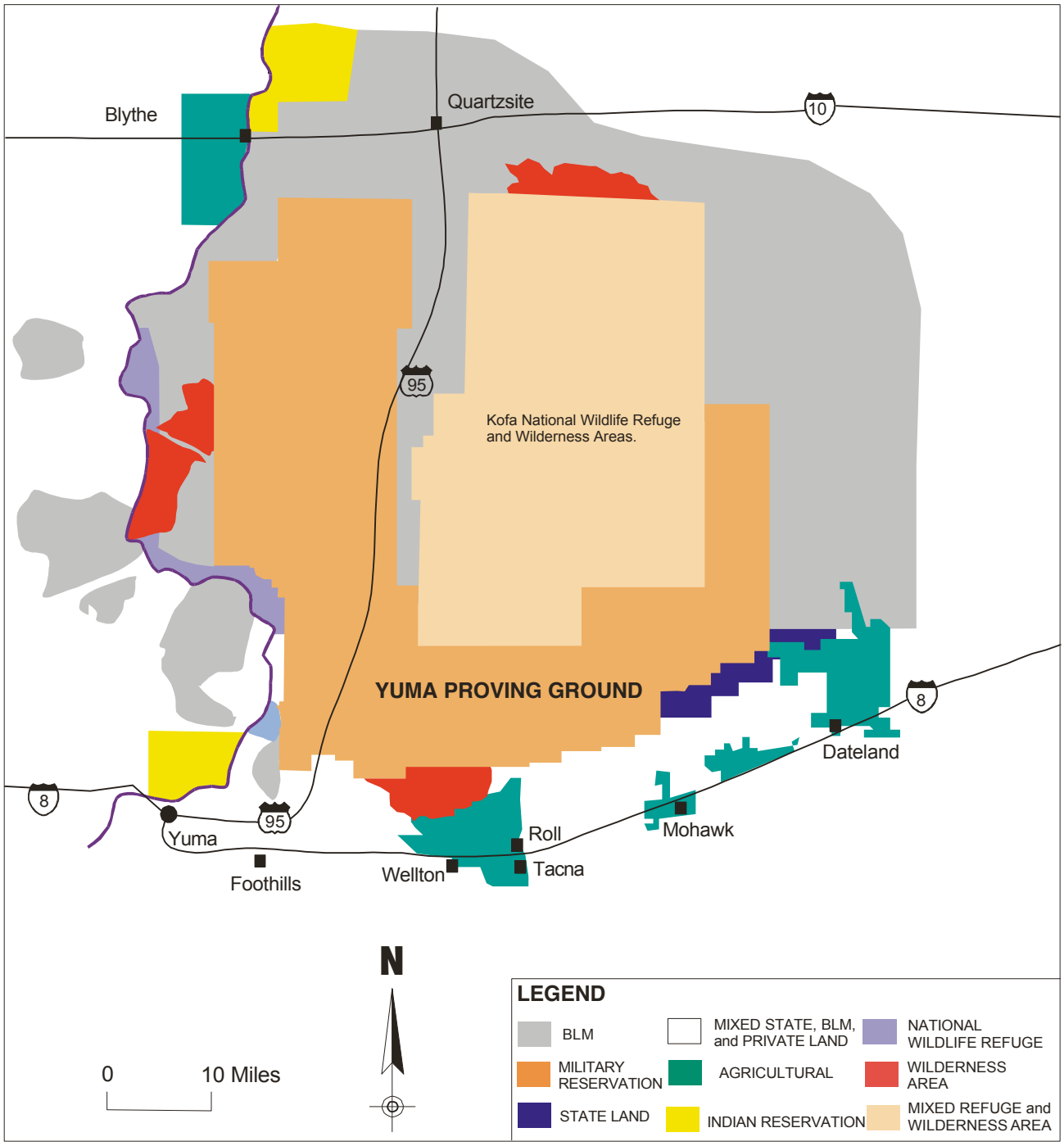


Figure 14. Yuma Proving Ground and Adjacent Land Use.

include mining. Hunting is only permitted within designated areas. Yuma Proving Ground is officially closed to any other civilian use of the range. There are small parcels of land leased from the State throughout the installation. The leases of these sections specify that YPG may use the land to conduct activities consistent with the intended military use of the installation.

3.8.1 Installation Use

Land areas are subdivided into the Cibola, Kofa, and Laguna regions. Land use for each of the regions is described on the following pages and listed in table 3-12.

3.8.1.1 Cibola Region Land Use

The Cibola Region, formerly referred to as Cibola Range, comprises the western YPG leg. It contains the West Environmental Test Area and the Castle Dome Heliport Annex areas. The area is best described as composed of large plains surrounded by mountains. Due to its size, isolation, and natural barriers of the surrounding mountains, the Cibola Region was developed for aircraft armament testing. The Chocolate Mountains divide the Cibola Region into north and south components. Most of the areas in this region have compatible military purposes.

The North Cibola Range is used for static detonation, conflagration testing of ammunition items, navigation system testing, combat skills training, and testing aircraft armament systems. The South Cibola Range has instrument drop zones and two extraction zones. Parachute pack maintenance and rigging facilities support the testing of airdrop and external transport by helicopter.

North of the Cibola Region, the nearest town is Quartzsite, located in La Paz County. Quartzsite is surrounded by BLM land. The population of Quartzsite changes drastically between October and April, when approximately three million winter vacationers and retirees visit the area surrounding Quartzsite. Unknowingly, some of these people camp on the installation, thinking they are on BLM land.

3.8.1.2 Kofa Region Land Use

The Kofa Firing Range parallels U.S. Highway 95 to the east. It provides a range length of 40 miles for direct and indirect fire weapons. Yuma Proving Ground has over 400 firing positions and 29 impact areas or mine fields. The NRC restricted area is dedicated to firing DU penetrators. Most other areas can accommodate multiple projects. The firing front contains the primary firing positions, observation towers and bunkers, and storage facilities for mission-oriented explosives used during testing of artillery weapons and ammunition. Range instrumentation includes high-speed and tracking cameras, radar, and fuse chronographs. Support facilities include environmental simulation facilities such as rough-handling, transportation-vibration, drop towers, temperature/altitude, temperature, humidity, enveloping flame, dust, and salt fog chambers necessary to perform ammunition safety tests. The restricted airspace area covers the artillery firing range of the Kofa Firing Range and has a surface-to-unlimited ceiling.

The East Arm is the north-south portion of Kofa Firing Range. This relatively undeveloped area has an occasional single-lane road, as well as tracks and trails passable by four-wheel-

TABLE 3-12
EXISTING LAND USE AREAS

Area	Hectares	Acres
Kofa Region		
Kofa Firing Range	151,677	374,605
Cibola Region		
Cibola Range Complex	183,908	454,206
Castle Dome Annex	349	862
Laguna Region		
Main Administrative Area	452	1,117
Materiel Test Area	319	788
Laguna Army Air Field	496	1,224
Castle Dome Heliport	362	893
Kofa Firing Front	1,814	4,479
Total	**339,377**	**838,174**

drive vehicles. A noise study conducted for the Kofa South Direct Fire Range (refer to 3.9) concluded that noise from military activities may reach the Muggins Mountains Wilderness Area located south of the southern YPG boundary, however, noise levels do not exceed the level allowed for wilderness areas. Noise levels reaching the sparsely populated areas adjacent to the installation are expected to be below allowable compatibility levels. High dust dispersion rates in the installation (U.S. Army Corps of Engineers & Mittlehauser, 1994) decrease the movement of dust clouds off the installation boundary. The southwestern portion of the Kofa National Wildlife Refuge may occasionally be affected by dust from military activities on YPG (U.S. Department of the Interior, 1995). Smoke and obscurant testing are conducted away from installation boundaries. A possibility of ordnance debris exists on a portion of the Kofa National Wildlife Refuge due to past military activities. Ordnance has previously been recovered from the refuge. In the event that UXO is discovered, the DoD is contacted for its removal (U.S. Department of Interior, 1995).

3.8.1.3 Laguna Region Land Use

The Laguna Region includes the Materiel Test Area, which houses the installation headquarters. The Main Administrative Area, located within the Laguna Region, is the only area that maintains its own formal land use plan. The Main Administrative Area includes the following:

- Family housing (officer/noncommissioned officer) - comprises approximately 50 percent of the developed area.
- Troop housing - one large barrack.
- Officer housing - one wing of the Bachelor Officer Quarters.
- Community facilities - education center, library, post office, family/community center, commissary, guest house, chapel, credit union, thrift shop, and nursery.
- Service - utilities, storage, fire station, engineering, maintenance, and administrative services.
- School - James Price Elementary School.
- Medical - health clinic, dental clinic, and veterinary clinic.
- Security - sentry station, emergency operations center, and evidence storage building.

According to the 1992 Land Use Study, incompatibilities exist in the Main Administrative Area where supply and maintenance functions (industrial type) adjoin housing, community, and recreational land use. An industrial-type fence encloses the Main Administrative Area. Housing and recreational facilities are separated from testing courses by the fence and small hills.

Aircraft overflights originating from the Laguna Army Airfield may have some noise impact on adjacent wilderness areas such as Kofa National Wildlife Refuge and Muggins Mountains Wilderness Area. However, the Arizona Desert Wilderness Act of 1990 states, "Nothing in this title shall preclude low level overflights of military aircraft, the designation of new units of special airspace, or the use or establishment of military flight training routes over wilderness areas designated by this title." The BLM and the USFWS continue to cooperate with the military in pursuing mutually beneficial opportunities to protect the integrity of wilderness airspace and the protection of natural resources (U.S. Department of Interior, 1995).

3.8.2 Adjacent Land Use

For the most part, lands surrounding YPG are managed by other Federal agencies (i.e., BLM, USFWS, AGFD) and are undeveloped and sparsely populated. No major land use conflicts or encroachments that could impair YPG's operations have been found. Nonetheless, there may be some areas which could develop problems if not closely monitored (Hermann Zillgens Associates, 1992).

Federally owned land borders the installation on the north, east, and west. A combination of private, State and Federal land borders the south. Figure 14 shows extensive land holdings by the USFWS for wildlife refuges. The Kofa National Wildlife Refuge protects desert bighorn sheep habitat of the Castle Dome Mountains, located between the East Arm (Kofa Region) and Cibola Region. To the west, Imperial and Cibola National Wildlife Refuges protect wetland and waterfowl habitat along the Colorado River. Fisher's Landing and Martinez Lake are recreational areas located in the Imperial Wildlife Refuge. Bureau of Land Management land is sandwiched between the refuges and YPG on all sides. Private farming of the Wellton-Mohawk Irrigation District extends along the south edge within the Gila River flood plain.

Present buffer zones along the installation boundary represent the absolute minimum for accomplishment of YPG's assigned missions. The Hidden Shores RV Village, a BLM/ private party recreation concession, is located adjacent to the west side of YPG with access through YPG from U.S. Highway 95. Information received from the BLM indicates that private entrepreneurs are expanding and redeveloping recreational facilities by developing a resort-type RV trailer park with associated facilities (U.S. Department of the Interior, 1998). There are no incompatibilities between the development taking place at Hidden Shores and baseline activities at the Main Administrative Area, the area in the Laguna Region closest to Hidden Shores.

Three recent property rezoning cases on the south side of the installation may indicate a trend toward housing development. Yuma County rezoned 40 acres north of Dome Valley to one acre suburban ranch parcels (SR1) located one mile south of YPG at Avenue 37E and Co. 4th St. The county rezoned five acres north of Dome Canal to two-acre suburban ranch parcels (SR2) at Avenue 17E south of Co. 2nd St. In addition, 160 acres were rezoned to RA10 (rural area 10 acre minimum) parcels between Avenue 17E and 18E between Co. 2nd and 3rd St. There is no indication that population pressure would cause community development to exceed available land within the life of this EIS (15 years).

3.8.3 Off-Post Locations Land Use

U.S. Bureau of Reclamation manages Senator Wash Regulating Reservoir. Portions of Death Valley used by YPG and Imperial Sand Dunes are managed by BLM. Yuma Proving Ground owns and operates rail spur and loading dock facilities off site at Blaisdell, AZ, which is cut off from the installation by BLM and private land. The BLM has issued a

right-of-way for 40 acres for a portion of Blaisdell Railroad Siding (BLM serial number AZA 30293). The 40 acres are located in the NE1/4SW1/4 of section 28, T. 8 S., R. 21 W (U.S. Department of the Interior, 1998). The roadway used at Oatman Hill is paved highway.

3.8.4 Regional Recreation Resources

The Yuma and La Paz counties diverse physiographic characteristics, sunny climate, and natural water resources are ideal for outdoor recreation. The Kofa, Muggins, and Castle Dome mountains, in the northern part of the area, and the Tinajas Altas Mountains, in the southern part of Yuma County, offer opportunities for camping, hiking, and small game hunting.

The Gila and Colorado rivers offer year-round water activities. The Colorado River provides fishing, swimming, rafting, and sunning areas. Nearby BLM and USFWS wilderness areas and neighboring wildlife refuges in the Cibola, Kofa, and Imperial areas provide numerous places for picnicking, camping, and hiking. The BLM's recreation complexes at Squaw Lake and Senator Wash and the Hidden Shores recreation concession offer areas for the outdoor enthusiast. Martinez Lake and Fisher's Landing, which are within the Imperial Wildlife Refuge, are also areas that can be used for outdoor activities. Additionally, the BLM's La Posa and Imperial Long-Term Visitor Areas (LTVAs) bring many winter visitors to the area that enjoy facilities and amenities at YPG. Yuma Proving Ground does not have areas for trapping, hiking, or camping (except by hunters). Hunters may enter and camp on YPG during designated hunting seasons if they possess valid AGFD and YPG hunting licenses. Portions of North Cibola, South Cibola, and the East Arm are designated for this use.

During the spring months, the public is invited to view and photograph parachute activities of the Army and international military teams at Cox Athletic Field. "Military Appreciation Days" are also held. A host of military activities are open for viewing by the public, ranging from vehicle displays and air shows, to a munitions firing exhibit. The Army provides installation recreational activities/facilities to military personnel and their family members. The facilities include a community club, a skill development center, a theater, and picnic areas. There are also athletic fields, tennis, handball, and basketball courts, playgrounds, a gymnasium, a swimming pool, a bowling center, and dedicated administrative areas for youth recreation.

3.9 NOISE

Noise is considered a source of pollution because it can be a public health hazard, causing hearing impairment and undue psychological stress. Understanding some characteristics of noise to evaluate noise impacts is important. Environmental noise is not steady, but varies in amplitude from one moment to the next. Furthermore, sound energy is radiated in all directions from the source. As the area of noise exposure increases, noise energy crossing each unit of area decreases; i.e., noise weakens as it travels over long distances. Additionally, natural ridges, hills, and bluffs act as noise barriers reducing sound by 10 to 15 percent in valleys, drainages, and all areas without line-of-sight positioning (Barbaro and Cross, 1973).

Efforts taken on behalf of the transportation and construction industries have helped lessen the potentially harmful impacts of noise. Noise, as a nuisance is generally a common concern. The amount of noise generated by a source can have very different physiological and psychological effects depending on the person exposed.

Noise control can be achieved by several methods including isolation, suppression, and shielding. Local and national laws generally dictate the noise control level. The Department of Transportation (DOT), Housing and Urban Development (HUD), and Occupational Safety and Health Administration (OSHA) have established guidelines on the permissible amount of noise to which an individual may be exposed. These guidelines help protect individuals from harmful effects of noise and the potential impairment.

Generally, land surrounding YPG is undeveloped and sparsely populated. Noise is generated from a variety of sources; transportation and firing activities are the main sources of noise on YPG.

At YPG, ambient noise (baseline noise when the installation is not in operation) is associated with natural sources such as wind and with helicopter flights from MCAS Yuma and AGFD wildlife surveys, Luke Air Force Base jets flying overhead, commercial air traffic, and traffic on U.S. Highway 95. Impact criteria are defined in 32 CFR 650.168. Table 3-13 summarizes noise zones.

As early as 1951, the Army sought a Letter of Permission from USFWS to accommodate noise incompatibilities. The letter allows noise to travel onto the Kofa National Wildlife Refuge from an artillery impact area close to the refuge southern boundary (Vander Zyl, 1987). This noise is muffled and typically non-intrusive.

The Noise Control Act (1972) was enacted to promote an environment free from noise that jeopardizes public health and welfare. The act states that Federal agencies "(1) having jurisdiction over any property or facility, or (2) engaged in any activity resulting, or which may result, in the emission of noise, shall comply with Federal, state, interstate, and local requirements . . ." [Section 4(b)]. In Section 6 of the act, the EPA Administrator is directed to establish noise emission standards for products and to prescribe regulations for such products. Yet, in Section 3, Congress excluded any military weapons or equipment designed for combat use from definition of a product.

In a 1989 memorandum, the Office of Judge Advocate General stated that " . . . the correct Army policy with respect to the Noise Control Act is that all Army activities should endeavor to comply with all Federal, state and local requirements respecting the control of noise as stated in Section 4(b) of the Act, unless to do so would conflict with the Army's mission. The obligation to comply with state and local noise laws arises out of the Army's policy of cooperation on environmental matters generally" (United States Army Environmental Hygiene Agency, 1991).

TABLE 3-13
INSTALLATION COMPATIBLE USE ZONES (ICUZ)

ICUZ	c-weighted day-night sound level (CDNL) in decibel (dB)	Description
I	< 65 dB	Noise levels are acceptable and there is no conflict with all land use.
II	> 65 and < 75 dB	Noise levels are unacceptable for sensitive land use, i.e., hospitals, schools, and residences. Compatible with business.
III	> 75 dB	Unacceptable for use other than some industrial and commercial activities.

To reduce noise impact, the Army established the ICUZ noise management program at all major commands and installations (AR 200-1, 7-5). The ICUZ is a concept of achieving compatible land use in areas around military installations. The purpose of ICUZ is to prevent incompatible development in high-noise exposure areas, and to protect the operational capability of the installation (United States Army Environmental Hygiene Agency, 1991). The program sets up Army policy on land-use planning. An active ICUZ program is aimed at protecting present and future operational capabilities of an installation. Encroachment problems may be caused by land uses that are not compatible with existing and future noise environments, or noise environments that are not compatible with existing and future installation land uses.

A worst case noise analysis was conducted for the Kofa South Direct Fire Range (Gutierrez-Palmenberg, Inc., 1996e). The study analyzed noise levels from large caliber weapons firing during tests. Land directly north, east, and west of the Kofa South Direct Fire Range is used exclusively for military tests. No sensitive noise receptors lie in these directions for several miles. The Muggins Mountain Wilderness Area, located about four miles southeast, has been tentatively identified as a sensitive noise receptor area. The study concluded that the wilderness area is not impacted by noise generated from the range. Other potential noise sensitive locations are unaffected by noise from the firing range.

3.9.1 Noise in the Kofa Region

This region is essentially void of personnel. People operating firing ranges are required to wear hearing protection. Noise from aircraft is comparable with noise generated from firing activities. Other sources of noise are barely distinguishable from background noise levels.

Outdoor day-night sound levels in the wilderness area are within acceptable ranges. Any gun bursts or high-explosive projectile impacts heard in the wilderness area sound like distant, muffled thunder. The Arizona Desert Wilderness Act of 1990 anticipated the possibility of incidental noise beyond the boundary of a wilderness area. The act specifically states that " . . .the fact that non wilderness activities or uses can be seen or heard from areas within a wilderness area shall not, of itself, preclude such activities or uses up to the boundary of the wilderness area."

3.9.2 Noise in the Cibola Region

The Cibola Region does not have administrative facilities where human receptors are found. Any human receptors in this area are personnel involved in testing and training activities. Personnel involved in these activities are safeguarded from high noise levels by way of standard operating procedures and personnel safety training. No permanent human receptors are identified in the Cibola Region.

3.9.3 Noise in the Laguna Region

Laguna Region includes and is adjacent to populated areas. Aircraft activities may have adverse impacts on these populated areas, especially areas next to the Laguna Army Airfield. Helicopters operate throughout range airspace producing noise levels as high as 97.3 dBA at 61 m (200 feet) above ground level, in remote areas or during landings, to roughly 85 dBA while transiting the range. Though a single aircraft overflight may exceed the OSHA standard of 115 dBA at which humans experience pain, such events would not exceed the maximum time limit of 15 minutes for exposure above 115 dBA (U.S. Department of the Army, 1995). No firing activities take place in this region. Noise from YPG aircraft flying off the installation is not a serious problem because thay are generally at signficantly higher altitudes than when on the installation.

Test missions involving aircraft are mainly conducted within the installation boundaries, primarily in the Cibola Region. Aircraft used by the Military Free Fall School fly over the Imperial National Wildlife Refuge. The aircraft are low speed and are not expected to exceed noise standards.

3.9.4 Noise in Off-Post Locations

There are no permanently populated areas in off-post locations. No installation aircraft takeoffs and landings or firing activities are involved with off-post testing and training. Other sources of noise may be evaluated based on public complaints.

3.10 HAZARDOUS SUBSTANCES AND WASTE MANAGEMENT

Hazardous substances are defined within certain laws and regulations to have specific meanings. For this RWEIS, a hazardous substance is any one of the following: any substance designated pursuant to Section 311(b)(2)(A) of the CWA; any element, compound, mixture, solution, or substance designated pursuant to Section 102 of Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); any hazardous waste having the characteristics identified under the Resource Conservation and Recovery Act (RCRA); any toxic pollutant listed under Toxic Substances Control Act (TSCA); any hazardous air pollutant listed under Section 112 of the CAA; or any imminently hazardous chemical substance or mixture with respect to which the EPA Administrator has taken action pursuant to subsection 7 of TSCA. A list of hazardous substances is found in 40 CFR 302.4. [Refer to section 3.13.3 for a discussion on solid waste management units (SWMU's).]

Environmental programs at YPG uses aggressive management practices to minimize use of hazardous substances and reduce resulting waste streams. Strict spill prevention requirements offer additional protection to human health and the environment.

At YPG, industrial processes, routine maintenance activities, testing, and support activities are the primary operations using hazardous substances and generating wastes. Additional hazardous substances present at YPG are lead and asbestos. Renovation of residences and other buildings are gradually eliminating these materials from buildings on YPG.

3.10.1 Hazardous Substances Management

Gasoline, diesel, and chlorine are substances present at YPG in large amounts. They are stored at quantities above reporting limits. They are reported in the Tier Two Emergency and Hazardous Chemical Inventory submitted to the Arizona Emergency Response Commission and the local Emergency Planning Committee. Submission of the Tier Two form is required by the Arizona Emergency Planning and Community Right-to-Know Act (EPCRA), which implements Title III of the Federal Superfund Amendments and Reauthorization Act (SARA) of 1986.

The purpose of the Tier Two form is to provide state, Tribal, and local offices and the public with specific information on hazardous substances present at YPG during the previous year.

Yuma Proving Ground is required to submit the Facility Annual Report (FAR) to ADEQ. In this report, YPG reports the quantities, nature, and disposition of generated hazardous waste and the efforts taken to reduce the volume and toxicity of hazardous waste in comparison to previous years.

Hazardous substances are stored according to Army regulations and all applicable Federal, State, and local ordinances. For a listing of hazardous substances stored on-site, review SPCCP and ISCP (Gutierrez-Palmenberg, Inc., 1997c). The following paragraphs address potentially hazardsous substances used at YPG.

3.10.1.1 Fuels

Fuels are stored, transferred, and transported on the installation. Fuels are stored in ASTs and USTs. There are currently 18 aboveground storage tanks with a total capacity of 606,946 L (143,486 gallons). The bulk of these tanks contain fuel oil, used oil, aviation fuel, gasoline, or diesel fuel. Many of the ASTs have some form of secondary containment structure. There are 51 USTs that primarily contain heating oil or gasoline. The total storage capacity of USTs is 511,043 L (120,814 gallons). Yuma Proving Ground conducted leak testing of all USTs under a POL contract between 1991 and 1995. Under EPA regulations, facilities with USTs are required to replace them or to install corrosion protection and spill/overflow prevention technology. Yuma Proving Ground is in the process of removing remaining USTs.

3.10.1.2 Petroleum Products

The majority of POLs are stored in large storage tanks (either above or below ground). However, small amounts are stored in individual sites scattered through industrial working areas for use as necessary in maintenance and repair of vehicles.

Used oils are poured into a labeled 55-gallon drum and set aside to recycle. For the most often used materials, such as fuels and lubricants, substantial changes in the amounts used have not occurred from 1991 to 1995 (Gutierrez-Palmenberg, Inc., 1997c).

3.10.1.3 Solvents

Solvents are used in parts cleaning during routine maintenance of vehicles and weapons systems. Most maintenance activities use Safety-Kleen® solvent. Safety Kleen® cold degreasing tanks are located in seven buildings. Each degreasing tank is equipped with a solid stream dispensing nozzle and an interior drain rack. Safety Kleen® solvent is reclaimed by Safety Kleen® Corporation on a quarterly basis. Environmental programs maintain pickup manifests.

Another solvent used at YPG is PD680 (Stoddard solvent). Each PD680 solvent tank is a cold cleaner immersion tank with enclosed design. The solvent PD680 is used in aircraft and vehicle maintenance.

3.10.1.4 Ordnance

As an Army testing facility, YPG stores, utilizes, and destroys considerable quantities of propellants, explosives, and pyrotechnics (PEPs). Additionally, small quantities of oil, paint, and acetone are consumed. Industrial radiography for examination of ammunition consumes photographic chemicals and hydraulic fluids. There are numerous storage facilities located on the Kofa Firing Range, as well as a facility for the preparation and modification of all calibers of ammunition, including experimental munitions and small rockets. This facility can store four-and-a-half tons of explosive items.

Kofa Firing Range is used for artillery, mortar, and munitions testing. Gun positions are both fixed and temporary. Approximately 67 percent of completed testing is accomplished on this range. The other major range on YPG is Cibola Range, which supports aircraft armament testing. Tested systems include rockets, cannons, and an array of other armaments.

The heavy use of live-fire testing ranges for military weapons results in large amounts of UXO, that for the most part, must be cleared by Explosive Test Operator (ETO) experts. Special techniques are required and regular sweeps of the ranges occur. However, significant quantities of UXO remain in both ranges.

3.10.1.5 Pesticides and Herbicides

Application of pesticides and herbicides varies. Annual consumption is tracked via the Pest Management Report (Form DD1532) as shown on table 3-14. An inventory of chemical pesticides and herbicides is maintained in Building 404. Pesticides and herbicides are stored on a concrete spill containment pad within a fenced complex. Additional information on pesticides and herbicides, as well as a copy of the inventory are in the SPCCP and ISCP (Gutierrez-Palmenberg, Inc., 1997c).

All Material Safety Data Sheets are available with the chemical inventory. Pesticides and herbicides are registered with EPA, and containers are properly labeled in compliance with the Federal Insecticide, Fungicide, and Rodenticide Act: Part II (FIFRA) registration and labeling requirements. Pesticide and herbicide use is kept to a minimal level. The chemicals are only mixed in quantities needed for application.

3.10.1.6 Asbestos

Yuma Proving Ground is currently surveying approximately 500 buildings for asbestos. The last survey conducted in 1989 (Schrader Architects, 1989), revealed the presence of asbestos in 67 buildings. A separate survey must be carried out before any renovation or demolition work is done.

Asbestos abatement during construction and renovation is implemented per Asbestos Hazard Emergency Response Act (AHERA) regulations. Asbestos is managed according to the draft Yuma Proving Ground Asbestos Management Plan. Under new regulations, most buildings would be presumed to contain asbestos, unless proven otherwise. Ongoing asbestos abatement would be needed.

3.10.1.7 Lead

A lead abatement survey has been completed for the general housing area and older industrial buildings. A Lead-Based Paint Management Plan was completed in 1995 (Gutierrez-Palmenberg, Inc., 1995a). The plan is followed prior to and during renovations to housing and administrative facilities. Renovation wastes are disposed of after determination of the quantity of lead in the paint through laboratory analysis.

3.10.1.8 Polychlorinated Biphenyls and Other Chemicals

The only known polychlorinated biphenyls (PCB's) at YPG are in transformer oil. As transformers are received at the Directorate of Public Works (DPW) complex, the oil is sampled and tested by a lab. While awaiting lab results, transformers are kept on plastic spill crates placed on the concrete spill containment pad of the DPW complex. As of April 1997, all known transformers containing PCB's have been disposed of and replaced with non-PCB transformers (McGee, 1997).

Small amounts of chemicals also are stored at individual sites throughout the industrial working areas for use as necessary in maintenance and repair of vehicles. For more information on chemical storage, reference the SPCCP and ISCP (Gutierrez-Palmenberg, Inc., 1997c).

TABLE 3-14
PESTICIDE USAGE

Chemical	CAS #	Quantity (1995)
Hydramethylon	67485-29-4	318 ounces
Diazinon	333-41-5	23.5 pounds
Chloropyrifos	5598-13-0	3197 gallons
Permathrin	52645-53-1	133 gallons
Carbaryl	63-25-2	5320 gallons
Resmethrin	10453-86-8	79 gallons

3.10.2 Hazardous Waste Management

3.10.2.1 Hazardous Waste Storage Facility

Hazardous wastes generated at YPG have been managed successfully using the existing HWSF located in the Laguna Region. Hazardous wastes and expired hazardous substances accumulate at this location while awaiting disposal. No wastes from outside YPG are accepted at the HWSF. No treatment is conducted and no wastes are disposed of at the HWSF.

Yuma Proving Ground has a thorough tracking system for all hazardous wastes generated through industrial activities. First, the generator logs into the HWTS and produces a waste analysis sheet based upon laboratory analysis, generator knowledge, or material safety data sheets. This analysis is reviewed and approved by the installation environmental coordinator (IEC) for turn-in to HWSF, located in Buildings 2668-2677. (Each storage pad is numbered as a separate building.) The Directorate of Logistics then generates a DD Form 1348-1 for turn in to the DRMO, where the waste is again temporarily stored. Environmental programs prepare shipping manifests. Finally, licensed disposal contractors pick it up. This system allows detailed tracking of hazardous waste during the entire disposal process.

3.10.2.2 Open Burn/Open Detonation Management Unit

Open burning/open detonation is a means of demilitarizing many explosive items, decontaminating large metal objects, and reducing most combustibles to a smaller volume. Open burning/open detonation is normally the safest method currently available for the effective destruction, decontamination, and treatment of explosives and explosive wastes. The Kofa OB/OD fenced area measures approximately 2,100 m (7,000 feet) north-south by 2,100 m (7,000 feet) east-west. The site active area containing the trenches and pads is about 10 hectares (25 acres) and is buffered by an 80 hectares (200 acre) area devoid of vegetation. It is an open-air facility.

The OB/OD management unit is a large cleared area consisting of open trenches and two open-burn, concrete pads with three pans each. The pads and pans are used to treat (by burning) excess propellant and ammunition-related materials. Propellant and powder are carefully loaded in burn pans located on each pad. The material is ignited and left to burn completely. Lead contaminated ash is collected from the pans and pads for disposal as hazardous waste. The OB/OD facility is operated in accordance with a RCRA Part B Interim Permit. The regulatory authority is ADEQ.

The OB/OD management unit is a satellite accumulation area. No waste explosives (EPA Hazardous Waste Code D003) are stored at the OB/OD treatment facility. All waste explosives are destroyed by OB/OD treatment. Waste ash is a by-product of burning M1 propellants. Waste ash (EPA Hazardous Waste Code D008) is accumulated in a 55-gallon drum and temporarily held on the OB/OD treatment facility, inside the safety bunker approximately 1 km (0.6 miles) from the burn pads and trenches, for later transport to the HWSF. The container is marked with EPA and DOT labels.

3.10.2.3 Hazardous Substances and Waste Management by Region

The potential for fuel spills exists in the Kofa and Cibola Region; but it is most likely in the Laguna Region where the largest storage tanks are found. The CWA and the Oil Pollution Act of 1990 have established requirements for spill prevention and control. It is the policy of the U.S. Army to establish and maintain the capability to contain and clean up all spills of oil and hazardous substances; and to handle, use, and store all hazardous substances to avoid or minimize the possible accidental spill and pollution of land, air, and water. Tank truck loading and unloading have the potential for large quantity spills. Standard operating procedures are being developed to ensure that tank car, tank truck, and vessel loading and unloading procedures meet the requirements and regulations established by the Arizona Department of Transportation and are directed in a manner to prevent spills.

Petroleum, oils, and lubricants are important in maintenance activities. These materials are used in large quantities. The quantities of POL fluctuate based on mission requirements. Solvents are discussed under the Laguna and Cibola Region. The Laguna Region is where most maintenance operations take place. Some maintenance is conducted in the Cibola Region.

Ordnance is tested and managed at YPG. New requirements under the EPA Munitions Rule apply to YPG's management of ordnance once they are promulgated by ADEQ.

There are no known transformers containing PCB's in operation or storage at YPG. In 1983, transformers at YPG were analyzed for PCB's. The PCB containing transformers have been gradually disposed of and replaced with non-PCB transformers. The last known PCB containing transformer was turned in for disposal in 1995 (McGee, 1997).

KOFA REGION

Explosives, propellants, and pyrotechnics are treated at the Kofa OB/OD management unit. The OB/OD management unit operates at 100 percent of its daily capacity, 1,000 kg (4,000 lbs) of propellants and 450 kg (1,000 lbs) of explosives. However, it operates well below its yearly capacity, 328,500 kg (730,000 lbs) of propellants and 16,425 kg (6,500 lbs) of explosives. Decommissioning of waste munitions via OB/OD processes is permitted by an interim RCRA Part B Permit. The RCRA Part B permit application was completely revised in 1996.

The OB/OD site is a satellite accumulation area for waste ash. Waste ash is a by-product of propellant burning. Chemical analysis has detected lead in the waste ash. For this reason, the ash is treated as hazardous waste. Waste ash is accumulated in a sealed 55-gallon drum, located inside the safety bunker. When full, the drum is transported from the OB/OD site to the HWSF. The quantity of waste ash generated and disposed of in three consecutive years during the baseline period is as follows: 1993-265 kg (589 lbs); 1994-152 kg (339 lbs); 1995-212kg (472 lbs). No lead contamination was found in waste ash treated in 1995. Public

access to the OB/OD facility is prohibited. The OB/OD facility is completely surrounded by military land used for military activities. No residential communities are located within several miles of the OB/OD facility. Locked gates and warning signs secure site access. Security police patrol the area 24 hours per day.

The Army anticipates the possibility that OB/OD activities would be replaced by a greater emphasis on recycling. The propellant within munitions could be salvaged and the metal sold for scrap after any residue is removed. No other hazardous wastes are treated on-site.

CIBOLA REGION

Routine maintenance and industrial processes are performed in this region. These activities consume various oils and small quantities of paint, solvents, and lubricants. At the LAV Division in the Castle Dome Annex, welding, maintenance, and mechanical work are performed. Activities conducted at the LAV mainly consume oils, antifreeze, sulfuric acid, paint, and acetylene gas. Conex boxes are used to store in-use hazardous substances (Gutierrez-Palmenberg, Inc., 1997c).

There is no long-term storage of hazardous substances or treatment of hazardous wastes. Fuel is available from portable fuel tanks. Any wastes generated are taken to the HWSF for eventual disposal. There is the potential for spills from refueling activities.

LAGUNA REGION

Maintenance of tracked and wheeled vehicles involves the majority of the hazardous substances used and stored in this region. The principal maintenance activities take place in Building 3490. Maintenance activities performed include complete engine rebuilds, gun cleaning, lubrication, and fluid changes. Other facilities use and store hazardous substances in smaller quantities. Table 3-15 lists the wastes accumulated at the HWSF and shipped off site during the 1995 calendar year. Note that some wastes may be onetime shipments that do not necessarily represent typical wastes generated at YPG.

Chlorine is stored and used in this region at quantities reported to the EPCRA Reporting Center under section 313, title III of the SARA and the Pollution Prevention Act of 1990. During 1991-1995, reporting requirements were based on storage amounts since YPG did not have any accidental chlorine releases.

The Pollution Prevention Program is evaluating the issue of household hazardous waste from the housing units. The City of Yuma conducts a periodic household hazardous waste collection event. Several volunteers at the installation assist in the collection of household hazardous wastes generated at YPG to be sent to the City of Yuma. A more concrete methodology detailing types and quantities is anticipated under the Pollution Prevention Plan.

OFF-POST LOCATIONS

No hazardous substances or waste are permanently stored, treated, or disposed at any of YPG's off-post locations. Transport of hazardous substances is in accordance with legal requirements.

3.10.2.4 General Programs

USE AND STORAGE

Periodic audits are conducted at facilities where hazardous substances are used. These audits serve as a tracking system for hazardous substance use. In addition to obtaining material usage amounts, storage and containment are investigated. Emphasis is placed on the prevention and control of spills.

The Hazardous Material Pharmacy Program using the Hazardous Substances Management System (HSMS) is being implemented at YPG. The HSMS is an automated chemical tracking system designed to provide "cradle-to-grave" tracking for hazardous substances at the chemical constituent level. The program will centralize the ordering of hazardous substances.

The program facility will become the primary storage and distribution center of all large quantities of hazardous substances at YPG. The HSMS integrates hazardous substance and hazardous waste management, pollution prevention support, and EPCRA reporting.

DISPOSAL

The universal waste rule issued by EPA (40 CFR 273) is designed to reduce the amount of hazardous waste items in the municipal solid waste stream, encourage recycling and proper disposal of certain common hazardous wastes, and reduce the regulatory burden on businesses that generate these wastes.

The rule aims to promote recycling of batteries, mercury containing thermometers, and recalled pesticides by relaxing collection, handling, and transportation requirements; making it easier to properly treat and recycle these wastes. According to the rule, facilities can accept universal waste from other handlers and forward it to a treatment or disposal facility or other universal waste handler without obtaining a RCRA permit provided the handlers meet certain accumulation times and rules. Yuma Proving Ground would coordinate and establish an agreement with MCAS Yuma and other government agencies to consolidate wastes that fall under this rule. This would increase cost effectiveness of disposing of the waste. In YPG's case, wastes would include waste batteries and mercury containing thermometers.

SPILL CONTAINMENT

The installation fire department can provide emergency response in the event of a large spill. The ISCP and the SPCCP provide information on the storage and handling of petroleum-based products, hazardous substances, and appropriate response actions in the event of fire, explosion, or release of hazardous substances and wastes.

FUELS

Remaining USTs are scheduled for removal and site characterization. In the meantime, USTs are monitored monthly.

TABLE 3-15
WASTES SHIPPED IN 1995

Category	EPA HW Code	Quantity (lbs)
Waste paint related materials	D001, D035	746.0
Orange stencil paint	D001, D008	100.0
Primer epoxy	D001, D035	34.0
Waste adhesives	D001, D002	186.0
Blasting media (cadmium& chromium contaminated beads and sand)	D007, D006	10,185.0
Waste batteries and battery parts	D001, D002, D003, D006, D007, D008, D009, D011	2,644.0
Waste caustic alkali liquid n.o.s.[1] (DS-2)	D002	80.0
Hazardous waste liquid	D001, D002	956.0
Hazardous waste solid n.o.s. (lead, chromium) n.o.s.[1]	D007, D008	94.0
Waste flammable liquid n.o.s.[1]	D001	1,376.0
Waste corrosive liquid n.o.s.[1]	D002, D007	52.0
Waste propellant	D001	51,534.0 (treated on-site)
Waste explosives	D003	2,706.0 (treated on-site)
Waste combustible liquid n.o.s.[1]	D001, D006, D008, D018, D035, D039, D040	13,076.0
Hazardous waste solid n.o.s.[1]	U061	302.0
Waste berylium powder (labpack)	D001, D015	3.0
Waste nitric acid (containing lead)	D002, D008	3.0
Waste mercury	D009	3.0
Oxygen breathing apparatus (canister)	D002	103.0 [2]

[1] Not otherwise specified
[2] Reported as quantity generated. A shipped quantity was not reported.

PETROLEUM PRODUCTS
Yuma Proving Ground continues to recycle used oils. All used oil is collected in ASTs. The used oil is picked up by a private contractor for recycling. Control practices such as oil/water separators attached to vehicle wash racks minimize discharge potential.

SOLVENTS
Yuma Proving Ground continues to decrease the use of chlorinated solvents. Where military specifications provide flexibility YPG has replaced chlorinated solvents with environmental friendly alternatives. Safety Kleen® solvent has replaced PD680 solvent in many applications at YPG. Used Safety Kleen® solvent is collected by a commercial contractor and recycled outside the installation.

ORDNANCE
Ordnance management is highly controlled. Basic requirements for care of ammunition are defined in chapter 22, AMC-R 385-100. Personnel do not handle ammunition unless they are certified under AMC-R 350-4. Ammunition is stored in specially designed magazines. These facilities are located in isolated areas with controlled access.

PESTICIDES AND HERBICIDES
The application of pesticides and herbicides continues to be controlled. Inventories of stored and applied amounts are compiled and maintained.

ASBESTOS
Removal of asbestos continues if facilities are renovated. In the meantime, warning signs are placed on the entrance to buildings determined to have asbestos.

LEAD
The management of lead ash from OB/OD activities continues based on RCRA requirements and pollution prevention principles. The management of lead-based paint continues in accordance with Housing and Urban Development guidelines. Disposal of lead-based paint is according to RCRA guidelines.

POLYCHLORINATED BIPHENYLS
No known PCB containing transformers are used or stored at YPG. Suspect transformers are analyzed to determine their PCB content.

3.11 RADIATION

Radiation is the process, both natural and man made, in which energy is emitted as particles or waves. For convenience in understanding the environmental effects, radiation is divided into two groups based on the radiation's ability to remove electrons from atoms and molecules. The two groups are known as ionizing radiation and nonionizing radiation. Areas of YPG where sources of radiation are present are described in figure 15.

For ionizing radiation, each particle or wave possesses enough energy to dislodge electrons from an atom or a molecule (ionize them). Ionizing radiation creates ions in the environment. While creating an ion in non-living material has little effect, creating an ion in a healthy cell is not desirable. Ionization can damage a cell, possibly starting a cancer. Some examples of ionizing radiation are alpha and beta particles emitted during radioactive decay as well as x-rays from x-ray machines used by doctors, dentists, and industrial radiographers. Ionizing radiation is regulated based on the risk they pose to humans and the environment.

With nonionizing radiation, the individual particles or waves do not possess enough energy to ionize atoms or molecules. Adding excess energy, which usually results in a temperature increase, creates nonionizing radiation's environmental effects. This change in temperature may be useful (as in a microwave oven) or it may be harmful (as a skin burn from radar). Some sources of nonionizing radiation are radios, televisions, radar, and lasers. Radio and television is broadcast at such low energy levels that environmental effects are very small. Radar, which are more powerful than radio and television, have a small exclusion area (about one hundred feet or so) where harmful effects are possible. Low power lasers cause no environmental damage and are readily found at checkout counters and in bar-code systems. Medium power lasers can damage the eye if accidentally observed, while high power lasers can be used to weld steel hulls on submarines. Nonionizing radiation is regulated based on the risk they pose to the environment.

3.11.1 Ionizing Radiation

Depleted uranium and industrial x-ray equipment are discussed per region. The effects of tritium illuminating devices are common to all regions since they are found throughout YPG.

Tritium is present in illuminating devices. The tritium beta impinging on zinc sulfide creates a fluorescent illumination that makes "night sighting" possible. Devices are normally issued as part of a targeting system for specified weapons and weapons systems. The environmental program monitors these devices. They are kept with their associated weapons. Tritium lights have small environmental impact for two reasons. First, the tritium is contained within glass vials that absorb all of the radiation emitted by the tritium. Second, the tritium is a gas, and if the glass vial is broken, the tritium diffuses into the atmosphere (Dunfrund, 1997).

3.11.1.1 Depleted Uranium

High velocity projectiles are manufactured from DU, which is the leftover metal from making nuclear reactor fuel. This metal is deficient (depleted) in the U-235 isotope. The DU projectiles are fired in an area controlled by a license and recovered (at a controlled range) to the maximum extent possible. Recovered DU is recycled or disposed of as low level radioactive waste. Two main sizes of projectiles are used. One is about the size of a pencil and contains less than 1 kilogram (2.2 lbs) of DU. The second is larger and contains less than 5 kilograms (11.0 lbs) of DU.

3.11.1.2 Moisture Density Gauge

A moisture density gauge is used on-site. These soil moisture measuring devices include a neutron source, americium-beryllium (Am-Be), and a cesium-137 source. They detect minute changes in the water content of soil. The radioactive source is encapsulated to prevent any loss of radioactive material from the device. Because of its rugged construction, this device falls into the category of "special form sealed source."

3.11.1.3 Industrial X-Ray Equipment

Industrial x-ray equipment is an electrical source of radiation. This equipment is used to take radiographic images of the internal structure of objects such as weapons components or aircraft systems. Yuma Proving Ground has this type of device typically in the range up to 10 megavolts (MV).

3.11.1.4 Tritium Illumination Systems

Tritium is a low-energy beta particle emitter used in fluorescent illumination devices. It is sealed in a glass envelope within the devices and maintained under NRC license. Trained personnel for weapons system targeting use these devices.

3.11.2 Nonionizing Radiation

3.11.2.1 Laser Systems

Laser systems are used for weapons systems sighting and alignment. Lasers emit coherent electromagnetic radiation (light) that travels in a straight line. Yuma Proving Ground has both continuous wave and pulsed lasers with energies up to two megawatts (MW). They are used in the Cibola Region.

3.11.2.2 Radar Systems

Radar systems are routinely used at several locations to track airborne tests and artillery projectiles. These radar systems and antennae are controlled to reduce exposure to personnel and the environment. It is necessary that radar systems have little interaction with the environment to accomplish their intended purpose of tracking a variety of items. Conducting tests in isolated areas further reduces the interaction of the radar systems with humans and animals. Some radar systems at YPG are high powered and could cause irreparable damage to tissue, especially after long-term, continuous exposure. The possibility of human and animal exposure to high powered radar exists; however, radar is not frequently used in high-power mode. Most use is categorized as non interference, low powered (Dunfrund, 1997). Training, procedures, and interlock systems prevent inadvertent exposure to the emissions from these systems. Environmental programs for operations of these systems establish exposure controls. The Range Safety Officer establishes monitoring controls for maintenance operations performed on these systems.

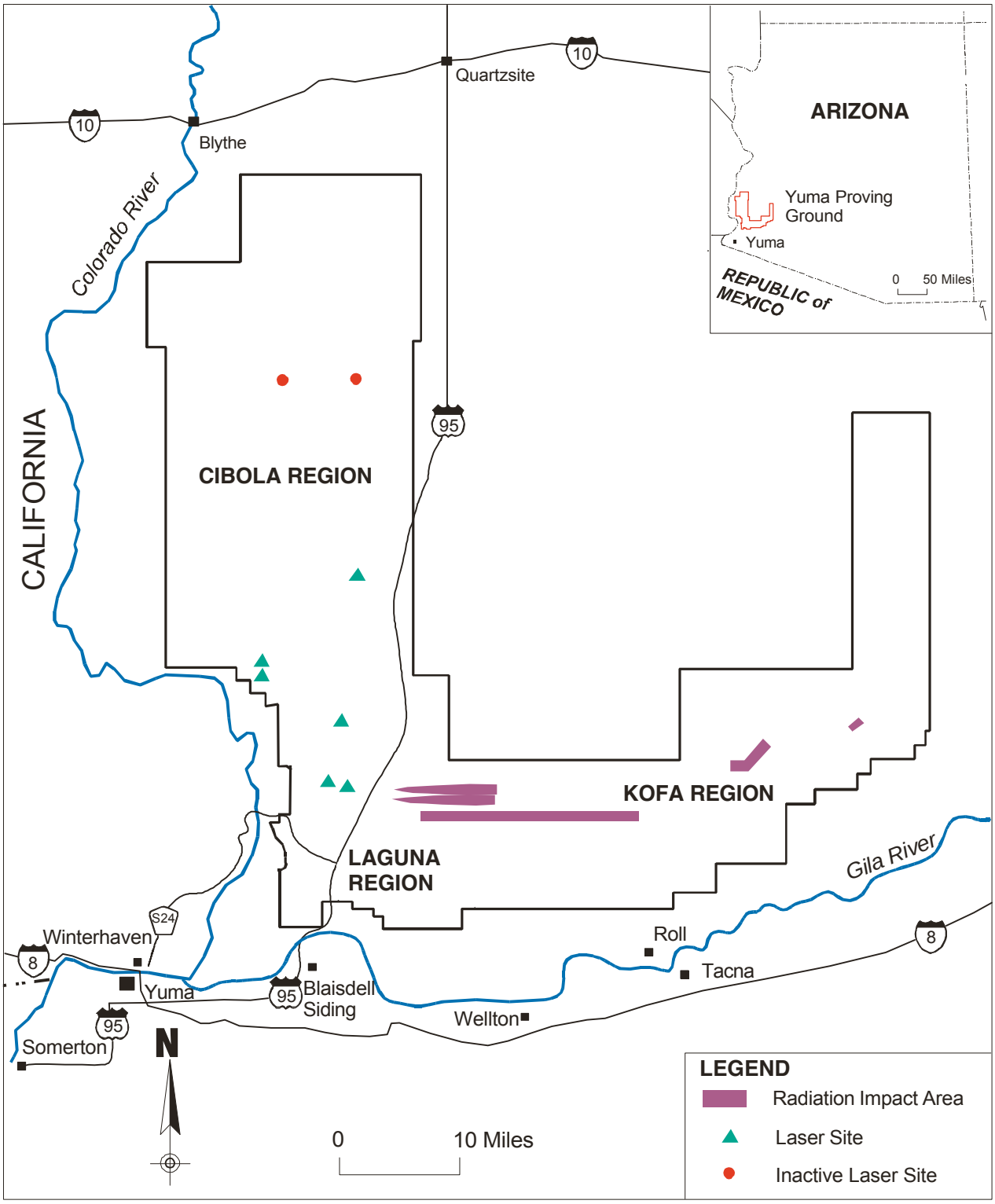


Figure 15. Radiation Use Areas on Yuma Proving Ground.

3.11.2.3 Telemetry Systems

Telemetry data are frequently transmitted from test items. Telemetry systems operate at power levels and on frequencies that are approved by the YPG frequency manager.

3.11.2.4 Low Frequency Emissions

Some electrical systems operate at low frequencies (with levels typically less than 10 MHZ). Examples include power systems that provide electricity to homes and emit 60 Hz emissions (i.e., low-energy electromagnetic radiation) at low power levels. The installation has not experienced effects from this type of external, nonionizing radiation exposure. Low-energy electromagnetic testing has not been conducted.

3.11.2.5 Radio Communications Devices

Hand-held radios are used to communicate with range control. Relay towers on high points allow YPG personnel to communicate throughout the range with these low-powered radios. Radios used by YPG personnel may clutter the radio frequency but are allowed to do so. The energy transmitted by radios is very low and does not interfere with other energy sources (Dunfrund, 1997). Radio waves from aircraft are not restricted to YPG. Aircraft transmitting radio waves at high enough wattage and at a close distance from a receptor may be a nuisance inside and outside the installation.

3.11.3 Radiation by Region

3.11.3.1 Kofa Region

IONIZING RADIATION

The DU-licensed area on the Kofa Range is shown in figure 15. The DU range has an area of approximately 51.0 km^2 (19.5 square miles). It is controlled by an NRC source material license. The range is monitored under an NRC mandated environmental radiation monitoring plan (ERM). This range is the only NRC-licensed range at YPG (Dunfrund, 1996).

Of the 10,000 projectiles fired since the start of licensed operations, 5,000 have been recovered. The recovered DU has been recycled or disposed of as low level radioactive waste at a licensed waste facility. The unrecovered DU is within the boundaries of the restricted access NRC-licensed range. Periodic recovery continues.

There are several smaller areas that have been used for Department of Energy (DOE) testing. These sites are also on Kofa Range. The DOE sites were added to the Environmental Radiation Monitoring Plan to monitor potential movement of DU away from the licensed area. The sites are under DOE rather than NRC jurisdiction.

The environmental program conducts environmental monitoring and evaluates the impact of DU projectile testing based on sample results taken and studies conducted. The types of environmental sampling utilized include air sampling, impact site(s) soil sampling, wash sampling at various locations remote to the firing line, and soil sampling at several locations outside the site, as well as thermoluminescent dosimeter (TLD) monitoring of occupationally exposed workers (Dunfrund, 1997).

Air quality can be affected by entrainment of DU from soil into the atmosphere. Soil samples and air samples were collected and evaluated during recovery of impacted DU on the desert pavement at YPG from 1979 to 1982 (Luna, Parker, and Taylor, 1983). The levels of atmospheric uranium contamination were below allowable health protection standards (Gutierrez-Palmenberg, Inc., 1996b).

In 1992, scientists collected soil samples from the soft impact area at YPG (Ward and Stevens, 1994). Particle size analysis showed that only a small portion of the soil activity is subject to resuspension. Air samples taken downrange during survey activities and recovery operations have indicated air concentrations well below 10 percent of the NRC derived air concentration (DAC) levels which would require exposure evaluations. Air samples were also taken at three locations at the NRC-restricted site boundary during operations to evaluate air concentrations in unrestricted areas surrounding the site. The concentration levels were typical of the background concentration found throughout the world. The air sampling program and studies indicate DU test operations have no measurable effects on air quality at the Kofa Range (Gutierrez-Palmenberg, Inc., 1996b).

The natural background level of uranium was determined to be consistent with the average abundance of uranium in the earth's crust of 2-4 gU/g (Ebinger, et al., 1995). During fiscal years 1990 through 1993, a total of 151 soil samples were taken around the NRC-licensed area to evaluate the levels of DU in the soil. The sample locations for this program were chosen to evaluate uranium transported from the Kofa Firing Range via water runoff. The Scoping Survey Report (Scientific Ecology Group, 1995) indicated radiation levels at the range are background levels except in the trench areas where penetrators have impacted and over areas where penetrators have not yet been recovered.

A study conducted by Ebinger indicated that although DU metal will undergo dissolution in the environment, an insoluble compound forms. Low levels of soluble uranium travel very slowly through soil vertically and are subject to adsorption as they pass through the soil. Ebinger also sampled the groundwater from YPG and determined through a limited sample database that uranium concentrations were below detection limits. Transfer of soluble uranium with rain water runoff is limited because of the low solubility of uranium in the rainwater and uranium's high density (Ebinger, et al., 1995).

A catch box has been constructed to serve as a containment device for fired DU penetrators. It further localizes DU input. The DU management area consists of an apron in front of the catch box, which drains into an impoundment basin or holding pond. This holding pond will collect storm water runoff that could transport radioactive particles, minimizing DU entry into the nearby washes (Gutierrez-Palmenberg, Inc., 1996b). Since the evaporation rate (271.78 cm/year or 107 in/year) exceeds the rain fall rate (2.54 to 7.62 cm/year or 1 to 3 in/year), little water accumulates in the basin.

The DU catch box allows for greater recovery of fired DU rounds. The baseline recovery rate was approximately 50 percent [recovery has increased to 90 percent (Dunfrund, 1997)]. Retrieving penetrators from the range maintains soil

concentrations below the action standard requiring corrective actions and minimizes the uranium source terms. Routine soil samples are taken from the penetrator impact area and inside and outside the boundary of the NRC-licensed area. The results from these soil samples are evaluated using EPA and NRC standards, which control radiological hygiene of the test range.

The range is continually monitored to ensure that levels of DU are below threshold limits. Per NRC license SMB-1411, YPG is expected to conduct an annual review of environmental data. The review summarizes the data for the past year, identifies any action levels that were exceeded, and discusses corrective actions, which have been taken or are planned. The review and summary are maintained for inspection purposes (Prange, 1996).

Several potential pathways were identified for DU introduction and transportation through the food chain that include small insects, reptiles, small and large animals, and humans (Ebinger, et al., 1995). Modeling of DU transfer showed that small herbivores accumulate DU from soil ingestion and consumption of DU contaminated vegetation. Large herbivores, while exposed by these pathways, do not accumulate DU. Depleted Uranium accumulation in small herbivores results from their close proximity to contaminated soils in the impact area. Deer and rabbits could consume vegetation which has DU contaminated dust on its leaves; however, the dilution effects of obtaining food sources outside the impact area are highly influential.

In addition, the noise and disturbing activities at the range would tend to limit deer access to this area. The animal-to-human pathway becomes detrimental only when humans consume animals that contain DU. There is only minimal hunting of animals that live in or migrate through the impact area, and the consumption of wildlife is limited to deer, bighorn sheep, and possibly quail. The probability of DU transfer to humans through the consumption of animals is extremely low and the dilution effects of other food sources is highly influential (Gutierrez-Palmenberg, Inc., 1996b).

The second ionizing radiation source is x-ray use. X-rays are used in the radiography facility exposure chamber. This main chamber of the building has a sunken floor designed to absorb the x-rays and to minimize radiation exposure to workers and the environment. Additional safety controls such as the use of robotic equipment to move live ammunition are in place to further minimize exposure. The environmental program staff monitors all personnel working in the area. X-ray machines give off low energy. These devices are considered “flash” x-rays because they operate at micro seconds (sec).

No personnel are allowed within the immediate area when these devices operate because of the danger involved with firing. The radiation from x-rays is monitored and controlled in accordance with state and Army regulation. A small portable x-ray system is used on the firing ranges to examine fuses of UXO under investigation, as well as other imaging. Yuma Proving Ground personnel using this x-ray system are monitored by the environmental programs staff, and no unmonitored personnel are allowed on the range during examination.

Whenever incoming troops carry weapons with tritium illuminating devices, the environmental programs is notified and inspects the devices for damage and leakage.

NONIONIZING

No laser systems are used in the Kofa Region.

3.11.3.2 Cibola Region

IONIZING

Depleted uranium projectiles are not fired in the Cibola Region. All other activities using ionizing radiation devices are discussed under the Kofa Region.

NONIONIZING

Yuma Proving Ground has both continuous wave and pulsed lasers. They are located on the Cibola Range, which is a controlled access area. In addition to access control over the range, YPG maintains control over the associated airspace to prevent inadvertent exposure to personnel. Lasers are also found in aircraft. During a test, aircraft aim the laser at target designators, which hold the target; the munition tracks the light beam and hits the target. Lasers are contained by the ground; they are not directed up to the sky or the horizon and they are used on the installation only. The primary hazard associated with these systems is potential damage to the eyes. Exposure of the eyes is minimized by controlling the areas where lasers are used and providing protective equipment (e.g. protective glasses) for personnel working with or adjacent to lasers.

3.11.3.3 Laguna Region

IONIZING

There are no military or nonmilitary testing activities involving ionizing radiation sources in the Laguna Region. Ammunition containing DU is shipped, received, or stored in buildings located on Firing Front Road. The buildings are DU Storage Magazines, DU Recovery Building, DU Shipping and Receiving, GP-1 Condition Facility, and Fixed and Loose Cargo Vibration Facilities.

NONIONIZING

All nonionizing radiation used by YPG can be used in the Laguna Region. Radar and lasers have infrequently been used in this region. Radios and power lines for both military and nonmilitary uses are found throughout the Laguna Region.

3.11.3.4 Airspace

IONIZING

No military testing activities involving any of the sources of ionizing radiation take place in the Airspace Region. Airspace is controlled during DU firing to avoid ricochets.

NONIONIZING

Airborne laser targeting systems are routinely used in the airspace over the Cibola Region. Military activities involving these sources of nonionizing radiation within the Airspace Region are controlled by Range Control through administrative procedures. Radar is routinely used during flight and test missions.

Tracking of aircraft or vehicles does not deliberately expose personnel to energy emissions from lasers. There may be incidental laser exposure of pilots and drivers. There have been no documented adverse health effects on pilots and/or drivers from incidental exposure to lasers (Dunfrund, 1997). Precautions are taken to ensure that exposure to lasers is avoided or minimized. Furthermore, lasers are rarely used to track aircraft and/or vehicles carrying personnel.

3.11.3.5 Off-Post Locations

IONIZING

Like civilian aircraft, military aircraft have flight emergency instrumentation, such as the turning bank. Flight emergency instrumentation is designed to remain operational despite aircraft power failure. Radioactive components provide flight emergency instrumentation with its own illumination so that pilots can read from the dials if the aircraft loses power. These radioactive components are a small source of radiation and are not considered a major concern in the event of an aircraft crash (Dunfrund, 1997).

NONIONIZING

Sources of radiation in off-post locations are not permanent. They consist of laser systems, radios, and radar found within vehicles such as the Bradley and other standard Army equipment. Test personnel are strictly prohibited from using these laser systems anywhere other than in designated areas. The potential for exposure from lasers has been minimized through standard operating procedures. Radio frequency exposures are similar to those from civilian operations.

3.12 AESTHETIC VALUES

Yuma Proving Ground is located in an area characterized by rugged mountains, broad alluvial plains, and sparse desert vegetation. The natural areas and features in figure 16 have been identified by the YPG environmental programs as areas of aesthetic and visual value (Morrill, 1996).

3.12.1 Areas of Aesthetic and Visual Value

3.12.1.1 Adjacent Wilderness Areas

Adjacent wilderness areas surrounding YPG include the Muggins Mountains Wilderness, Kofa National Wildlife Refuge, Imperial National Wildlife Refuge, and Trigo Mountains Wilderness. These regions provide areas for picnicking, camping, hiking, and sight-seeing.

3.12.1.2 Aesthetics in Kofa Region

YPG lands surround Red Bluff Mountain, located along the southern boundary of the Kofa Firing Range. This mountain's striking geologic features and its potential for providing wildlife watering holes have made it an area of conservation interest (Morrill, 1996).

3.12.1.3 Aesthetics in Cibola Region

Needles Eye is one of the pinnacle peaks in the Trigo Mountains. Sawtooth ridges and steep-sided canyons have been dissected by numerous deep washes to produce this geologic wonder.

The La Posa Dunes are located in the northern corner of the north Cibola Region. The sand dune complex, formed by the accumulation of windblown sand, has probably been stabilized by big galleta grass. This area may also provide habitat for the Mojave fringe-toed lizard.

Mohave Peak, one of the higher peaks in the south Cibola Region, is an outstanding feature that dominates the landscape. This mountain, with its natural water tanks and undisturbed terrain, is important to the habitat of desert bighorn sheep.

3.12.1.4 Aesthetics in Laguna Region

The Muggins Mountains are bisected by the YPG southern boundary. The western end of the formation includes a cluster of rugged peaks. The most prominent peak is near the center of the Muggins Mountain Wilderness. Their colorful geologic stratum is considered scenic for the desert region (U. S. Department of Interior, 1985).

3.12.2 Areas of Special Interest

3.12.2.1 Kofa Region

White Tanks, located in the Tank Mountains of YPG's East Arm, provides a natural water-collecting pool for wildlife. White Tanks has been nominated to the National Register of Historic Places.

3.12.2.2 Cibola Region

Washes that flow into the Colorado River are major topographic features within the Cibola Region. They have been found to be rich in wildlife. Important areas of special interest include Mojave, Gould, Indian, McAllister, and Yuma washes.

3.12.2.3 Laguna Region

The environmental program staff has completed a project under the DoD Legacy Resource Management Program in the vicinity of Camp Laguna, one of General George Patton's training areas during WWII. This project consisted of an archaeological survey and oral histories of individuals at the camp during that time. The resulting Wahner E. Brooks outdoor historical display of military materiel was dedicated May 17, 1995.

3.12.3 Visual Environment

The installation developed a design guide that establishes a unifying motif for buildings and infrastructure (Hermann Zillgens Associates, 1988). This guide emphasizes improving the quality of the visual environment by designing structures to fit into surrounding desert areas, which visually dominate the installation. Guidelines for retaining visual quality state " . . . man made forms should be integrated and reinforce the natural environment." Architectural styles, buildings, roads, open spaces, and signs are types of infrastructure for which design criteria are to be followed.

3.12.3.1 Visual Environment in Kofa Region

Buildings in this region are primarily ammunition storage igloos, environmental test facilities, and other test support centers. Safety and functionality were the primary consideration during design and construction of these facilities. Exterior appearance and landscaping of buildings is considered when all other functional needs are fulfilled. For example, ammunition igloos have earthen coverings.

Special paints, doors, or walls may be required on some facilities that may not meet design guidance defined in the Yuma Proving Ground Design Guide (Hermann Zillgens Associates, 1988).

3.12.3.2 Visual Environment in Cibola Region

The Cibola Region has two areas with permanent buildings, the Castle Dome Annex and Cobra Flats. Buildings in these areas are of older construction and were completed prior to development of design guidance for the installation. As routine maintenance and remodeling of these buildings is accomplished, the Army follows current design guidance.

3.12.3.3 Visual Environment in Laguna Region

Most of the installation buildings and facilities are located in the Laguna region. Architectural styles on the installation represent over 40 years of operation and construction activities. This has resulted in diverse architectural styles, ranging from pre-engineered metal buildings, wood frame stucco, and concrete masonry to temporary manufactured mobile trailers. As maintenance, remodeling, demolition, and new construction are accomplished, guidance provided in the Installation Design Guide is implemented.

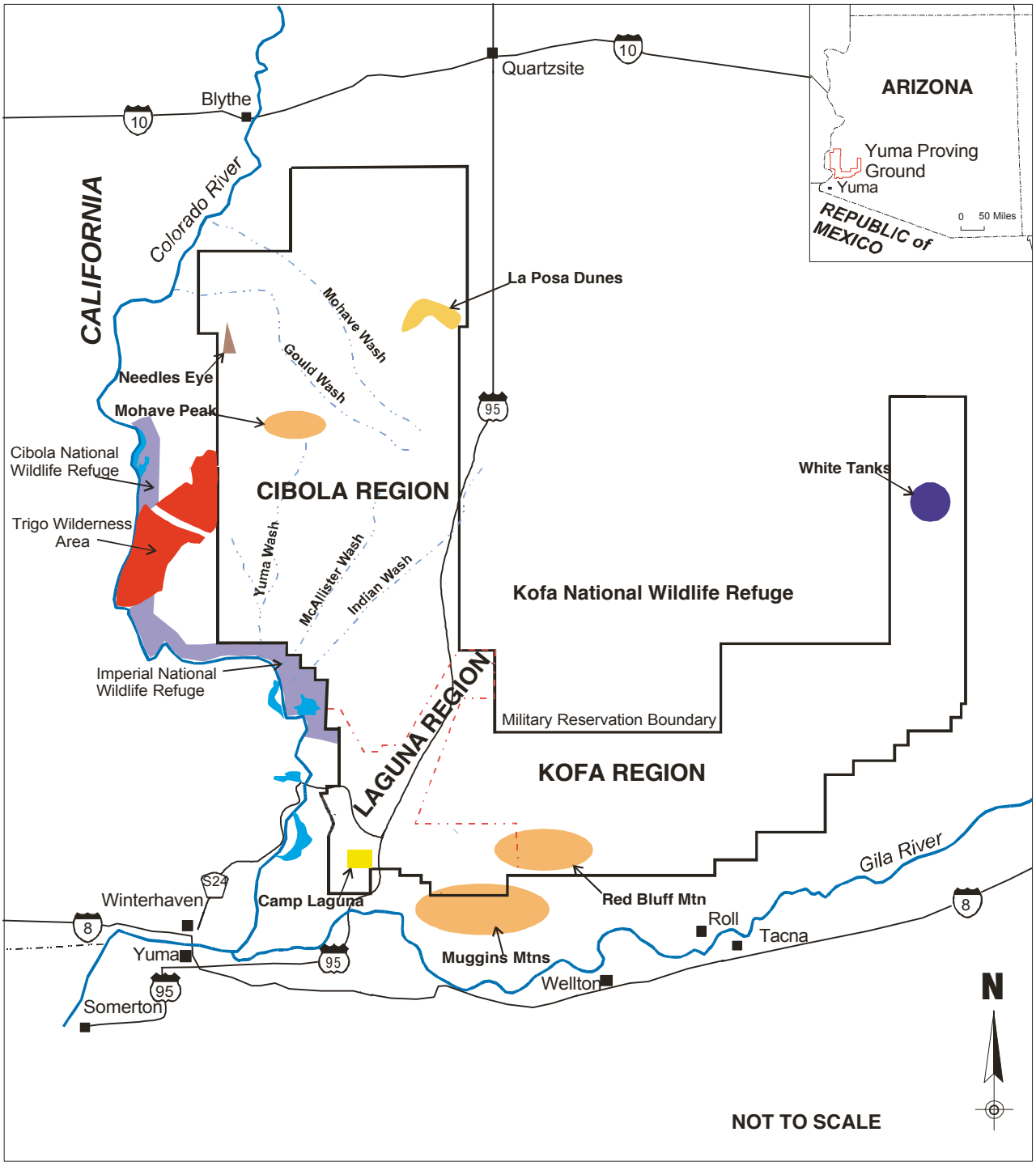


Figure 16. Areas on Yuma Proving Ground of Aesthetic and Visual Value.

3.13 UTILITIES AND SUPPORT INFRASTRUCTURE

This section addresses utilities and support infrastructure at YPG.

3.13.1 Power Supply Distribution Systems

3.13.1.1 Electric Power

As shown on table 3-16, three types of energy are used at YPG: process, facility, and mobility. Process energy is electrical energy consumed by equipment during mission operations. Facilities energy is energy consumed by buildings (for heating, cooling, lighting, and power generation). Mobility energy includes mobility fuels for the aircraft armament branch, air delivery branch, and mobility branch.

Yuma Proving Ground receives its electricity from four sources. The primary source is the Western Area Power Administration (WAPA) which supplies power from the hydroelectric stations on the Colorado River at Davis and Parker Dams. Smaller amounts come from the Four Corners Salt River Project coal-fired plant, Yuma County Water Users Association, and from excess power purchased from Wellton-Mohawk Irrigation and Drainage District.

Electricity from WAPA, which supplies a majority of process and facilities energy, is transmitted approximately 145 km (90 miles) from a substation near Parker, AZ, to YPG's new 20 Megavolt Amp (MVA) Substation K via a 161 kV (kilovolt) transmission line. The 161 kV transmission line has a capacity higher than 20 MVA, but YPG power is limited to 20 MVA capacity of the substation transformer. (Yuma Proving Ground is capable of supplying 50 to 60 percent more energy through the transmission line but is limited by the transformer.) Once the electricity reaches YPG, it is distributed throughout the installation via area substations at the following five locations: Main Administrative Area, Materiel Test Area, Kofa Firing Range, Castle Dome Heliport, and Cibola Range (Nixon, 1996). The installation has a back-up emergency supply substation across the Colorado River with a capacity equal to the 20 MVA of Substation K. This substation is called Army Tap.

Process energy is primarily supplied by electric power lines. Historical records for electrical process energy show that an annual average 50,710 mBtu (million British thermal units) was consumed between FY 1991 and FY 1995.

Facilities energy is delivered primarily in the form of electricity from power lines, but solar, fuel oil, and propane are also used. Facilities energy is concentrated in the Main Administrative Area, where a majority of the houses and office complexes are located. Approximately 20 percent of all facilities energy is used for housing.

Mobility energy is consumed in direct proportion to man-hours associated with mission activities. Mobility energy is used primarily in the Materiel Test Area (Laguna Region), and to a lesser degree in the Kofa and Cibola regions.

Emergency and standby power is available to specific installation facilities related to safety, security, and health (the pump house, health clinic, sewage lift station, and airfield). Yuma Proving Ground recently acquired two 1-MW trailer-mounted diesel/electric mobile emergency generator plants. The new 450 kW photovoltaic power solar station provides emergency power to the water treatment plant in the Main Administrative Area, should a total line power failure occur.

3.13.1.2 Diesel

Yuma Proving Ground operates 73 generators, including 6 gasoline engine generators under 600 hp. These mobile-unit generators are operated on an as-needed basis throughout the YPG range (Gutierrez-Palmenberg, Inc., 1997e).

3.13.1.3 Solar Generation

A 450 kW solar electric photovoltaic generation plant, furnishing about five percent of electricity requirements, is

TABLE 3-16
ENERGY USE AT YPG[1]

TYPE OF ENERGY	PROCESS	FACILITIES	MOBILITY
1991	52,035	76,446	49,650
1992	51,181	80,053	52,700
1993	53,727	74,195	48,000
1994	48,105	78,486	44,200
1995	48,500	73,037	46,080
AVERAGE	**50,710**	**76,443**	**48,126**

[1]All quantities reported as million British thermal units (mBtu).

now in operation. Additionally, YPG has a 150-ton solar, thermal chiller plant at building 2105, which displaces about 140 kW (kilowatt) of electric load. Additional recently completed photovoltaic projects are a 2 kW project at meteorological tower # 10 and a 10 kW project at Building 2105. These two projects are connected to the electric grid and supplement the 450 kW project previously cited. A 105 kW future project is planned for Kofa range (Nixon, 1996).

3.13.2 Communications Systems

The communications network includes a general telephone service, a defense communications system, a variety of internal telephone communications throughout the installation, and military communication systems to contact sources outside the YPG installation.

3.13.2.1 Commercial Telephone Lines

US West Telephone Company in Yuma provides telephone service to the Main Administrative Area. This system carries local city service, defense switched network (DSN), foreign exchange (FX), dedicated point-to-point service, and long-distance service.

3.13.2.2 U.S. Army Telephone Network

The DSN, government owned and operated, is based in the Main Administrative Area. Activities include processing message and card traffic and processing facsimile traffic (sending pictures and figures) necessary for installation operations (Drapala, 1996).

Communication to and between test ranges is conducted through both metallic and fiber optic communications cable (aerial and underground) of various sizes. The three telephone exchanges are located at the Main Administrative Area, the Kofa Firing Range, and the Materiel Test Area. The trunk radio system, consisting of two sites (hill 630 and Windy Hill), is being installed during FY 96-98 to replace the voice communications systems for mission activities. Other mission communication technology includes 20 multichannel radio consoles for mission control.

3.13.2.3 Fiber Optics

The range digital transmission system is a proposed fiber optics service with over 300 feeder sites. The system will provide increased communications, video on demand, and Internet services. The system will follow existing rights of way in the Kofa Firing Range and the Cibola Region. The line will parallel U.S. Highway 95, follow Cibola Lake Road, loop up to the north Trigo Mountains and then return to the highway (Drapala, 1996).

3.13.2.4 Microwave Communications Capabilities

Microwave systems relay test data from the Cibola Region to the data acquisition and reduction computing facility. Support equipment includes high resolution color videos, line videos, analog FM, pulse code modulation (PCM), and digital data systems.

3.13.2.5 Video Links

On Kofa Range, 10 mission video links are relayed from various locations through Windy Hill to the range operations center (ROC). In addition, approximately 60 security video links relay to an installation post on South Kofa Range. Wide band telemetry from both ground and airborne platforms are relayed by microwave and fiber cable to the ROC.

3.13.3 Solid Waste Management

Yuma Proving Ground, like a small city, generates solid waste such as sewage, paper products, plastics and plastic containers, glass containers, and domestic refuse associated with residential housing and light commercial operations. Disposal of these waste products is accomplished at the installation solid waste landfill, directly east of the dynamometer course about 5 km (3 miles) north-by-northeast of Laguna Army Airfield.

The landfill, constructed in 1969, is designated a small municipal solid waste landfill to dispose of installation solid wastes. A small landfill accepts less than 18.0 metric tons (20 tons) of refuse per day (ADEQ A.R.S. 49-762.01; 40 CFR 257). The 49.7 ha (123 acre) landfill accepts garbage, refuse, demolition/construction debris, and nonhazardous dried sludge generated from YPG activities. No hazardous substances or liquids are disposed due to the nature of accepted wastes. At the current daily rate of 15.3 metric tons (16.9 tons) of refuse accepted, closure is projected in 24 years (Gutierrez-Palmenberg, Inc., 1996c).

Sewage is collected in septic tanks that are periodically pumped, or collected via gravity sewer lines and pump stations into lagoons. After drying, the solid wastes are disposed at the solid waste landfill.

Antifreeze is recycled and reused. Used lubricating oil and oil products (generated during normal servicing of vehicles and equipment) are stored in a variety of tanks. Used diesel fuel, gasoline, and other cleaning solvents, are stored in properly labeled 55-gallon drums. The majority of waste oil, fuel, and solvents are disposed off-post, via contract through the directorate of logistics, supply division. (For a more thorough discussion, read the section on hazardous substances and wastes in this chapter.) Medical waste products are disposed off-post under Army regulations and RCRA regulations for hazardous wastes (Herring, 1996) and Hazardous Materials Transportation Act (HMTA) regulations.

Formerly, YPG used an incinerator to destroy sensitive documents. However, operation was discontinued about eight years ago, and the incinerator was replaced by shredder equipment.

In 1988, the Army conducted a study under RCRA Part B to identify, describe, and evaluate solid waste management units at YPG (U.S. Army Environmental Hygiene Agency, 1988). Of the several types of waste produced at the installation, none were found to pose a significant contamination threat to human health or the environment. Waste produced includes domestic and administrative solid waste, domestic wastewater, various petroleum products from vehicle maintenance, and munitions-related waste.

3.13.4 Wastewater Treatment

Yuma Proving Ground operates six wastewater facilities. All facilities that discharge industrial wastewater must obtain an APP and a Notice of Discharge (NOD) from the ADEQ. Lagoons collect domestic sewage and brine waste from water treatment plants. Waste is discharged into septic tanks or specially designed evaporative lagoons. Lagoons are cleaned periodically and septic tanks are pumped on a regular basis. Facilities are described below.

3.13.4.1 Kofa Region

DEPLETED URANIUM (DU) CATCHMENT FACILITY, APP 10290

This facility includes a concrete ballistic impact structure designed to capture DU projectiles from ammunition acceptance testing. The facility also includes an evaporation basin and a pollutant management area. The area is lined to catch displaced sand from projectile impact. In addition, the pollutant management area will collect storm water runoff that may transport low-level radioactive particles.

3.13.4.2 Laguna Region

KOFA FIRING RANGE LAGOONS, NOD 44-609, APP 100794

Per the APP executive summary, the proposed facility will treat approximately 74,100 L (19,500 gallons) per day of domestic waste including small amounts of water from air conditioners, evaporative coolers, and treated vehicle wash-down water from an oil/water separator. The collected water will flow into four new lined evaporation waste lagoons, where all effluent will be evaporated. In 1996, the facility consisted of one lagoon. Three additional lagoons will be constructed. Depth to groundwater is about 60 m (200 feet).

LAGUNA ARMY AIRFIELD LAGOONS, NOD 44-608, APP 100795

A new Laguna wastewater treatment facility, completed in early 1996, includes two evaporation lagoons. Per the APP executive summary, when the facility is fully operational, it will treat approximately 117,800 L (31,000 gallons) per day of domestic waste, including small amounts of waste from air conditioners, evaporative coolers, and wastewater from an aircraft wash rack. Synthetic liners will assure 100-percent evaporation. Depth to groundwater is approximately 57 m (190 feet).

MATERIEL TEST AREA LAGOONS, NOD 44-611, APP 100797

In 1996, the facility contained two evaporation ponds with an average monthly flow rate of 4,997,000 L (1,315,000 gallons) of sewage. Depth to groundwater is about 42 m (140 feet). A new lagoon is in the planning stages.

CASTLE DOME HELIPORT LAGOON, NOD 44-610, APP 100793

In 1996, domestic sewage was treated at the rate of 22,800 L (6,000 gallons) per day using two waste lagoons. The new annex receives well water and treats it with a reverse osmosis system. Part of the water becomes potable and the remainder, a brine solution, is pumped to a pond for evaporation. Groundwater is at a depth of approximately 190 m (635 feet).

MAIN ADMINISTRATIVE AREA LAGOONS, NOD 44-600, APP 100796

The Main Administrative Area evaporative facility treats domestic waste and brine. The bottoms and sides of its five lagoons are lined with a 6-inch layer of local bentonite clay. Groundwater is at a depth of approximately 10.5 m (35 feet).

3.13.5 Petroleum Product Delivery, Storage and Usage

Petroleum storage tanks are located at seven locations. Most fuel is stored in the Laguna Region, where tracked and wheeled vehicles and aircraft are housed. Table 3-17 lists fuel storage areas.

3.13.6 Water Distribution System

Wells are the primary source of water. Of the 15 wells located on the installation, 11 are in use. The 11 wells supply water to six numbered water systems. One to four wells and a separate pumping, storage, and distribution facility serve each system.

Water is supplied to Cibola Region, South Cibola Range; Kofa Region, Kofa Firing Range; and Laguna Region, Materiel Test Area, Laguna Army Airfield, and Main Administrative Area. Distribution of water from the wells is conducted through polyvinyl chloride (PVC) pipe, cement, steel, and galvanized pipelines (Haygood, 1996).

Water is not readily available in the northern part of the installation, especially the North Cibola Range. Surveys conducted in this region indicate there are two possible sites from which water production could be expected; however, no drilling has been performed to confirm this possibility (see section 3.3.2).

Yuma Proving Ground wells and water distribution systems are tested regularly, in compliance with Arizona Drinking Water Regulations, the Safe Drinking Water Act of 1974, and corresponding EPA drinking water regulations (40 CFR 141). The State of Arizona specifies that water systems using only groundwater sources (ref. section 3.3.2) must perform inorganic chemical analysis once every three years (Haygood, 1996).

3.13.7 Facilities and Services

Populated areas, including the Main Administrative Area, Materiel Test Area, and Laguna Army Airfield, provide support services and infrastructure to the Laguna Region.

The YPG Strategic Plan (1997) indicates the military would be reduced in size as civilian personnel transition into military positions. This would result in a decreased need for services and facilities used exclusively by military personnel (e.g., medical, commissary, and installation exchange). Financial considerations could eventually cause these facilities to close. Alternate arrangements would be made for remaining military personnel and dependents.

Base housing is presently occupied at 93 percent of capacity. Bachelor officers quarters are occupied at 100 percent housing capacity. Bachelor enlisted quarters are occupied at lower rates. Transient quarters are occupied between 30 and 75 percent of housing capacity. The Golden Knights and the Military Free Fall School occupy transient quarters on a seasonal basis. Considering the trend toward military personnel downsizing, the Army does not plan to construct additional housing.

TABLE 3-17
FUEL STORAGE AREAS

Location	Quantity/Gallons/Type	Fuel Type
Cibola Region		
Castle Dome Annex (light armored vehicles)	one 5,000 AST	Diesel
Aerostat Complex	one 10,000 AST	Diesel
Laguna Region		
Laguna Army Airfield	one 10,000 AST two 10,000 USTs	JP-8 aviation fuel JP-8 aviation fuel
Main Administrative Area	one 10,000 UST three 9,800 USTs one 10,000 UST	Unleaded Unleaded Diesel
Materiel Test Area	one 15,000 AST two 15,000 ASTs one 15,000 AST two 11,400 ASTs	Unleaded JP-8 Diesel Heating oil
Kofa Firing Front	one 10,000 AST one 10,000 AST	Unleaded Diesel
Castle Dome Heliport	one 10,000 AST	JP-8 (varies)
Note: There are no permanent fuel storage areas in the Kofa Region.		

3.14 TRANSPORTATION

This section discusses the YPG transportation system. Included is a description of access routes to and from the installation, internal road system, air transport services, railroads, and transportation of ordnance.

3.14.1 External Transportation Network

U.S. Highway 95 is the principal access route to YPG. This north/south two-lane, paved road bisects the Kofa National Wildlife Refuge and YPG. Another paved road, California State Highway 24 (S24) is a frequently used corridor by employees and visitors to the installation from Yuma.

The installation is bounded on the north by Interstate 10, which provides east/west access between Los Angeles, CA, and Phoenix, AZ. Interstate 8, another east/west access route south of YPG, connects San Diego, CA, and Yuma, AZ, with Tucson, AZ.

The heaviest traffic periods on U.S. Highway 95 and S24 are at the beginning (5:00 a.m.-7:00 a.m.) and end (3:30 p.m.-5:30 p.m.) of the workday. As many as 5,000 vehicles a day travel U.S. Highway 95 to or beyond the installation (Yuma Metropolitan Planning Organization, 1995a). The majority of these vehicles are traveling to the installation or must traverse the proving ground en route to their destination. Resulting traffic increases the potential for automotive accidents, particularly on the two-lane section of U.S. Highway 95 and during high traffic winter months.

3.14.2 Installation Road System

Vehicle access throughout YPG consists of 291 km (181 miles) of paved roads, 1,316 km (818 miles) of improved roads (gravel/graded), and numerous unimproved roads (dirt only).

The majority of paved roads are in the Laguna Region (Main Administrative Area, Materiel Test Area, and Laguna Army Airfield). Roads in the Cibola Region and Kofa Firing Range (Kofa Region) are mostly gravel and unimproved. The gravel road system was upgraded in 1984. The subsurface material was replaced with a six-inch layer of compacted clay/gravel. The main roadways and well-traveled secondary roads are presently maintained through private contractors. This maintenance includes grading, watering, and repair of storm-damaged roads (Ebadirad, 1996).

A description of the road system and the status of these roads is provided below and organized by geographic region.

3.14.2.1 Kofa Region

There are six major gravel roads and two major paved roads within the Kofa Firing Range. All are closed to public access due to the nature of the test area. The gravel roads are Growl, Kofa-Mohawk, Kofa-Wellton, Mortar Range, and Firing Front/Extension Roads. Pole Line Road is paved for approximately 32 km (20 miles); the balance is gravel and maintained when necessary, generally after heavy storms and subsequent damage. Secondary roads are also routinely maintained (Ebadirad, 1996).

The East Arm of YPG is virtually undeveloped and currently has no extensive road system. Some roads exist near the eastern portion of the Kofa Firing Range. These roads provide access to impact areas and installation sites. This area is also closed to public access.

3.14.2.2 Cibola Region

The north and south Cibola Ranges consist of large plains surrounded by mountains and are predominately for aircraft armament firing. An extensive, but primitive, road network is necessary for military personnel to reach laser sites and microwave stations, transfer portable instrumentation, place and retrieve stationary or moving targets, and pick up cargo in drop zones. The main roads, all of which are gravel and maintained as required, consist of Middle Mountain, West Cibola Access, Water Tank, Cibola Front, Cheyenne Base, CM1, Redhill, East Target, and Target Boundary. Several other small connecting roads exist and are maintained according to their use. This road network is closed to the public. Cibola Lake Road and Corral Road transect the north Cibola Region in a general east-west direction. Cibola Lake Road is open to public access, but surrounding land is closed.

3.14.2.3 Laguna Region

Within the Main Administrative Area, most roads and parking areas are paved. Major resurfacing has not been conducted for five to seven years. These roads are maintained, as required. The main roads are Laguna, Barranca, 1st Street, 2nd Street, and 5th Street. Several smaller roads traverse the installation network (Ebadirad, 1996). Paved side streets provide access to residential areas and other installation facilities such as office buildings, storage areas, and parking areas. Unpaved roads in the Laguna Region are used to transport vehicles to mobility courses for testing. Mobility courses are not maintained as part of the transportation system. Laguna Road transects the Laguna Region and is open to public access. Martinez Lake Road transects the installation between the Cibola and Laguna Regions. This road is maintained by Yuma County and open to public access.

3.14.3 Air Transportation

Air transportation requirements, including civilian and military requests to use YPG airspace, are served in coordination with Yuma International Airport and scheduled by the MCAS Yuma (Swinford, 1996).

Laguna Army Airfield, located 3 km east of the Main Administrative Area near U.S. Highway 95, provides military air transport support. It has a 1,800 m (6,000 feet) long and 46 m (150 feet) wide north/south runway and an adjacent east/west runway 1,829 m (6,000 feet) long and 31 m (100 feet) wide. This airfield was designed for small, fixed-wing and rotary-wing aircraft. Both runways can accommodate C-5, C-17, C-130, and C-141 cargo aircraft. However, when summer temperatures escalate, these aircraft are restricted to 40 percent of their gross maximum weight.

Improvements to the airfield include a tower rehabilitation/upgrade and a storage building for the Military Free Fall School, located at the south end of the field. Landscaping around the tower will be included in tower improvements. Concrete pads will be added to the airfield tarmac area to be used for parking aircraft.

Yuma Proving Ground also maintains Castle Dome Heliport, located in the Laguna Region. This facility is used for RDTE of aircraft and aircraft armament systems. It includes a 900 m (3,000 feet) runway of metal matting and four helipads for aircraft parking. The facility also accommodates a taxiway and support facilities. There are no helipads within the Materiel Test Area or Kofa Firing Range. There is a helipad at Castle Dome Annex, two helipads sited within the Indian Wash Test Area, and one sited at Cobra Flats Aviation Test Facility. There are three steel-matt helipads within the Cibola Range Complex. In addition, there is one serviceable emergency helipad at the Main Administrative Area.

3.14.4 Railroads

Yuma Proving Ground possesses an off-reservation loading site at Blaisdell Siding to accommodate railway transport. Extension of the rail line from this site, approximately 17 miles south of the installation, to YPG was considered but was determined impractical due to cost and infrequent need.

3.14.5 Transportation of Ordnance and Hazardous Substances

In accordance with the HMTA, tests that require transport and storage of hazardous materials are coordinated with Materiel Test Directorate, Range Safety, and environmental programs prior to transport. Documentation for on and off-post shipping and receiving, as well as materials tracking is required. Proper container labels and vehicle placards are required for transport along roadways. Range safety defines the best installation route to lessen endangerment of the public and environment (Butler, 1996). Medical waste products are disposed off-post according to regulations (see section 3.13.3).

3.15 HEALTH AND SAFETY

Fire protection and explosive safety are regulated at a local or site specific level. Guidance concerning safety issues can be found in 29 CFR Occupational Safety, 40 CFR Environmental Safety, and 49 CFR Transportation Safety. Explosives and ammunition safety questions are addressed in DoD Standard 6055.9, Ammunition and Explosives Safety and in Army safety regulations. Safety standards and procedures for day-to-day operations at YPG are found in the following regulations: USAYPG Regulation 385-1 Safety and Occupational Health Program, 9 April 1992; AMC Regulation 385-100 Safety Manual, September 1995; and AR 385-10 The Army Safety Program, May 1988.

Extreme climate and rugged terrain poses potential hazards to personnel working outdoors on extensive ground-based projects. Personnel are cautioned to limit activities during severe heat and humidity and increase water intake (U.S. Department of the Army, 1992). Due to the lack of immediately available medical attention, remote locations pose potential risks to personnel health and safety. Personnel minimize this risk by carrying cellular phones and two-way radios. Personnel involved in ground-based training missions are exposed to potential hazards from animal and insect bites, and some forms of vegetation. Personnel who work outdoors receive safety and awareness briefings. Yuma Proving Ground has established standards for regulating the operation of government vehicles (U.S. Department of the Army, 1992).

Operations involve RDTE of military vehicles and weapons systems. Specific safety issues for a particular test environment are addressed through standard operating procedures for each test or piece of equipment.

3.15.1 General Public Health and Safety Concerns

The public is discouraged from wandering onto ranges. Warning signs are posted and safety briefings are conducted before access is granted. Individuals gaining illegal access to range areas are at extreme risk for injury due to lack of knowledge and training. Due to the sparseness of vegetation in all regions, there is very minimal risk to the public and personnel from range fires. Numerous warning signs are posted along U.S. Highway 95 and other access roads where the public traverse YPG.

3.15.2 Explosives

USAYPG Regulation 385-1 and a series of standard operating procedures guide range safety in both the Cibola and Kofa Regions.

3.15.3 Cryogenic

Due to environmental testing of weapons systems, liquid carbon dioxide, liquid nitrogen, and liquid oxygen are frequently used. These materials present special safety problems because of their extremely low temperatures. Safety in working with these materials is enhanced by the extensive use of standard operating procedures directed at safe handling.

3.15.4 Hazardous Substances and Waste

While the handling, management, and shipment of these materials is addressed under other sections of this RWEIS, safety issues with these substances represent serious threats to human health and environment due to such factors as carcinogenic or mutagenic properties. Proper procedures for handling these materials are addressed at the Federal level (40 CFR, Hazardous Waste Management). In addition, YPG has a site specific spill contingency plan (Gutierrez-Palmenberg, Inc., 1997c). These plans are updated biannually.

3.15.5 Nondestructive Inspection Techniques

Yuma Proving Ground maintains a two MV x-ray for nondestructive inspection of various munitions prior to test-firing.

3.15.6 Laser Radiation

There is extensive use of laser systems in the Cibola Region for aircraft and other armament systems. Laser systems may present hazards to human vision even over great distances. Warning signs, liberally posted in laser operating areas, along with range clearance and the issuance of appropriate protective gear, are part of the standard operating procedure (see section 3.11). The short hazard range for radar renders their use safe for YPG workers.

3.15.7 Industrial Safety

Yuma Proving Ground maintains an industrial hygienist and a trained staff of safety professionals. They ensure that proper procedures are followed both for unusual military activities (such as munitions work) and for standard industrial activities (such as construction).

3.15.8 Flight Safety

Laguna Army Airfield maintains a fleet of helicopters and supports Army aviation activities. Weapons testing associated with Army aircraft is routinely conducted in the Cibola Region. In developing and conducting these tests, aircraft crew safety is addressed. Guidance is provided by FAA regulations and Army and YPG operating guidelines.

3.15.9 Electromagnetic Radiation

Electromagnetic radiation (EMR) is generated by numerous radar components, communications equipment, and power supplies in weapons systems. The primary health and safety concerns focus on minimizing exposure to avoid potential physiological changes to the human body (see section 3.11.2.4).

4.0 ENVIRONMENTAL AND SOCIOECONOMIC CONSEQUENCES

4.1 INTRODUCTION

Chapter 4 describes potential environmental and socioeconomic consequences and cumulative effects of the Preferred Alternative. The discussion is organized by the 14 resource areas identified in chapter 3. Impacts and mitigation for the Preferred Alternative are discussed for each region. On a programmatic level, the discussion of environmental consequences provides the framework for adequately assessing impacts in future NEPA documentation. Tiered EISs, EAs, and RECs will reference issues, consequences, effects and mitigation addressed in this RWEIS.

This chapter also provides a summary overview in section 4.18 of the other alternatives (alternatives A through E) evaluated in detail in the Draft RWEIS. For detailed information on these alternatives, refer to the Draft RWEIS (YPG, 1998). A comparison of the Preferred Alternative with alternatives A through E is presented in section 2.4 of this Final RWEIS.

The environmental consequences and mitigation of impacts addressed in this chapter are based on the projected YPG installation development over the next 15 years. Programmatic consequences and mitigation of impacts may not reflect impacts and mitigation associated with specific projects developed under the Preferred Alternative. As project data (e.g., test objectives, acres to be used, number of new facilities to be built, number of test miles to be driven) become available for assessment, specific project impacts will be more completely understood. Tiered NEPA documents will address specific project issues, concerns, and opportunities during the development and revision of the YPG mission. Mitigation measures are described for the Preferred Alternative including avoidance, elimination, or compensation.

4.1.1 Significance Criteria

The Army criteria to determine significant environmental impacts as a result of proposed YPG activities are displayed in a highlighted box at the beginning of each of the following issue sections. The significance criteria are based on regulatory threshold standards. The significance criteria allow the decisionmaker to identify environmental concerns associated with specific projects.

4.1.2 Alternatives

The consequences and cumulative effects of the six alternatives evaluated in the Draft RWEIS are briefly summarized at the end of the chapter.

4.2 AIR RESOURCES

Due to the activities conducted at YPG, regulated air pollutants are not normally an issue. Impacts to air quality are considered significant if the criterion identified in the box below is met.

- **An action exceeds emission limits established under the CAA.**

4.2.1 Effects of the Preferred Alternative

Allowable regulatory limits for stationary sources have not been exceeded as a result of baseline activities at YPG. In 1995, potential air emissions from permitted sources as determined by ADEQ were below regulatory emission limits. A 1996 air emissions inventory indicated NOx levels were well below established Federal and State regulatory standards (Gutierrez-Palmenberg, Inc., 1997e). Projecting the low and high values for the Preferred Alternative and comparing them to emission limits, produced no impact from stationary sources, as shown in table 4-1.

Table 4-1 does not include mobile sources. Particulate emissions from mobile sources were also tentatively evaluated. Tentative particulate emission rates calculated and projected from test miles driven at YPG in 1995 ranged from 41 tpy to 86 tpy (calculated according to United States Environmental Protection Agency, 1985). These particulate emissions reflect general rates assigned to the Preferred Alternative and not necessarily emissions associated with specific projects. Tracked and wheeled vehicles roving freely over large tracts of undeveloped land may potentially increase dust emissions by 15 to 25 percent (calculated according to United States Environmental Protection Agency, 1985).

TESTING

Most testing activities at YPG are not expected to contribute significantly to air pollution. Use of the Kofa Dust Course could cause increases in PM_{10}. Scheduling of tests should prevent significant impacts to air quality from use of the Kofa Dust Course.

TRAINING

Training activities that involve large numbers of tracked and wheeled vehicles on open tracts of undeveloped land could significantly impact air quality. Use of smoke and other obscurants during training exercises may impact air quality. Other training activities are not expected to significantly impact air quality.

BUSINESS PARTNERSHIP OPPORTUNITIES

Private ventures are not expected to impact air quality any differently than from current activities.

RECREATIONAL AND OTHER ACTIVITIES

Increases in recreational use of YPG are not predicted to cause any significant impact to air quality. Agricultural outleases could significantly impact air quality, especially for PM_{10}.

TABLE 4-1
AIR EMISSION ESTIMATES OF PERMITTED (STATIONARY) SOURCES FOR THE PREFERRED ALTERNATIVE

Primary Air Pollutants	Emission Limit Under CAA	Range	
		Low	High
CO	100 tpy	< 3.85 tpy	8.09 tpy
NO_x	40 tpy	< 15.89 tpy	33.36 tpy
SO_x	40 tpy	< 1.59 tpy	3.36 tpy
PM	25 tpy	< 1.03 tpy	2.15 tpy
VOCs	40 tpy	< 6.29 tpy	13.18 tpy
Pb	0.06 tpy	no data	no data
HAPs	varies by substance	< 0.22 tpy	0.48 tpy

4.2.2 Mitigation Measures

4.2.2.1 Particulate Matter (PM_{10})

Yuma Proving Ground implements dust control measures and reports to ADEQ with a summary of these activities. Projects conducted in the PM_{10} nonattainment area are closely evaluated to assess impacts on air quality. Air conformity analysis assists in determining the necessary mitigation efforts to reduce PM_{10} for specific projects in the PM_{10} nonattainment area. Travel of heavy equipment over desert pavement is restricted to minimize dust emissions. Some of the YPG roads are watered during mission activities to reduce dust.

Best management practices and other soil conservation techniques will be used for any proposed agricultural outleases.

4.2.2.2 Ozone-depleting Chemicals

The DoD has directed management of ODCs to comply with the CAA. The DoD directive identifies CFCs and halons applications and prioritizes their use. Also identified is the long-term process of decreasing DoD dependence on CFCs and halons due to the reduced availability in future years (Department of Defense, 1989).

4.2.2.3 Smokes and Obscurants

Smoke testing at YPG is conducted outside of the YPG PM_{10} nonattainment area and not in close proximity to the installation boundary. The test areas are selected to prevent chemicals or particulates from drifting into the PM_{10} nonattainment area, out of the test area, or beyond the installation boundary. To minimize the negative environmental impacts, outdoor testing is limited by specified wind direction and speed ranges, specified lapse conditions, quantity of material for individual tests, and total quantity tested at a particular site. During training exercises, cloud and meteorological conditions are monitored. Exercises are terminated if smoke is likely to affect areas outside the designated exercise area (Muhly, 1983).

4.2.2.4 Criteria Air Pollutants, VOCs, and HAPs

Facility audits are routinely conducted at YPG to evaluate potential sources of air emissions. Reports are currently submitted to ADEQ on degreaser and generator usage. Yuma Proving Ground is evaluating the introduction of power lines to isolated areas of the ranges to eliminate the use of generators for remote power. Solvent tanks located at YPG are monitored to minimize the release of VOCs and HAPs.

4.3 WATER RESOURCES

Impacts are assessed for testing, training, public-private partnership opportunities and other activities. (Impacts from wastewater treatment areas and mitigation are discussed in section 4.13, Utilities and Support Infrastructure.) Impacts to water resources are considered significant if one or more of the criteria identified in the box below are met.

- **Surface water is contaminated by storm water runoff to levels above Federal or State water quality standards.**
- **"Waters of the U.S." are degraded by actions that exceed limits authorized under the CWA.**
- **Groundwater is depleted to the degree that subsidence causes fissures to form.**
- **Groundwater quality is degraded below CWA standards.**

4.3.1 Effects of the Preferred Alternative

Installation facilities and infrastructure in support of the RDTE mission require potable and non-potable water for domestic and industrial uses. Pollutants contaminating surface water or groundwater may potentially be released from construction activities, from wastewater treatment facilities, hazardous substance spills, or leaking USTs.

Current water use by YPG for 1997 is over 1400 acre feet. Projected use in 2006 under the Preferred Alternative is 1900 acre feet. Projecting to 2014, water needs will be approximately 3800 acre feet. Since this is less than 6% of the inflow and outflow of the aquifer, and less than 0.005% of the total aquifer (Freethey and Anderson, 1986) no impact to the aquifer is predicted for the Preferred Alternative. It is therefore anticipated that groundwater withdrawal is not likely to cause earth fissures.

The city of Yuma uses Colorado River water exclusively. Current use is approximately 30,000 acre feet. The total allocation for Yuma is 50,000 acre feet (Carrol, 1999). Increasing demands by the city of Yuma over the next 15 years should be met by its current allocation. City of Yuma water use should therefore not impact the groundwater aquifer.

The potential impacts to water quality are expected to increase with increased military and nonmilitary activities. Diversifying the YPG installation mission with public private partnership opportunities will require compliance with laws and regulations concerning water resources. A water allocation of Colorado River water supplied by BOR through wells in the YPG Main Administrative Area continues to be negotiated. New wells will not be immediately needed except in remote areas because available groundwater exceeds water demands.

TESTING

Ground disturbance by military vehicles during testing or training activities alters natural hydrologic features. Road crossings through washes have the greatest potential to impact surface water. (Refer to section 4.5, Biological Resources for a discussion of Section 404 CWA regulation.) Vehicle damage can result in increased erosion and sedimentation after rainstorms (Ayres and Associates, 1996). However, potential for impacts to washes is generally limited because most testing missions are routinely conducted on established test courses for tracked and wheeled vehicles.

TRAINING

The possibility exists for significant impacts in washes from maneuvering troops and tracked and wheeled vehicles (Ayres and Associates, 1996). Impacts are possible from road crossings through washes, and would be similar to those discussed above.

BUSINESS PARTNERSHIP OPPORTUNITIES

Public-private partnership opportunities at YPG may depend heavily on groundwater withdrawals, if the operation of the facility includes hotels, or private-vehicle testing facilities. The developer will be responsible for obtaining Colorado River water, if needed, through a water allocation from BOR.

Valid diversification of YPG activities is expected to require the maximum available groundwater withdrawal capacity of existing wells. As a result, new production wells may be required.

Obtaining Section 404 permits required for private ventures will be the responsibility of the public/private developer. Current permit monitoring and reporting to the State of Arizona for NPDES and APP will continue to be the responsibility of YPG environmental programs for all existing facilities. For newly constructed facilities, the developer will be responsible for permit monitoring and reporting to the State of Arizona.

RECREATION AND OTHER ACTIVITIES

No impacts are expected from increased recreational activities on YPG. Agricultural outleases could have a significant demand for water beyond the projected needs of YPG. The lessee will be responsible for negotiating water rights with BOR for the lease.

4.3.2 Mitigation Measures

Aggressive management practices are in place at YPG to minimize the potential impact from hazardous material spills. Basic practices include adequate containment, safe storage of hazardous wastes or materials and enforcing established safety procedures for each hazardous substance.

Aboveground storage tank areas are routinely monitored and inspected for leakage by environmental programs and logistics office. At the YPG HWSF, soil berms are placed around fenced perimeters and all waste is stored on concrete pads and plastic containment cartons (Gutierrez-Palmenberg, Inc., 1997a). The containment and berms reduce the likelihood of surface water contamination by confining a potential spill from off-post migration.

There is known groundwater contamination from petroleum spills at the POL bladder test spill site. The area of groundwater contamination is less than 2.60 km^2 (1 square mile). Areas of localized groundwater contamination shall be monitored for movement of plume(s) and the groundwater remediated as feasible. All USTs at YPG have been brought to current regulatory standards. Known leaking USTs have been removed, and site characterization investigations have been or are being conducted. Restoration or remediation is being coordinated with ADEQ.

The Yuma Wash study (Ayres and Associates, 1996) suggests techniques to protect watersheds and active wash channels. Environmental programs assess the implementation of these protection techniques on a project by project basis.

Yuma Proving Ground practices water conservation techniques such as planting of drought tolerant species and desert landscaping according to the INRMP. The installation may consider other conservation techniques in the future.

All water returned through the sewer collection systems at YPG is on lined and unlined lagoons. Groundwater recharge at YPG occurs only though unlined lagoons. The State aquifer protection program encourages lined lagoons. Groundwater recharge at YPG would drop to zero from these environmental policies, regardless of any action taken under any of the alternatives.

4.4 Geological and Soil Resources

Impacts to soil resources are considered significant if the criteria identified in the box below are met.

- **Soil subsidence occurs over large areas.**
- **Activities result in severe soil erosion.**
- **Permanent contamination of soil occurs**

4.4.1 Effects of the Preferred Alternative

Soil contamination at YPG mainly involves UXO and impact debris, which may contain hazardous residues. Soil contamination is not common to all regions. The Kofa, Cibola, and Laguna regions have varying levels of soil contamination from ordnance and impact debris. Large areas within each region are virtually undisturbed and uncontaminated. The Kofa Region is the most contaminated region because it contains most of the impact areas. Unexploded ordnance deposition on the surface will increase in designated regions if firing activities increase.

Soil erosion results from tracked and wheeled vehicle and firing operations damaging the surface crusts or natural desert pavement. Soil displacement from surface disturbing activities such as vehicles and firing operations could increase as activities increase. The potential for erosion remains the same for disturbed areas. Because of increases in staff and funds, personnel may consistently accomplish corrective measures such as filling of borrow pits after projects.

Construction of new facilities in undisturbed areas may disturb project area soils. Construction on previously disturbed areas may not cause substantial soil disturbances unless facilities are expanded beyond the footprint of the former facility.

Recreational activities have a minimal potential to contaminate soils. Spills of fuels and other vehicle and equipment fluids may occur. Areas open to camping, hiking, and hunting are not likely to be contaminated if reasonable precautions are taken. Opening recreational areas may require additional maintenance due to the increased use. There will be an increase in the potential for soil erosion from the incorporation of new and enhanced activities associated with public-private partnership opportunities.

Increased military activities raise the potential for soil contamination from training and testing. Soil contamination includes accumulation of UXO, DU residue (NRC impact areas), impact debris in impact areas, and possible spills of fuels and other fluids directly on the soil. Increased activities lead to more soil disturbance. The frequency of the action and the stability of the soil influence the magnitude of the disturbance. Recovery time for the soil is expected to increase proportionally to the frequency of activity.

Earthquake models that determine ground motion utilize the depth to bedrock as a major parameter. Ground motion from earthquakes is reduced as the bedrock depth increases (Kagami and Kobayshi, 1974). Placing 150 meters (500 feet) in an earthquake model as the depth to bedrock estimates the expected ground motion to zero. Wells drilled on YPG to 400 meters (1,300 feet) in depth have not reached the basin's bedrock floor (Entech Engineers, Inc., 1987). Therefore, impacts from an earthquake on YPG are not considered likely. The installation sits on the Sonoran zone, "...a nearly stable block between tectonically active regions to the northeast and southwest" (Euge, Schell, and Lam, 1992).

4.4.1.1 Kofa Region

TESTING

The impacts to soils and geology associated with military testing are limited primarily to surface soils. New construction of roads and facilities, the widening or expansion of course paths, and increases in munitions testing will further disturb soil integrity and increase the potential for soil erosion. Damage to soils and vegetation in the proposed site for the Combat Systems Test Complex is likely. The proposed area contains substantial areas of desert pavement and small washes. Establishing an open maneuver area for training allows tracked and wheeled vehicles to maneuver in any direction within the area during troop training operations. The maneuver area is also expected to modify the terrain features of the area through preparation of dug-in positions and other excavations. Modifications may include the construction of trenches and berms. No support buildings are necessary. Soil resources in this area are expected to become heavily disturbed. Semi-permanent scars in the form of ruts and tracks will occur on desert pavements, affecting surface water flow (section 4.3.1). Vehicular movement within the maneuver area will disturb cryptogamic crusts. This designated maneuver area is limited to the southeastern corner of Kofa Region (see figure 4 in section 2.1.4.1), and the washes affected are isolated from navigable waters of the United States. These adverse impacts will remain localized.

Army policy for munitions testing is to clear impact areas of unexploded ordnance to the extent possible. UXO which remains does not actually affect the character of soil resources, but has a major effect to land use (section 4.8).

The use of DU was considered a possible source of radiological or other contamination to soils. However, studies (section 4.11) have shown that this type of contamination is also negligible. No other effects (such as chemical reactions or toxic reactions to wildlife) have been postulated for DU munitions in the environment.

Accidental contamination of soil by petroleum products or hazardous materials and wastes are less likely to occur on controlled military test ranges than on other less regulated and controlled lands.

Smoke testing may contaminate soils. One type of smoke testing that may contaminate soils is fog oil aerosols. The retention of fog oil may vary by soil type, although the residue tends to evaporate rapidly. Coarser soils may allow more downward leaching of deposited residues and reduced evaporation rate. The hydrocarbons composing the fog oil

residue are biodegradable and are attenuated over time (Driver, et al., 1993). Other materials used in smoke testing, namely graphite, kaolin, and white/red phosphorus, are not expected to adversely impact the soils. (U.S. Army Corps of Engineers, 1993; Yon et al., 1983).

TRAINING

Increased training within the Kofa Region has the greatest potential to adversely impact soil resources of any of the groups of activities considered under the Preferred Alternative. Unlike tests, where experiments are finely controlled, troop elements are typically given general guidelines and allowed "creative freedom" to accomplish their training mission objectives.

Tactical considerations typically call for vehicles to remain dispersed in open environments. Cover and concealment is critical during combat, so it is likely that training units will maximize the use of washes and available desert vegetation.

Soil disturbance is the greatest challenge to soil resources as a result of training activities. Soils and desert pavements are extremely difficult to protect under training scenarios. Mechanized units (both tracked and wheeled) are likely to cause long-term damage to soils and soil caps. Because of this, training units may be limited in terms of size and types of equipment authorized. Training will be restricted to a few designated areas within the Kofa Region, where impacts to the YPG test mission and to the environment will be minimized. Integrated Training Area Management system procedures will be used to avoid, reduce, and mitigate training impacts to soils.

Accidental contamination of soil during training exercises will be cleaned up under the procedures of the ISCP. No UXO producing munitions will be fired within maneuver areas during training exercises.

BUSINESS PARTNERSHIP OPPORTUNITIES

Overall, impacts from use of the region by private industry are very similar to impacts from military use. Private industrial use of the region must be compatible with the unique military activities taking place in this region. Private industrial and commercial projects compatible with the military mission include small arms testing, test and evaluation of electronic equipment, and counter munitions technology. Vehicle use by automotive manufacturing companies has the potential for the incidental spill of fuels or other vehicle fluids directly on the soil.

RECREATION AND OTHER ACTIVITIES

Few new activities are considered likely under the Preferred Alternative for the Kofa Region. Hunting within the East Arm is likely to continue, however total numbers of hunters in this area on an annual basis are typically less than 50 user-days. Hunters, hikers, and ORV recreationists not complying with access regulations and Federal and State laws are likely to impact soil resources.

A high voltage power line and the right-of-way currently exist along the south edge of the Kofa Region. Additional lines may be added in the future. The access and maintenance roads to support these lines have some potential to affect soils that are crossed by the route.

If agricultural outleases are ever considered for the Kofa Region, they have the potential to affect soils. Requests to consider grazing have been received for the southeastern portion of the Kofa Region, but have been denied. Grazing could affect soils by reducing vegetation and increasing erosion. Row crops, although considered unlikely, would cause the greatest changes to soils. Wind erosion could result in loss of topsoil while soil treatments could enhance soil fertility and productivity.

4.4.1.2 Cibola Region

TESTING

The introduction of open-trench RDTE demolition projects to the Cibola Region changes the site-specific terrain since such projects involve the detonation of high explosives buried in trenches. Explosives and demolition tests require construction of obstacles, fighting emplacements, and position fortifications. There will be further terrain disturbances resulting from clearing of areas for drop zones and the introduction of additional targets.

If determined appropriate, the sites can be restored at the conclusion of the test. However, in most cases where the terrain alteration is not environmentally detrimental and the alteration does not preclude use for future tests and activities, the alterations can be left in place. Natural desert pavement areas may be disturbed as new activities expand established ranges, roads, and buildings.

Aircraft armament testing is unlikely to pose any unique impacts to soil resources. The use of explosive tipped munitions in existing impact areas adds to the presence of UXO contamination of these sites. Use of lead, steel, and other projectiles increases the presence of these elements in target area soils. However, no adverse environmental effects have been documented or are predicted from this use.

Access roads to test sites and targets can impact soils. The proposed construction of a new drop zone will involve clearing vegetation and could increase the potential for soil disturbance and soil erosion. Undeveloped trails are the most likely to degrade and result in loss of soil to a depth of one half meter (more or less, depending on substrate). Likewise, tests involving tracked or wheeled vehicles can pulverize desert pavements and damage banks at wash crossings. Use of fixed, hardened sites and constructed roads can significantly reduce this type of damage.

Tracked and wheeled vehicle test courses can result in some soil loss and localized terrain alteration, depending upon test criteria. Because tests typically require replication over identical conditions, testers attempt to design tests to minimize damage to courses. Maintenance of courses generally precludes significant impact to soil resources.

Smoke testing may contaminate soils. One type of smoke testing that may contaminate soils is fog oil aerosols. Other materials used in smoke testing, namely graphite, kaolin, and white/red phosphorus, are not expected to adversely impact the soils (ref. section 4.4.1.1 Kofa Testing).

TRAINING

Effects of training activities upon soils within the Cibola Region are similar to those described in section 4.4.1.1 (Kofa Training), with the addition of parachute training. Maintenance and use of landing zones might have some impact to soils. Use of vehicles to drive across landing zones or the use of drop zones can leave ruts and soil damage under some conditions.

Cross country maneuvers are more likely within the Cibola Region, given fewer conflicts with other testing activities (i.e. closed safety fans) and UXO contaminated lands. However, the soil types found within Cibola Region are typically hardier (with some exceptions) than those found within Kofa Region, thereby resulting in less damage to soils (Cochran, 1991). Monitoring and management of soil resources through the ITAM or similar program will be necessary to prevent degradation of soils.

BUSINESS PARTNERSHIP OPPORTUNITIES

The Cibola Region may be practical for a number of public private partnership opportunities. Most of these would be similar or identical to testing activities conducted by the military mission, but for private sector purposes. As such the impacts to soils are predicted to be identical (with less intensity due to fewer tests) to those predicted for military tests in section 4.4.1.2 (Cibola Testing).

Increased soil erosion is associated with private off-road vehicles and military vehicles driving in open-terrain (Webb and Wilshire, 1983). The introduction of private public partnership opportunities, such as private aviation testing (i.e., helicopters) and automotive testing will result in increased soil disturbance if vehicles and the individuals are allowed to travel in undisturbed areas. More travel on unimproved roads is predicted.

The additive effect of public private partnership opportunities will be cumulatively negligible for the Cibola Region, but could be locally intense. Some unimproved access routes may require development as improved constructed roads to prevent erosion and soil loss.

RECREATION AND OTHER ACTIVITIES

Sand and gravel sites might be developed within the Cibola Region to support public roads that transverse the region. These would alter terrain locally, but provided that they are developed in accordance with permit and regulatory limitations, should not have significant adverse effects to soils or geological resources.

Hunting and authorized recreational activities are not anticipated to affect soils or geology of the region. Cibola region contains the two most heavily used hunting areas within YPG (North Cibola and Arrastra Hunting Areas). However, hunters tend to comply with installation and State regulations regarding use of existing roads and trails and are unlikely to engage in illegal dumping activities which could result in loss of future access and hunting privileges.

Lack of access to water resources (regardless of allocation) and poor quality of forage makes development of any agricultural outleases in the Cibola Region unlikely. Therefore, no impacts to soil from agriculture are anticipated under the Preferred Alternative.

4.4.1.3 Laguna Region

TESTING

Laguna Region contains a number of vehicle test courses used to evaluate equipment in varying terrain. Under the Preferred Alternative, the usage of these courses is likely to increase. Loss of dust particles in test courses will likely increase, if more exercises occur, resulting in wind and water erosion removing the fine substrate materials. Although many vehicle courses can avoid soil surface loss through development of constructed roads with gravel surfaces, this technique would defeat the purpose of a dust course.

Smoke testing may contaminate soils. One type of smoke testing that may contaminate soils is fog oil aerosols. Other materials used in smoke testing, namely graphite, kaolin, and white/red phosphorus, are not expected to adversely impact the soils (section 4.4.1.1. Kofa Testing).

TRAINING

Training that will occur in the Laguna Region under the Preferred Alternative will consist of small units conducting non-open maneuver type training or parachute training. Laguna Region is used as an administrative area for visiting training units. Most training activities are associated with long established facilities. Establishment of new maneuver areas in this region is not anticipated.

BUSINESS PARTNERSHIP OPPORTUNITIES

Laguna Region is where the majority of public-private partnership opportunities will occur. The proposed hot weather automotive test complex is to be located at the Roadrunner Drop Zone. Private industry activity may perform test and evaluation for automotive crash survival, alternative energy vehicles, earth moving equipment, ride dynamics, and tires. These activities will likely impact existing soil resources and may increase the potential for spills of fuels or other vehicle fluid.

The proposed construction and operation of a technology center complex may have an impact to existing soil resources. Some soils would be permanently dedicated for use.

Although existing camping spaces are available at the Main Administrative Area, additional recreational facilities are proposed. Developed camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camping areas are subject to heavy foot traffic and some vehicular traffic. Proposed paths and trails for hiking, biking, and horseback riding should require almost no cutting and filling of soil resources.

RECREATION AND OTHER ACTIVITIES

Small portions of Laguna Region have historically been designated for use as a recreational ORV area. This type of activity can be allowed after site specific NEPA reviews have been completed (32 CFR 656.7). Recreational ORV use of an area can destroy soils by promoting both wind and water erosion. Desert pavements, hillside slopes, and even wash bottoms can be affected by recreational ORV activities. Prevention and correction of soil degradation in an approved recreational ORV area will be expensive and time consuming.

Continued use of the Martinez Hunting Area, where most hunting access occurs on foot should pose little risk to soil resources.

An existing Recreational Vehicle Park poses few minor risks to soil resources, mostly from accidental or intentional dumping of contaminates onto the ground. Most RV's restrict themselves to improved roads and do not attempt to drive over undisturbed areas. Recreational activities have the potential for fuel and other fluid spills.

Laguna Region does have some potential for agricultural outleasing, either for row crops or citrus. Agricultural activities could convert existing desert soils into prime and unique farmlands, a designation given to farmlands immediately adjacent to the south boundary of this region. Such designation could be beneficial to soil resources. If farming was allowed to occur without utilizing best management practices, valuable soils could be permanently lost. Assuming only lands within 0.7 kilometers (.5 miles) of the boundary were made available to agricultural outleases, less than 1,000 hectares would be involved.

4.4.1.4 Off-Post Locations

Off-Post locations are used in accordance with regulations from the controlling agencies, including BLM and BOR. Activities in off-post locations may disturb soils.

TESTING

Test activities which occur at off-post locations are unlikely to have any permanent effect on soil or geologic resources. YPG does not manage or control the soil resources of off-post locations. Launching or firing of long-range munitions from off-post locations to target impact areas on YPG should have negligible effect to soils at the firing position. Ground disturbing activities are typically minimal during use of these areas. Restoration of soils is conducted in accordance with the requirements of the land managing agency. The potential for incidental releases of fuels and other fluids from equipment and vehicles will increase. In areas where desert pavement has been removed, soil remains exposed to erosion. The possibility exists for greater disturbance of the soils with more frequent use by Munitions and Weapons, Automotive and Natural Environment, and Combat Systems division. Any accidental contamination of soils is cleaned up in accordance with the ISCP.

TRAINING

Training at off-post locations will generally not be under the operational control of YPG. Any resident units that trains at an off-post location must comply with all imposed environmental and land use permit stipulations. Long term impacts to soils are not anticipated.

BUSINESS PARTNERSHIP OPPORTUNITIES

No public-private partnership under the authority of YPG will occur at off-post locations.

RECREATION AND OTHER ACTIVITIES

No activities that fall into this category under the control of YPG will occur at off-post locations. Recreational ORV uses and hunting at the property at Blaisdell Siding are not part of the Preferred Alternative.

4.4.2 Mitigation Measures

Federal law, in the form of the Sikes Act, requires installations to prepare Integrated Natural Resource Management Plans to provide for "no net loss in the capability of military installation lands to support the military mission of the installation" (16USC670a). The Army has designed the ITAM program to achieve optimum, sustainable use of Army lands by implementing a uniform management/decisionmaking process (AR 200-1, 15-17). Integrated Training Area Management aids trainers and natural resource managers in preserving training lands for future use. The ITAM program integrates four major thrusts that provide Army planners, trainers, and land managers with a comprehensive approach to land management [ITAM Implementation Plan, Environmental Division, US Army Construction Engineering Research Laboratory (USACERL)]. These are listed below.

- Land Condition Trend Analysis (LCTA) - This is a long term land monitoring program that is used to evaluate land capabilities to support different missions and documents environmental trend data.
- Training Resource Integration (TRI) - This is a computer model to assist decisionmakers and land managers to optimize land and natural resource capabilities with mission requirements.
- Land Rehabilitation and Maintenance (LRAM) - This is the component of the program geared at restoring damaged soils on military installations. It uses revegetation and other low maintenance techniques to stabilize and repair locations where erosion has caused loss of surface soils.
- Environmental Awareness (EA) - This is the educational component of the program. The education is aimed at prevention of environmental degradation, promotion of stewardship, and wise use of natural resources.

Implementation of the ITAM program through an on-site ITAM plan is underway at YPG by environmental programs. Components of the program specify mitigation measures including road closures, reseeding, harrowing, vegetation rehabilitation, and graded structures.

Yuma Proving Ground will continue to confine vehicular traffic to established test courses and maneuver areas. Because of the vulnerability of the desert to off-road traffic, selection of project locations will involve consideration of the stability and

resiliency of the soil. Reference to the YPG soil survey (Cochran, 1991) is used to select soils with higher resilience to use for the most detrimental operations. Recovery of ordnance will continue to take place. Vehicles will continue to travel in already disturbed areas when practical to reduce impacts on undisturbed areas. Recovery of eroded areas will continue to take place. Fueling points, staging, and defilade areas (excavations where vehicles hide) will be established for specific projects. This will decrease the impacts to soil by having assigned areas to serve these purposes instead of allowing the tester to establish them at their convenience. Testers will establish additional areas after review from environmental programs. Designated crossings could be incorporated as a means to reduce erosion. Deposition of dredged or fill material in waterways will be CWA Section 404 permitted. Damage to the soil will be assessed along with restoration. Modeling programs will be used to model the soil dynamics for proposed project locations.

4.5 BIOLOGICAL RESOURCES

Potential cumulative impacts to biological resources as a result of implementation of the Preferred Alternative are discussed in this section. Mitigation procedures are described. Impacts to biological resources are considered significant if any of the criteria in the box below is met.

- **Habitat necessary for all or part of the life cycle of a species is lost as a result of activities allowed under the Preferred Alternative. (e.g., lambing areas, migratory corridors, or wildlife watering areas).**
- **Threatened or endangered species are adversely affected.**
- **A regional or local species is extirpated.**
- **Ecological processes are damaged to the extent that the ecosystem is no longer sustainable or biodiversity is impaired.**

4.5.1 Effects of the Preferred Alternative

Army activities have the potential to affect biological resources. Habitat is vulnerable to surface disruption by vehicle and troop movements. Noise from firing artillery and from low flying aircraft may also disturb wildlife. The presence of humans, regardless of the activity they are engaged in, is often enough to disturb animals or cause them to avoid areas. Army policy and Federal and State regulations provide for protection of biological resources on Army lands through avoiding, minimizing, or mitigating impacts. Wild horses and burros will be managed in accordance with the Cibola-Trigo Herd Management Plan (BLM, 1998), as amended.

4.5.1.1 Kofa Region

For purposes of discussion, the Kofa Region is discussed relative to its two component parts. The majority of activity centers on the large east-west oriented portion of the region, south of and adjacent to Kofa NWR. It is referred to as the "Kofa Ranges." The second portion of Kofa Region is referred to as "East Arm" and is the north-south oriented property, east of and adjacent to Kofa NWR. When the term "Kofa Region" is used, it refers to both parts.

The Kofa Ranges are located in relatively poor wildlife habitat. Vegetation is sparse and water, with the exception of wells maintained for the test mission, does not exist except during rare rainfall events. No rare species are known to have habitat or use this area. However, some wildlife does migrate across the ranges, moving between the mountains of Kofa NWR and the Gila River Valley twice each year, but limited to a couple of corridors. From a biological resource perspective, the Kofa Ranges are ideally suited for military test range use with few conflicts.

The East Arm has relatively greater value to biological resources. It contains a variety of habitat types and therefore supports greater diversity than the Kofa Ranges. It contains both natural and artificial watering sites. Mountain ranges (such as the Tank and Palomas Mountains) support healthy populations while the Palomas Plain and other valley floors are much less productive. Most military activity takes place in the broad, flat plains (when it occurs at all).

TESTING

The testing of explosive munitions on YPG requires that numerous and often extensive impact areas be dedicated for this purpose (figure 4). Most artillery impact zones are located in areas of creosote-bursage vegetative types. Due to the nature of some munitions research conducted at YPG, many of the impact areas must be cleared of all vegetation and leveled to provide safe, efficient tests. These may not fully recover within the next century and may therefore not be available to wildlife even if military operations decreased. Implementation of the Preferred Alternative might create larger ranges for operational testing and free-travel (designated areas for off-road driving) and thus impact vegetation. Once established, these areas provide little habitat for wildlife and are devoid of plants. Edge species may see minor benefits.

On YPG, barren impact areas are generally smaller in size than "natural" impact areas, because they require intense maintenance to retain their usefulness. Barren impact areas account for less than 1 percent of the total land area in Kofa Region. Small mammals and reptiles will likely be directly affected by such activity. Environmental programs reviews locations of impact areas to ensure activities are placed in flat areas away from desert washes. Flat areas are usually of the creosote-bursage vegetative type, which is considered low-value habitat for wildlife (Palmer, 1986; deVos and Ough, 1986; Ough and deVos, 1986).

Other impact areas retain some or all vegetation and terrain variation, such as washes. These natural impact areas provide good habitat and are protected from alternative uses, which might disturb or adversely affect wildlife. Although wildlife can be injured or killed when explosive munitions (or UXO) detonate, such instances are rare. Species that might be affected during detonations are the common wildlife, such as mule deer, coyotes, small game, and birds. Feral horses and burros might also be affected, although their distribution makes this unlikely. None of the direct mortalities associated with explosive munitions are considered to adversely affect wildlife populations, even on local levels.

Range safety fans and buffer zones around impact areas tend to have a positive effect on habitat. Once established, they dramatically limit the types and number of activities that can occur within the zone. This creates an ideal situation for biological resources, where habitat is protected and disturbance is low.

Under the Preferred Alternative, it is likely that additional impact areas will be required during the next 15 years. Minor losses of habitat will occur. However, any losses can be easily mitigated through habitat improvement projects and avoidance of wildlife corridors when impact area locations are selected.

There has been recent research (USA CHPPM, 1998) to investigate whether explosive residues and by products are being taken up by the food chain. Preliminary results are indicating no such uptake is occurring. No toxic effects to plants or wildlife are predicted, based on exposure to explosive residues found in and around impact areas.

Direct fire ranges often require that vegetation be cleared to provide "line-of-sight" between the firing point and the targets. YPG attempts to adjust targets, within the limitations of the test parameters, to avoid tall plants (such as ironwood trees and saguaro cacti). Where this cannot be accomplished, plants may be trimmed or removed. Most plants removed are salvaged and replanted elsewhere on the installation.

A system of access roads and trails to support test activities is established in Kofa Region. Wildlife may be directly affected if increases in the number of tests or activities cause a proportional increase in the number of vehicle-animal collisions on these roads. One or two large animal (deer or equine) collisions are typically reported each year. Speed limits are set relatively low and because only a limited number of personnel are authorized to drive "down range", this is not considered to be a significant threat to wildlife populations.

The potential for fragmentation of big game and predatory wildlife populations due to loss of wildlife corridors is low. This is because wildlife corridors are found in desert washes, particularly where smoke tree populations exist. Migration corridors are found in this region between the Gila Mountains and Kofa National Wildlife Refuge (Palmer, 1986). Wildlife cross the ranges in spring and fall moving between the mountains to the north and the Gila River to the south. Little movement occurs during the heat of summer, when most testing occurs to take advantage of extreme heat conditions. Water developments on Kofa NWR, to the north, tend to encourage wildlife to stay there, avoiding the drier military ranges to the south. Wildlife water sources in mountainous areas are periodically checked by wildlife biologists. No significant effects to biological resources are anticipated due to any operational testing activities in the Kofa Ranges under this alternative.

Few caves and mines exist within the Kofa Ranges portion of Kofa Region, therefore, no conflicts with bats and other cave dwelling animals are predicted. Bats do benefit from the presence of two wells and associated small ponds that are maintained to support test activities. Likewise, wild horses and burros also benefit from the presence of these water sources.

Although specific research to validate the opinion is lacking, indirect fire of artillery and other munitions is not considered to affect wildlife beneath the line of fire. The projectiles are essentially silent at ground level as they pass by overhead and unless a receptor is near to either the firing point or the target point, that same receptor should be unaware that a projectile has passed. Noise from artillery firing and explosive munitions detonating are typically acute rather than chronic. Other research (Anderson et al., 1989) tends to indicate that most animal species acclimate to the noise associated with gun firing and helicopter flight operations. On YPG, there are documented instances of birds nesting near fixed gun firing points and at helicopter hangars. Noise is not considered a serious problem for biological resources in Kofa Region. (A more thorough discussion of noise is found in section 4.9.)

Operational testing is projected to occur in newly established range and maneuver area facilities (shown in figure 4) in Kofa Region. It is predicted to adversely affect biological resources within the established range complex. Wildlife is likely to be displaced within and from the maneuver area when tests (or training exercises discussed in section 4.5.1.2 Cibola Testing) are being conducted. These tests may involve both personnel on foot and in vehicles that will operate under tactical scenarios. As soldiers use washes and terrain features for cover, concealment, and movement, wildlife activities are likely to be disrupted.

Testing within the East Arm is likely to be limited to the use of existing or new impact areas for indirect munition's targets. Other test activities might occur, but have not been proposed. Impact areas established in the large open plains, such as the existing area in the northern portion of East Arm, have relatively poor quality habitat for species such as mule deer and bighorn sheep. No impact areas in mountainous areas, where sheep and deer are common, are proposed or are likely under the Preferred Alternative.

TRAINING

Training within the Kofa Region has the potential to temporarily disturb and redistribute wildlife from approved training and maneuver areas. Training exercises that occur during spring and fall have a slightly greater impact to wildlife resources that travel across the Kofa Ranges than exercises in summer.

Exercises involving tracked and wheeled vehicles have greater potential to damage habitat than exercises involving dismounted soldiers alone (see discussion at section 4.4.1.1 Kofa Training). Provided that personnel comply with Army and YPG regulations, impacts to biological resources should be negligible.

Training exercises that request permission to use parts of East Arm will require additional scrutiny and sufficient stipulations to preclude conflicts with biological resources. However, training by small units with an understanding of environmental constraints (such as avoiding water developments) should not pose a risk to these resources.

BUSINESS PARTNERSHIP OPPORTUNITIES

It is unlikely that public private partnership opportunities will require new infrastructure within the Kofa Region. The most likely activities for this region would be private sector test and evaluation of small arms, electronic equipment, and counter munitions technology. They would use existing ranges. Potential impacts to biological resources would be identical to those caused by military testing (section 4.5.1.1 Kofa Testing).

RECREATION AND OTHER ACTIVITIES

Few new activities are considered likely under the Preferred Alternative for the Kofa Region. The Kofa Ranges are closed to all public access, due to security and safety concerns associated with the test mission. Less access allows less disturbance to wildlife and benefits biological resources. Under the Preferred Alternative, the Kofa Ranges will remain closed to public access with an exception that the area may be opened to hunting.

Hunting within the East Arm is likely to continue, however total numbers of hunters in this area on an annual basis are typically less than 50 user days. Hunters who obey installation access regulations and Federal and State wildlife laws are unlikely to impact wildlife populations and contribute to their management through permit and license fees and excise taxes.

Maintaining East Arm as a closed area to the public (except during hunting season) will benefit wildlife and plants. If the federally listed endangered Nichol's Turk's Head Cactus (see discussion in section 3.5) is discovered to exist within this vicinity, it will automatically be protected from uncontrolled access and disturbance.

Hunting areas may change over the period 1999-2014. In order to facilitate enforcement of the Kofa closed area, the land areas south of the high voltage power line ROW may be opened to hunting. This will result in the designation of the highly visible power line as an obvious boundary for the closed to hunting area to the north. Accidental trespass by hunters should be reduced or eliminated by this action. Wildlife north of the ROW may experience less (unauthorized) hunting pressure once a clearly definable boundary is established.

If agricultural outleases are considered for the Kofa Region, they have the potential to affect biological resources. Requests to consider grazing have been received for the southeastern portion of the Kofa Region, but have been denied. Grazing could affect wildlife by directly competing for forage. Cattle grazing could also influence the distribution of cowbirds that are nest predators of other less common bird species.

Row crops, although considered unlikely, could influence distribution of species, greatly benefiting some while potentially harming others. Pesticide and herbicide usage would be a concern. Natural plant regimes would be displaced by introduced species for human consumption. Wildlife might benefit from water used to flood irrigate or otherwise water crops. Some locally common crops, such as corn, wheat, and safflower are of particular benefit to doves and other bird species. Citrus groves provide high quality nesting and roosting sites for many birds. Other crops, such as cotton provide some cover, but very little food or other life-cycle needs for wildlife. Any revenue generated by agricultural outleases would be retained by the installation for support of natural resource (i.e. wildlife) management.

4.5.1.2 Cibola Region

TESTING

Tests involving explosives and demolition technologies can alter site specific habitats. Typically the effects of such alterations are limited to less than one hectare in size. In most cases the habitat alteration is not environmentally detrimental. Sonoran Desert habitats tend to be so open that small scale disturbances do not affect composition and distribution of species.

Typical tests include technologies to construct obstacles, fighting emplacements, and position fortifications. Except for a few specialized habitats (such as sand dunes where the Mojave fringe-toed lizard is known to exist), these types of activities are unlikely to affect biological resources. Typically, tests can easily be located to avoid conflicts with habitats of less common species. Explosives tests are not anticipated to be of such size to create a risk of increased seismic activity beyond the immediate test site. No effects should ever extend beyond installation boundaries.

Drop zones for air delivery tests may displace small mammals and reptiles but do not pose a problem for more mobile species such as large mammals and birds. Predatory birds often pursue prey around clearings such as drop zones.

Aircraft armament testing is unlikely to pose any unique impacts to biological resources. The use of explosive tipped munitions in existing impact areas adds to UXO contamination of these sites. Use of lead, steel, and other projectiles increases the presence of these elements in target areas, but uptake of lead by birds is unlikely due to its configuration and size. Lead from large military munitions is not comparable to lead shot.

Any operational testing that might occur in Cibola Region would have impacts similar to those discussed for Kofa Region (section 4.5.1.1 Kofa Testing). Wildlife issues are a bit different, as the Cibola Region does contain several small mountain ranges and a greater variety of habitat types. Most wildlife corridors extend from the Trigo Mountains west to the Colorado River. Most operational testing would take place south and east of the Trigo Mountains. Mountain areas such as Chocolate Mountains and the Middle Mountains are considered inappropriate for this type of testing from a test criteria point of view. Observers must be able to monitor the actions of soldiers to perform successful evaluations.

Use of access roads to test sites and targets can impact wildlife through human disturbance, however experience has shown resident wildlife acclimated to the levels of military testing anticipated under the Preferred Alternative. Collisions with large mammals are rare in the Cibola Region, largely due to road conditions that require slower speeds.

Noise from helicopters used in aircraft armament testing is discussed in section 4.9, but is not considered a risk to wildlife populations in the Cibola Region. Bighorn sheep and mule deer do appear to be acclimated to routine military aircraft activities (Weisenberger et al., 1993).

TRAINING

Effects of training activities upon biological resources within the Cibola Region are similar to those described in section 4.5.1.1 (Kofa Training). Parachute training will involve maintenance and use of landing zones, which should have small impacts to plants and animals in the immediate location of the clearings.

Cross country maneuvers are likely within the Cibola Region, given fewer conflicts with other testing activities (i.e. closed safety fans) and UXO contaminated lands. This could expose more wildlife to humans and possibly displace individual animals on a temporary basis. However, the extent and number of training exercises anticipated under the Preferred Alternative is not predicted to have adverse effects on populations.

Sensitive habitats such as water developments, mines, caves, and special habitats can be placed off limits to troops as tactical obstacles. Personnel that comply with environmental stipulations will pose no risk to plants and wildlife associated with these habitats.

Off road driving in washes by military personnel during training may affect movement of wildlife such as deer (which are commonly found in washes), especially near water sources. Raptors sometimes perch and nest on targets. Tests may be rescheduled or nests removed and hatchlings transferred by a permitted rehabilitation specialist under the Migratory Bird Treaty Act.

Training exercises will make tactical use of washes. However most of the primary washes in the Cibola Region are braided and wide, giving both wildlife and humans room to avoid each other. Smaller, tributary washes have less value to wildlife, and are less likely to be occupied by wildlife when troops are present. Use of washes as movement corridors by training units is not considered a significant threat to wildlife resources.

BUSINESS PARTNERSHIP OPPORTUNITIES

The Cibola Region may be practical for a number of public private partnership opportunities. Most of these would be similar or identical to testing activities conducted by the military mission, but for private sector purposes. As such, the impacts to biological resources are predicted to be identical (with less intensity due to fewer tests) to those predicted for military tests in section 4.5.1.2 (Cibola Testing).

RECREATION AND OTHER ACTIVITIES

Cibola region contains the two most heavily used hunting areas within YPG (North Cibola and Arrastra Hunting Areas). A third area (Highway 95 Hunting Area) is less used, but is important due to its easy access along U.S. Highway 95. However, hunters tend to comply with installation and State regulations regarding wildlife harvest, since violations could result in loss of future access and hunting privileges. Hunting areas may possibly be established in Cibola Region at Gould Wash and Crazy Woman Wash vicinities. Impacts from vehicular tracks could be expected on vegetation and desert pavement if areas are opened to camping and hunting. All military hunting permit revenues are retained by installations for exclusive use by the wildlife management program.

Retaining the closure of mining in Cibola Region will benefit bats and other mine-associated species. This may positively affect bat populations, which are vulnerable to mine shaft disturbance. Bats roost in the Cibola Region in numerous abandoned natural caves and mine shafts. Management activities under the *Integrated Natural Resources Management Plan*, such as the installation of bat-friendly gates at mine entrances, will also benefit bats.

4.5.1.3 Laguna Region

TESTING

Laguna Region contains a number of vehicle test courses, some of which are referred to as "dust courses" (figure 6). Under the Preferred Alternative, where usage of these courses is likely to increase, fine soil and dust may cover the surfaces of plants downwind of the tracks. This can adversely affect plants by interfering with photosynthesis and reproductive processes. Recovery of desert plants in this environment is extremely slow. Although many vehicle routes and trails can avoid this problem through development of "constructed" roads with gravel surfaces, this technique would defeat the purpose of a dust course.

Some new test courses might be considered. Increased construction may not be a problem in terms of biological resources if facilities are sited in areas of low habitat value, such as flat areas of the creosote-bursage vegetative type (Palmer, 1986; deVos and Ough, 1986; Ough and deVos, 1986).

Most new construction associated with the administrative functions of the test mission will occur in Laguna Region and will result in negligible site specific loss of biological resources.

TRAINING

Training that will occur in the Laguna Region under the Preferred Alternative will consist of mostly small units conducting non-open maneuver type training or parachute training. Laguna Region is used as an administrative area for visiting training units. Parachute training also concentrates its takeoffs from the Army airfield. Most training activities are associated with long established facilities. Establishment of new maneuver areas in this region is not anticipated. Most administrative use involves only driving on paved roads and limited bivouac at fixed sites.

Occasionally, biological resources (such as scorpions, poisonous spiders, and venomous snakes) will conflict with training activities. In the Laguna Region, where administrative areas are usually located, the conflicts occur most often. Unlike individual soldiers and vehicles that can move or easily adjust when conflicts occur, semi-fixed facilities such as mess tents, communication trailers, and maintenance structures are problematic to move. Environmental awareness training is key to preventing and resolving these types of conflicts.

BUSINESS PARTNERSHIP OPPORTUNITIES

Laguna Region is where the majority of public-private partnership opportunities will occur. Some of these will not result in any changes to existing impacts to biological resources.

Other possible projects, such as construction and operation of the technology center complex and a hot-weather test complex, may have an impact to existing biological resources. Some habitats would be altered by new construction.

Wild horses and burros drink from several water sources in the Laguna Region. These animals visit well-pumped impoundments that provide water to testers. The wild equines are adapted to human development. They seek available water from leaking outdoor water faucets, air conditioners or evaporative cooler water drains, irrigated lawns, and a few watering troughs set out by testers. Artificial water sources in the desert could be influencing wild populations to increase. Fences may be required to exclude horses and burros from landscaped areas. Construction, which avoids washes, will avoid conflicts with wildlife corridors. Since Laguna Region does not contain bighorn sheep or any significant mule deer habitat, neither of these important species will be affected. Yuma Proving Ground staff is currently participating in an interagency effort to write an interdisciplinary plan that covers this region. This plan, the Trigo Mountains and Imperial National Wildlife Refuge Cooperative Management Plan, will address appropriate management levels for wild horses and burros.

Historically, landscaping resulted in many high maintenance and high water demand plants being introduced into the Sonoran Desert setting of YPG. The remnants of this approach to landscaping are still obvious in the Main Administrative Area of Laguna Region. Tamarisk, citrus trees, oleander bushes, and rye grass are some plants introduced over the years. Since the 1980's, YPG has embraced a xeriscape approach to landscaping. Chapter 2 of the *Integrated Natural Resources Management Plan* constitutes the installation Landscape Planting Plan. It emphasizes a reliance on native plants and indigenous rock materials. Drought and heat tolerant plants are required whenever new plantings are made.

RECREATION AND OTHER ACTIVITIES

Small portions of Laguna Region have historically been designated for use as a recreational ORV area. This type of activity may be allowed after site specific NEPA reviews have been completed (32 CFR 656.7). Recreational ORV use can degrade habitats and disturb wildlife to the extent that they abandon otherwise suitable habitats.

Continued use of the Martinez Hunting Area, where a minimal amount of hunting occurs, should pose no risk to biological resources.

Laguna Region does have some potential for agricultural outleases. Agricultural activities could convert existing desert habitats into managed fields or orchards, depending upon the crops selected. Although row crops can provide periodic cover, their primary benefit to wildlife is that some crops (corn, wheat, or safflower) provide high quality food sources. Citrus groves can provide long term habitat (20+ years) for many bird species. Other crops, such as cotton and iceberg lettuce, provide little food value and may adversely affect wildlife due to intense pesticide and herbicide use.

The infrastructure to provide water to crops (e.g. irrigation ditches) can benefit a wide variety of wildlife. Wildlife populations are typically denser around the periphery of agriculture. If existing wildlife incentive programs managed by AGFD and other agencies are used, wildlife could benefit greatly from agriculture.

4.5.1.4 Airspace

No use of airspace by any of the activities, under consideration by the Preferred Alternative, should have any impact to biological resources in the Laguna Region. Although the Laguna Army Airfield is located within the Laguna Region, it is not in the vicinity of important habitat or likely to result in effects to nearby habitats. Aircraft typically fly slower and in strict adherence to instructions when operating above the Laguna Region.

Effects of noise on wildlife at YPG have never been studied. If the installation used the restricted airspace less often, there would be an opportunity to schedule more activity from outside sources in the airspace. The air traffic controllers could schedule more commercial flights and high-speed military jet or helicopter missions inside the airspace. Wildlife may be more sensitive to the noise originating from these sources because the high-speed aircraft is generally louder than the aircraft originating from YPG.

Changes in small aircraft flight patterns are not expected, although the number of flying missions will increase. Where planes fly at low levels, they could affect golden eagles, desert bighorn sheep, and mule deer (Kennedy, 1996a).

Airspace is used over the installation, Kofa National Wildlife Refuge, and part of Imperial National Wildlife Refuge. Aircraft flight patterns tend to avoid the Colorado River as much as possible to avoid disturbances to wildlife. When flights originating from YPG cross into the Imperial National Wildlife Refuge, pilots observe the airspace designation published on the airspace sectional map, which establishes an elevation restriction. A small portion of airspace over the refuge is used for aircraft while ascending to reach parachute drop zones in the Laguna Region.

4.5.1.5 Off-Post Locations

Senator Wash Regulating Reservoir is used for testing amphibious equipment. Amphibious vehicles are tested for floating capability, entering and exiting the water on an established boat ramp. Military vehicles tested on the reservoir are fewer than the numerous publicly owned recreational water craft. The razorback sucker, a federally endangered native fish, is present in the Senator Wash Regulating Reservoir. This species is probably not affected by water craft (Hayes, 1997), however, a study has not been initiated. Any unintentional release of petroleum products or other substance, as a result of testing amphibious technologies at Senator Wash, are identified and cleaned up immediately following the procedures of the ISCP and any applicable land use permit. No adverse effect to aquatic resources in Senator Wash, including the razorback sucker, are anticipated.

Tests at Oatman Hill and Death Valley are conducted on pavement, therefore not impacting roadside vegetation. At Imperial Sand Dunes, tests are conducted on unpaved roads. Vegetation is avoided. Blaisdell Siding tests are conducted on railroad tracks.

TESTING

Launching or firing of long-range munitions from off-post locations to target impact areas on YPG should have negligible effect to biological resources at the firing position. Firing from sensitive habitats or areas with endangered or threatened species is not required and not anticipated under the Preferred Alternative. Ground disturbing activities are typically minimal during use of these areas. Restoration of habitats is conducted in accordance with the requirements of the land managing agency.

To the extent that YPG controls and uses the airspace (figure 7) above Kofa NWR and some other, adjacent off-post lands, there remains a remote possibility that a projectile or aircraft could unintentionally crash onto these lands. Although the chances of such an accident are small, the possibility does exist, given the nature of the test mission at YPG. Should such an incident occur, YPG would coordinate with the appropriate land managers to take appropriate emergency recovery actions. Once an emergency situation no longer exists, YPG would coordinate with these same agencies to

retrieve, clean up, and restore any affected sites. YPG would work with appropriate land managers to preclude long term adverse impacts to wildlife and biological resources.

TRAINING

Training at off-post locations will generally not be under the operational control of YPG. Any resident unit that trains at an off-post location must comply with all imposed environmental and land use permit stipulations. Long term impacts to biological resources are not anticipated.

BUSINESS PARTNERSHIP OPPORTUNITIES

No public-private partnership opportunities under the authority of YPG will occur at off-post locations.

RECREATION AND OTHER ACTIVITIES

No activities that fall into this category, under the control of YPG will occur at off-post locations. Recreational ORV use and hunting at the property at Blaisdell Siding are not part of the Preferred Alternative.

4.5.2 Mitigation Measures

Natural resources will be managed under the *Integrated Natural Resources Management Plan* (Yuma Proving Ground, 1995a) and all applicable environmental laws. Palmer (1986), deVos and Ough (1986), and Ough and deVos (1986) conducted wildlife inventories on portions of the installation. They recommended that the Army locate military activities in creosote-bursage vegetation. It is low-value habitat for wildlife and the most common vegetative type. Disturbances in these areas have the potential of affecting fewer biological resources such as wildlife species or plants of rare occurrence.

For areas having intense ground disturbance (i.e., artillery impact zones, tracked and wheeled vehicle test areas, or operational testing maneuver areas), Palmer (1986), deVos and Ough (1986), and Ough and deVos (1986) recommend intensely impacting a single locality rather than dispersing the effects over a large area. Testers should continue to utilize Castle Dome Plain and King Valley areas to the maximum extent. Ecologically sensitive species impacts to La Posa sand dunes in the northwest corner of the installation and the northern portion of the Chocolate Mountains will be avoided. Permanent interruption of deer and desert bighorn sheep movement corridors will be avoided between the Chocolate Mountains and Castle Dome Mountains, and between the Mohave Tank Mountains and South Trigo Peaks. Permanent interruption of any series of major washes that lead directly to the Colorado River (e.g., Gould, Mohave, Trigo, and Yuma Wash) will be avoided. These are used as movement corridors by wildlife.

Palmer (1986), deVos and Ough (1986), and Ough and deVos (1986) recommended the installation develop avoidance measures that could minimize disturbance to wildlife in the vicinity of wildlife watering sites and natural tinajas. The authors also suggested avoiding military activities in immediate vicinities of water sites during periods of drought (annually, May 15 - October 15).

An elevation of 610 m (2,000 feet) above ground level should be maintained if aircraft fly over the Colorado River. At this elevation, aircraft can fly in any direction. If low-flying aircraft are forced to fly near the Colorado River, they should never fly the length of the river, but only perpendicular to it. Flying across the river minimizes disturbance to shorelines and sandbars where eagles are most commonly perched. Perch locations of wintering eagles are known. Thus, AGFD should be consulted to help delineate preferred crossing locations should low-level flights across the river be necessary. Further consultation may be needed with the USFWS.

Consultation is recommended with the COE for any project where discharges of dredged or fill material to washes cannot be avoided.

Yuma Proving Ground will follow maximum practicable compliance with guidelines established by the Arizona Interagency Desert Tortoise Team (Murray and Dickinson, 1996). Surveys and inventories for wildlife, sensitive species, and protected plants will be needed to support lower tier NEPA documents for any new facilities constructed. Mitigation may be required under Section 404 of the CWA if desert washes are filled during golf course construction. Yuma Proving Ground will consider implementing a mitigation plan that integrates environmental sustainability and carrying capacity of ranges. This plan will consider setting aside sensitive habitats to ensure protection of these areas. Identification of desert bighorn sheep migratory corridors, watering areas, and lambing grounds should be incorporated as mitigation to reduce potentially significant impacts to these areas. Environmental programs staff should consider an environmental awareness program initiated through ITAM to instruct hunters to stay on existing roads and minimize soil disturbance by practicing low-impact camping and hunting.

INRMP

Federal law, in the form of the Sikes Act (16 USC 670, et seq.), requires installations to prepare integrated natural resource management plans (INRMP) to manage military installation lands to support the military mission of the installation and provide sustainable populations of biological resources. Many other Federal and state laws apply to biological resources on military lands. The requirements of these laws are incorporated into the *YPG INRMP*. The *INRMP* has been subject to public review and is a dynamic document, where changes can be considered and incorporated periodically, as appropriate.

The *YPG INRMP* is divided into six major sections. These are defined in the following box.

- General Land Management. This section includes most of the ITAM program objectives (see section 4.4.2, Mitigation Measures) and general land management objectives.
- Land Management and Grounds Maintenance. This portion incorporates the installation Landscape Planting Plan and addresses specific objectives with regard to improved grounds development and maintenance.
- Forest Management. At the present time, YPG does not contain commercial forest resources and was not required to prepare a Forest Management Plan. However, in the future, this portion of the INRMP will be rewritten with the intent of addressing vegetative resources of other than commercial quantities and use.
- Wildlife Management. This portion of the INRMP was developed cooperatively among the installation, Arizona Game and Fish Department, and the United States Fish and Wildlife Service. It identifies priorities for management and establishes cooperative frameworks for accomplishing specific activities.
- Outdoor Recreation. Hunting (and associated activities) is the primary action addressed in this section of the INRMP. Other activities are identified as possibilities and may be added to YPG's outdoor recreation program if further evaluation determines that this can be done without adverse effects to the military mission or to the biological resource base.
- Endangered Species Management. Although YPG contains no resident, federally listed, proposed, or candidate species as of 1998, this section of the INRMP provides basic information about migratory species and other State program "wildlife species of concern". Should a listed species be located within YPG or suitable habitat for an endangered species be identified on YPG, then this section of the plan will be rewritten to specify management actions.

4.6 Cultural Resources

Yuma Proving Ground mission activities have the potential to significantly impact cultural resources. Implementation of the Preferred Alternative will have a significant impact if one or more of the following criteria identified in the box below are met.

- **Prehistoric and historic sites eligible for the National Register of Historic Places are adversely affected.**
- **Native American religious or other cultural activity areas are adversely impacted.**

4.6.1 Effects of the Preferred Alternative

Military activities at YPG potentially pose a threat to cultural resources. Some impacting activities include construction, tracked and wheeled vehicle testing and maneuvers, and munitions testing. In addition, both public and private industry in their use of facilities at YPG has the potential to impact cultural resources

Yuma Proving Ground has large areas that are not currently used for physically intrusive activities. These areas have not been surveyed for cultural resources. The Kofa Region has limited surveyed locations. The Cibola Region has been surveyed east of the Chocolate Mountains, generally in the southern half of the region. The Laguna Region has completed the largest extent of cultural resources surveying. The test courses, Laguna Army Airfield, the administrative offices, and the logistics support area for Kofa Firing Range have completed surveys.

Environmental programs comply with cultural resources program goals to manage, protect, and preserve cultural resources on YPG. Protection of cultural resources is accomplished through archaeological surveys, coordination with the SHPO, local community, and Native Americans, and mitigation of impacts. Prior to the construction of a test area, building, road, or testing or maneuver activity, environmental programs office determines the regulatory requirements necessary to evaluate and mitigate any affected cultural resources. If the proposed action has a potential affect on cultural resources, YPG initiates established cultural resource procedures.

Pursuant to the National Historic Preservation Act (NHPA), the Army prepared a *Draft Historic Preservation Plan* (Miller and Smithwick, 1995a) with the installation's management objectives, and survey and evaluation strategies. Generally, if a cultural resources survey has previously been completed in the area of the proposed action, or if the area of the proposed action has been previously disturbed (i.e. covered with concrete, or bulldozed), an additional survey is not required. An exception to this determination is in disturbed areas where the previous investigations indicated that cultural resources may be present. For any area, the land users are instructed to suspend activities if cultural resources are revealed during earth moving and to immediately contact YPG environmental programs.

The preferred method of cultural resources preservation is "*in situ*", meaning the cultural artifacts are left undisturbed. Army personnel, contract employees, or public works staff that have a need to know are briefed on the avoidance of the cultural resources site while performing work. This practice is called "post and avoid."

Depending upon recommendations of the vested parties, a site testing and synthesis may be prepared and implemented. Environmental programs may coordinate through direct communication with the SHPO and local Native American Tribes to accomplish the plan by hosting regular meetings and field trips attended by Tribal members.

Military activities inherently have the potential to disturb soil surfaces. However, impacts to archaeological sites as a result of increased military mission shall be minimized. Prior to the implementation of any activity, environmental programs will evaluate the potential for cultural resource impacts in accordance with cultural resources regulations. An increased number of cultural resources surveys may be the result. Private industry and increased recreational use of YPG shall result in an increase in the number of cultural resource surveys. Varied use of ranges/facilities will reflect a general need of land possibly having cultural resources. Archaeological surveys will be required in previously unused areas.

Circular rock features, lithic scatters, pottery drops, petroglyphs, prehistoric and historic Native American trails, and Camp Laguna (General Patton's World War II camp) are among the types of features protected on YPG. Cultural resources are additionally protected from vandals or artifact hunters by not publishing exact locations in survey reports.

Environmental programs office is expected to be responsible for YPG compliance with cultural resources laws. Environmental programs will also be responsible to evaluate projects and activities to determine the necessity for a survey. Potential risks to cultural resources associated with the expanded diversified mission will be greater.

However, YPG is expected to manage the resources with an active mitigation plan and minimize the risks. To accomplish this, environmental programs will continue to work closely with local Tribes to share information regarding YPG and the region.

In order to protect cultural resources, site specific information for individual regions is not presented in this RWEIS.

TESTING

Excavation of open trenches and detonation of explosives has the potential to impact any existing cultural resources. An additional dust course and turnaround loops are expected. An expansion of the current DU region, impact areas for long-range munitions testing, and the construction of the Combat Systems Test Complex has been proposed. A ground-maneuvering and free-travel area could be established allowing open-terrain testing of combat vehicles. These proposed activities could adversely impact any existing cultural resources.

TRAINING

The Military Free Fall School and the Golden Knights training activities may increase. Visiting military units and the special forces are expected to increase training activities in the Kofa Region. In addition, other troop and visiting personnel will conduct specialized training throughout the northern portion of Cibola. Any areas not previously disturbed or surveyed will need investigation for cultural resources. Personnel will need instruction from environmental programs on avoidance, protection, and preservation of cultural resources.

BUSINESS PARTNERSHIP OPPORTUNITIES

Private industrial and commercial testing of small arms, tracked and wheeled vehicles, demolition equipment, and long-range missile and artillery testing contracts are expected to be awarded. Contract employees will be briefed on avoidance of any culture resource sites encountered.

RECREATION AND OTHER ACTIVITIES

Public recreational uses may be opened for additional hunting areas, designated hiking areas, a desert golf course, a RV park, and rock collection locations. There may be occurrences of individuals extending their activities into restricted locations. The potential for recreationalists to locate cultural resources will increase.

4.6.2 Mitigation Measures

YPG complies with the National Historic Preservation Act, its amendments and other Federal and State requirements. Army regulations and technical manuals (32 CFR 650.181-193) address the structure and policy of protection and preservation of historic properties, including traditional cultural properties on the installation. Procedures for complying with cultural resources laws are described in the *Draft Historic Protection Plan* (Miller and Smithwick, 1995a and 1995b). This Plan will be superceded by the *Integrated Cultural Resources Management Plan* (ICRMP). In accordance with the plan and applicable Federal and State laws, all areas of proposed activities are surveyed by a federally permitted cultural resources professional.

The ICRMP for YPG is currently being finalized under a Memorandum of Agreement with the State Historic Preservation Office and will be released in the near future. The plan has been circulated for review and comment. The plan addresses cultural resource eligibility issues in a "broad pattern of history and prehistory in the area".

Mitigation measures used to protect cultural resources include those listed in the box below.

- Limited use of public lands
- Public Education
- Issuance of construction digging permits
- "Post and avoid" practice to avoid discovered cultural resources while performing military or nonmilitary activities.
- Native American groups are contacted and consulted upon archaeological discoveries.
- Adherence to regulations presented in *Draft Historic Preservation Plan*

4.7 SOCIOECONOMICS

Impacts to socioeconomics are considered significant if one or more of the conditions identified in the box below are met.

- **Implementation of the alternative results in substantial changes in number of employees, due to growth, that would overload the public services such as schools and increase demand for housing beyond that presently available.**
- **Implementation of the alternative result in changes in the number of employees, due to downsizing, that would leave the present public services with funding problems and under utilization and create excess housing.**

Since there are few well-defined or commonly accepted criteria for assessing socioeconomic impacts, they are assumed to result from population changes in the community. Impacts are addressed for the entire installation.

4.7.1 Effects of the Preferred Alternative

The percentage contribution of wages from military and civilian personnel to the local economy is expected to decrease as these populations decrease. However, increases in contractor personnel will increase the contribution YPG makes to the local economy. The total financial impact of YPG from testing, training, public-private partnership opportunities and other activities on the community is expected to remain at current levels ($119 million per year). As a result, socioeconomic conditions directly affecting the City of Yuma and YPG should not change appreciably.

The Preferred Alternative assumes for fluctuations of military and nonmilitary activities as national defense requirements change. Yuma Proving Ground military, civil service, and contractor payroll/populations are expected to fluctuate. The composition of the workforce is expected to continue its shift to a greater contractor population. The current downsizing trend among Army employed civilians is anticipated to continue. As personnel retire, most empty positions are to be eliminated or personnel from other installations are moved into these available positions instead of hiring new personnel.

Higher revenue will be generated from the sale of goods and services with the arrival of additional personnel to YPG. The growth of YPG could parallel that which Yuma County is currently experiencing. Economic contribution to the community could be as high as $179 million. Native American and lower income communities could be positively effected by this economic contribution.

Under the Preferred Alternative, a positive impact on the local and regional communities is expected. More activities represent more income to the local economy. An increase in activities will lead to a greater number of individuals with professional degrees in the area. Many of these individuals may be involved in the community activities such as the annual career fair and school science fairs.

TESTING

Testing activities are projected to remain overall at comparable levels under the Preferred Alternative to the baseline period. Therefore, contributions made by testing activities to the local economy should not be significantly different for the Preferred Alternative.

TRAINING

Increases in training exercises will increase the number of people (temporarily) at YPG. This is expected to have a minimal economic impact, since the relocation is temporary and training soldiers would rarely relocate families for such a short time period.

BUSINESS PARTNERSHIPS OPPORTUNITIES

Private ventures are expected to increase during 1999-2014. Private ventures are expected to increase revenue for YPG, and should therefore increase the contribution YPG makes to the local economy. With projected greater reliance on private contractors and increased emphasis on recreational facilities and activities, job opportunities and wages should increase. Growth in the local economy will likely come from private industry. As the new technology and conference complex is established, several hundred more jobs may be available.

RECREATION AND OTHER ACTIVITIES

Agricultural outleases could create competitive disparities in the local agricultural economy, creating significant socioeconomic impacts. No other activities considered of this type are predicted to have a significant socioeconomic impact.

4.7.2 Summary

As one of the principal nonagricultural employers in Yuma County, YPG's growth is parallel to the growth of the community. Whether private industry or military mission activities generate revenue, the local economy will benefit from the increased use of the installation. It is estimated that over the next 15 years, the economic impact of this alternative to the surrounding area could approach $200 million. An increase of this magnitude will involve not only diversification of activities at YPG, but also a substantial increase in income to the installation through that diversification. The trend of the objectives under this alternative is one of growth. Under the Preferred Alternative, the growth will tend to be twofold: private and defense related. It is expected that diversification will mean more jobs in the private sector and a possible increase in jobs in the defense sector as well.

4.8 LAND USE

Impacts to land use are considered significant if one or more of the criteria identified in the box below are met.

- **Land is degraded so it cannot be used for current or planned use.**
- **Planned uses conflict with off-post land use, especially along the YPG boundary.**

4.8.1 Effects of the Preferred Alternative

Installation land use analysis revealed that the majority of YPG's land is dedicated to uses that are complementary or are compatible. Most YPG land is reserved for artillery and weapons systems testing, vehicle mobility testing and evaluation, personnel training, and aviation related testing. These mission activities have priority over other uses.

Land use designations will remain the same with the proposed military activity increase. Land use will vary with the new mission needs. Incorporating additional troop training activities, open maneuver areas, and advanced technology projects throughout the installation will enhance land use. New enhancements will include the incorporation of integrated testing methods, combat systems and munitions testing facilities, and establishment of ground-maneuvering and free-travel areas.

New nonmilitary uses such as commercial developments, private industrial testing, and recreational uses will be introduced in areas that will not conflict with land use assessment. Therefore, military related impacts will be the same as those discussed for baseline activities and are not included below. The military mission at YPG will continue to receive priority over nonmilitary uses. The Preferred Alternative may potentially affect land use patterns in nearby Betty's Kitchen area, Mittry Lake area, and BLM's recreational complexes at Squaw Lake and Senator Wash.

Diversified military, commercial, and recreational activities may result in range scheduling limitations or conflicts. Augmenting personnel with associated range scheduling training is expected to minimize problems. Increased military mission activities for all regions will continue to have priority in scheduling use of locations and facilities.

Increased nonmilitary activities will have the potential to disturb adjacent lands. More frequent activities on the range may create additional air pollution despite the high dispersion rates in the installation. Opening additional lands on YPG for recreational use increases the possibility for individuals to inadvertently trespass on adjacent private land or managed wildlife and wilderness areas.

4.8.1.1 Kofa Region

TESTING

The primary use of this region will continue to be testing of artillery, mines, mortars, and military munition systems. Integrating additional mission activities into the Kofa Region will enhance use. Increased firing missions will not necessitate a corresponding increase in prepared or designated impact areas and firing ranges. A few additional impact areas and gun positions will have to be constructed to accommodate artillery projects with longer ranges. However, increased firing missions will generally entail increased usage of existing impact areas and gun positions. If new impact areas are located near the installation boundary or in extremely remote locations (East Arm), monitoring for unauthorized access will be more difficult. This may result in increased potential for injury to individuals gaining illegal access (trespass).

TRAINING

Training activities are compatible with designated land use. Training areas will be designed to fit the needs of the primary mission and fit land use requirements.

BUSINESS PARTNERSHIP OPPORTUNITIES

Military activities in the Kofa Region limit the type of nonmilitary activities that can be safely conducted in this region. Private testers will comply with the restrictions in this region. Ventures such as long-range missile and artillery work for foreign governments and private industry utilizing several range areas will be introduced to the region.

RECREATION AND OTHER ACTIVITIES

Seasonal hunting will continue in designated areas of the Kofa Region (East Arm). The Preferred Alternative will consider the expansion of hunting areas whereever conflicts with the military mission and safety do not occur.

4.8.1.2 Cibola Region

TESTING

Establishing the Kofa South Direct Fire Range in the Kofa Region for munitions and weapons and combat systems projects will make available firing areas in Cibola Region for aviation systems projects. The isolation and size of the Cibola Region makes military testing compatible as a land use.

Laser testing will continue in remote areas to minimize adverse impact on the public. Laser sites are well marked and numerous warning signs are posted along the perimeter of the sites.

TRAINING

Increased military training and maneuver activities in the northern Cibola Region may require stricter monitoring to keep winter visitors off restricted military land. Although the YPG boundary is defined by restricted area warning signs, the possibility exists for the public to trespass.

BUSINESS PARTNERSHIP OPPORTUNITIES

Increased private industrial and commercial testing such as small arms, tracked vehicles, tires, and demolition equipment may conflict with scheduling military use of existing facilities. It may also present degradation of the land through soil erosion.

RECREATION AND OTHER ACTIVITIES

The North Cibola hunting area may be expanded in the south and additional hunting areas opened for various recreational activities. Furthermore, the region may be open for private sector operations. An increase in activity and visitors in the region may result in more instances of personnel straying into hazardous areas.

Expanded training exercise areas and additional land opened for seasonal hunting may increase scheduling conflicts between military use of the area and authorized public users.

4.8.1.3 Laguna Region

TESTING

The primary use of this region will continue to be support and administrative services, housing, and recreational facilities. Existing tracked and wheeled vehicle testing courses will remain. Many test courses are open areas with limited infrastructure. Housing and recreational facilities are separated from test courses by a fence and terrain features. The construction of turnaround loops in the east and west ends of the Middle East Cross Country Course will allow testers the flexibility to run half the course minimizing potential impacts to terrain.

TRAINING

Castle Dome Heliport and Laguna Army Airfield will be used for simulated airfield siege training. Cox Field and Laguna Army Airfield will increase training of the Military Free Fall School and Golden Knights. These training activities will have little impact on planned land use since the facilities for them presently exist.

BUSINESS PARTNERSHIP OPPORTUNITIES

Incompatibilities in the Main Administrative Area will decrease with the moving of industrial facilities to other areas. Easy access and established infrastructure in the Laguna Region present several opportunities for incorporating private industry ventures and public uses.

There will be a change in land use for military, commercial ventures, and recreational purposes. Changes or modifications include opening mobility courses for private industry use, leasing land for commercial development of a technology and conference complex and the hot-weather test center. These test courses can be utilized for other activities. Since all test courses are adaptable for private industry testing, there will not be incompatibilities between military operations and private industry testing. The possibility exists for increased aircraft flying over populated areas.

RECREATION AND OTHER ACTIVITIES

Areas of the region may be opened for hunting and hiking, among other recreational activities. Agricultural outleases will be planned to minimize land use conflicts.

4.8.1.4 Off-Post Locations

The installation does not currently use any off-post locations for non-mission uses. No modifications to land use of designated off-post locations are anticipated. Automotive testing currently conducted at Oatman, AZ may be transferred to an optional location currently in the developmental phase. Activities at the Navajo Army Depot may experience a slight overall increase. New off-post firing positions for long-range missiles and artillery may be established. Death Valley and the Imperial Sand Dunes are anticipated to be utilized in the next 15 years for automotive/vehicle/equipment testing and troop training activities. Off-post YPG activities shall be coordinated with regulatory agencies. Active and reserve military training may increase use of Senator Wash Regulating Reservoir. These limited changes are not expected to impact on-site or adjacent land use.

4.8.2 Mitigation Measures

Military activities will always have priority over nonmilitary activities. The land use management program is followed to ensure land use is compatible with the surrounding activities. This program may also include a zoning strategy plan to assist in organizing areas by potential use.

Conflicts that may arise from increased use of ranges and facilities can be mitigated by carefully assessing activities in advance of upcoming projects. Construction of facilities and establishment of training/testing areas follow careful planning. Planning often considers the effects of several factors like noise and air pollution on the adjacent communities. Existing incompatibilities in land use may be reduced by gradually relocating industrial functions from the Main Administrative Area. Currently dispersed medical facilities may be consolidated to form a single, “one stop” medical complex (Hermann Zillgens Associates, 1992).

Along the installation boundary, 0.8 km (0.5 mile) wide buffer zones are established. These buffer zones are designed to eliminate or minimize impacts (namely noise, air quality, and health and safety) on adjacent property. Low-level flights over wildlife refuges and wilderness areas are avoided. Signs are placed conspicuously to identify restricted areas and installation boundaries. Yuma Proving Ground will consider placement of more signs at the boundaries to control access in areas where authorized public access will increase.

4.9 NOISE

Cumulative installation and off-post noise impacts and mitigation are presented. Impacts are considered significant if the following criteria identified in the box below are met.

- **Noise levels allowed in Installation Compatible Use Zone (ICUZ); as described in 32 AR 200-1, 7-5, are violated.**
- **Noise levels at testing areas exceed DoD standards that establishes acoustical limits, as described in AR 40-**

4.9.1 Effects of the Preferred Alternative

People living near the installation boundary may occasionally be aware of the noise created by aircraft overflights and testing activities. Annoyance depends on the time of day noise occurs, the background noise environment, and whether the person is indoors or outdoors. Annoyance and complaint potential from single events, such as aircraft flyovers, are highly subjective. Limited data exist in this area (United States Army Environmental Hygiene Agency, 1991). Firing ranges are found in an ICUZ III area (zone of greatest noise impact). Temporary construction noise is predicted, but not expected to be an impact along the installation boundary.

Noise in all regions will increase if military activities increase. However, intensity of noise from weapons firing and aircraft are expected to remain the same. Any major new activity may require a noise study to determine compatibility with the assigned noise zone. If new facilities are constructed adjacent to housing or administrative areas, the construction of additional support activities may temporarily generate noise that may be an annoyance in the vicinity.

Activities in firing ranges should not impact baseline noise levels since firing ranges are found in an ICUZ III area that represents the noise zone with the highest value. The range for noise in an ICUZ III area has no upper limit (see table 3-13).

The increase in flights by helicopters and other aircraft could generate increased complaints from populated areas surrounding YPG. Increased military flight operations and commercial aircraft testing could increase aircraft flights over some adjacent residential areas such as Quartzsite, Hidden Shores, Martinez Lake, or Wellton.

4.9.1.1 Kofa Region

TESTING

Kofa South Direct Fire Range was determined to generate the worst highest impact at YPG (Gutierrez-Palmenberg, Inc., 1996 e). The testing at this location uses large caliber weapons. The Muggins Mountain Wilderness Area is not likely impacted by noise generated from the firing range. This region is essentially void of personnel. When firing is in progress, hearing protection is required for individuals using firing range equipment.

TRAINING

Training activities utilize the Combat Systems Test Complex and free-travel areas. special sorces units use this region to train in the unique terrain features. These activities should contribute little to noise levels.

BUSINESS PARTNERSHIP OPPORTUNITIES

Impacts from nonmilitary mission activities (public-private partnership opportunities) are unlikely to alter maximum noise levels currently generated in the regions. However, introduction of these activities could increase the occurrence and duration of noise.

RECREATION AND OTHER ACTIVITIES

Recreational activities and hunting are not anticipated to impact noise levels in the Kofa Region, although recreational users may object to noise from military activities.

4.9.1.2 Cibola Region

TESTING

Demolition, weapons firing, and aircraft activity are expected to increase. These activities may require a noise study to determine compatibility with the assigned noise zone.

TRAINING

Drop zone, troop training, and special sorces activities may have little impact on noise levels. The aircraft associated with these activities may produce noise that generates complaints from populated areas surrounding YPG.

BUSINESS PARTNERSHIP OPPORTUNITIES

Use of the Cibola Region by private industry, other than testing of demolition equipment, has little potential to effect noise levels.

RECREATION AND OTHER ACTIVITIES

Recreational activities and hunting are not likely to produce noise impacts. Recreational users may object to noise from military activities.

4.9.1.3 Laguna Region

TESTING

Tracked and wheeled vehicle testing is performed within this region and anticipates activity to increase. Noise levels may increase. No firing of munitions occurs in this region. Construction is proposed for a new dust course and turnaround loops, but any increased noise will be temporary.

TRAINING

Training exercises in the Laguna Region are likely to increase. The Military Free Fall School and the Golden Knights will expand training at Cox Field and Laguna Army Airfield, resulting in increased aircraft and vehicle activity. Increased field training is anticipated at Training Area Bravo. The intensity of noise is expected to remain the same.

BUSINESS PARTNERSHIP OPPORTUNITIES

The construction of the technology and conference complex will generate increased noise, but only temporarily. Nonmilitary use for testing in the Laguna Region will utilize existing facilities and not likely to impact noise levels.

RECREATION AND OTHER ACTIVITIES

Public recreational uses including camping, hiking areas, an off-road racing course, a golf course, and an RV park are proposed. These activities are not likely to affect noise levels, except during construction.

4.9.1.4 Airspace

Increased military and private industry flight activity could draw complaints from residential areas such as Wellton. Expected increases in military and nonmilitary airspace activity in the Laguna region will likely impact noise levels. Aircraft overflight operations involving drop zones and personnel training will have little impact on baseline noise levels.

4.9.1.5 Off-Post Locations

No populated areas, installation aircraft activity, of firing activity are associated with off-post location testing or training. Regulatory decisions are administered through corresponding agencies involving noise levels.

4.9.2 Mitigation Measures

Potential noise impacts on or off installation are currently reviewed during project development of the test mission. Firing ranges and training areas are intentionally remote where noise levels are compatible with the noise zone designated for the area (Vander Zyl, 1987). These areas are devoid of sensitive receptors, and no sensitive receptors are planned for these areas.

The Army has an environmental noise abatement program implemented by environmental programs. Noise pollution can be minimized through noise-reduction engineering, administrative and operational controls, and appropriate siting and design of facilities and ranges. Development and procurement of reduced noise weapons systems and other military combat equipment will be used when consistent with operational requirements (32 CFR 650.174). Military Standard (MIL-STD)-1474C establishes noise levels for newly designed or purchased equipment.

Safety zones and hazardous noise areas are established with noise level meters and warning signs posted to minimize risk to human health. Personnel required to operate in noise hazard areas are required to wear hearing protection equipment, such as earplugs and ear muffs. Yuma Proving Ground uses a technique developed by the Explosives Research Group (ERG) which provides a good first approximation of effects of weather conditions on impulsive noise propagation. Table 4-2 lists "good" and "bad" firing conditions.

No applicable community annoyance standards for single-event noise exposures characteristic of firing operations or explosive ordnance disposal (EOD) activities exist. An environmental noise complaint procedure is established in 32 CFR 650.173, as follows (Saunders, 1991):

- All environmental noise complaints will be logged.
- The complainant will be assured every effort will be made to correct the problem, mission permitting.
- A copy of the complaint will be provided to the installation Environmental Quality Control Committee (Director, environmental programs).

Normally, on-site monitoring of environmental noise is not considered due to the demand of time, labor, and equipment. When a ICUZ III area extends off installation, or there is a controversy, on-site monitoring will be implemented. Permanent, automated monitoring equipment provides statistically better data and is far less labor intensive.

Although natural barriers buffer noise, minor off installation noise incompatibilities exist in remote portions of the Kofa National Wildlife Refuge. A letter of permit from the Department of Interior has covered this minor noise problem since 1951 (updated in 1958). Incorporation of the letter of permit constitutes required mitigative action (Vander Zyl, 1987). Noise studies are conducted on an as-needed basis.

TABLE 4-2
"GOOD" AND "BAD" FIRING CONDITIONS RELATED TO NOISE

Good Conditions	Bad Conditions
Clear skies with billowy cloud formations, especially during warm weather.	Days of steady winds 5-10 mph with gusts of greater velocities (above 20 mph) in direction of close by residences.
A rising barometer immediately following a storm	Clear days on which "layering of smoke or fog is observed.
	Days following large temperature differences (about 20°C) between day and night are noted.
	Generally high barometer readings with low temperatures.

4.10 Hazardous Substances and Waste Management

Hazardous substance and waste management includes production, storage, transport, use, treatment and disposal. Impacts are assessed for testing, training, public-private partnership opportunities and other activities. A significant impact would occur if any of the criteria identified in the box below are met.

- **The environment or public is adversely affected due to a release of a hazardous substance or waste to the air, water, or soil during transport, storage, or handling.**
- **The environment or public entities are adversely affected during demilitarization of munitions.**

4.10.1 Effects of Preferred Alternative

No violations were documented during the baseline period. Various activities at YPG involve the production, storage, transport, use, treatment, and disposal of hazardous substances and wastes. Some of the more commonly used materials in industrial activities are fuels, petroleum products, and solvents. Chlorine is used and stored in large quantities for non-industrial purposes such as swimming pool chlorination and water treatment. The pesticide and asbestos management programs are discussed in chapter 3.

Although additional temporary storage areas will reduce the accident potential during transportation of hazardous wastes to the HWSF, these storage areas may be potential sites for spills.

When new waste streams or greater quantities of hazardous or toxic materials are identified by environmental programs, compliance criteria is enforced. Extensive monitoring by environmental programs will be performed. The management of ordnance will continue in a highly controlled environment, involving only certified personnel.

TESTING

Testing activities commonly use fuels, petroleum products, solvents and munitions. Current management policies will continue to reduce or eliminate the risk of spills from these activities.

TRAINING

Increases in training activities could increase the potential for spills, especially for fuels and other substances used by vehicles.

BUSINESS PARTNERSHIP OPPORTUNITIES

Increased nonmilitary activities at YPG will not include accepting wastes generated off-post. Private industry operations could potentially increase the amount of hazardous substances and waste on YPG. The installation will work closely with regulators to encourage environmentally friendly operations and strict compliance with legal requirements by private industry.

RECREATION AND OTHER ACTIVITIES

Increasing use of YPG by civilians for recreation may increase the potential for spills of fuel or other substances. This is not expected to be a significant impact, due to the level of recreational use expected under the Preferred Alternative.

Agricultural outleases could increase the potential for a spill of hazardous substances related to commercial agriculture. Pesticides and some fertilizers are sources for significant impacts from contamination.

4.10.2 Mitigation Measures

Mitigation measures are based on pollution prevention principles. Pollution prevention is defined as a practice that reduces the amount of any hazardous substance, pollutant or contaminant entering any waste stream or otherwise released into the environment prior to recycling, treatment or disposal; and reduces the hazards to the public and environment associated with the release of such substances, pollutants, or contaminants.

The *YPG Pollution Prevention Plan* (GPI, 1994a) will continue to facilitate evaluation of operations, exploration of pollution prevention opportunities, and implementation of prevention goals.

Pollution prevention policy for operations on the installation is set forth in the *YPG Pollution Prevention Plan* (Gutierrez-Palmenberg, Inc. 1994a) and is as follows:

- Environmental protection is the responsibility of all YPG employees.
- The command structure at YPG fully supports and endorses the goals of pollution prevention and hazardous waste minimization. The command structure actively implements the P*ollution Prevention Plan* and actively encourages all YPG personnel to participate in pollution prevention.
- The installation recognizes and supports the idea that pollution should be controlled by eliminating emissions and waste at the source and makes this goal a keystone of the *Pollution Prevention Plan*.
- The installation seeks to demonstrate its concern for the environment and the local community by recognizing its shared responsibility for pollution prevention between government testing and evaluation, and the general public.

The generation of waste will be minimized to the greatest extent possible. For instance, recycling of munition propellants will decrease open burning operations. The increase in the quantities of hazardous substances and wastes will be met by strict implementation of the HAZMIN program, designed to prevent and minimize pollution. The goals of the Army's HAZMIN program are outlined in AR 200-1, 5-4. Pollution prevention identifies product substitution, recycling, reuse, and source reduction whenever practical. Product substitution is not always a feasible alternative due to the uniqueness of the industry involved at YPG. Control technologies are implemented to minimize the potential for accidental releases.

4.11 RADIATION

This section describes the cumulative impacts of radiation and mitigation on humans and the environment. Impacts from radiation sources are considered significant if one or more of the criteria identified in the box below are met.

- **Routine use of a facility or weapon causes exposure beyond regulatory limits of health and safety.**
- **Land areas outside the NRC-licensed area become contaminated.**

4.11.1 Effects of the Preferred Alternative

Several potential sources of radiation exposure to personnel and members of the public exist at YPG. Some sources have received notoriety due to their use in weapons systems. However, the environmental hazard is unlikely due to the isolation of the test areas and the limited number of personnel working on these ranges.

Cumulative environmental impacts consist of radiation from increased use of tritium illuminating devices, radar, lasers, radios, and DU penetrator testing. Table 4-3 is a comparison of non-ionizing radiation sources on YPG for the Preferred Alternative. Greater numbers of equipment with radioactive components are expected on the installation. These activities will increase the potential of exposure for personnel and the environment.

TESTING

Expansion of the DU firing range will require a new NRC license. The NRC-restricted area around the DU firing range shall remain in place.

Laser systems are not tested at YPG. However, some testing operations, such as laser-guided munitions, employ lasers as part of the test. Personnel in the line of site of the laser beam are subject to irreparable damage to tissue, primarily the eyes. Tests involving lasers, such as laser-guided munitions tests will increase. However, lasers are utilized under very controlled conditions and exposure is minimized. Testing and evaluation activities will increase overall, reflecting more frequent use of radiation sources. Adherence to applicable health and safety standards will minimize any corresponding increase in potential exposure to humans and animals from radiation sources.

The number of DU rounds fired is expected to increase with increased military activity. However, the NRC-licensed catch box is not expected to be enlarged. Larger round fragments shall be retrieved from the catch box, but any small fragments will remain with the residue and could potentially wash into the surface water impoundment built to contain such runoff. Increased levels of DU could be detected in residual material that is routinely cleaned from the impoundment. However, radioactive levels are expected to be well below the permitted standard.

TRAINING

Troop training will involve more tritium illuminating devices during night training resulting in potentially increased exposure.

BUSINESS PARTNERSHIPS OPPORTUNITIES

Public-private partnership opportunities are not expected to impact baseline levels of radiation at the installation, since nonmilitary activities involving radiation sources are not expected to take place at YPG.

RECREATION AND OTHER ACTIVITIES

Increased recreational use of YPG could increase the potential for accidental exposure from unauthorized trespass onto ranges or training exercise areas. Laser test ranges are most likely to experience unauthorized entry from the increased recreational users.

4.11.2 Mitigation Measures

Monitoring and management of radiation sources at YPG is accomplished through environmental programs and the safety office. This proactive approach greatly reduces the potential for impacts related to use of radiation sources. Yuma Proving Ground will continue to monitor and control all radiation sources and other NRC license requirements. Applicable health and safety regulations will be followed to minimize or eliminate the potential for exposure or injury to personnel and the public. When testing using lasers occurs, range control ensures anyone on the range has the appropriate laser goggles.

TABLE 4-3 NON-IONIZING RADIATION SOURCES

Source	Quantity [1] (Number of Emitters)	
	Low	**High**
Radars		
Tracking Radar	12	12
Muzzle Velocity Radars	37	37-74
Radar Speed Guns	10	10
Lasers		
Surveying	12	12
Target/Ranging	16	16-32

[1] Change to baseline quantities is estimated from best available data.

4.12 AESTHETIC VALUES

This section examines potential impacts and mitigation to aesthetic values resulting from the Preferred Alternative. Impacts to these areas are considered significant if the criterion identified in the box below is met.

- **Panoramic views or scenic beauty of specific areas are permanently degraded.**

4.12.1 Effects of the Preferred Alternative

The military mission is not expected to impact areas of aesthetic and visual values. Activity in the Kofa region takes place in designated test areas not observable by the general public and has minimal impact on areas of aesthetic value. The majority of mobility courses are located in the Laguna region, but are not near areas of aesthetic value. Mobility courses located in this region result in some impact to the panoramic vistas since their use periodically generates quantities of dust that can remain suspended and obscure panoramic views. In the Cibola Region, minimal impacts have occurred as a result of baseline activities. These impacts have occurred over the past several years in some areas (i.e., Yuma Wash). Most of these impacts were inadvertently caused by intensive ground-based training activities by visiting military units.

During construction and mission activities, designated areas of aesthetic and visual interest may be impacted. These designated areas will be avoided whenever possible. When mission needs require use of one of these areas, appropriate management, mitigation and documentation will be executed.

As new facilities are constructed, use of the Yuma Proving Ground Design Guide may eliminate or minimize impacts to the visual environment. Increased military mission activity and associated funding could also result in more rapid improvement of existing buildings and facilities in the region.

TESTING

Increased traffic on vehicle test courses and unimproved roads by military personnel in most regions will increase the amount of dust generated, thereby obscuring the panoramic vistas. Smoke testing also obscures visibility.

TRAINING

Most military missions are expected to increase, while other activities may diversify to include more training and advanced technology projects. These changes in military activity may pose impacts common to all regions. Construction of new buildings and facilities will follow the Yuma Proving Ground Design Guide to avoid conflicting with the established physical environment. This will enhance plans to improve the efficiency and pleasant physical environment for installation personnel and visitors.

BUSINESS PARTNERSHIP OPPORTUNITIES

Private industry testing is expected to increase over the next 10 to 15 years. These changes in nonmilitary activity may pose impacts common to all regions. Construction of new buildings and facilities will follow the *Yuma Proving Ground Design Guide* to avoid conflicting with the established physical environment. This will enhance plans to improve the efficiency and aesthetic physical environment for installation personnel and visitors.

RECREATION AND OTHER ACTIVITIES

Camping, hunting, and other public uses could experience varying levels of modification. As more public access is allowed to YPG, damage to unique features such as washes and desert terrain may occur. Users of newly expanded areas on YPG may inadvertently trespass into strictly managed areas adjacent to the installation, resulting in accidental damage to wilderness areas. Increased traffic on unimproved roads by the public in most regions will increase the amount of dust generated, thereby frequently obscuring the panoramic vistas.

Agricultural outleases could produce dust, impacting visibility of nearby aesthetic resources.

4.12.2 Mitigation Measures

The aesthetic impact is dependent upon the location of the activity. Mitigation measures used to protect aesthetic resources include:

- Repairs to washes with terrain impacts
- Sighting of all activities to avoid areas of aesthetic value
- Use of the YPG Design Guide to construct new facilities to provide an aesthetically pleasing environment
- Sighting of test courses away from public view (i.e., nearby public roads) and aesthetic resources
- Environmental Awareness instructions for training units in proper procedures and avoidance measures associated with ground-maneuvering activities to minimize or eliminate impacts to aesthetic resources.

4.13 Utilities and Support Infrastructure

This section discusses potential impacts and mitigation to utilities and internal support infrastructure on the installation. Implementation of the Preferred Alternative will cause significant impacts if the following criterion identified in the box below is met.

- **Utilities or infrastructure are taxed beyond their capacity to support installation mission requirements.**

4.13.1 Effects of the Preferred Alternative

Facilities are adequate to support mission requirements. The Preferred Alternative provides for variations in YPG activity as national defense requirements are modified. Existing facilities and infrastructure associated with all regions and off installation locations will continue at levels used during the baseline period. Increased military mission will have some short term effects on utilities and support infrastructure. One example is the increased wastewater discharged into the sewage lagoons.

Increased utilities and support infrastructure will be required for public-private partnership opportunities such as the technology and conference complex and recreational activities. Expanded hunting areas will not require improvements to utilities or infrastructure.

4.13.1.1 Impacts Common to Functional Units Located at YPG

Improvements, maintenance, and modernization of existing utilities and infrastructure, along with new construction of facilities, will be required to support an increased and enhanced diversified military mission.

POWER DISTRIBUTION SYSTEM

The existing power distribution system is adequate to supply energy for military mission needs under the Preferred Alternative. However, expanded private sector activities, such as the private partnership for the technology and conference complex, may require approximately 30%-40% more power than currently used at YPG.

COMMUNICATION SYSTEMS

Communication systems are maintained for all buildings and structures at YPG. Commercial telephone lines, the U.S. Army telephone system, fiber optic cables, microwave communications, and video links will be adequate for maintaining baseline activities. Under this alternative, new communication systems will be built for the technology and conference complex and for other public-private partnership opportunities, such as the auto test center. The developer will be responsible for purchasing and operating these systems.

WASTEWATER TREATMENT

Wastewater treatment facilities are adequate for baseline and military activities. The Main Administrative Area wastewater lagoon may be used to treat wastewater for the technology center if an examination of engineering designs determined that the holding capacity is adequate.

WATER DISTRIBUTION SYSTEM

The YPG water distribution system is adequate to irrigate existing lawns and playing fields in the Main Administrative Area. More military personnel residing in the housing area would result in increased water for domestic use. If recreational facilities use is increased, the water demand would also increase.

WATER SUPPLY

The existing water pump capability is 10,718 acre feet per year. Water needed under the baseline condition by the year 2006 is 1,900 acre feet per year. Under the Preferred Alternative, projected need by 2014 is 3,800 acre feet per year. Existing wells are adequate to fulfill this need. There is no impact expected to groundwater supply.

High water demand activities have been identified. The proposed golf course is one of these activities. The developer will be required to negotiate independently with BOR for a Colorado River Allotment.

Wells near the golf course could be interpreted by BOR as belonging to the Colorado River surface water. The Main Administrative Area and Laguna Army Airfield may increase usage if private ventures are developed. If development occurred in this region, upgrading may include improved transportation and communication networks and possibly adapted facilities for nonmilitary uses. Private company employees at the test areas and resort complex are expected to be housed in the City of Yuma. Additional housing at YPG will not be required.

Utilities and internal support infrastructure in each region overlaps in shared use with testing, training, public-private partnership opportunities, recreation, and other activities. In this following section, regions in YPG are used as discussion separation rather than activities within each region.

4.13.1.2 Kofa Region

Facility maintenance and infrastructure improvements will increase as mission activity increases (i.e., continued paving of Pole Line Road and increased maintenance of existing roads). Communication links will be affected by an increased military mission. Additional lines, fiber optics cables, and other "nonline" communications facilities will need to be upgraded in this region to support any increase in activity.

Establishing additional areas in the Kofa Region as permanent test or training sites will require the installation of power and water. The construction of buildings and roads to support these sites shall be evaluated and implemented based on mission needs.

4.13.1.3 Cibola Region

PETROLEUM PRODUCT DELIVERY, STORAGE AND USAGE

There are two above ground storage tanks for vehicle fuels and additional used oil tanks. There are currently no plans to purchase or install more tanks. The expected increase in military activity in this region may increase the potential for spills of petroleum products.

4.13.1.4 Laguna Region

SOLID WASTE MANAGEMENT

An increase in mission activity will require additional logistical support, improvements to facilities at the Laguna Army Airfield, and increased use and maintenance of facilities at the Main Administrative Area and Laguna Army Airfield. If more than 20.0 tons (18.0 metric tons) per day were accepted because of an increased military mission or private partnership, the existing landfill shall change status from a small landfill to a large landfill. The new landfill status will require a permit revision (A.R.S. 49-762.01E, 40 CFR Part 257). In addition, a new landfill may need to be sited.

POWER DISTRIBUTION SYSTEM

Under baseline conditions, the power distribution system (i.e., transformers and lines) can receive and deliver 100 percent more energy than is currently purchased. New contracts for purchasing energy may need to be negotiated for the expanded mission. Twenty-four hour test operations are currently possible.

PETROLEUM PRODUCT DELIVERY, STORAGE, AND USAGE

There are above and underground storage tanks for vehicle fuels and used oil at YPG. There are currently no plans to purchase or install additional tanks. With the increased consumption of petroleum products, the tanks will be frequently filled, increasing the possibility of accidental spills.

WASTEWATER TREATMENT

Of the five wastewater treatment lagoons present in this region, three have additional holding capacity. The Laguna Army Airfield lagoon can treat four times more sewage than the current levels. The Kofa Firing Range lagoon can treat two-thirds more sewage. The Castle Dome Heliport can increase capacity. The Main Administrative Area and Materiel Test Area lagoons will need to be evaluated for expansion under the Preferred Alternative. The Materiel Test Area lagoon is currently designed to accept more wastewater.

4.13.1.5 Off-Post Locations

Responsibility of utilities and support infrastructure at off-post locations is regulated at those locations by the corresponding agency.

4.13.2 Mitigation Measures

Infrastructure shortages and excesses are managed under the YPG Master Plan. If services and facilities on the installation used exclusively by military personnel and their dependents are eliminated, alternate services and facilities will need to be identified. These services could be located at the MCAS or in the City of Yuma. Some services, such as medical, dental, veterinary, and mental health are currently available in the City of Yuma. Construction and staffing of a new medical center could handle increased military mission demands. Vacant YPG housing may be rented to civilians or contractor employees to lessen the financial effects of underutilized facilities. Installation housing may be limited to military personnel or the construction of new quarters requested. Closed or vacant facilities could be modified to meet mission needs.

Utilities and support services will be expanded to keep up with increased usage. Larger wastewater treatment facilities in the Main Administrative Area and Materiel Test Area may be needed.

Wastewater lagoons at YPG are lined and monitored to prevent infiltration to groundwater. The lagoons are protected with berms to prevent storm water runoff from mixing with the wastewater and entering surface waters. The low velocity associated with sheet flow minimizes migration of pollution.

The quality of ground water recharge is subject to the restrictions and stipulations required of YPG's APP permits. The environmental program monitors recharge on a periodic basis for ADEQ review and comment. Monitoring will continue under the Preferred Alternative.

4.14 TRANSPORTATION

This section discusses potential impacts and mitigation of the Preferred Alternative on external transportation networks, as well as the installation road system. Impacts are considered significant if the condition identified in the box below is met.

- **Transportation characteristics are reduced to a level that impacts safety or movement of people, goods, and services.**

4.14.1 Effects of the Preferred Alternative

Transportation will fluctuate, but will not reduce the level of safety or movement of people, goods, and services. Traffic will possibly increase on State and county roads. This could result in more frequent delays and a greater number of accidents, particularly along U.S. Highway 95 during peak travel hours. Increased public access to installation areas could make traffic problems worse. Increased public use of installation roads may increase the deterioration of paved, improved, and dirt roads resulting in a need for more frequent maintenance. The Preferred Alternative may require construction of new roads and an increase or decrease in maintenance of existing roads depending upon the extent and complexity of new activities.

Installation activities of testing, training, public-private partnership opportunities, recreation, and other issues will not be individually discussed in this section. These activities share utilization of the same road network to gain access to facilities.

4.14.2 Mitigation Measures

A staggered work schedule may be considered to distribute traffic flow loads throughout the day. Appropriate procedures are used, in accordance with applicable regulations, during transportation of equipment and ordnance to minimize hazards to personnel and the public. Regionally, several projects are planned by outside agencies such as Arizona Department of Transportation and Yuma County to assist in alleviating traffic concerns on U.S. Highway 95 (Yuma Metropolitan Planning Organization, 1995b and Yuma Metropolitan Planning Organization, 1997). Specific projects include the following:

- Constructing a climbing lane on U.S. Highway 95 from mile post 73.1 to 75.2.
- Conducting a scoping study on U.S. Highway 95 from Yuma to Aberdeen Road and implementing recommendations.
- Installing signal lights along U.S. Highway 95 at Araby Road, and Avenues 5E and 7E.
- Constructing an “All Weather Bridge” on U.S. Highway 95 over Fortuna Wash.

With increased traffic, warning signs about the presence of wild horses and burros on the roadway may be required.

4.15 HEALTH AND SAFETY

Issues addressed in this section relate to potential impacts to public and occupational health and safety associated with operations at YPG. Mitigation procedures are described. Impacts are considered significant if the criterion identified in the box below is met.

- **Public or YPG personnel health or safety is adversely affected.**

4.15.1 Effects of the Preferred Alternative

Army regulations and procedures promote a safe work environment and guard against hazards to the public. Yuma Proving Ground programs and day-to-day operations are accomplished according to applicable Army, Federal, State, and local health and safety standards.

TESTING

Much of the work conducted at YPG is developmental testing of weapons and tactical equipment. This type of activity has inherent risks to the health and safety of personnel directly involved in projects. Yuma Proving Ground has minimized the impacts associated with RDTE activities by incorporating stringent safety standards and procedures into day-to-day operations (U.S. Department of the Army, 1992).

TRAINING

The desert environment poses unique risks to units training at YPG. Native flora (e.g. jumping cactus, catclaw acacia) and fauna (e.g. bark scorpion, diamondback rattlesnakes) can injure soldiers. Heat related illness and dehydration are other seasonal safety risks present at YPG.

BUSINESS PARTNERSHIP OPPORTUNITIES

Private ventures will pose risks to health and safety based on the activity. Developers and operators will be responsible for compliance with all Federal, State, and local laws and regulations that protect health and safety.

RECREATION AND OTHER ACTIVITIES

Hikers, campers, and hunters could trespass into restricted areas. Climate and native organisms pose the same risks to recreational users as described above under training. Agricultural outlease holders will be responsible for compliance with all Federal, State, and local laws and regulations regarding health and safety.

4.15.2 Mitigation Measures

The nature of operations at YPG has inherent health and safety risks. Adherence to established safety standards and procedures prevent or reduce health and safety risks to personnel and the public.

The Airspace and Range Operations Plan (1996) has listed safety procedures for activities that occur on YPG. Safety features for lasers are listed in Military Standard 1425A (US Department of Army, 1991). Fire prevention regulations are detailed in YPG Regulation Number 420-1 (US Department of Army, 1993). Army safety rules and procedures are delineated in The Army Safety Program (US Department of Army, 1988), the Army Safety Manual (US Department of Army, 1995), and updates published by the Army. Personnel at YPG will follow all safety procedures listed in the above documents. Other safety procedures used at YPG to enhance a safe work place are:

- Work activities are monitored, and unsafe procedures are halted and proper safety procedures are implemented.
- Yuma Proving Ground conducts a safety program with functional responsibilities for execution assigned to the Director of Safety.
- The installation conducts an annual "Safety Awareness Week" to provide educational opportunities to personnel on a variety of topics.
- Yuma Proving Ground has an active Safety Council (committee) to review safety procedures and accidents.
- Emergency communication networks will be considered, where feasible, to support increases in recreational activities.

4.16 Unavoidable Environmental Effects

4.16.1 Irreversible and Irretrievable Commitment of Resources

Biological, cultural, soil resources, and employment opportunities have the potential to be irreversibly or irretrievably committed under implementation of the Preferred Alternative. Permanent alterations of the visual landscape are potential under the Preferred Alternative.

Sensitive biological resources are present in various habitats throughout the installation. The firing ranges are generally located on flat plains where biological diversity is lower (see section 4.5). Locating activities in these areas minimizes the loss of biological resources. Avoidance of areas of high biological diversity minimizes impacts to biological resources.

Likewise, numerous cultural resources surveys indicate artifacts and archaeological sites are widely scattered within the boundaries of the installation. Cultural resources consultations will be required for each proposed project with the potential to affect cultural resources. Once destroyed, cultural resources are irretrievably lost. Once removed from a site, cultural resources are removed from their context. Cultural sites are nonrenewable resources sensitive to surface disturbance. Avoidance and mitigation are preferred practices in lieu of collection. Archaeological site densities vary across the installation and careful placement of test areas and infrastructure is critical to protection of these areas.

No prime and unique farmlands or wetlands are expected to be affected by the Preferred Alternative. Materials, such as metals used in producing munitions, are recycled. Unexploded ordnance present in areas such as artillery impact zones is retrievable. Millions of pounds of ordnance have been fired onto the ranges. The presence of munitions debris or hazardous materials and subsequent remediation could close parcels of land for unspecified periods. Although ranges can be cleaned of debris, they cannot be 100 percent guaranteed safe for use by the public. Figure 17 shows areas of known and potential UXO contamination.

4.16.2 Energy Requirements and Conservation Potential

Two types of energy are used at the installation: facility energy and mobility energy. Conservation of these two types of energy is reported in the *Installation Energy Resources Management Plan* FY86 - FY95, IRCN 1492-DOE (QU). Facility energy (i.e., measured in terms of building floor space) comprises 90 percent of all energy used at YPG. The energy conservation goal for facility energy is 1.3 KBtu per year. This goal is reached contingent upon fuel and electricity consumption in response to increased military activity on the installation and hot summer weather conditions. Mobility energy comprises 10 percent of all energy consumption. The quantity of fuel used is consistent with the military RDTE mission, which fluctuates from year to year. Energy is conserved via insulation/weatherization, modernizing facilities, incorporating energy conservation building techniques in new construction, using solar energy, purchasing fuel efficient vehicles, and reducing mileage driven.

4.16.3 Natural or Depletable Resource Requirements and Conservation Potential

In keeping with national trends of strong natural resources conservation, Army regulations and directives (32 CFR 650 and DoD 4210.15) emphasize pollution prevention as a preferred environmental management technique. Efficient use of raw materials, including energy and water, is emphasized under pollution prevention. A *Pollution Prevention Plan* has been written and submitted to the State of Arizona.

Renewable resources contribute 80 percent of facility energy. Of this quantity, hydroelectric power provides 73 percent of the power supply and solar energy contributes 7 percent. Nonrenewable energy sources provide the remaining 20 percent (15 percent from coal, 5 percent from nuclear sources).

4.16.4 Urban Quality, Historic and Cultural Resources, and Design of the Built Environment

Implementation of the Preferred Alternative considered will minimally affect urban quality, general design of the built environment, quality of life (i.e., privacy, schools, and services), or time use allocation. Urban quality in Yuma, AZ, located 37 km (23 miles) to the southwest, is unaffected by operations at YPG except for contributions to the local economy. As identified in section 4.6, cultural resources on the installation could be significantly impacted under the Preferred Alternative. Mitigation measures outlined in section 4.6 reduce impacts below the threshold of significance.

4.16.5 Relationship Between Short-term Uses of the Human Environment and the Maintenance and Enhancement of Long-term Productivity

Long-term biological productivity of the natural environment at YPG will be sustained. Off road travel of tracked and wheeled vehicles could scar the landscape and reduce visual resources. Since the installation's inception in the 1950's, testers have generally performed tracked and wheeled vehicle activities and placed impact zones in basins covered with the creosote bush-bursage vegetative community, which has a low potential for biological diversity (section 4.5). Long-term impacts of these activities on land surfaces are monitored through LCTA, funded through the Army ITAM program. Implementation of the INRMP and ICRMP will contribute to the management and enhancement of biological and cultural resources, respectively.

Long-term productivity of wildlife habitats is protected through environmental programs. Environmental programs advises testers to avoid fragile habitats such as desert bighorn sheep lambing areas, natural and artificial wildlife watering sites, and desert washes. Healthy populations of desert bighorn sheep and mule deer and many other wildlife species exist in mountainous and undisturbed areas of the installation. Forage is available in numerous mountain ranges and wash habitats.

4.16.6 Potential Regulatory Conflicts

Implementation of the Preferred Alternative will not cause any potential regulatory conflicts.

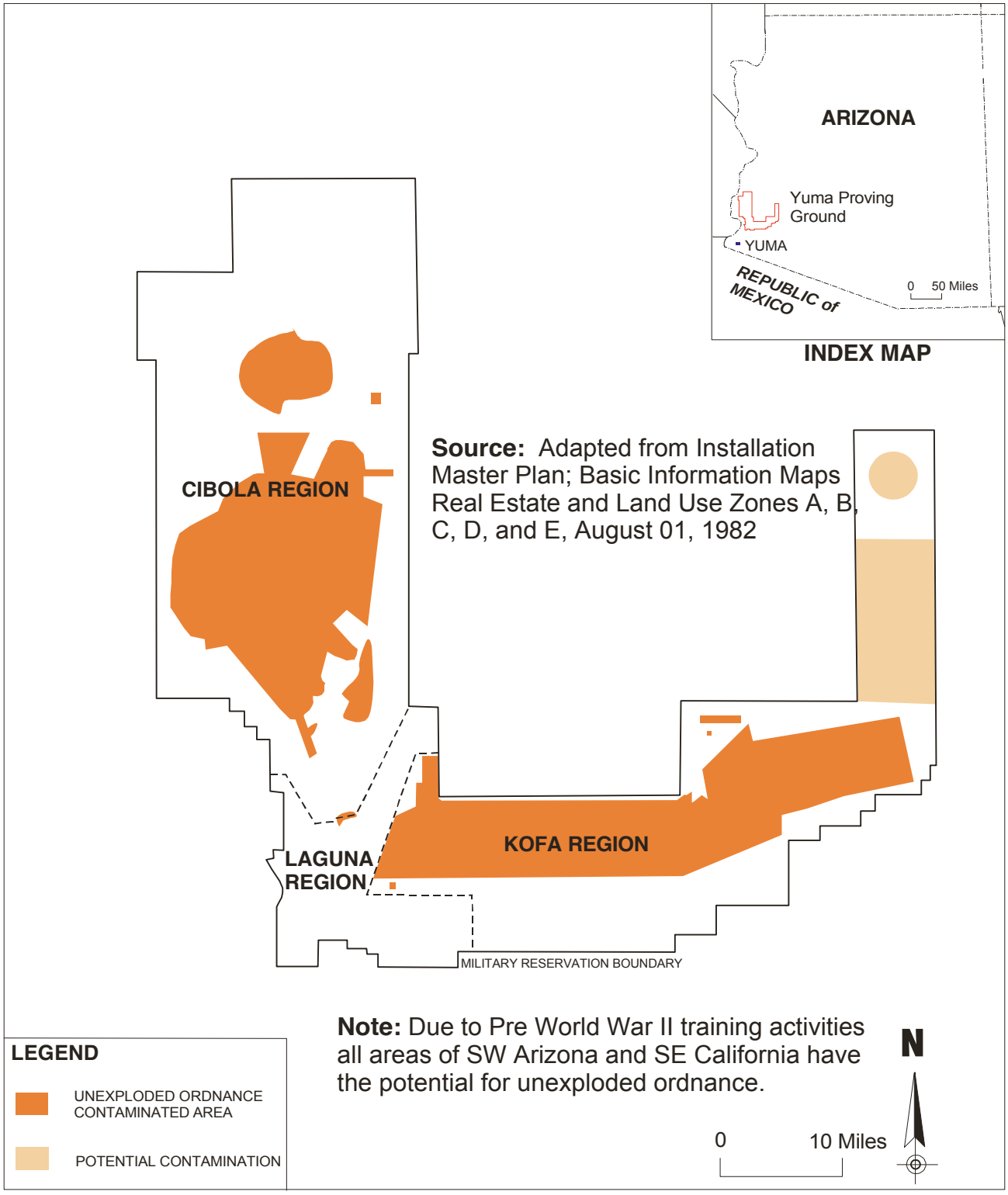


Figure 17. Areas of Known and Potential UXO Contamination.

4.17 CUMULATIVE IMPACTS OF THE PREFERRED ALTERNATIVE

Cumulative impact is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) 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 Part 1508.7).

4.17.1 Local Cumulative Impacts

To better analyze the cumulative effect of the actions contemplated by this RWEIS, the issue was broken into two levels; local and regional. The first involves the cumulative effects of all the component actions on the installation and its immediate vicinity environment. It considers the total effect of all the incremental activities added together. These are the "local" cumulative effects.

In other words, local cumulative effects are the impact to the human and natural environment of Yuma Proving Ground caused by the combination of all testing, training, and non-military activities that may occur at any given time.

The preceding document, as a programmatic EIS, has described these effects. It has looked at both the individual and collective impacts of all YPG activities. Further discussion of local cumulative effects here would be redundant.

4.17.2 Regional Cumulative Impacts

In addition to this installation-based assessment of cumulative impacts, the presence of YPG must be considered cumulatively within the geographic boundaries of the Lower Colorado Valley Division of the Sonoran Desert and within the political boundaries of southwestern Arizona, southeastern California, and northern Sonora in Mexico.

Although YPG holds the distinction of being one of the largest military installations in the world (3,400 km^2 or 1,300 mi^2), for most issues identified in this EIS the installation is a minor contributor to cumulative impacts of the region.

The installation is one of several military reservations set aside for testing or training in the Yuma region. The other military installations are as follows: Barry Goldwater Bombing Range (10,700 km^2 or 4,100 mi^2), MCAS Yuma (12.0 km^2 or 4.5 mi^2), and the Chocolate Mountain Gunnery Range (1,900 km^2 or 720 mi^2). Other federally owned land is Bureau of Land Management - Yuma District (6,500 km^2 or 2,500 mi^2), the Kofa National Wildlife Refuge (2,700 km^2 or 1,000 mi^2), Cibola National Wildlife Refuge (67 km^2 or 26 mi^2), Imperial National Wildlife Refuge (100 km^2 or 39 mi^2). Cumulative impacts of Federal lands have not been addressed for the geographical region.

The BLM mission statement provides for a land management policies that are designed to "sustain the health, diversity and productivity of the public lands for the use and enjoyment of present and future generations" (BLM, 1998). Bureau of Land Management lands are open for public recreation, mining claims, agriculture, and grazing. The use of buffers, placement of test areas, and management of activities on YPG greatly reduces potential impacts to neighboring BLM lands. Actions taken under the Preferred Alternative have no foreseeable impact on any BLM land uses.

Wildlife refuges are managed by U.S. Fish and Wildlife Service for the "conservation and management of fish, wildlife, and plant resources of the United States for the benefit of present and future generations"(Executive Order 12996, 1996). The use of buffers, placement of test areas, and management of activities on YPG greatly reduces potential impacts to neighboring wildlife refuges. Refuges impacted by YPG activities have been mitigated (see section 4.9.2) to the fullest extent practical. Activities under the Preferred Alternative will have little or no impacts on refuge management. The Preferred Alternative does not present a potential to cause a significant incremental impact combined with the actions of other Federal agencies in the geographical area.

The private lands adjacent to or nearby YPG are not managed under any unified strategy. Yuma County grew by over 40% from 1980 to 1990, with the city of Yuma growing by almost 30% for the same period (Yuma Chamber of Commerce, 1997). The activities at YPG will not directly affect the development caused by this growth, but the continued use of the land as a military installation will prevent urbanization. The cumulative effect on the future of the region may be to preserve open space, depending on the rate of growth the region experiences over the next fifteen years.

Yuma is located within the Yuma County PM_{10} nonattainment area (ref. figure 9). As shown in the figure, a small corner of YPG in the populated Laguna Region lies within this area. Based on data available for Yuma County the installation is a minor contributor to the cumulative impact of activities producing PM_{10} in the Yuma County nonattainment area. Increased mission activities involving large numbers of tracked and wheeled vehicles roving freely on undeveloped tracts of land could potentially threaten the nonattainment area.

Cumulative impacts of water use in the region have not been extensively studied. Lower Colorado River water is withdrawn for Mexican and American domestic and agricultural use. Yuma Proving Ground allotment is for 55 acre feet of the 9,000,000 acre feet available in the system annually. The size of the underground aquifer east of the Colorado River is 50,000,000 acre feet. (Freethey and Anderson, 1986) Groundwater use by the installation is not expected to contribute to lowered water tables regionally (section 4.3).

Biological and cultural resources have been impacted due to military presence in the region (as evidenced by findings in recent EISs such as MCAS Yuma and Luke Air Force Base, pending). Mitigation measures set forth in these studies compensate for losses to biological and cultural resources.

Cumulative impacts to biological resources have been examined for the Sonoran Desert. Nabhan and Holdsworth (1998) surveyed fifty-four field scientists working in the Sonoran Desert, each with an average of twenty years field experience. The field scientists were asked to rank the most significant threats to the biodiversity of the Sonoran Desert ecosystem on the basis of their own field observations since 1975. The top ten threats to the desert ecosystem were listed as: (1) urbanization, (2) in-migration of people, (3) surface water impoundment, (4) inappropriate grazing practices, (5) aquifer mining, (6) lack of planning for growth, (7) exotic grass planting, (8) conversion to farmlands, (9) recreational impacts, and (10) biological invasions. Most of these activities are prohibited on the installation.

The only activities listed that are currently allowed on YPG are recreation and aquifer mining. Recreation is far less extensive than on public lands, being limited to hunting only. Increases in recreational activities under the Preferred Alternative would be limited to appropriate lands, leaving much of the installation off limits. The amount of water pumped from the aquifer is minor in comparison to the total (see sections 3.3 and 4.3). For both of these activities, the levels experienced on YPG render their impacts much less severe and should limit their affects on regional biodiversity. Agricultural outleases could have significant cumulative impacts on biological resources.

Humphrey (1987) concludes that the western sections of the Sonoran Desert around the Mexican-American border have not seen any appreciable taxonomic or life-form changes in the plant communities over the last 90 years. Military control and use of much of the land in this area, with its prohibitions on consumptive uses (e.g., ranching, mining, and agriculture) and extensive recreational uses, could be in part responsible for the preservation of existing biological resources.

The use of buffers around test areas, and the exclusion of all other activities from these areas, creates micro-refuges for biological resources. Although increased testing activities could impact these buffers negatively, most activities will use existing ranges and facilities, preserving the buffers and the biological resources contained therein. Overall, YPG activities have protected the land from the major sources of degradation to the surrounding desert ecosystem.

Cumulative impacts to biological resources have not been previously examined for the entire Lower Colorado Region. Surveys have been done for parts of the region. Extensive biological surveys and sampling have been conducted along the Lower Colorado River in association with BOR activities. Inventories of birds and mammals have been conducted on wildlife refuges and BLM land surrounding YPG.

The Lower Colorado River flood plain has experienced drastic changes in the last 100 years. Flood plains have experienced deforestation with the advent of dams, irrigation, agriculture, and urbanization. However, none of the activities occurring on YPG have ever affected the river.

The upland desert where YPG is located has not been as heavily disturbed. Stands of ironwood trees, which live for up to 800 years, can be found along washes throughout the installation. For the most part, native desert vegetation and habitats remain, though sometimes in a disturbed condition.

Military activity, such as Patton's troop training during WW II, permanently disturbed soils and vegetation. The overall cumulative effects of past activities together with present and proposed activities have never been assessed for YPG. Mitigation measures, based on the INRMP will offset losses from present and future impacts, thereby reducing overall cumulative impacts to biological resources.

The cumulative impacts on cultural resources have not previously been studied for all activities in the region with reference to past, present, and reasonably foreseeable future actions by private or public entities. Prehistoric Native American groups generally inhabited the broad alluvial flood plains where archaeological evidence is scattered. Modern agriculture and developments such as cities and smaller settlements have destroyed much of the archaeological record.

The remaining cultural resources are found in the interior desert such as YPG where prehistoric Native American groups once traveled several hundred kilometers on trails to a myriad of site locales. Hundreds of sleeping circles, trails, and other small sites are present throughout the area.

Cultural resources surveys are conducted at YPG according to historic preservation laws. The findings contribute to the growing body of knowledge regarding prehistory and history in the area. However, cumulative impacts for the region will never be fully understood because so many remains have already been destroyed in the populated and agricultural areas.

Military testing, training, and maneuvering have the potential to destroy cultural resources remaining in the interior desert areas of the Lower Colorado River and Gila River areas. Approximately 8.8 percent of the installation has been surveyed for cultural resources. Results from these studies indicate that archaeological sites tend to be distributed throughout YPG. Some areas show heavier site concentrations than others.

A study of site types based on geomorphologic features across YPG could be valuable for assessing cumulative impacts and as a predictive model for the feasibility of placing military and civilian testing in areas lacking evidence of archaeological sites. An assessment of earlier studies is needed along with random sampling and surveying of unsurveyed land for the existing database.

The application of non-intrusive survey technology may expedite a more thorough understanding of archaeology of the region. Any ground activity has the potential to disturb cultural resources, including firing, vehicle testing, and troop training or maneuvering.

Portions of the installation, especially the Laguna Region, were heavily scarred in the past by tracked and wheeled vehicles. Many tracks were left during Patton's era when troops trained in the Lower Colorado desert region. Cultural resources could have been crushed or buried, rendering them undetectable. Modern practices confine vehicle movements and surface disturbing activities to avoid impacts to cultural resources.

The use of buffers and the limited access by the public creates areas on YPG where cultural resources will remain preserved. As with biological resources, cultural resources can be harmed by consumptive uses of the land. Another source of damage to cultural resources comes from theft and vandalism by pot hunters or other members of the public. The limited public access to YPG will prevent these impacts and aid in the preservation of cultural resources.

The military and civilian population of 2,000 employees at YPG is expected to decrease (YPG Strategic Plan, 1997). In contrast, the City of Yuma and surrounding smaller municipalities are rapidly expanding. Yuma county population increased by 11 percent from 1990 to 1994; the City of Yuma increased by nine percent from 1990 to 1994.

The area experiences an influx of as many as 74,000 winter visitors each year, nearly doubling the population of Yuma County. Growth of the winter visitor population is five percent per year. Foreseeable cumulative impacts to surrounding communities should be beneficial as there are no conflicts with land use and the types of facilities to be offered at YPG.

Although an increase in base operations could lead to cumulative negative impacts on local roadways, actions being taken by outside agencies will mitigate any negative effects to transportation systems (see 4.14.2). Buffer zones are established along the installation boundary. These buffer zones are designed to eliminate or minimize impacts.

4.17.3 Environmental Justice

In accordance with E.O. 12898 and DoD Instruction 4715.9, the Army must examine the demographic profile of the population around YPG. Included with this examination is a determination as to whether the Preferred Alternative has an adverse effect on human health or the environment of the communities around YPG, including Native American and lower income communities.

Several small communities are located next to or nearby YPG. Communities that could be effected by activities on YPG are found in California, Arizona, and the Native American Reservations. Activities and facilities at YPG may affect the communities of Bard and Winterhaven, California.

Activities and facilities at YPG may also affect the communities of Quartzsite, Martinez Lake, Hidden Shores, Wellton, Roll, Tacna, and Dome Valley, Arizona. Hundreds of winter visitors at BLM's Imperial and La Posa LTVA communities use facilities at YPG.

Yuma County has a resident Hispanic population of approximately 40% (see section 3.7.3). Yuma County also supports a large, mainly Hispanic, itinerant agricultural labor population during the harvest season. Many of the laborers reside in the San Luis area, or in southern Yuma.

The Army, as with all federal offices, has affirmative action and equal employment opportunity programs in place to ensure economic opportunities created under the Preferred Alternative are available to all people, regardless of race, creed, gender or religion. Economic opportunities under the Preferred Alternative are therefore expected to positively impact lower income and Native American communities.

Local communities experience minor physical impacts of Army activities (mainly noise). The use of buffers around test areas and remote locations for activities keep impacts from YPG away from surrounding communities.

No waste facilities operated by YPG are located near any neighboring communities. Monitoring of activities, mitigation of impacts, and appropriate programs (see section 4.9.2) to handle complaints from neighbors minimize impacts on these communities.

4.17.3.1 Disproportionate Impacts

A disproportionate impact is an impact, positive or negative, that effects one segment of the population to a much greater extent than the rest of the population. Few disproportionate impacts to low-income or minority communities are foreseen under the Preferred Alternative.

Areas where negative impacts might occur would include air quality and noise. For both resources, YPG activities are managed and monitored to ensure impacts do not normally leave the installation and are minimized when they do (see sections 4.2 and 4.9). A few low-income farm workers and winter visitors, living in mobile homes or travel trailers, may live close enough to installation boundaries to realize some effects.

Increased traffic on U.S. Highway 95 in the vicinity of Yuma Proving Ground is a negative effect that rural residents living at Martinez Lake and Quartzsite experience when driving to locations south of the installation, such as the city of Yuma.

Military retirees (typically low income) living at Martinez Lake or Hidden Shores can receive medical care and conduct limited shopping, dining, and social activities on YPG, saving them the longer trip to Yuma and creating for them an (apparent) disproportionate benefit. Other apparent benefits to local, rural residents living and visiting near the installation include the presence of emergency services, such as fire protection, search and rescue, and emergency medivac on military aircraft.

4.18 Environmental and Socioeconomic Consequences for Other Alternatives Considered

4.18.1 Alternative A (No-Action alternative)

4.18.1.1 Air Resources

Allowable regulatory limits for stationary sources have not been exceeded as a result of baseline activities. Particulate matter emissions from mobile sources for all alternatives were tentatively evaluated. The emission rate for PM_{10} calculated and projected from test miles driven in 1995 for alternative A is 41 tpy (calculated according to EPA 1985).

Tracked and wheeled vehicles roving freely over large tracts of undeveloped land will potentially increase dust emissions by 15 to 20 percent, exceeding limits judged to be significant (calculated according to Geomet Technologies, Inc. 1993).

4.18.1.2 Water Resources

Road crossings have the greatest potential to impact surface water. They have the potential to impede the natural flow of water in the channel. Pollutants contaminating surface and groundwater could be released during construction activities, wastewater treatment, or from hazardous substance spills and leaking USTs. Wastewater lagoons are lined and monitored to prevent infiltration to groundwater sources.

The quantity of water removed from the aquifer is minor (1,443 acre feet per year based on 1997 estimate) compared to the size of the aquifer, estimated by USGS to be 50,000,000 acre feet (Freethy and Anderson, 1986). Due to the small volume of groundwater withdrawn from the aquifer, earth fissures are not likely to occur.

4.18.1.3 Geological and Soil Resources

Soil contamination at YPG mainly involves unexploded ordnance (UXO) and impact debris, which may contain hazardous residue. The Cibola, Kofa, and Laguna regions have varying levels of soil contamination from ordnance and impact debris. Large areas in each region are virtually undisturbed and uncontaminated. The Kofa region is the most contaminated because it contains most of the impact areas. Soil erosion results from tracked and wheeled vehicles and firing operations, damaging the surface crust and desert pavement.

4.18.1.4 Biological Resources

Habitat is vulnerable to surface disruption by vehicle and troop movements. Noise from artillery firing and low-flying aircraft may also disturb wildlife. Habitats that are considered sensitive at YPG include sand dunes, mountain ranges, wildlife watering sites, desert washes, and abandoned mines.

Vegetation can be crushed when vehicles drive through desert washes or stray off established test courses, roads and trails. Plants are sometimes cleared during construction of a new testing areas or before the construction of buildings and roads. Creation of new impact zones may require clearing and leveling vegetation to facilitate projectile recovery. Trees and shrubs may be pruned to create a clear line of site to targets from gun positions. Plants growing beside unpaved roads and trails are sometimes coated with considerable amounts of dust, harming the plant in numerous ways.

Military activities, particularly training exercises conducted in all regions, utilize low depressions for moving vehicle or foot soldiers. Animal species may be temporarily forced out of washes when vehicles and troops are moving through an area. Removal of vegetation for artillery impact zones or test areas removes habitat. Small mammals and reptiles will likely be directly affected by such activity. In the Cibola region, hunter and military training may affect movement of deer.

Arizona Game and Fish Department recognizes rare wildlife in Arizona in its draft Wildlife of Special Concern (Arizona Game and Fish Department, 1996). The environmental programs advises test proponents whether new military activities might have potential to affect any of the species described in Part 6 of the INRMP (Yuma Proving Ground, 1995a).

Environmental programs coordinates with proponents to relocate activities having the potential to affect sensitive species or their habitats. The installation, in coordination with the U.S. Fish and Wildlife Service, have determined that past activities have not required consultation under Section 7 of the Endangered Species Act.

4.18.1.5 Cultural Resources

Activities pose a low risk to historic properties if they result in minimal soil disturbance, or if they are conducted in areas of previous surveys or data recovery operations (Miller and Smithwick, 1995a). Activities pose a potential major risk to historic properties if surface soil is severely disturbed.

Land leases, construction, tracked vehicle testing and maneuvers, and munitions testing can pose major risk. Construction has the potential for the highest risk at YPG; however, military aircraft overflights can create noise vibrations that could also adversely affect some cultural properties.

4.18.1.6 Socioeconomics

Yuma Proving Ground military, civil service, and contractor payroll/populations are expected to fluctuate. A slight drop in the military budget is anticipated for the near future. The composition of the workforce is expected to continue its shift to a greater contractor population.

4.18.1.7 Land Use

Installation land use analysis revealed that the majority of YPG's land is dedicated to uses that complement or are compatible with baseline operations. Most land is reserved for artillery and weapons systems testing, vehicle mobility testing and evaluations, personnel training, and aviation related testing.

4.18.1.8 Noise

Noise mapping for YPG shows a small impact. People living near the installation may be annoyed and could complain about the noise environment. Annoyance and complaint potential from single events, such as aircraft flyovers, are highly subjective. Firing ranges are found in ICUZ III area. Temporary construction noise is expected.

4.18.1.9 Hazardous Substance and Waste Management

No violations have been documented for the baseline period (1991-1995).

4.18.1.10 Radiation

Radiation exposure to personnel and members of the public exist from DU ammunition and tritium containing devices, radios, lasers, and radar devices. Air quality can be effected by entrainment of DU from the soil into the atmosphere.

4.18.1.11 Aesthetic Values

The military mission is not expected to impact areas of aesthetic values. In the Cibola range, minimal impacts have occurred as a result of baseline activity. Most of these impacts were inadvertently caused by intensive ground-based training activities by visiting military units.

4.18.1.12 Utilities and Support Infrastructure

Some changes to the infrastructure would be required with continued trends toward military personnel downsizing, particularly in the Laguna region.

4.18.1.13 Transportation

Transportation will fluctuate, but will not reduce the level of safety or movement of people, goods, or services.

4.18.1.14 Health and Safety

The nature of RDTE work involves unique safety hazards to YPG personnel. Extreme climate and rugged terrain poses potential hazards to personnel working outdoors on extensive ground-based projects. Personnel involved in ground-based training missions are exposed to potential hazards from animals and insect bites, poisonous snakes, and some types of vegetation. Individuals gaining illegal access to ranges are at extreme risk for injury due to lack of knowledge and training.

4.18.1.15 Cumulative Impacts

Soil, biological, and cultural resources may be exposed to frequent negative impacts during the next 15 years with current fluctuating socioeconomic conditions. Mitigation strategies incorporated into an aggressive environmental program would avoid or minimize long term impacts to all resources.

4.18.1.16 Environmental Justice

The impact of the No-Action Alternative to minorities and low income populations in the vicinity of Yuma Proving Ground would be very similar to those discussed under the Preferred Alternative (see Section 4.17.3 and 4.17.3.1).

Adverse effects include periodic noise events, rare dust events, and occasional traffic congestion. Beneficial effects include limited shopping, dining, social activities, and access to emergency services provided by the installation.

4.18.2 Alternative B (50% decrease)

4.18.2.1 Air Resources

Particulate matter emissions from mobile sources for all alternatives were tentatively evaluated. The emission rate for PM_{10} calculated and projected from test miles driven in 1995 for Alternative B is 20 tpy, (calculated according to EPA 1985).

Tracked and wheeled vehicles roving freely over large tracts of undeveloped land will potentially increase dust emissions by 15 to 20 percent, exceeding limits judged to be significant (calculated according to Geomet Technologies, Inc. 1993).

4.18.2.2 Water Resources

Decreased construction and grading of unimproved roads may correspondingly reduce potential sources of sedimentation transported during storm runoff. Decreases in activity would correspond to a decreased risk of accidental surface water contamination.

Groundwater impacts are similar to those of alternative A. A decrease in activity is expected to reduce the potential for groundwater contamination.

4.18.2.3 Geological and Soil Resources

Soil contamination from testing and training would decrease. The potential for an incidental spill of fuels or other substances from aircraft, vehicles, equipment, or storage areas would be less if activities were reduced. Soil displacement from surface disturbing activities such as vehicles and firing operations would lessen as activities decrease.

4.18.2.4 Biological Resources

Impacts associated with a reduction of military activities potentially benefit biological resources because fewer ground-based activities will take place. Vegetation will slowly begin to recover in areas previously disturbed.

Wildlife is a noise receptor. Implementation of alternative B will correspondingly reduce noise originating from test events. With the reduced Army mission, noise may increase if commercial flights or high-speed military aircraft use the airspace.

4.18.2.5 Cultural Resources

Decreased use of ranges/facilities will reflect a general decline of activities on land possibly having cultural resources. Fewer archaeological surveys will be required because new areas would not be opened for Army testing. Under alternative B, the Army will have less resources to protect the installation from trespassers entering the installation for camping and illegal collection of artifacts.

4.18.2.6 Socioeconomics

A decrease in military and civilian payroll/populations is anticipated. The combination of decreased mission activities and continued personnel downsizing is expected to significantly impact the community, since YPG employs 6.4 percent of the working force in Yuma County. Native American or lower income communities may be negatively affected by the decrease in economic activity.

4.18.2.7 Land Use

The baseline designation of the land use in all regions would not be affected by a decease in military activities.

4.18.2.8 Noise

Occurrence of all noise in all regions will decrease if few aircraft and weapons firing missions are conducted. Maximum noise levels should remain the same since the type

of activity will take place. Noise generation will be less frequent than baseline levels. Noise levels could increase from increased air traffic from outside YPG using the airspace.

4.18.2.9 Hazardous Substance and Waste Management

The amounts of materials and waste generated, transported, stored, used, treated, and disposed of will likely decrease by as much as 50 percent. There will likely be a decreased potential for the accidental release of fuels in storage and during transportation and refueling activities.

4.18.2.10 Radiation

Testing and evaluation activities would be decreased overall, reflecting a decreased use of radiation sources.

4.18.2.11 Aesthetic Values

Decreased military missions are expected to reduce environmental impacts to areas of aesthetic value.

4.18.2.12 Utilities and Support Infrastructure

Alternative B would potentially affect support and infrastructure services by decrease in use, maintenance, modernization, and remodeling of facilities.

4.18.2.13 Transportation

Minimal impacts to air transportation, railroads, or transportation of ordnance are anticipated as a result of decreased activities under alternative B.

4.18.2.14 Health and Safety

Potential hazards to safety are the same as discussed under alternative A. Exposure to safety hazards would decrease with a decreased military mission.

4.18.2.15 Cumulative Impacts

Cumulative impacts to soils and geology, biological, and cultural resources would decrease with military activities.

4.18.2.16 Environmental Justice

A 50% reduction in total activity level would reduce the number of incidents where dust and noise could possibly escape the installation boundaries to nearby low income and non-English speaking residences.

Likewise, this level of reduction would probably eliminate the beneficial effects of local shopping, dining, and social activities as those would probably be eliminated as part of the total reduction in activities. Emergency services might be restricted to on post.

4.18.3 Alternative C (100% increase)

4.18.3.1 Air Resources

No violations of allowable regulatory limits for stationary sources are predicted for Alternative C. Particulate matter emissions from mobile sources for all alternatives were tentatively evaluated. The emission rate for PM_{10} calculated and projected from test miles driven in 1995 for Alternative C is 82 tpy, (calculated according EPA 1985). Tracked and wheeled vehicles roving freely over large tracts of undeveloped land will potentially increase dust emissions by 15 to 20 percent, exceeding limits judged to be significant (calculated according to Geomet Technologies, Inc. 1993).

4.18.3.2 Water Resources

Military activities would increase as much as 100 percent. The potential for impacts to water quality would correspondingly increase. A greater potential could exist for cumulative impacts and degradation of water quality. The possibility exists for significant impacts in washes from maneuvering troops and tracked and wheeled vehicles (Ayres and Associates, 1996).

New wells will not be immediately needed except for in remote areas because available groundwater exceeds water demands. Increases in activities would be expected to increase contamination risks.

4.18.3.3 Geological and Soil Resources

Incidental releases of fuels, oils, and other substances found in aircraft, vehicles and equipment directly on the soil would be more likely to occur with increased activities in all regions. Unexploded ordnance contamination of soils would increase in regions where firing is conducted if activities increase. Construction of new roads and facilities and the increases in munitions testing would further disturb soil integrity and increase the potential for soil erosion. There would be further terrain disturbances resulting from clearing of areas for drop zones and the introduction of additional targets. New desert pavement areas would be disturbed as new activities expand established ranges, roads, and buildings.

4.18.3.4 Biological Resources

Impacts described in alternative A will be increased under this alternative.

Greater erosion potential in these areas could result from vegetation removal. Combat testing or operational testing could alter natural features in washes due to maneuvering troops and vehicles.

Management of species of concern would be the same as under alternative A. Increased impacts to species of concern could occur with increased military activities.

4.18.3.5 Cultural Resources

Impacts to cultural resources would increase with increasing military activities

4.18.3.6 Socioeconomics

A positive impact on the local and regional communities is expected from increases in activity at YPG.

4.18.3.7 Land Use

A few additional impact areas and gun positions would have to be constructed to accommodate artillery projects with longer ranges. Death Valley and the Imperial Sand Dunes would be used more frequently in the next 15 years for automotive testing and vehicle/equipment testing as well as troop training activities, respectively.

4.18.3.8 Noise

Occurrence of all noise in all regions will increase. The construction of additional support activities may temporarily generate noise that could annoy certain populations in the vicinity if facilities are constructed around housing and administrative areas.

4.18.3.9 Hazardous Substance and Waste Management

If new waste streams and greater amounts of hazardous or toxic materials are involved, more immediate compliance criteria could arise. More extensive monitoring would be performed to include all new possible sources of hazardous waste.

4.18.3.10 Radiation

Testing and evaluation activities would increase overall, reflecting more use of radiation sources.

4.18.3.11 Aesthetic Values

During construction and mission activities, designated areas of aesthetic and visual interest could be impacted.

4.18.3.12 Utilities and Support Infrastructure

Increased military mission would have some short term effects on utilities and support infrastructure. Improvements, maintenance, and modernization of existing utilities and infrastructure, along with new construction of facilities would be required to support an increased military mission.

4.18.3.13 Transportation

Traffic would possibly increase on State and county roads. This could result in more frequent delays and a greater number of accidents, particularly along U.S. Highway 95 during peak travel hours.

4.18.3.14 Health and Safety

Increases in military activities would increase exposure of YPG personnel to the safety hazards outlined in alternative A.

4.18.3.15 Cumulative Impacts

Soil, biological, and cultural resources may be exposed to intense pressure as the installation expands its employment and project base.

4.18.3.16 Environmental Justice

Increase of military mission activities would possibly increase the number of adverse noise, air quality, and transportation quality incidents over the baseline (alternative A). Of these, traffic concerns would be the most likely. Increase in military budgets would likely lead to improvements in noise control and air quality protection.

Services to military retirees and low income rural residents around the installation would probably remain constant or slightly improve with more military activity on the installation. The impacts would be similar to those identified for alternative A.

4.18.4 Alternative D (modified non-military activities)

4.18.4.1 Air Resources

No violations of allowable regulatory limits for stationary resources are predicted for Alternative D. Particulate matter emissions from mobile sources for all alternatives were tentatively evaluated. The emission rate for PM_{10} calculated and projected from test miles driven in 1995 for Alternative D is 45 tpy, (calculated according to EPA 1985). Tracked and wheeled vehicles roving freely over large tracts of undeveloped land will potentially increase dust emissions by 15 to 20 percent, exceeding limits judged to be significant (calculated according to Geomet Technologies, Inc. 1993).

4.18.4.2 Water Resources

Proposed public-private partnership opportunities may depend heavily on groundwater for operating such facilities as a golf course, hotel, or private vehicle testing facilities.

Potential impacts to surface water quality are expected from agricultural outleases. Mining is expected to also potentially impact surface and groundwater quality.

4.18.4.3 Geological and Soil Resources

There would be a increase in the potential for soil erosion from the incorporation of new and enhanced activities associated with public-private partnership opportunities. These activities would lead to greater soil disturbances. Recreational activities have a minimal potential for soil contamination.

Mining would potentially contaminate soils from the transportation, storage, and use of hazardous materials at the site. Soils would be disturbed by the excavation and other earthwork. Soil disturbances from mining operations and support infrastructure could lead to greater erosion and soil displacement downstream.

Activities such as off-road racing, have the potential for spills of fuels and other fluids to occur directly to the soil.

4.18.4.4 Biological Resources

Impacts from military activities are similar to those described in alternative A. Impacts from vehicular tracks could be expected on vegetation and desert pavement if areas are opened to campers and hunters. Mining could potentially restrict movement of bighorn sheep and mule deer in areas. Continued mining in established mining shafts could disturb the bats residing there. Roads and other infrastructure constructed for mining could impede the natural flow of water in the washes, thereby affecting plant life and habitat down wash.

Management of species of concern would be the same as alternative A. Impacts to species of concern could increase from increased private industry and recreational activities.

4.18.4.5 Cultural Resources

There is the potential for an increase in impacts to cultural resources from development by private industry and increased recreational use. Management of impacts to cultural resources would be similar to alternative A.

4.18.4.6 Socioeconomics

Increased development by private industry could increase the economic contribution YPG activities contribute to the region.

4.18.4.7 Land Use

Increased nonmilitary activities would lead to a greater potential to disturb adjacent lands. Commercial aircraft testing could increase aircraft flights over some populated areas such as Quartzsite, Hidden Shores, or Wellton.

4.18.4.8 Noise

Impacts from nonmilitary activities (public-private partnership opportunities) are unlikely to change maximum levels of noise currently generated in the region. However, introduction of these activities could increase the occurrence of noise. Noise may also be present for longer periods of time.

4.18.4.9 Hazardous Substance and Waste Management

There would be an overall increase in the baseline amounts of hazardous substances and waste used and generated because of additional waste streams from the introduction of private industrial activities.

4.18.4.10 Radiation

Impacts are the same as described under alternative A. Nonmilitary activities are not expected to involve sources of radiation.

4.18.4.11 Aesthetic Values

Mining has the potential to cause significant impact to areas of aesthetic interest, if this activity is placed in or near these areas. Much of this impact could be irreversible and could be considered significant. Increased traffic on unimproved roads by public users would increase the amount of dust generated, thereby more frequently obscuring panoramic views.

4.18.4.12 Utilities and Support Infrastructure

Increased utilities and support infrastructure would be required for public-private partnership opportunities, such as the technology and conference complex, mining and recreational activities.

4.18.4.13 Transportation

Impacts are the same as described under alternative C.

4.18.4.14 Health and Safety

Impacts are the same as under alternative C.

4.18.4.15 Cumulative Impacts

Impacts are the same as under alternative C.

4.18.4.16 Environmental Justice

Modifying non-military activities on the installation should have no measurable difference in adverse effects to minorities and low-income rural residents than those of alternative A. Conceivably, some benefits might occur as services could be located closer to installation neighbors, who tend to be low-income.

4.18.5 Alternative E (some of each)

4.18.5.1 Air Resources

No violations of allowable regulatory limits for stationary resources are predicted for Alternative E. Particulate matter emissions from mobile sources for all alternatives were tentatively evaluated. The emission rate for PM_{10}, calculated and projected from test miles driven in 1995 for Alternative E is 86 tpy (calculated according to EPA 1985). Tracked and wheeled vehicles roving freely over large tracts of undeveloped land will potentially increase dust emissions by 15 to 20 percent, exceeding limits judged to be significant (calculated according to Geomet Technologies, Inc. 1993).

4.18.5.2 Water Resources

Surface water impacts would be the same as alternatives A, C, and D.

The maximum groundwater capacity of existing wells would accommodate the demands of this alternative.

4.18.5.3 Geological and Soil Resources

Increase in both military and nonmilitary activities will have similar consequences as described in alternatives C and D.

4.18.5.4 Biological Resources

Impacts are similar to alternatives A, C, and D.

4.18.5.5 Cultural Resources

Impacts would be similar as for alternatives A, C, and D.

4.18.5.6 Socioeconomics

It is estimated that the potential impact for this alternative could approach $200 million over the next 15 years. Under this alternative the growth will tend to be twofold: private and defense related.

4.18.5.7 Land Use

Diversified activities to include more military, commercial, and recreational activities could result in range scheduling limitations. Increased nonmilitary activities would have a greater potential to disturb adjacent lands.

4.18.5.8 Noise

Potential impacts under this alternative could result from an increase in military operations and introduction of new non-mission activities.

4.18.5.9 Hazardous Substance and Waste Management

Impacts will likely be the same as described under alternative A and D. Nonmilitary industrial process would be governed by the same regulations as military activities.

4.18.5.10 Radiation

Cumulative environmental impacts consist of increased use of tritium illuminating devices, radars, lasers, radios, and DU penetrating testing. Greater numbers of equipment with radioactive components would be utilized on the installation. This would increase the potential for exposure to personnel and the environment.

4.18.5.11 Aesthetic Values

Private industry testing is expected to increase over the next 10 to 15 years. As more public access is allowed to YPG, damages to unique features such as washes and desert terrain could occur.

4.18.5.12 Utilities and Support Infrastructure

Impacts would be the same as described under alternative A, C, and D.

4.18.5.13 Transportation

Impacts are the same as described under alternative C and D.

4.18.5.14 Health and Safety

Impacts are the same as described under alternatives C and D.

4.18.5.15 Cumulative Impacts

Impacts are the same as described under alternatives C and D.

4.18.5.16 Environmental Justice

Impacts are the same as described for the Preferred Alternative, and approximately the same as for alternatives A , C, and D.

5.0 LIST OF PREPARERS

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6.0 DISTRIBUTION LIST

Yuma Proving Ground contacted various Federal, state, and local agencies, Native American groups, elected representatives, public interest groups, industries, and private citizens interested in the issues regarding this EIS. Following is a list of the contacts who received the Final RWEIS.

Federal Agencies

U.S. Army Center for Health Promotion
U.S. Army Corps of Engineers
U.S. Army Dugway Proving Ground
U.S. Bureau of Indian Affairs
U.S. Bureau of Land Management
U.S. Bureau of Reclamation
U.S. Customs Service
U.S. Department of Agriculture
U.S. Electronic Proving Ground
U.S. Environmental Protection Agency
U.S. Federal Aviation Administration
U.S. Fish and Wildlife Service
U.S. Geological Survey
U.S. Immigration and Naturalization Service
U.S. Marine Corps, Yuma
U.S. National Park Service
U.S. Naval Air Facility

Native American Groups

Ak-Chin Indian Community
Augustine Indian Tribe
Barona Indian Tribe
Cabazon Band of Mission Indians
Campo Band of Mission Indians
Chemehuevi Indian Tribe
Cocopah Indian Tribe
Colorado River Indian Tribe
Cuyapaipe
Ft. Mojave Indian Tribe
Gila River Indian Community
Havasupai Tribe
Hopi Indian Tribe
Hualapai Indian Tribe
Jamul Indian Tribe
Kaibab-Paiute Tribe
La Posta Band
Manzanita Band
Najavo Nation
Pasqua Yaqui Tribe
Quechan Indian Tribe
Rincon Indian Tribe
Salt River Indian Community
San Carlos Apache Tribe
San Juan Southern Paiute
Sycuan Indian Tribe
Tohono O'Odham Nation
Tonto Apache Tribe
Torres-Martinez Tribe
Viejas Indian Tribe
White Mountain Apache
Yavapai-Apache Tribe
Yavapai-Prescott Indian Tribe

State Agencies/Universities

Arizona Department of Agriculture
Arizona Department of Environmental Quality
Arizona Department of Mines & Mineral Resources
Arizona Department of Public Safety
Arizona Department of Transportation
Arizona Department of Water Resources
Arizona Game and Fish Department
Arizona Geological Survey
Arizona State Government - Governor's Office
Arizona State Land Department
Arizona State Museum
Arizona State Parks
Arizona-Mexico Commission
Arizona Western College
California Department of Fish and Game
California Department of Parks & Recreation
California Department of Transportation
California Department of Water Resources
California Regional Water Quality Control Board
California State Government - Govenor's office
California State Land Commission
California State Parks
Colorado State University
Inter-Tribal Council of Arizona
Northern Arizona University
The University of Arizona

Local Agencies

Board of Supervisors, Yuma County
Board of Supervisors, Bisbee, AZ
City of Blythe
City of Lake Havasu
City of Needles
City of San Luis
City of Somerton
City of Yuma
Imperial County
La Paz County
San Diego Public Library
Town of Gila Bend
Town of Parker
Town of Quartzsite
Town of Wellton
Yuma County Library District
Yuma County

Organizations/Businesses

Ageiss Environmental, Inc.
Arizona Desert Bighorn Sheep Society
Arizona Historical Society
Arizona Public Lands Information Center

BLM Lands Foundation
Deep Canyon Desert Research Center
Defenders of Wildlife
Desert Fishes Council
Earth Tech
Jason Associates Corporation
GeoMarine, Inc.
The Greater Yuma Economic Development Corporation
Horne Engineering Services
Minerals Exploration Coalition
Palo Verde Irrigation District
Rural Alliance Military Accountability
San Diego Public Library
S-E-W Consulting
Science Applications Int'l Corp.
Southwest Center for Biological Diversity
Tetra Tech, Inc.
ULTA Systems Environmental
Western Law Center
Snowbird Information Center
Yuma Metropolitan Planning Organization

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Sandstrom, Arthur
Scott, Willa
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Vaughan, Postelle
Wendt, Gene
Wood, Mildred

GLOSSARY

Absolute Dating - A dating technique whereby artifacts can be dated by scientific methods that produce statistically useful results.

Activity - A unit, organization, or installation that performs a function or mission (AR 200-1).

Ambient - The environment as it exists around people, plants, and structures.

Ambient Air Quality Standards - Those standards established according to the CAA to protect health and welfare (AR 200-1).

Asbestos - Either of two incombustible, chemical-resistant, fibrous mineral forms of impure magnesium silicate, used for fireproofing, electrical insulation, building materials, brake linings, and chemical filters. Asbestos is a carcinogenic substance.

Attainment Area - Region that meets the NAAQS (National Ambient Air Quality Standard) for a criteria pollutant under the (CAA) Clean Air Act.

Baseline Period - RWEIS time frame is from 1991 through 1995.

Best Management Practices (BMP's) - Methods, measures, or practices to prevent or reduce the contributions of pollutants to U.S. waters. Best management practices may be imposed in addition to, or in the absence of, effluent limitations, standards, or prohibitions (AR 200-1).

Budgeted Capacity - A measure of the maximum time a resource is planned to be operated in support of paying customers under present, normal personnel conditions, including the use of contractor personnel. Budgeted capacity excludes resource overtime.

Budgeted Capacity/Year - Budgeted capacity planned at the beginning of the fiscal year.

Cantonment - Area of residential and administrative use.

Criteria Pollutants - The Clean Air Act of 1970 required the EPA to set air quality standards for common and widespread pollutants in order to protect human health and welfare. There are six "criteria pollutants": ozone (O_3), carbon monoxide (CO), sulfur dioxide (SO_2), lead (Pb), nitrogen dioxide (NO_2), and particulate matter less than 10 micrometers in diameter (PM_{10}).

Cumulative Impact - The impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonable 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).

Decibel (db) - A unit of measurement of sound pressure level.

Desert Varnish - The organic activity of bacteria in very arid climates whereby chemical processes assimilate manganese to produce a dark coating on the surface of rhyolite and granitic rock. The underside of these same rocks regularly contain a red oxide coating produced by an iron fixing bacteria.

Direct Effects - Effects which are caused by the action and occur at the same time and same place [40 CFR 1508.8 (a)].

Dissolved Solids - A general indicator or contamination by inorganic materials.

(Dust) Palliative - A method used to reduce dust generation by wet suppression. Chemical stabilization binds the dust and surface particles to form a protective crust. Physical stabilization makes the dust heavy, thus unable to become airborne.

Dynamometer - A nearly level surface that allows continuous loading of all types of vehicles for evaluation of full-load cooling performance.

Ecofact - Organic material (plant or animal) that has been collected for storage and/or used by human groups for food, tools, or ceremonial objects.

Emission - A release of a pollutant.

Environmental Assessment/Environmental Impact Statement (EA/EIS) - An EA is a publication that provides sufficient evidence and analysis to show whether a proposed system will adversely affect the environment or be environmentally controversial. If the proposed system will adversely affect the environment or be controversial, an EIS is prepared to disclose impacts.

Fauna - Animal life, especially the animal characteristics of a region, period, or special environment.

Fixed-Wing Aircraft - A generic term used in this document to reference the broadest class of aircraft-those in which aerodynamic lift is generated when the airframe including the fixed- or nonrotating-wing is moved through the air by forward thrust from a jet engine or engine driven propeller. Fixed-wing types customarily include fighter, attack, transport, observation, reconnaissance, and trainer aircraft.

Flora - Vegetation; plant life characteristic of a region, period, or special environment.

Hazardous Substances - A substance as defined by section 101(14) of CERCLA. a. For the purpose of this regulation a hazardous substance is any one of the following. 1) Any substance designated pursuant to section 311 (b)(2) (A) of the CWA. 2) Any element, compound, mixture, solution or substance designated pursuant to section 102 of CERCLA. 3) Any hazardous waste having the characteristics identified under the RCRA. 4) Any toxic pollutant listed under TSCA. 5)

Any hazardous air pollutant listed under section 112 of CAA. 6) Any imminently hazardous chemical substance or mixture with respect to which the EPA Administrator has taken action pursuant to subsection 7 of TSCA. b. The term does not include: 1) Petroleum, including crude oil or any fraction thereof, which is not otherwise specifically listed or designated as a hazardous substance in a above. 2) Natural gas, natural gas liquids, liquefied natural gas, or synthetic gas usable for fuel (or mixtures of natural gas and such synthetic gas). c. A list of hazardous substances is found in 40 CFR 302.4 (AR 200-1).

Hazardous Waste - A solid waste identified in 40 CFR 261.3 or applicable foreign law, rule, or regulation (see also solid waste) (AR 200-1).

Hazardous Waste Storage - As defined in 40 CFR 260.10, ". . . the holding of hazardous waste for a temporary period, at the end of which the hazardous waste is treated, disposed of, or stored elsewhere" (AR 200-1).

Heavy Metals - Metallic or semimetallic elements of high molecular weight, such as mercury, chromium, cadmium, lead, and arsenic, that are toxic to plants and animals at known concentrations.

Hydrocarbon - Any of a vast family of compounds containing hydrogen and carbon. Used loosely to include many organic compounds in various combinations; most fossil fuels are composed predominantly of hydrocarbons. When hydrocarbons mix with nitrogen oxides in the presence of sunlight, ozone is formed.

Indirect Effects - Effects which are caused by the 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, water, and other natural systems, including ecosystems [40 CFR 1508.8 (b)].

Installation - A grouping of facilities, located in the same general vicinity, over which the installation commander has authority (AR 200-1).

Installation Compatibility Use Zone (ICUZ) - A land use planning procedure employed to control environmental noise (AR 200-1).

Lithic - Relating to, or being a stone tool.

Mobile Sources - Vehicles, aircraft, watercraft, construction equipment, and other equipment that use internal combustion engines for energy sources (AR 200-1).

Monitoring - The assessment of emissions and ambient air quality conditions. The following monitoring techniques are used emission estimates, visible emission readings, diffusion or dispersion estimates, sampling or measurement with analytical instruments (AR 200-1).

National Ambient Air Quality Standards - Nationwide standards set up by the EPA for widespread air pollutants, as required by Section 109 of the Clean Air Act. Currently, six pollutants are regulated by primary and secondary NAAQS: carbon monoxide (CO), lead, (Pb), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM_{10}), and sulfur dioxide (SO_2).

National Environmental Policy Act (NEPA) - U.S. statute that requires all federal agencies to consider the potential effects of proposed actions on the human and natural environment (42 U.S.C. 4321-4347).

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 ambient air quality standards.

Open Burning - The combustion of any material without control of combustion air to maintain adequate temperature for efficient combustion, containment of the combustion reaction in an enclosed device to provide enough residence time and mixing for complete combustion, or control of emission of the gaseous combustion products (AR 200-1).

Pediment - A broad gently sloping bedrock surface with low relief that is situated at the base of a steeper slope and is usually thinly covered with alluvial gravel and sand.

Relative Dating - A dating technique whereby artifacts are associated in context with otherwise non-durable artifacts (by themselves) and assumptions of their components are made. An example of this would be a well-dated, short-lived pottery type associated with other artifacts.

Restricted Airspace - Airspace having defined vertical and lateral dimensions which has been established by the FAA (via the rule-making process) within which the flight of aircraft, while not wholly prohibited, are subject to restriction. Restricted airspace is established to contain or segregate activities which would be hazardous to other nonparticipating aircraft.

Significant Impact - According to 40 CFR 1508.27, "Significantly" as used in NEPA requires consideration of both context and intensity.

a. Context. The significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality. Significance varies with the setting of the proposed action. For instance, in the case of a site-specific action, significance would usually depend upon the effects in the locale rather than in the world as a whole. Both short- and long-term effects are relevant.

b. Intensity. This refers to the severity of impact. Responsible officials must bear in mind that more than one agency may make decisions about partial aspects of a major action.

Solid Waste - ". . . Any discarded material that is not excluded by section 261.4(a) or that is not excluded by variance granted under sections 260.30 and 260.31" (40 CFR 261.2).

State Implementation Plans (SIP's) - Plans developed to designate the methods to attain and maintain ambient air quality standards (AR 200-1).

Toxic Substance - A harmful substance which includes elements, compounds, mixtures, and materials of complex composition.

Unclassified Area - Areas in which the air quality has not been evaluated.

User Time - The measure of the use of a resource paid for by a customer (includes setup and takedown times only if they preclude use of resource by another customer). It includes both regular and overtime.

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LIST OF ACRONYMS AND ABBREVIATIONS

A

AAAQS	Arizona Ambient Air Quality Standards
ADEQ	Arizona Department of Environmental Quality
ADOT	Arizona Department of Transportation
AGFD	Arizona Game and Fish Department
AHERA	Asbestos Hazard Emergency Response Act
Am	americum
AMC	Army Materiel Command
APP	Aquifer Protection Permit
APS	Arizona Public Service
AR	Army Regulation
ARS	Arizona Revised Statute
ASM	Arizona State Museum
AST	aboveground storage tank

B

Be	berylium
BLM	U.S. Bureau of Land Management
BMGR	Barry M. Goldwater Range
BOR	U.S. Bureau of Reclamation
BP	before present
BRAC	base realignment and closure
Btu	British thermal unit

C

C	Celsius
CAA	Clean Air Act
CAMA	California-Arizona Maneuver Area
CDX	Castle Dome Annex
CDH	Castle Dome Heliport
CE	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFC	chlorofluorocarbons
cm	centimeter(s)
CFR	Code of Federal Regulations
CO	carbon monoxide
COE	U.S. Army Corps of Engineers
CRD	Cultural Resources Database
CWA	Clean Water Act

D

DA	Department of Army
DAC	derived air concentration
dB	decibels
DC	Defense Communications System
DOE	U.S. Department of Energy
DoD	U.S. Department of Defense
DOI	U.S. Department of Interior
DOT	U.S. Department of Transportation
DPW	Directorate of Public Works, YPG
DRMO	Defense Reutilization Mobilization Organization
DRWEIS	Draft Range Wide Environmental Impact Statement
DSN	defense switched network
DU	depleted uranium
DZ	drop zone

E

EA	environmental assessment
EA	Environmental Awareness (ITAM program)
EIS	environmental impact statement
EM	electromagnetic
EMR	electromagnetic radiation
ENMP	Environmental Noise Management Program
EO	Executive Order
EOD	explosive ordnance disposal
EPA	U.S. Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
ESA	Endangered Species Act
ETO	explosive test operator
ERM	Environmental Radiation Monitoring Plan
EZ	extraction zone

F

FY	fiscal year
F	fahrenheit
FAA	U. S. Federal Aviation Administration
FAR	Facility Annual Report
FIFRA	Federal Insecticide, Fungicide, & Rodenticide Act
FLPMA	Federal Land Policy and Management Act
FOB	forward operating base
ft	foot or feet
FX	foreign exchange

G

GP	gun position
GPI	Gutierrez-Palmenberg, Inc.
GPS	global positioning system

H

ha	hectares
HAPs	hazardous air pollutants
HAZMIN	Army program to minimize hazardous waste production
HMTA	Hazardous Materials Transportation Act
hp	horsepower
HSMS	Hazardous Substances Management System
HUD	U.S. Housing and Urban Development
HWSF	Hazardous Waste Storage Facility
HWTS	Hazardous Waste Tracking System
Hz	hertz

I

ICUZ	Installation Compatible Use Zone
ICRMP/HPP	Integrated Cultural Resource Management Plan/Historic Preservation Plan
IDG	Installation Design Guide
in	inches
in/year	inches per year
INRMP	Integrated Natural Resources Management Plan

ISCP	Installation Spill Contingency Plan
IEC	installation environmental coordinator
ITAM	Integrated Training Area Management

J

JAWS	Juveniles at Work

K

KHZ	kilohertz
km	kilometer(s)
kV	kilovolt
kW	kilowatt

L

l	liter(s)
LAAF	Laguna Army Airfield
LAN	local area network
LAV	Light Armored Vehicle
LCTA	Land Condition Trend Analysis
LRAM	Land Rehabilitation and Maintenance
LZ	landing zones

M

m	meter(s)
mBtu	million British thermal units
MCAS	Marine Corps Air Station
MFFS	Military Free Fall School
MHZ	megahertz
MIL-STD	military standard
mm	millimeter(s)
mph	miles per hour
MOU	Memorandum of Understanding
MV	megavolts
MVA	megavolt amp
MW	megawatt
MWR	Morale, Welfare and Recreation

N

NAAQS	National Ambient Air Quality Standards
NAFTA	North American Free Trade Agreement
NBC	Nuclear, Biological, and Chemical
NEPA	National Environmental Policy Act
NEW	net explosive weight
NHPA	National Historic Preservation Act
NO	nitric oxide
NOA	Notice of Availability
NO_2	nitrogen dioxide
NOx	nitrogen oxides
NOD	Notice of Discharge
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NRC	Nuclear Regulatory Commission
NRCS	Natural Resources Conservation Service (formerly SCS)
NTMBS	neotropical migratory birds

O

OB	open burning
OD	open detonation
ODCs	ozone depleting chemicals
OSHA	Occupational Safety and Health Act

P

PAC	production acceptance
Pb	lead
PCB	polychlorinated biphenyl
PCM	pulse code modulation
PEPs	propellants, explosives, and pyrotechnics
PL	Public Law
PM_{10}	particulate matter of 10 microns or less in diameter
POL	Petroleum, oil, and lubricants
ppm	parts per million
PVC	polyvinyl chloride

Q

QA/QC	quality assurance/quality control

R

R	restricted airspace
RCRA	Resource Conservation and Recovery Act
RDTE	research, development, test and evaluation
REC	Record of Environmental Consideration
RMP	Resource Management Plan
RMS	root mean square
ROC	Range Operations Center
ROD	Record of Decision
RUMS	Resource Utilization Measurement Systems
RWEIS	Range Wide Environmental Impact Statement

S

S/cm	microsiemens
SARA	Superfund Amendments and Reauthorization Act
SCS	Soil Conservation Service (Now the NRCS)
SDWA	Safe Drinking Water Act
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SO_2	sulfur dioxide
SO_3	sulfur trioxide
SOx	sulfur oxide
SOMTE	soldier operator-maintainer test and evaluation
SOP	standard operating procedure
SPCCP	Spill Prevention, Control, and Countermeasures Plan
SRP	Salt River Project
SWDA	Solid Waste Disposal Act
SWMU	Solid Waste Management Unit

T

TECOM	Test and Evaluation Command
T&E	Test and Evaluation
TD	Test Directorate
TDS	total dissolved solids
TLD	thermoluminescent dosimeter
tpy	tons per year
TRI	Toxic Release Inventory
TRI	Training Requirements Integration
TSCA	Toxic Substances Control Act
TSP	total suspended particulates

U

UAV	Unmanned Aerial Vehicle
US	United States
USA	United States Army
USC	United States Code
USCS	Unified Soil Classification System
USGS	U. S. Geological Survey
USFWS	U. S. Fish and Wildlife Service
USMC	U. S. Marine Corps
UST	underground storage tank
UXO	unexploded ordnance

V

VOCs	volatile organic compounds
VPG	Virtual Proving Ground

W

WAPA	Western Area Power Administration
WEPP	water erosion protection project
WWII	World War II

Y

YPG	US Army Yuma Proving Ground

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INDEX

APPENDIX A - List of Laws, Regulations, Management Plans, Permits, Licenses, and Memoranda of Understanding

LAWS AND REGULATIONS: Federal and state statutes institute a number of responsibilities for Yuma Proving Ground. In addition, Army regulations establish standards applicable to Department of the Army installations. Regulatory authority involves the Environmental Protection Agency, the Arizona Department of Environmental Quality, and other regulatory agencies along with internal regulation from the Department of Defense. Many responsibilities are specifically mandated, while discretionary authority is given for dealing with others. Laws and regulation titles are referenced by name.

GENERAL

Abatement of Environmental Nuisances
AZ Title 49-143

Environmental Effects of Army Actions
AR 200-2

Environmental Nuisances
AZ Title 49-141

Environmental Protection and Enhancement
AR 200-1

Environmental Quality
AZ Title 18

Environmental Quality Improvement Act, 1970
42 U.S.C. Sec. 4371-4375

Federal Compliance with the Right-to-Know Laws and Pollution Prevention Requirements
EO 12856

Federal Land Policy and Management Act, 1976
43 U.S.C. Sec. 1701 to 1784

Fish and Wildlife Coordination Act
16 U.S.C. Sec. 661 et. seq.

Freedom of Information Act
5 U.S.C. Sec. 552

National Environmental Policy Act, 1970
42 U.S.C Sec. 4321

Pollution Prevention
AZ Title 49-961

Pollution Prevention Act, 1990
42 U.S.C. Sec. 13101 to 13109

Pollution Prosecution Act, 1990
42 U.S.C. Sec. 4321

Protection and Enhancement of Environmental Quality, 1970
EO 11514

Right to Enter Premises for Inspection or Abatement
AZ Title 49-144

The Environment AZ Title 49-201 through 49-391

AIR QUALITY

Air Contaminants, Toxic and Hazardous Substances
29 U.S.C. Sec. 655 et seq

Air Emissions from Federal Facilities
42 U.S.C. Sec. 7418

Air Quality Act, 1967
42 U.S.C. Sec. 7401 et. seq.

Air Quality Programs In General
42 U.S.C. Sec. 1857 et. seq., 7401 et. seq., 7501 et. seq., and 7601 et. seq..

Approval of State Plans for Standards of Performance for New Stationary Emission Sources
42 U.S.C. Sec. 7411

Certification of New Emission Sources for Conformance with National Emission Standards for Hazardous Air Pollutants Including Radioactive Materials
42 U.S.C. Sec. 7412(c)

Clean Air Act, 1955
42 U.S.C. Sec. 7401 et. seq.

Comprehensive Air Quality Act, 1992
A.R.S. 49-401 to -593

Global Climate Protection Act
15 U.S.C. Sec. 2901 note

National Emission Standards for Hazardous Air Pollutants (NESHAP)
42 U.S.C. Sec. 1857 et. seq.

Prevention of Significant Air Quality Deterioration
42 U.S.C. Sec. 7470 et. seq.

Records and Reports of Weather Modifications Activities
85 Stat. 735
AZ Title 49-701 through 49-888

Travel Reduction Programs AZ Title 49-581

WATER RESOURCES

Clean Water Act, 1972
33 U.S.C. Sec. 1251 et. seq.

Clean Water Restoration Act, 1966
P.L. 89-753

Drinking Water
A.A.C., Title 18, Chapter 4

Drinking Water and Certification
AZ Title 18

Groundwater Management Act
A.R.S. 45-401 to -704

Guidelines Controlling Discharge of Dredged or Fill Material in Waters of the U.S. including Wetlands
33 U.S.C. Sec. 1344(b) and 1361(a)

Land and Water Conservation Act, 1976
16 U.S.C. Sec. 460

Land and Water Conservation Fund Act, 1965
16 U.S.C. Sec. 4601

Permits for Discharges of Dredged or Fill Materials into Waters of the United States
33 U.S.C. Sec. 1344

Refuse Act, 1899
33 U.S.C. Sec. 407

Rivers and Harbors Appropriation Act, 1899
33 U.S.C. Sec. 401 to 426p and 441 to 454

Rules Governing Work or Structure in or Affecting Navigable Waters of the United States
33 U.S.C. Sec. 401 and 403

Safe Drinking Water Act, 1974
42 U.S.C. Sec. 300f

Soil and Water Resources Conservation Act, 1977
16 U.S.C. Sec. 2001

Water Quality Control
AZ Title 49-401 through 49-593

Water Quality Control
A.R.S. 49-201 to 265, 49-301 to-391

Water Quality Programs in General
33 U.S.C. Sec. 1160 et. seq. and 1251 et. seq.; 42 U.S.C. Sec. 300f et. seq. and 6901et. seq.

Water Resources Development Act, 1990
33 U.S.C. Sec. 2309a, 2316, 2320 (P.L. 101-640)

GEOLOGICAL AND SOILS RESOURCES

Act of July 26, 1866 (Mining Law)
43 U.S.C. Sec. 932

Mineral Exploration and Extraction
AR 405-30

Mining Law, 1872
36 CFR 228

Soil and Water Resources Conservation Act, 1977
16 U.S.C. Sec. 2001 to 2009

Surface Mining Control and Reclamation Act
30 U.S.C. Sec. 1201-1328; 18 U.S.C. Sec. 114

BIOLOGICAL RESOURCES

Airborne Hunting Act
16 U.S.C. Sec. 724j-1

Arizona Desert Wilderness Act
P.L. 101-628

Arizona Native Plant Law, 1992
A.R.S. Title 17

Endangered Species Act, 1973
16 U.S.C. Sec. 1531 et. seq.

Endangered Species Preservation Act, 1966
16 U.S.C. Sec. 1531

Engle Act, 1958
10 U.S.C. Sec. 2671

Federal Insecticide, Fungicide, and Rodenticide Act, 1947
7 U.S.C. Sec. 136

Federal Land Policy and Management Act, 1976
43 U.S.C. Sec. 1701 et. seq.

Fish and Wildlife Conservation Act, 1980
16 U.S.C. Sec. 2901 et. seq.

Fish and Wildlife Coordination Act, 1934
16 U.S.C. Sec. 661- 666c

Hunting, Fishing, and Trapping
18 U.S.C. Sec. 41

Migratory Bird Conservation Act, 1966
16 U.S.C. Sec. 715

Migratory Bird Treaty Act, 1918
16 U.S.C. Sec. 703-711

National Environmental Policy Act, 1970
42 U.S.C. Sec. 4321

Sikes Act, 1960
16 U.S.C. Sec. 670 et. seq.

U.S. Fish and Wildlife Service Mitigation Policy
16 U.S.C. Sec. 661-667

Wild Horse and Burro Act
16 U.S.C. Sec. 1331

CULTURAL AND HISTORIC RESOURCES

American Folklife Preservation Act
PL 94-201

American Indian Religious Freedom Act, 1978
42 U.S.C. Sec. 1996

Antiquities Act, 1906
16 U.S.C. Sec. 431-433

Archaeological and Historic Preservation Act, 1974
16 U.S.C. Sec. 469- 469c

Archaeological Data Conservation Act, 1974
16 U.S.C. Sec. 469

Archaeological Resources Protection Act, 1979
16 U.S.C. Sec. 470aa-mm

Historic Preservation
AR 420-40

Historic Sites Act, 1935
16 U.S.C. Sec. 461-467

Historical and Archeological Data Preservation
16 U.S.C. Sec. 469 et. seq.

Museum and Historical Artifacts
AR 870-20

National Historic Preservation Act, 1966
16 U.S.C. Sec. 470-w6

Native American Graves Protection and Repatriation Act, 1990
25 U.S.C. Sec. 3001-13

Protection and Enhancement of the Cultural Resources
EO 11593

Reclamation Projects Authorization and Adjustments Act, 1992 Title XL 16 U.S.C. Sec. 470a et. seq.; & 470 note; 43 U.S.C. Sec. 390h-1 et. seq.

SOCIOECONOMICS

Airport and Airway Development Act, 1971
49 U.S.C. Sec. 1430

Americans with Disabilities Act, 1990
42 U.S.C. Sec. 12101

Executive Order on Environmental Justice
EO 12898

North American Free Trade Agreement Implementation Act, 1993
P.L. 103-182

LAND USE

Arizona Annual Game Regulations
R12-4-101 et. seq.

Executive Orders on Use of Off-Road Vehicles on Public Lands
E.O. 11644 (1972); Revision 1 E.O. 11989 (1977); Revision 2 E.O. 12608 (1987)

Permits for Use of Wilderness Areas
16 U.S.C. Sec. 472 and 551

Program for Land Conservation and Utilization
7 U.S.C. Sec. 1011(e)

Public Land Orders (Deeds) (Secretary of Interior declarations to withdraw or open lands in the public domain).

Use of Off-Road Vehicles on Army Lands
AR210-9

NOISE

Aviation Safety and Noise Abatement Act, 1980
49 U.S.C. Sec. 1431

Noise Control Act, 1972
42 U.S.C. Sec. 4901 to 4918

Noise Pollution Abatement Act, 1970
P.L. 91-604

Noise Standards: Aircraft Type and Airworthiness Certification
49 U.S.C. Sec. 1354, 1421, 1423, 1431, and 1655

Operating Noise Limits
49 U.S.C. Sec. 1344 et. seq..

Procedures for Abatement of Highway Traffic and Construction Noise
23 U.S.C. Sec. 109

Quiet Communities Act, 1978
42 U.S.C. Sec. 4901

HAZARDOUS SUBSTANCES AND WASTE MANAGEMENT

Arizona Emergency Planning and Community Right-to-Know Act
A.R.S. 49-281 to -296

Asbestos Hazard Emergency Response Act, 1986
15 U.S.C. Sec. 2641-2654

Comprehensive Environmental Response, Compensation and Liability Act
42 U.S.C. Sec. 9601 et. seq.

Control of Toxic Substances in General
15 U.S.C. Sec. 2601 et. seq.

Emergency Planning and Community Right to Know Act
42 U.S.C. Sec. 11011

Federal Facilities Compliance Act
P.L. 102-386

Federal Insecticide, Fungicide, and Rodenticide Act, 1988
7 U.S.C. Sec. 136

Hazardous and Solid Waste Amendments of 1984
42 U.S.C. Sec. 6926

Hazardous and Toxic Materials and Substances
29 U.S.C. Sec. 655 et. seq.

Hazardous Materials Emergency Response Operations
AZ Title 49-108

Hazardous Materials Regulations
49 U.S.C. Sec. 1801

Hazardous Material Transportation Uniform Safety Act, 1990
49 U.S.C. Sec. et. seq.

Hazardous Substances Response Revenue Act, 1980
26 U.S.C. Sec. 4611

Hazardous Waste Management
AZ Title 49-1001 through 49-1073

Lead Based Paint Poisoning Prevention Act, 1971
42 U.S.C. Sec. 4822

Lead Contamination Control Act, 1988
42 U.S.C. Sec. 300j-21 to 300j-25

Lead Exposure Reduction Act (TSCA Amendment), 1922
15 U.S.C. Sec. 2601 et. seq.

National Contingency Plan for the Release of Oil and Hazardous Substances into the Environment
42 U.S.C. Sec. 9605

National Pollutant Discharge Elimination System (NPDES) Wastewater Permits
33 U.S.C. Sec. 1342

Occupational Safety and Health Act, 1970
29 U.S.C. Sec. 655 et. seq.

Oil Pollution Act, 1990
33 U.S.C. Sec. 2701-2761 et. seq. Permits for

Permits for Facilities to Handle Hazardous Materials
49 U.S.C. Sec. 1801 et. seq.

Permits for Hazardous Waste Treatment, Storage, and Disposal Facilities
42 U.S.C. Sec. 6925

Permits for the Treatment, Storage and Disposal of Hazardous Wastes
42 U.S.C. Sec. 6901 et. seq.

Pest Management Program
AR 420-76

Pesticide Programs In General
7 U.S.C. Sec. 136 et. seq.

Preliminary Notification of Hazardous Waste Activities
42 U.S.C. Sec. 6930

Regulations of Hazardous Chemical Substances and Mixtures
15 U.S.C. Sec. 2605

Removal and Remedial Actions Taken in Response to the Release or Threatened Release of Hazardous Substances
42 U.S.C. Sec. 9601(23) and (24)

Resource Conservation and Recovery Act
42 U.S.C. Sec. 6901 et. seq.

Solid and Hazardous Waste Management
AR 420-47

Standards Applicable to Generators and Transporters of Hazardous Wastes and for Owners and Operators of Hazardous Waste Treatment, Storage and Disposal Facilities
42 U.S.C. Sec. 6901 et. seq.; 6922-6924

Toxic Effluent Standards
33 U.S.C. Sec. 1251 et. seq.

Toxic Substances Control Act, 1976
15 U.S.C. Sec. 2601 et. seq.

Treatment, Storage or Disposal of Hazardous Wastes
2 U.S.C. Sec. 6925

Underground Storage Tank Act
A.R.S. Title 49-1001 to 1073

RADIATION

AR 385 Series and applicable intermediate command supplements and regulations.

Atomic Energy Act, 1954
42 U.S.C. Sec. 2014, 2021, 2021a, 2022, 2111, 2113,2114

Control and Recording Procedures for Exposure to Ionizing Radiation and Radioactive Materials
AR 40-14

Control of Health Hazards from Lasers and Other High Intensity Optical Sources
AR 40-46

Control of Ionizing Radiation Act
A.R.S. 30-651 to 696

Guidance to Other Federal Agencies For Environmental Radiation Standards
42 U.S.C. Sec. 2021(h)

Licensing and Radiation Safety Requirements for Radiography
42 U.S.C. Sec. 2111 et. seq. and 5841 et. seq.

Low Level Radioactive Waste Policy Act
42 U.S.C. Sec. 2021b-2021d

Nuclear Waste Policy Act, 1982
42 U.S.C. Sec. 10102-10270

Radiation Protection Programs
42 U.S.C. Sec. 2011 et. seq.

Radiation Standards for Drinking Water
42 U.S.C. Sec. 300f et. seq.

Standards for Protection Against Radiation
42 U.S.C. 2073 et. seq. and 5841 et. seq.

HEALTH AND SAFETY

Fire Prevention
AR 420-90

Fire Safety
AR 420-2

Public Health Service Act
42 U.S.C. Sec. 300f to 300j-11

Safety Program
AR 385-10

U.S. Army Materiel Command Safety Manual
AMC-R 385-100

YPG Materiel Test Directorate Safety
YPG REG 385-10-2

UTILITIES AND SUPPORT INFRASTRUCTURE

Arizona Recycling Program
AZ Title 49-831

Criteria for Classification of Solid Waste Disposal Facilities and Practices
42 U.S.C. Sec. 6907(a)(3) and 6944(a);
33 U.S.C. Sec. 1345

Easements/Permits for Powerline Rights-of-Way
43 U.S.C. Sec. 3871

Energy Supply and Environmental Coordination Act, 1974
15 U.S.C. Sec. 791 to 798

General Industrial and Construction Standards
29 U.S.C. Sec. 655 et. seq.

Management of Special Waste
AZ Title 49-851

Management of Used Oil
AZ Title 49-801

Military Construction
AR 415-15

Permits for Disposal of Sewage Sludge
33 U.S.C. Sec. 1345

Personnel Security Program
AR 380-67

Sale or Lease of Land for Solid Waste Disposal Sites
43 U.S.C. Sec. 869 et. seq.

Security of Army Property at Unit and Installation Level
AR 190-51

Solid and Hazardous Waste Management
AR 420-47

Solid Waste Disposal Act, 1965
42 U.S.C. Sec. 6901

Solid Waste Management
AZ Title 49-901 through 49-973 or A.R.S. 49-701 to -868

Solid Wastes and Hazardous Wastes from Federal Facilities
42 U.S.C. Sec. 6961

Solid Wastes in General
42 U.S.C. Sec. 3251 et. seq. and 6901 et. seq.

U.S. Army Physical Security Program
AR 190-13

Wastewater Discharges from Federal Facilities
33 U.S.C. Sec. 1323

MANAGEMENT PLANS: Some of the management plans outlined below are required by federal law while others are initiated by the installation as a means of monitoring the conditions of current management practices. In cases where aspects of the management plans are left to the discretion of the facility Army regulations are followed to maintain consistency with other Army installations.

Water and Sewage AR 420-46AMCISA, YPG Environmental Management Plan (provisional). 1991, updated USAPG ES-E 1992 and 1994.

Camp, Dresser & McGee, Inc., YPG Spill Prevention, Control and Countermeasures (SPCC) Plan and Installation Spill Contingency Plan (ISCP). 1989.

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Preservation Plan, Phases 1, 2, and 3, Yuma Proving Ground. 1995.

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Associated Industrial Activities, Pollution Prevention Plan Yuma Proving Ground. 1994.

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YPG Annual Hazardous Waste Minimization (HAZMIN) Plan. 1988-92.

YPG Guidance for Storm Water Discharges from Construction Activities, EPA General Permit,

Storm Water Pollution Prevention Plan, Yuma Proving Ground. 1993.

YPG Hazardous Waste Management Plan (Preliminary) Yuma Proving Ground. 1991.

Yuma Proving Ground STEYP-ES-E, Army Hazardous Waste Minimization and Pollution Prevention Plan. Dec 1993.

PERMITS AND LICENSES: Permits have been obtained or permit applications have been submitted for Yuma Proving Ground based on RCRA regulations and section 404 of the Clean Water Act. Furthermore, the Arizona Aquifer Protection Permit Program set forth in A.R.S. 49-203 and 49-241 through 251, and A.A.C. R19-8-101 through 130 has issued YPG several permits.

AQUIFER PROTECTION PERMIT PROGRAM

Air Cargo Test Prep Lagoon
APP 900392

44-600
Main Admin. Area Lagoon
APP 100796

44-608
Laguna Airfield Lagoon
APP 100795

44-609
Kofa Firing Range Lagoon
APP 100794

44-610
Castle Dome Heliport Lagoon
APP 100793

44-611
Materiel Test Area Lagoon
APP 100797

YPG Firefighter Training Pit
APP 101346

Arizona Solid Waste Disposal Permit, YPG Sanitary Landfill.
APP 101049

DU Catchment Facility
APP 102901

WATER SUPPLY PERMIT PROGRAM

14-102
Yuma Aerostat Water Supply System

14-361
Laguna Airfield Water Supply System

14-363
Materiel Test Area Water Supply System

14-364
Castle Dome Water Supply System

14-367
Kofa Firing Range Water Supply System

14-371
Air Cargo Test Facility Water Supply System

14-403
Main Administrative Area Water Supply System

NPDES PERMITS

EPA Notice of Intent (NOI) to operate in accordance with 40 CFR 122.26 NPDES General Permit for Storm Water Discharge Associated with Industrial Activities. There are sixteen YPG industrial activities regulated.

EPA NOI to operate in accordance with 40 CFR 122.26 NPDES General Permit for Storm Water Discharge from Construction Activity. Presently there are eight Base Realignment And Closure (BRAC) related major construction activities in progress which are regulated by the General Permit.

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APPENDIX C - COMMENT RESPONSE DOCUMENT

FINAL RANGE WIDE ENVIRONMENTAL IMPACT STATEMENT

Table of Contents

CHAPTER 1: THE PUBLIC COMMENT PROCESS

1.1 INTRODUCTION

Public involvement is crucial to the National Environmental Policy Act (NEPA) process. During the drafting and revision of the Range Wide Environmental Impact Statement (RWEIS), input from the public and other government agencies was actively sought. These comments were included in the formation of the preferred alternative. This Comment Response Document (CRD) describes how public and other agency input was gathered on the Draft RWEIS. The CRD also contains the responses of Yuma Proving Ground (YPG) to public and agency comments. The CRD is a supplement to the *Public Involvement Plan* published December 27, 1995. The *Public Involvement Plan* describes how the public would be involved from project initiation through Draft and Final RWEIS versions. A separate *Public Meeting Plan,* dated July 22, 1996, was written for public scoping meetings. The public commentary process was run by Gutierrez-Palmenberg, Inc. (GPI) in association with the YPG environmental programs.

1.2 PUBLIC OUTREACH

GPI notified the public community on the availability of the Draft RWEIS, public meetings, and the procedures to follow on voicing comments. The Notice of Availability (NOA) for the Draft RWEIS was published August 18, 1998. A copy of the NOA is included as exhibit A. The public outreach effort included announcements on radio and television, in newspapers, and on fliers. A toll-free number (800-330-1348) was established for the public to comment telephonically. In an effort to reach non-English speaking communities, all materials were also released in Spanish. Copies of the English and Spanish fliers and press releases are included as exhibit B.

1.2.1 Television

The following is a list of television stations that were provided press releases of the availability of the Draft RWEIS and the public meetings:

KECY
KSWT
KYMA
KAWC*
Sun Television (cable)

1.2.2 Radio

The following is a list of radio stations that were provided press releases of the availability of the Draft RWEIS and the public meetings:

KEZC/KJOK*
KTTI/KBLU*
KYJT*
KCFY
OUTPOST-YPG*
KBUX
KNLB (Lake Havasu, Arizona)

1.2.3 Newspapers

The following is a list of newspapers that were provided press releases of the availability of the Draft RWEIS and the public meetings:

Yuma Daily Sun*
Yuma Advantage
Cactus Comet - MCAS*
Super Shopper*
Quartzsite Gem*
Imperial Valley Press
Parker Pioneer*
Arizona Republic*

1.2.4 Fliers

The following is a list of locations or organizations where fliers were posted or distributed. All locations were provided with fliers in both English and Spanish.

Yuma County Library
Yuma City Hall (180 W. 1st St.)
Yuma City Hall (100 N. Main St.)
Yuma County Courthouse
Convention & Visitor Bureau
Arizona Historical Society/Century House
Circle K Corporate Offices (24 copies of each)
Denny's (I-8 & 16th St.)
La Fuente Inn
Motel 6
McNeese Shell (24th & 4th)
8th St. Coin Laundry Mat (2 copies of each)
Super Suds (1701 S. Ave. B; 2 copies of each)
Yuma Market
Walmart
K-mart
Target
Walgreen's (16th & Ave. B)
Rite Aid (4th Ave.)
Southgate Mall
Fry's Grocery
Smith's
Albertson's
IGA
Del Sol Supermarket
Basha's Mercado
Jim's Harley Davidson
Pioneer Shopping Center (Foothills)
Texaco Gas Station (Foothills)
AEA Credit Union (Foothills)
VFW #8242 (Highway 95)

1.2.5 Toll-Free Number

A toll-free number (800-330-1348) was established for the public to comment telephonically. No comments were received by telephone.

* Denotes locations provided materials in Spanish.

1.3 PUBLIC MEETINGS

Two public meetings were held in the Yuma area during the 45 day comment period for the Draft RWEIS (August 18, 1998 through October 2, 1998). The purpose of these meetings was to educate participants about the Draft RWEIS and solicit their comments on the document. The meetings were organized and facilitated by GPI in cooperation with YPG environmental programs.

1.3.1 Meeting Locations, Dates, and Times

Palm Garden Community Center
Building 530
YPG Main Post
Date: September 28, 1998
Time: 3:00 P.M. to 6:00 P.M.

Yuma Civic and Convention Center, West Wing
1440 Desert Hills Drive
Yuma, Arizona
Date: September 30, 1998
Time: 2:00 P.M. to 8:00 P.M.

1.3.2 Meeting Facilitators

Staff and ID Team Members who were available to answer questions are listed in table C-1.

1.3.3 Format

The public meetings followed an informal one-on-one format. This was the same format used during the scoping meetings at the initiation phase of the RWEIS. In this type of setting, the Army gives the public the opportunity to speak with subject matter experts who record public concerns and issues expressed during discussions. Discussions were limited to comments on the Draft RWEIS.

1.3.4 Meeting Places

The Yuma Convention Center, West Wing was selected for the site of the Yuma meeting. The Palm Garden Community Activity Center was used for the meeting with YPG personnel and public attendees.

1.3.5 Meeting Organization

The meeting room was organized to have participants first encounter an EIS Core Team member seated at an *OVERVIEW* table. At this table, attendees were greeted and given an

TABLE C-1
RWEIS and ID Team Staff

Name	Degree(s)	Professional Experience	Project Affiliation
Tracey Epperley	B.S. Mechanical Engineering	1991 - 2000	YPG Project Officer, Air, NEPA, Noise, Water (YPG, 1995-2000)
Sylvia Fisk	B.S. Geology	1985 - present	Geology, Air, Water (GPI, 1995-1999)
Veronica Garcia	A.A. General Studies B.S. Environmental Science/Biology	1996 - present	Air, Water, Hazardous Materials, Biology (GPI, 1995-1999)
Delores Gauna	A.A. General Studies B.A. Liberal Studies	1994 - present	YPG Cultural Resources Manager (YPG, 1995-present)
Junior Kerns	B.S. Wildlife Management & Biology	1977 - present	YPG Project Officer, Biology, NEPA (YPG 1995-present)
Steve Lewis	B.S. Engineering	1989 - present	Hazardous Substances, Health & Safety, Utilities & Support Infrastructure, Noise (GPI, 1995-1999)
Kimberly Maloney	A.A. Environmental Science	1992 - present	Alternatives, NEPA (GPI, 1995-1999)
Karen Reichhardt	A.A. Geology B.A. Geology/Biology M.A. Botany	1976 - present	GPI EIS Task Manager, ID Team, Biology, NEPA (GPI, 1995-1999)
James Smithwick, Ph. D.	B.A. Anthropology/ Sociology M.A. Anthropology Ph. D. Environmental Science	1972 - present	Quality Control, Cultural Resources, Sociology, NEPA (GPI, 1995-1999)
Lisa Perot-Woolfolk	B.A. Mass Communications M.B.A. Marketing	1982 - present	Writer, Editor (GPI, 1995-1999)

orientation on the organization of the meeting. Participants were then encouraged to go to any or all of various tables in the meeting. Each table was staffed by a GPI facilitator or a YPG environmental programs employee. Attendees were encouraged to discuss their concerns over the Draft RWEIS. A three-minute computerized presentation was projected for viewing at the entrance. The presentation was run continuously during the meetings.

1.3.6 Press Room

A room divider was used to partition the room into two halves. The other half of the room was used as a press room. Mr. Junior Kerns was available at a table in the press room to answer questions and provide an orientation for members of the press.

1.3.7 Meeting Room

Inside the main meeting room, six round tables were placed in a circular pattern around the room. Each table had sharpened pencils and blank comment cards on them. Each table was identified by a stand-up card. Traffic flow was from one table to the next, allowing participants to speak with a subject matter expert at each table. Overall topics and facilitators are shown below. Ms. Karen Reichhardt and Ms. Veronica Garcia were available to interpret meeting conversations with Spanish speaking attendees.

OVERVIEW, front table *(L. Woolfolk)*
ALTERNATIVES CONSIDERED (K. Maloney and V. Garia)
BIOLOGICAL RESOURCES, UTILITIES AND SUPPORT INFRASTRUCTURE (K. Riechhardt)
CULTURAL RESOURCES, SOCIOECONOMICS, NOISE, LAND USE (Dr. J. Smithwick)
AIR, WATER, SOILS, TRANSPORTATION (S. Fisk)
HAZARDOUS MATERIALS MANAGEMENT, HEALTH AND SAFETY (S. Lewis)
PRESS ROOM (J. Kerns)

1.3.8 Discussion Groups and Individual Discussions

Presenters stationed at each table encouraged participants to discuss their topics of interest. Presenters discussed the RWEIS - its depth, purpose of, and need for action, goals, etc. Presenters attempted to learn what specific concerns the participants had, and to get them to commit these concerns to a comment sheet and hand it in at the meeting. Presenters did not take a position or speak on behalf of the government. For specific information about YPG operations, participants were directed to speak with environmental programs officers Mr. Junior Kerns and Ms. Tracey Epperley.

CHAPTER 2: PUBLIC COMMENTS AND YPG RESPONSE

2.1 INTRODUCTION

Yuma Proving Ground received comments from 15 people and agencies. Comments were provided by mail and written responses at public meetings. No responses were received by telephone. Comment letters were addressed to Mr. Charles Botdorf (Acting Director, YPG environmental programs), Mr. Junior Kerns (Wildlife Biologist, YPG environmental programs), Ms. Tracey Epperley (Environmental Engineer, YPG environmental programs), or Ms. Karen Reichhardt (RWEIS Team Leader, GPI). Ms. Tracey Epperley and Mr. Junior Kerns were the project officers for the RWEIS.

2.2 PUBLIC COMMENTS AND YPG'S RESPONSES

2.1.1 List of Comment Letters

Comment letters are listed in table C-2. Each letter is assigned a number for reference.

2.1.2 Comments and Responses

Comments have been quoted from the letters and responded to in the order the subjects appear in the RWEIS.

TABLE C-2
Comment Letters and Reference Numbers

Reference number	Name of agency or individual	Date
1	John Colvin Jr., Yuma, AZ	September 20, 1998
2	Arizona Desert Bighorn Sheep Society	September 25, 1998
3	Jon Fugate, The Yuma Valley Rod & Gun Club, Inc.	September 28, 1998
4	Bryan Morrill, Yuma, AZ	September 30, 1998
5	U. S. Fish & Wildlife Service Kofa National Wildlife Refuge	September 28, 1998
6	Arizona Department of Mines and Mineral Resources	September 29, 1998
7	Arizona State Historic Preservation Office	September 29, 1998
8	United States Department of the Interior Bureau of Land Management Yuma Field Office	September 30, 1998
9	Defenders of Wildlife National Headquarters, Washington, D.C.	October 1, 1998
10	The Hopi Tribe	October 2, 1998
11	Arizona Department of Environmental Quality	October 8, 1998
12	United States Marine Corps Marine Corps Air Station, Yuma, AZ	October 15, 1998
13	Arizona Game & Fish Department, Habitat Branch	October 16, 1998
14	Environmental Protection Agency, Region 2 Strategic Planning and Multi-Media Programs Branch	October 16, 1998
15	Ron Kearns, Kofa National Wildlife Refuge	October 17, 1998

SOURCE	COMMENT	RESPONSE
Issue: General		
1	Decisions should be left to the managing unit...mostly YPG with reasonable technical input from the appropriate or supporting discipline when requested.	Agreed. See Development Criteria on page 12.
1	Must commend the effort for a well done report.	Thank you.
4	Excellent draft, no discrepancies. Transition to the draft RWEIS to next level should be acceptable.	Thank you.
7	Thank you for providing this office with a copy of the draft RWEIS. It appears that most of the comments offered in my letter to you of March 20, 1997, have been addressed in the revised document.	Thank you.
8	The draft EIS is generally easy to read and shows good editing. The maps and layout of the document are pleasing.	Thank you.
11	Overall, the RWEIS is a well-written, well organized document. It clearly covers all of the requirements of NEPA. However, the documents use a number of acronyms and initials. It is normal writing style to define these the first time they are used; however, the reader must make frequent use of the appendices throughout the document to figure out the meaning of many terms, acronyms and initials. It is good practice to have both; a list of defined acronyms used in the text, and to define the acronym the first time they are used.	Thank you. Acronyms are defined the first time they are used, and defined again in the List of Acronyms and Abbreviations.
11	The mission of YPG is military in nature involving training and testing with a variety of munitions, vehicles (both wheel and track), fixed and rotary wing aircraft, etc. It is difficult to interface this mission with environmental stewardship. However, actions can be taken to prevent unnecessary degradation to the environment, and those activities should be sought.	Comment noted.
12	MCAS Yuma is referenced on several pages as MCAS-Yuma. Please remove the "-".	Removed "-" from MCAS Yuma.

SOURCE	COMMENT	RESPONSE
12	Overall your Draft RWEIS is well written and of excellent quality. It is a good example of what a Programmatic EIS should look like, and you have adequately covered all the important environmental issues for Yuma County.	Thank you.
13	The Department is concerned about the adequacy of this document as an Environmental Impact Statement (EIS) and its usefulness for incorporating environmental consequences into the decision making process. One of the primary purposes of the National Environmental Policy Act (NEPA) is to ensure that environmental consequences are considered in decision making processes. Consistent with NEPA, the Department believes that this document should provide a detailed description of the proposed action, alternatives, associated impacts, mitigation (if necessary), and monitoring. In addition, the Department does not believe that this document adequately describes specific actions related to the various alternatives. This leads to inadequacies in the document for describing and quantifying impacts (direct, indirect, short-term, long-term, and cumulative), developing and describing mitigation and monitoring and making comparisons of environmental impacts associated with the various alternatives. These concerns are consistent with comments provided in the Department's letter on the Preliminary Draft RWEIS, dated August 12, 1996 (Department letter enclosed).	In depth, detailed discussion of specific projects is beyond the scope of this programmatic Environmental Impact Statement. Project specific details will be discussed in the project's separate National Environmental Policy Act documentation. National Environmental Policy Act documentation for future projects will tier to the Range Wide Environmental Impact Statement

SOURCE	COMMENT	RESPONSE
14	According to the draft RWEIS, the document will be used as a document to tier off of when individual actions, as part of a selected alternative, are examined further in individual NEPA documents. As such, the draft RWEIS evaluates the environmental impacts that would be associated with the various alternatives in a general manner. EPA believes that the draft RWEIS adequately evaluates the resources of concern (e.g., ground water, biological resources, riparian areas) in the potentially impacted environment; however, we agree that more specific environmental analyses will need to be prepared, and mitigation measures developed, in order for EPA to fully evaluate the potential adverse impacts associated with the potential action(s). With this in mind, we strongly recommend that the final RWEIS and Record of Decision document the Army's commitment to prepare more detailed NEPA analyses for specific actions pertaining to the selected alternative	Noted.
14	In conclusion, based on our review and in accordance with EPA policy, we have rated this draft RWEIS as EC-2, indicating that we have environmental concerns due to the lack of detailed analyses pertaining to actions associated with the implementation of a preferred alternative, and that additional information should be presented in the final RWEIS (if possible), Record of Decision, and subsequent NEPA documents tiered off the RWEIS in order to address our concerns.	The Final Range Wide Environmental Impact Statement contains as much detail as possible given the programmatic nature of the document. Additional information on impacts of the preferred alternative has been included in the final version. Tiered documents will be project and detail specific.
15	My understanding is this EIS is an umbrella document and the refuge staff will be notified of the availability to comment on lower tier documents disclosing “site-specific impacts, especially for cultural and biological resources.”	This is correct.
15	The RWEIS was well written, organized, and mostly complete. [The ID team’s] effort is to be commended.	Thank you.

SOURCE	COMMENT	RESPONSE
Issue: Cover		
11	Cover: The statement, "[.]...in concert with the environment" is contradictory to the mission of YPG. While YPG has an obligation to comply with environmental laws, and be as "environmentally friendly" as possible, its mission is primarily for testing a variety of military material, particularly munitions. The RWEIS points out many instances where training and operations cause impacts on (particularly) animals, birds and plants.	The phrase "...In concert with the environment." expresses the US Army's commitment to execute its mission in an environmentally friendly manner.
Issue: Executive Summary		
5	On page S-3 of the Executive Summary you make the statement, "The negative impacts of diversifying YPG are outweighed by positive management of resources and mitigation of negative impacts." This statements seems to me to be a subjective value judgement and somewhat premature. Regardless of which alternative action is undertaken, time will be the ultimate judge of whether or not the positive impacts outweigh the negative.	Rephrased for Final Range Wide Environmental Impact Statement.
Issue: Purpose and Need 1.0		
8	Page 1, 1.1 INTRODUCTION should include a statement regarding ownership and status of YPG, similar to the following: Public Land Order 848, dated July 1, 1952, withdrew and reserved certain public lands in Arizona for the use of the Department of the Army in connection with the Yuma Test Station, pursuant to Executive Order No. 10355 of May 26, 1953. YPG lands are withdrawn from all forms of appropriation under the public land laws, including the mining and mineral leasing laws. Public Land Order 848 provides that YPG lands shall be returned to the administration of the Department of Interior when they are no longer needed for the purposes for which they are reserved. PLO 8476 dated September 28, 1983, withdrew 253 acres in Tps. 7 and 8S., R21W, G&SRM, from surface entry and mining for use by Department of Army for military purposes. The land remains open to mineral leasing.	Text added to section 1.1.2.

SOURCE	COMMENT	RESPONSE
8	Somewhere in this section a reference should be made to the following, and the RWEIS should state that the RWEIS and decisions/management actions will not affect agreements set forth in the Memorandums of Agreement and Cooperative Management Agreements. In July 1978, YPG, U.S. Army, and BLM entered into a Memorandum of Agreement relative to the management of wild, free roaming horses and burros on YPG. In September 1988 the two agencies entered into a Cooperative Management Agreement (CMA) for improving the management efficiency of land, natural resources, and facilities of interest to both parties. The [Cooperative Management Agreement] does not supersede the 1978 [Memorandum of Agreement]; it expands on it to touch all facets of the working relationship.	Development criteria table in section 2.1.2 states "Valid existing rights and formalized agreements are protected and maintained as required by law." This applies to Memorandums of Agreement and Cooperative Management Agreements.
8	Somewhere in the INTRODUCTION section - or possibly on page 12, Development Criteria for Alternatives Considered - it should be pointed out that YPG lands would be returned to the administration of the Department of Interior when they are no longer needed for the purpose for which they are reserved. Privatization ventures would then be turned over to BLM or phased out.	Comment noted. Yuma Proving Ground acknowledges that lands no longer required for military purposes are relinquished back to the Department of the Interior. Yuma Proving Ground does not anticipate relinquishment of any lands during the next 15 years. Closure of Yuma Proving Ground resulting in the release of all withdrawn lands is not considered a practical alternative. Closure would require an act of Congress and is beyond the scope of this Environmental Impact Statement .
Issue: Alternatives 2.0		
2	The [Arizona Desert Bighorn Sheep Society] recommends selection of Alternative B, the reduction of baseline activities, as the alternative that would be the least impacting to desert bighorn sheep and their habitat.	Noted.

SOURCE	COMMENT	RESPONSE
5	We are concerned ... to learn of the expected increase in military activities associated with Alternative E - diversified Mission (your preferred alternative). Despite your thorough discussion and positive approach to mitigating negative impacts, an increase in military activity over and around Kofa NWR would be contrary to our mission and objectives. The FWS cannot control military overflights, indeed, agreements are in place which specifically address the issue. None-the-less, the wilderness and wildlife values that we at Kofa NWR are charged with protecting cannot be best served by continued increasing levels of disturbance.	Alternative E was not the preferred alternative. No preferred alternative had been selected at the time the Draft Range Wide Environmental Impact Statement was published. Alternative E was included to demonstrate an approach to ultimately determining what the preferred alternative would be. The preferred alternative would involve different levels of military activities than under the No Action alternative (less direct Army testing, more non-Army military testing, more military training) and probable increases in compatible, non-military activities (which offer indirect support and supplementation of the military mission). This approach allowed decision makers to "pick and choose" from a range of activities analyzed under alternatives "B", "C", and "D". Text added to section 4.5 to address specifically impacts to the Kofa Wildlife Refuge. Yuma Proving Ground and the Department of Army policy is to consider and support the needs and desires of adjacent land owners and managers when conducting activities in support of our mission. To the extent practical, without unduly, adversely affecting the military mission, activities over the Kofa National Wildlife Refuge will be assessed for impact and coordinated with Refuge staff in an attempt to accomodate for the missions of both agencies.
5	We would support Alternative B - Decreased Military Mission. The primary purpose of Kofa NWR is to protect and enhance the population of desert bighorn sheep within the refuge. Although some literature suggests that sheep are only marginally disturbed by military overflights, certainly the fewer, the better as far as sheep are concerned.	Noted.
8	Page 15, 2.1.4.1 Kofa Region. Add the following as a last sentence: The eastern and southern outer boundaries of the Kofa Region border Bureau of Land Management (BLM), state, and privately owned lands.	Text added to section 2.1.4.1.
8	Page 15, 2.1.4.1 Cibola Region, 16, 17. Delete the words "Bureau of Land Management" and the patents around BLM. See (3) above, which addresses the acronym. The sentence should now read: "...western border of YPG and the inner eastern border adjacent to BLM and privately owned lands."	Text modified in section 2.1.4.2.
8	Page 15, 2.1.4.2 Add BLM in front of Trigo Mountain Wilderness.	Text modified in section 2.1.4.2.

SOURCE	COMMENT	RESPONSE
8	Page 15, 2.1.4.3 Laguna Region. Add the following last sentence: The Laguna Region is bordered on the west and south by BLM and privately owned lands.	Change made.
8	Page 21, 2.2 Alternative A - Baseline Activity Levels. Include discussion of the U.S. Customs Aerostat ground facility and Special Use Airspace.	The U.S. Customs Special Use Airspace is pictured in figure 7. Due to the sensitive nature of the operation, this is the only information included. No actions under any alternative will affect the Aerostat facility.
8	Page 23, 2.2.1.2 Areas need to be shown on a map.	Hunting areas are shown in figure 4-1 of the Integrated Natural Resources Management Plan (1997).
8	Page 24, 2.2.2.2 Areas need to be identified on a map.	See previous response.
8	Page 29, 2.2.5.2 Blaisdell Railroad Siding. Unless YPG leases or owns some of the private land at the Blaisdell Railroad Siding, the YPG site is now approximately 40 acres - the 554-acre site was reduced to 40 acres when the site authorization was renewed in January 23, 1998. Revise the paragraph to read: This area comprises approximately 40 acres located south of the installation along U.S. Highway 95. The site is on BLM land, utilized by the Army under BLM Right-of Way AZA 30293.	Corrected according to Yuma Proving Ground information on land reduction.
8	Page 44, 2.5.1.2 Will additional areas in the east arm be opened or not? May be opened isn't much of a commitment.	No specific plans are proposed at this time. The opportunities presented were identified as possibilities under the range of non-military activities assessed in the Range Wide Environmental Impact Statement.
8	Page 45, 2.5.2.3 Privatization Ventures, 26. Revise the first sentence to read: Public Land Order (PLO) 848 withdrew and reserved public lands in Arizona for the use of the DOA in connection with the Yuma Test Station, pursuant to Executive Order (EO) No. 10355 of May 26, 1953. YPG lands are withdrawn from all forms of appropriation under the public land laws, including the mining and mineral leasing laws.	This information would be appropriate in Section 3.8 Land Use. Alternate uses that would be compatible with the military mission were considered for analysis. Consideration of any activity does not automatically include it in the preferred alternative.
8	Note: do a document search for the term “P.L. 848" or “Public Law 848" and edit to “PLO 848" or “Public Land Order 848.”	Corrected. Thank you.
3	Expansion of hunting opportunity into more areas of YPG is supported by the YVRGC.	Comment noted.

SOURCE	COMMENT	RESPONSE
3	In regard to examples of non-military activities under this alternative, we are not supportive about eliminating or reducing public access to sensitive habitat or conservation areas. More information is needed in order to understand where and why this may be necessary.	No sensitive areas have been declared under the preferred alternative. Should such actions be warranted, Yuma Proving Ground will use the National Environmental Policy Act process to ensure public involvement with such decisions.
3	Page 50, 2.6.1.1 If the use is increased in the east arm, how is the public access going to be controlled? Due to the remoteness of the area and a lack of an identifiable YPG boundary many times you can be on YPG and not know it.	Added discussion on impacts and management of increased use in East Arm to section 4.8.1.1. & 4.8.2.
3	Recreational activities discussed under this heading are already allowed by YPG, including hunting, provided that we have the necessary permit issued by YPG. If this is indicating that hunting will no longer be allowed in the East Arm of YPG in the White Tank area, it will not be supported by the YVRGC.	No plans exist at this time to reduce hunting areas in the East Arm of Yuma Proving Ground. Call boxes in the White Tanks area have been removed from the preferred alternative.
8	Page 51, 2.6.1.2 The idea of putting call boxes in the area of White Tanks is not appropriate. The entire area is sacred to the Native Americans.	Call boxes were just another in the "Range of alternatives" that were evaluated. As Yuma Proving Ground continues to develop extensive communication networks to support the test and training missions, provision of call boxes at selected locations may become practical, however they are not included in the preferred alternative.
3	Designating shooting ranges on areas of the Kofa region needs to be better explained, so that comment can be provided.	Shooting ranges have been removed from preferred alternative, since nearby public ranges already exist..
3	Emergency communication networks also needs better explanation provided.	Call boxes have been proposed for these areas to support increased recreational use. The Army is considering feasibility and options for such projects. No decisions have been finalized yet.
8	Page 52, 2.6.2.2 Line 40 does this imply that a road would be constructed into Hidden Valley? Please clarify.	Requests for an access trail into Hidden Valley were made during scoping. If such a trail is established, it would bypass wilderness. The trail would provide access for military and non-military (e.g. wildlife management) activities.
3	Public road access to Hidden Valley is supported by the YVRGC.	Noted.
3	Expansion of additional hunting opportunity expanding as far south as Crazy Woman Wash is supported by the YVRGC.	Noted.
3	Expansion of hunting opportunities in the Laguna region is supported by the YVRGC.	Noted.

SOURCE	COMMENT	RESPONSE
8	Page 52, 2.6.2.2 Why is there a sudden need for call boxes in the Cibola region? Whether it is legal or not the area north of Cibola already receives intensive recreation use.	Call boxes have been proposed for these areas to support increased recreational use. The Army is considering feasibility and options for such projects. No decisions have been finalized yet.
3	Expansion of hunting opportunity around the Blaisdell Railroad Siding is supported by the YVRGC. We are concerned however, that this area also being utilized for off-road vehicle use at the same time, may not be compatible. More information is needed.	Hunting or off road vehicle use at Blaisdell Railroad Siding is dropped from the preferred alternative in the final Range Wide Environmental Impact Statement.
8	Page 56, 2.6.5.2 Recreational Activities. The RWEIS states, "There is potential for opening acreage around Blaisdell Railroad Siding for hunting or off-road vehicle use." Note that the Blaisdell site is on BLM land, authorized under a BLM Right-of Way to Army. The right-of Way grant states that the people of the United States generally have access to lands owned, administered, or controlled by the United States. The BLM has retained the right to authorize use of the area for compatible uses, for access, and so forth. The RWEIS indicates that YPG may open the area for hunting or off-road vehicle use, while in fact, those hunting would be guided by State law and off-highway vehicle use would be guided by BLM regulations and policies. Also change "off-road" to "off-highway."	Section 2.2.5.3. Hunting and/or off-highway vehicle use at Blaisdell Railroad Siding site is dropped from the preferred alternative in the final Range Wide Environmental Impact Statement.
9	The goal of the National Environmental Policy Act (NEPA) is to promote environmentally sensitive decision making. Yet Charles Botdorf's cover letter indicates that the preferred alternative will be Alternative E. Letter from Botdorf, Environmental Service Division, Department of the Army, 8/19/98. This is quite disturbing as Alternative E is the alternative least explained in the RWEIS, with the minimal assessment of environmental impacts.	The preferred alternative is not alternative "E". Alternative "E" was included in the Draft Range Wide Environmental Impact Statement to represent an alternative consisting of components of the other alternatives. The preferred alternative, identified in the Final Range Wide Environmental Impact Statement as alternative F, contains elements of alternatives A, B, C, and D, but differs is several aspects from alternative E. Alternative "A" was the No Action alternative and described activities that occurred during the baseline years (1991-1995). Alternatives "B", "C", and "D" established a range of practical activities that were analyzed in the draft. Alternative "E" was created by combining elements of "A", "B", "C", and "D" into a single alternative. However, it was not intended to be the preferred alternative. The cover letter signed by Mr. Botdorf indicated "…the Army anticipates the preferred alternative will closely resemble alternative E-Diversified Mission." We apologize for any confusion this wording may have caused.

SOURCE	COMMENT	RESPONSE
9	As noted under the summary of Alternative E, "significant impacts could occur to geology and soils, biological resources, cultural resources, and socioeconomic." RWEIS at S-3.	Your agreement with this statement is noted.
9	The RWEIS requires serious revision with a much more thorough explanation of what exactly the Department of the Army envisions under Alternative E. As the RWEIS stands, Defenders believes that it was produced "without observance of procedure as required by law" and constitutes a violation of the Administrative Procedure Act.	The preferred alternative, alternative F, was developed after publication of the Draft Range Wide Environmental Impact Statement. Comments from the public, government agencies and tribal governments were considered in forming the preferred alternative. A detailed analysis of the preferred alternative is provided in the Final Range Wide Environmental Impact Statement. Therefore, the Army believes that the Range Wide Environmental Impact Statement complies with the procedural requirements of the National Environmental Policy Act and its implementing regulations. Moreover, the Range Wide Environmental Impact Statement is a programmatic document. Therefore, in accordance with the National Environmental Policy Act, potential actions and impacts are addressed in a more general manner than in a project-specific document. Future project-specific proposals resulting from the decisions made based on this programmatic Environmental Impact Statement will be subject to the National Environmental Policy Act process through documents tiered from the Range Wide Environmental Impact Statement.

SOURCE	COMMENT	RESPONSE
9	Our primary concern with Alternative E is that it fails to explain why the Army is choosing to privatize on federal land. This decision alone requires careful analysis to determine if this is within the scope and mission of the agency and is preferable to returning sections of the Yuma Proving Ground (YPG) to the public for wilderness values -- an alternative that is not even considered in this document but is an equally valid alternative. Secondly, the type of activities that will occur under privatization are not sufficiently developed for public analysis. The RWEIS does not come close to explaining the myriad of impacts that associated with privatization as required at NEPA and is clearly not useful as a planning document. The RWEIS states that the selected alternative includes, "a technology and conference complex center with a 27-hole golf course, a hot-weather automotive test center, and a cogeneration energy plant. Increased on site civilian population and related support facilities (markets, service stations, pharmacies, etc..) RWEIS at 5. Throughout the document, the Army superficially refers to these projects yet fails to provide the least sort of detail making it impossible to make a rational decision.	Privatization is a broad concept which may take a variety of forms, but will always be mission related or authorized by law. Each individual privatization initiative will be the subject of detailed National Environmental Policy Act Analysis. Detailed analysis of the individual examples of possible initiatives referenced is beyond the scope of this programmatic analysis. Alternative F, the preferred alternative, discusses privatization to the maximum degree possible in this type of document.
9	We understand that this is a programmatic document and that the Army plans to tier project specific NEPA documents under this RWEIS. However, for this document to be an accurate planning document, NEPA requires that impacts be assessed at this stage. How can one make a reasoned assessment of the alternatives, when not even a complete list of the projects to be undertaken is given? How can one propose mitigation measures if the effects of the selected alternative are unknown (or described)?	Impacts of a range of alternatives were analyzed in the Draft Range Wide Environmental Impact Statement. Impacts of the preferred alternative are analyzed in the Final Range Wide Environmental Impact Statement. In accordance with Environmental Protection Agency and Council on Environmental Quality guidelines, this Range Wide Environmental Impact Statement attempts to concisely present that analysis by summarizing the methods by which the Army assessed potential impacts and by presenting the major findings and conclusions in the text of the Range Wide Environmental Impact Statement. References are provided for more detailed information and can be found in the appendices or in the Administrative Record for this Range Wide Environmental Impact Statement. The Administrative Record is open to the public for evaluation. The Notice of Intent for this Range Wide Environmental Impact Statement explains how to obtain this information.

SOURCE	COMMENT	RESPONSE
9	The RWEIS states that the effects are unknown or have yet to be developed or "will require more detailed evaluation in future environmental documentation." RWEIS at 58. Yet NEPA requires that the agency make projections now, "[r]easonable forecasting and speculation is thus implicit in NEPA and we must reject any attempt by agencies to shirk their responsibilities under NEPA by labeling any all discussion of future environmental effects a "crystal ball" inquiry." Scientists for Public Information v Atomic Energy Comm'n., 481 F.2d 1079, 1091-2 (D.D.C. Cir. 1973). Until these projects have been further fleshed out it is impossible to assess the impacts, the cumulative impacts or established mitigation measures for this region.	As previously stated, the Final Range Wide Environmental Impact Statement provides a more detailed analysis of the environmental consequences than the Draft Range Wide Environmental Impact Statement. Moreover, the quote from the judicial opinion cited in the comment was taken out of context. The quoted statement was not made in reference to the adequacy of the analysis in a National Environmental Policy Act document, but rather to the fact that a federal agency had failed to prepare a National Environmental Policy Act document at all.
9	Defenders of Wildlife supports selection of Alternative B, Decreased Baseline Activities as a starting point. Based on the RWEIS this is the alternative with the least harmful impacts to wildlife, native habitat and the environment. Additionally, it is the only alternative that is adequately described for which the Army to make a reasoned decision. If the Army selects Alternative E as the preferred alternative, which is by its own account admittedly the least environmentally satisfactory of the proposed alternatives, Defenders will request that the EPA or US Fish and Wildlife Service refer the proposed action to CEQ.	Comment noted. As stated previously, alternative E is not the preferred alternative.
11	What contingencies and protocol are in place if Alternative C, increased Military Mission, were to occur. Military operations could increase 100 percent, or more, if YPG is involved with mobilization for war or national emergency. The sudden influx of large number of troops would have a substantial impact on the environment and infrastructure.	Alternative C does not address mobilization for war or national emergency since these actions are beyond the scope of this Range Wide Environmental Impact Statement.
11	The document does not select a preferred alternative. Instead, Alternative E - Diversified Mission, is implied as the preferred alternative in the Executive Summary. If Alternative E is the preferred alternative, or goal of the RWEIS, it should be declaratively stated.	Comment noted. As stated previously, alternative E is not the preferred alternative. The preferred alternative was selected after the draft review process and is described in the final document.

SOURCE	COMMENT	RESPONSE
11	2.1.4.5 Off-post Locations: The Barry M. Goldwater Range (BMGR) is mentioned throughout the document, but is not included here as a location used by YPG.	The Barry M. Goldwater Range is not currently being used, therefore, it is not mentioned as an off post location. It is a possible source for fired munitions that would impact inside the Yuma Proving Ground, and is identified as such.
11	2.4.1.1 Munitions and Weapons: It mentions here and elsewhere that, "[F]iring sources may originate from offshore naval ships,...". Presumably these would be cruise or other guided missiles. Please identify the types of munitions addressed.	This installation tests and develops new munitions. Identification of all the possible munitions that could be tested is not possible. Missile tests are conducted elsewhere.
11	E. 2.5.2.3 Privatization Ventures: It is noted there are 410 acres of private patented mining claims, yet no mention if they are active, dormant or abandoned. No mention or recommendation is made to the acquisition of these private lands by purchase, exchange or donation. Also, no mention to the impact to YPG's mission of the location of these areas.	The preferred alternative does not alter the current status of existing private patented mining claims. All of these mining claims are patented, inactive mines. The mission at Yuma Proving Ground is virtually unaffected by these claims, since they are inactive and mostly located in mountainous areas not often used for testing.
11	F. 2.6.1.1 Military activities: An "EM gun" (Electromagnetic gun) is mentioned, but nothing about its operation or potential environmental impacts.	The preferred alternative does not include further use or testing of the EM gun at Yuma Proving Ground.
12	Regarding Alternative B: This type of alternative is a major concern to this command since a decrease in any aircraft operations over the Yuma Training Ranges would affect the training mission of MCAS Yuma.	Comment noted.
3	In summary, the YVRGC will support [DoD] expanding hunting opportunities on YPG.	Noted.
3	What [YVRGC], as an outdoor wildlife-dependent and recreational organization, will not generally support is two-fold. First, in regard to expanding activities not relating to military preparedness, it will be hard for our organization to support destruction of wildlife habitat.	Impacts of and alternatives to all proposed projects would undergo project specific National Environmental Policy Act analysis, tiered to the Final Range Wide Environmental Impact Statement. No public private partnership ventures will occur unless they support or enhance the mission of Yuma Proving Ground. Any projects that would involve the destruction of wildlife habitat would be subject to project specific National Environmental Policy Act documentation, including a review of reasonable alternatives.
3	Second, [YVRGC] will never support the expansion of any activity on YPG when responsibilities, wildlife habitat or outdoor wildlife-dependent recreational activities managed by the Arizona Game and Fish Department (AGFD) are removed from YPG, **without prior consultation with the AGFD.**	It is Yuma Proving Ground Policy to consult with Federal, State, and local agencies and interest groups in the preparation of National Environmental Policy Act documentation.

SOURCE	COMMENT	RESPONSE
Issue: Introduction, Affected Environment 3.0		
11	G. 3.1.2 Topography: Topography is related to landforms. The discussion starts out with the geologic history of the area. There is no discussion about topographic relief, drainage patterns, high and low points, topographic features, etc. A generalized topographic map of YPG would have been useful for interpretation. The statement, "[w]hen mountains were carved from large uplifted earth blocks bounded by faults-" is not correct and makes no sense. The mountains were formed by uplifting fault blocks and carved by physical and chemical erosion.	Added text to section and changed sentence about fault block.
Issue: Air Resources 3.2		
	No comments received.	
Issue: Water Resources 3.3		
8	Page 73, 3.3 Water Resources Needs a discussion about water rights; e.g., Colorado River water rights (perfected?) groundwater flow and/or surface flow - quantity and availability will affect development and privatization efforts. Needs expanded discussion about requirements for water conservation, groundwater quality, quality of groundwater recharge, and water management planning, per Bureau of Reclamation's mission to improve water resource management and the efficiency of water use throughout the Western United States.	In section 3.3.2.3 Water Supply, the current entitlement of the Yuma Proving Ground for 55 acre feet of Colorado River water is discussed. It is also stated that there are negotiations underway to increase the entitlement to accommodate projected requirements. Groundwater quality is discussed in detail with references in section 3.3.2.2 Groundwater Quality. There is no recharge program in effect, all recharge in this area is naturally occurring.
9	The types of proposed activity on the Laguna region are troubling. We are shocked that the Army would even consider building a golf-course and 300 room hotel in the Sonoran Desert. This ecosystem, fragile and geographically limited, is host to a diverse wildlife that is not found anywhere else in the world. We find it outrageous that in a time of recognized conservation, the Army would suggest such a flagrant consumption of resources at the expense of an imperiled ecosystem.	Impacts of and alternatives to all proposed projects would be discussed in project-specific National Environmental Policy Act documents, tiered to the Final Range Wide Environmental Impact Statement. No decision regarding the possible golf course project has been made, however, if a golf course is eventually constructed, the policy of Yuma Proving Ground would be to build it in harmony with the environment and utilize the best available technology to conserve desert resources.

SOURCE	COMMENT	RESPONSE
9	Under Alternative D and E, the RWEIS states that water allocation for the Colorado River continues to be negotiated with BOR. RWEIS at [page] 155. We do not think that it is possible to make a reasoned determination of alternatives until you have completed those negotiations and informed the public of the outcome. Defenders believe that no water should be withdrawn from the Colorado River, unless it is done through the Lower Colorado River Multispecies Conservation Program. Therefore selection of Alternative C, D or E is a violation of the Endangered Species Act. Proposed luxury developments like a golf-course, hotel and private-vehicle testing facility are heavily dependent on water and the RWEIS states that they will derive this from groundwater withdrawals. The Sonoran Desert ecosystem depends on these same sources of water and should take priority. The RWEIS does not discuss the conflict of resources.	Water allocation is a different issue than water consumption. Water allocation is an authorization established through a regulatory process of the Bureau of Reclamation or the State of Arizona, depending on jurisdiction. The Bureau of Reclamation allocates Colorado River water in accordance with their regulations and after appropriate National Environmental Policy Act review. This analysis determined that (although consumption might vary) the Yuma Proving Ground allocation of Colorado River water would remain constant under all of the alternatives considered. Yuma Proving Ground's mission use of water would remain below the requested authorization under all alternatives. However, it should also be noted that any non-military activities (whether that be an agricultural outlease or a technology center complex) would be responsible for obtaining allocations of water from sources outside the military allocation. (Most activities would likely purchase allocations from other current users.) The allocations of water by Bureau of Reclamation do take the needs of wildlife and endangered species into consideration. As long as users do not exceed their authorizations, no harm should occur to these species. None of the alternatives assessed under the scope of this Environmental Impact Statement contain any combination of activities which would cause Yuma Proving Ground or any authorized user of Colorado River water to exceed their authorization. Any decisions regarding the preferred alternative (alternative F) would be implemented in compliance with the Endangered Species Act and all other applicable laws and regulations.
9	Defenders believes that there should be no increases in withdrawals from the aquifer.	Noted.
9	It is misleading to allege that "Increased ground water withdrawal amounts would corresponds with increased waste water discharges." RWEIS at 156. Very little water would return to the aquifer after being used on a golf course or to mitigate dust caused by the increased number of off-road vehicles. Evaporation and use in a hot arid environment would account for the majority. [S.I.C.]	The sentence has been removed from the Final Range Wide Environmental Impact Statement.

SOURCE	COMMENT	RESPONSE
9	Water contamination, though an issue of great concern, is barely touched on. How can the Army reasonably propose automobile testing and earth moving equipment testing in this region without considering the hazard substances from fuel spills into both riparian areas and groundwater and the many affects that these activities can have on wildlife.	The Final Range Wide Environmental Impact Statement does consider in chapter 4 potential impacts to groundwater and wildlife from the alternatives. The Range Wide Environmental Impact Statement concludes that due to existing procedures and best management practices, as well as any additional mitigation measures that might be necessary, the preferred alternative would comply with all applicable environmental laws pertaining to groundwater and wildlife, and would minimize impacts generally to the extent practicable. The Administrative Record for the Range Wide Environmental Impact Statement contains further documentation of measures used at Yuma Proving Ground to prevent contamination. Contamination prevention and cleanup procedures are found in: the *Installation Spill Contingency Plan,* the *Pollution Prevention Plan*, and the *Spill Prevention Control and Countermeasures Plan*. The Range Wide Environmental Impact Statement references these documents in section 4.3 Water Resources.
11	The comment about the sanitary landfill (line 34, page 78) does not go into further discussion on whether or not the landfill is lined, has monitoring wells, etc to support the conclusion made.	Arizona Department of Environmental Quality, based on federal requirements, granted a small landfill exemption for the Yuma Proving Ground landfill. Arizona Department of Environmental Quality has no reasonable cause to believe groundwater contamination is occurring. Therefore no liner or groundwater monitoring wells have been required.
11	Same page, line 42: "POL bladder test spill site". No mention is made of site remediation intentions.	Before site remediation or restoration can be accomplished, a complete site characterization of the extent of potential contamination must be determined. We are in this process now.
Issue: Geological and Soil Resources 3.4		
6	Nothing in your document would lead me to believe that the Yuma Proving Ground isn't taking from Arizona the potentially largest and best mineral deposit in the state. Minerals were ignored by your report and your committee except for some small and insignificant referencing that minerals were being withdrawn.	Opinion noted. Section 3.4.2 summarizes basic mineral resource information about Yuma Proving Ground and the vicinity. The issue of "mineral development/mining" was considered at length by the Environmental Impact Statement preparation team. Mineral development/mining was left out of the preferred alternative due to conflicts with the mission, potential environmental impacts, and comments received on the Draft Range Wide Environmental Impact Statement.

SOURCE	COMMENT	RESPONSE
6	This land has been withdrawn from mineral exploration for over 50 years. Your references are 50 years old and mineral discovery was not the purpose of the study. In fact the way it was done almost suggests that they and their potential benefit to Arizona were specifically excluded from consideration.	The Public Land Order that established Yuma Proving Ground closed the lands to mining and mineral leasing. Mining was considered incompatible with the military mission. For that reason, patented mines within the boundary were also closed. This Environmental Impact Statement process did consider allowing a resumption of mining activities in all or part of the installation. Yuma Proving Ground recognizes that it does not have exclusive jurisdiction to make such a decision, as the Bureau of Land Management regulates all mining on Army lands. However, mining was still considered a practicable activity, under the non-military alternative (alternative "D").
6	Until your Statement includes a detailed study of the mineral potential of the Yuma Testing Range it should remain open for mineral exploration and mineral location.	The Range Wide Environmental Impact Statement team determined that adequate information regarding the mineral potential of Yuma Proving Ground was available. A decision was made to not include mineral exploration and mining activities as part of the preferred alternative.
6	You have taken a low view of the area's mineral production potential without having good reason. I urge you to hold your statement until the areas has been explored by competent mineral explorationists. By locking up this property you may be robbing Arizona of an opportunity to find and develop a large mineral deposit.	Conflicts with the military mission, security concerns about access, safety concerns, and environmental effects were the significant factors in the decision to leave mineral exploration and mining activities out of the preferred alternative.
8	Page 76, 3.3.1.3, Line 11 "bedrock ormation" should be "formation."	Corrected.
11	Mining receives almost no mention.	Mining was considered as a potential activity under alternatives "D". See sections 2.5 and 2.6 of the Draft Range Wide Environmental Impact Statement. The Range Wide Environmental Impact Statement is programmatic in nature and no individual activities received detailed discussions in the Draft.
11	How have past mining activities impacted the environment at YPG[?]	Yuma Proving Ground has been closed to mining since establishment by Public Land Order 848. Closed and abandoned mines have presented some safety hazards such as abandoned explosives and open shafts to military personnel. Abandoned mines have benefitted some wildlife species such as bats and ringtail cats. Access roads have affected drainage and erosion at some sites. Mines can be an "attractive nuisance" to personnel, creating liability issues. These, and other issues were evaluated before dropping mining from the preferred alternative.

SOURCE	COMMENT	RESPONSE
11	Also, do current mining activities occur for Base activities?	No minerals or locatables are mined on Yuma Proving Ground. There are no documented conflicts between installation activities and mining that occurs outside the boundaries of Yuma Proving Ground.
11	How is the sand and gravel used for construction and roads obtained?	Generally sand and gravel for military and authorized non-military purposes (i.e. maintenance of public roads by county work crews) is extracted from existing borrow areas. In the event that new borrow sites are required, a National Environmental Policy Act review occurs and any required permits are obtained prior to excavation.
11	The basin and range description found in the Topography Section may be better suited here.	Added section from 3.1.2, Topography to section, 3.4.1 Geological Description.
11	A generalized geologic map would have been a good complement to the cross-section.	Geologic maps were used by the Environmental Impact Statement teams. Inclusion in the Range Wide Environmental Impact Statement would not significantly contribute to the document.
11	The average monthly temperature table (Table 3-1) does not appropriately reflect the possible temperature extremes. To convey to the reader a more accurate representation of temperature variations and the environmental stress that it creates, a mention of potential highs and lows, based on the 33 years of data collaborated is advised.	The all-time record high and low temperatures are now included in section 3.1.1, Climate.
11	No mention is made of common variety minerals: uses, sources, etc.	A summary list of minerals was included in the Draft Range Wide Environmental Impact Statement at 3.4.2.
11	Quarrying can also have impacts on air and water resources.	Noted.
11	A map identifying the active mine locations would be useful.	There are no active mine locations on Yuma Proving Ground.
11	3.4.5 Seismicity: [Arizona Department of Environmental Quality] agrees with the assessment; however, with the number of structures holding munitions and [Petroleum, Oil, and Lubricants] ([Underground Storage Tanks] and [Aboveground Storage Tanks]), some mention of resistance to seismic events would be useful. For example, what would be the horizontal acceleration required to rupture tanks or cause a release of a hazardous substance stored?	Release of hazardous substances due to seismic events is equally unlikely under any alternative. If such an event were to occur, the *Installation Spill Contingency Plan* or other appropriate incident plans document the response Yuma Proving Ground would use.

SOURCE	COMMENT	RESPONSE
11	3.4.6 Geological and Soil Resources by Region: What is impact of smoke testing to geological resources? This topic needs to be moved to another section.	Paragraph modified and moved to 4.4.1.1 of the Final Range Wide Environmental Impact Statement.
Issue: Biological Resources 3.5		
1	Presence of burros is unnecessary and interferes with day to day activities. They should be removed entirely. Horses should also be eliminated from YPG. They are a nuisance and create hazards for highway traffic.	Comment noted.
2	The RWEIS does not provide an adequate comparison of the impacts to desert bighorn sheep and their habitat by each of the alternatives.	The Range Wide Environmental Impact Statement attempts to accurately summarize the impacts of each alternative on bighorn sheep. The Army believes there is sufficient information in the Range Wide Environmental Impact Statement to make an informed selection of the preferred alternative.
2	The Arizona Desert Bighorn Sheep Society does not feel there was enough information provided in the RWEIS to help assess impacts to desert bighorn sheep and their habitat.	Further information can be found in the bibliography and administrative record, Biological Resources, deVos and Ough, 1986; Ough and deVos, 1986; Palmer, 1986.
5	Although some literature suggests that sheep are only marginally disturbed by military overflights, certainly the fewer, the better as far as the sheep are concerned.	Army policy is to minimize disturbance of all wildlife, including bighorn sheep, to the extent possible without unduly interfering with mission requirements.
8	Page 92, Line 1 Peregrine falcons are not known to nest on YPG. This should be made clear.	Text added to section 3.5.2. noting that Peregrine falcons are not known to nest on Yuma Proving Ground.
8	Page 92, Line 7 The line might be changed to read "...white-winged doves and mourning doves, have habituated to artillery testing disturbances while on YPG." Doves are migratory birds and may be exposed to human activities during the winter when they occupy other areas.	Text modified.
8	Page 92, Line 22 This sentence does not make sense. Does it mean that YPG is not required to consult with the U.S. Fish and Wildlife Service? Perhaps it should read: "The installation has determined that past activities have not required consultation with the USFWS."	Text modified.

SOURCE	COMMENT	RESPONSE
8	Page 92, Line 44, Page 164, Line 16 and Page 166, Line 12 Razorback suckers have been in Senator Wash Reservoir since its creation in the early 1960s, although additional stocking may have occurred. The lake was gill netted prior to the introduction.	Corrections noted.
8	Page 94, Line 44 Bats are predatory mammals. We suggest striking the word "predatory" at the beginning of this sentence.	Text modified.
9	Defenders is particularly concerned about the impacts to the Cibola region. This area abuts the Kofa National Wildlife Refuge and the Colorado River, and contains significant riparian areas -- all areas with heightened wildlife values. Therefore, activities in this area are more likely to affect wildlife resources and wilderness. The short paragraph describing privatization measures does not begin to describe the activities to be undertaken pursuant to Alternative E. RWEIS at 53. The RWEIS suggests that the Cibola area will be available to the motion picture industry to test and evaluate products, as for private and commercial testing of small arms, rack pads, tracked-vehicles, ride dynamics, tires, demolition equipment and techniques. Id. The impacts of these activities are unassessed.	The Cibola region does not actually share a border with Kofa National Wildlife Refuge or the Colorado River. Yuma Proving Ground recognizes the biological value of washes on the installation. Private partnership activities will be restricted to existing infrastructure, preventing additional impacts to areas of wilderness value. Potential impacts are assessed in a more general manner, as is appropriate for a programmatic Environmental Impact Statement. Each project will be assessed under National Environmental Policy Act for project or site specific impacts.
9	Mitigation measures of Biological Resources in this area are similarly not specific enough to base a reasoned decision. The Alternative E mitigation measure provides that "Yuma Proving Ground will consider implementing a mitigation plan which integrates environmental sustainability and carrying capacity in the ranges and consider setting aside sensitive habitats to ensure protection of those area." RWEIS at 169. This is an entirely non-committal statement which does not provide informed discretion afforded to an agency's decision-making, and is subject to challenge.	Mitigation measures for the preferred alternative are addressed in more detail in the Final Range Wide Environmental Impact Statement and will be included in the Record of Decision.

SOURCE	COMMENT	RESPONSE
9	The use of Laguna Army Airfield will result in increased use of airspace over the Kofa National Wildlife Refuge. Furthermore, Alternative E states that there will be an increase in long-range artillery firing into the Barry Goldwater Air Force Range and the Chocolate Mountains Aerial Gunnery Range. The impacts of the increases are not discussed in the impact section. We are aware that wildlife considerations exist in each of these areas, yet they are not considered in the RWEIS. Furthermore, the associated impacts of noise are harmful to both wildlife and recreational use though mentioned in the impacts section with regard to the YPG, they are not mentioned with regard to the increased impacts in the BMGR or CMAGR.	Long range artillery would not be fired into Barry M. Goldwater Range or Chocolate Mountain Air Gunnery Range, but from them into Yuma Proving Ground. Noise impacts from such firings would be the responsibility of the agency conducting such tests, and are addressed briefly in the Final Range Wide Environmental Impact Statement, section 4.9.
9	The Biological Resources section fails to address the specific impacts of Alternative E on wildlife in this region. "The golf course could impact desert washes." RWEIS at 168. This in no measure describes the effect of an unnatural oasis in the desert on wildlife, nor the associated impacts of discharge of pesticides on wildlife. There are no mitigation measures described which would [address] these impacts. Mitigation measures for this region are either combined or exactly the same as those specified for the Cibola Region.	Comments noted. The Final Range Wide Environmental Impact Statement discusses in further detail impacts to wildlife in the Laguna Region. Pesticides management is discussed in section 3.10. The golf course will also have to go through project specific National Environmental Policy Act documentation before construction that would address in detail specific mitigations for the proposed action.
13	It is difficult to evaluate impacts to wildlife resources associated with the alternative actions presented in the Draft RWEIS because these actions are not adequately described and related potential impacts are not quantified. Since proposed military activity and potential impacts to wildlife resources are not qualified for each alternative, environmental consequences can not be used as a decision factor for selecting an alternative as presented in this document. If an alternative is selected from this document, any future actions will still have to undergo the NEPA process (i.e., on a project-by-project basis).	Comments noted. All future actions will undergo the National Environmental Policy Act process. This Range Wide Environmental Impact Statement is evaluating cumulative effects of the proposed action on a programmatic level. Specific projects are mentioned as examples, and are not necessarily mandated by the preferred alternative.

SOURCE	COMMENT	RESPONSE
15	I've been scheduling airspace over the Kofa with Range Operations personnel, for deer and sheep surveys, since 1982. My first contact was with Red (whose last name I've forgotten) then Larry Swinford and Doug Sorenson. All three men have accommodated the refuge staff when ever possible over the sixteen year period. I have not ever been disappointed by their scheduling of our flights. The Fish and Wildlife regional pilot/biologist has commented that we have established a unique rapport with YPG Range Operations, seldom seen elsewhere. Larry and Doug have shown professional excellence and I appreciate the assistance they have provided. I usually give a week or two notice before scheduling flights, but many times they have rescheduled the airspace with just a one hour notice. Additionally, I've had a good professional working relationship with [Junior Kerns and Valerie Morrill], especially dealing with the desert tortoise. I want to continue this respectful relationship as YPG seeks to diversify, even though our missions are very different. As a veteran, I understand your efforts to expand operations and appreciate the opportunity to comment.	Comment noted. Thank you for your support and cooperation.
15	In our discussion at the public meeting, I expressed concern of expanded artillery firing over the refuge in R-2307. The trajectories go over some of the prime bighorn sheep habitat in the Castle Dome Mountains. With diversification I'm concerned that research and development (R&D) artillery firing, with it's inherent uncertainties, will increase to unacceptable levels. At present, we don't know the frequency of R&D firing and how many rounds, if any, fall into wilderness areas on Kofa. I would propose that an accurate accounting of errant rounds that may have impacted refuge lands be documented and shared with the refuge manager. I don't know if such information is kept or if it is classified, but the manager would need it for determining the minimum tool needed to remove rounds from wilderness areas.	Artillery development and testing is a critical mission element at Yuma Proving Ground. The frequency and requirements of future tests depends on Department of Defense priorities. New systems tests receive National Environmental Policy Act evaluation before testing begins. Kofa National Wildlife Refuge staff are encouraged to participate in this process unless national security concerns prevent public participation. Yuma Proving Ground welcomes suggestions to reduce or remove impacts, as long as test requirements are met. To the best of our knowledge, no rounds have impacted into the Kofa National Wildlife Refuge since 1985. Records from before this time are incomplete, and verification of any rounds impacting the wildlife refuge is not feasible.
15	I assume that artillery and munitions engineers have confidence limits for anticipated impacts and that data would be available in detailed form in a lower tier document that we could comment on later.	Correct.

SOURCE	COMMENT	RESPONSE
15	For similar reasons, I would oppose artillery firing (with trajectories traversing King Valley) to the East Arm of the Kofa Firing Range. R&D firing would be especially opposed. Again, the refuge staff would need further information when and if firing is considered in this area that has not yet been impacted.	Comment noted. However, please note that a dedicated impact area (as shown on figure 4) has existed for many years in the East Arm of the Kofa Region. To achieve required test distances, this or other new impact areas may be required in the future.
15	I would be opposed to closing the road that crosses the East Arm leading to the refuge (towards refuge marker #48 intersection) and closure of existing hunting opportunities.	Comment noted.
Issue: Cultural Resources 3.6		
7	Thank you for providing this office with a copy of the draft RWEIS. It appears that most of the comments offered in my letter to you of March 20, 1997, have been addressed in the revised document.	Thank you.
8	Page 97, 3.6.2 Why is there no mention of White Tanks in the cultural section?	Text added to section 3.6. White Tanks is also addressed in section 3.12.2.
10	The Hopi people have a long historical connection to the area of the Yuma Proving Ground. This connection is founded on the traditional migration histories of the Hopi Rattlesnake, Water, Bow, Greasewood, Reed, Bear, Bearstrap, Spider, Sand, and lizard Clans, among others, who traveled through and resided in villages on or near the Yuma Proving Ground. As such, these specific Hopi clans may retain contemporary cultural and religious affiliations with specific areas, including archaeological sites, sacred places, and traditional cultural properties, located within the area of the Yuma Proving Ground. However, this document fails to adequately consider the concerns and interests of the Hopi Tribe and other Native Americans with respect to each of the alternatives. At best, this document provides little more than cursory lip service to these issues.	Text added to section 3.6.5. Native tribes have been invited to participate in the consultation process concerning cultural resources on Yuma Proving Ground.

SOURCE	COMMENT	RESPONSE
10	Specifically, this document fails to recognize the *trust responsibility* of the U.S. Army to Native American tribes in providing access to and protection of sacred places as directed under Executive Order 13007. It appears that there has been a significant failure by the U.S. Army Yuma Proving Ground to contact Native American tribes, that may have ancestral, historical, and contemporary connections to the Yuma Proving Ground, regarding the identification, protection, and future management of sacred sites located within the area covered by this draft EIS. This situation needs to be rectified prior to the finalization of this environmental document.	Text added to section 3.6.5. Yuma Proving Ground has access procedures in place in accordance with Executive Order 13007. The Hopi and other tribes have been invited to participate in Yuma Proving Ground consultation meetings concerning cultural resources issues.
10	Additionally, the Cultural Resource Section of this document is by far too vague and does not address the responsibility of the U.S. Army [Yuma] Proving Ground to initiate, coordinate, and integrate compliance with other relevant historic preservation and cultural resource legislation [i.e., National Historic Preservation Act (NHPA), Archaeological Resources Protection Act (ARPA), and the Native American Graves Protection and Repatriation Act (NAGPRA)], with the NEPA process outlined in this document. Even more surprisingly, this document fails to recognize the Department of the Army's ongoing efforts to develop counterpart regulation, in consultation with the Advisory Council on Historic Preservation, to stand in place of 36 CFR Part 800, for purposes of Army compliance with Section 106 of the National Historic Preservation Act. Each of these identified federal historic preservation and cultural resource legislations mandate the federal agency to consult, on a government to government relationship, with Native American tribes regarding the effects of the federal agency's undertaking on resources of traditional importance to Native American tribes. Again, this document fails to recognize or address this responsibility of the U.S. Army Yuma Proving Ground.	The Final Range Wide Environmental Impact Statement states in the first paragraph of section 3.6, "The YPG *Draft Resource Management Plan, Historic Preservation Plan* (1995) sets forth specific goals, policies, and procedures to identify, nominate, and protect archaeologic sites and other historic properties that are eligible or potentially eligible for nomination to the National Register of Historic Places. Environmental programs at YPG is currently writing an *Integrated Natural Resources Management Plan* which will supercede the *Draft Resource Managemetn Plan, Historic Preservation Plan*. The *Integrated Natural Cultural Resources Managment Plan* will be finalized in July, 1999." In addition, the plan addresses compliance with all federal laws and regulations regarding cultural resources and Native American issues. The Army believes it has appropriately addressed Native American Issues in both the text of the Final Range Wide Environmental Impact Statement and through consultation with Tribes throughout the NEPA process.
10	It is the Hopi Tribe's position that until the U.S. Army Yuma Proving Ground appropriately addresses the Native American issues presented in this letter, this entire draft [Environmental Impact Statement] is considered inadequate, in need of serious revisions, and should not be finalized.	Text was added to section 3.6.5. Yuma Proving Ground has an effective program of preserving and protecting its cultural resources. We feel that the effects of the proposed action on cultural resources have been adequately addressed in the Range Wide Environmental Impact Statement.

SOURCE	COMMENT	RESPONSE
Issue: Socioeconomics 3.7		
	No comments received.	
Issue: Land Use 3.8		
8	Page 110, 3.8.2 Fourth sentence - the information from Yuma County Planning Department is incorrect, if this is talking about Hidden Shores.	Information corrected.
8	Page 110, Line 38 and 39 This is debatable - there may well be incompatibilities between proposed developments on YPG and Hidden Shores.	Comment noted.
8	Page 110, 3.8.2 Adjacent Land Use. What about Fisher's Landing/Martinez Lake?	Added text to section 3.8.2. See also section 3.8.4.
8	Page 112, 3.8.4 Regional Recreation Resources. This section needs to mention nearby BLM and USFWS wilderness areas, BLM's recreation complex at Squaw Lake and Senator Wash, BLM's Hidden Shores recreation concession, and Martinez Lake/ Fisher's Landing. Also BLM's La Posa and Imperial Long-Term Visitor Areas (LTVAs), which bring many winter visitors to the area - the winter visitors enjoy facilities and amenities at YPG.	Added sentences in section 3.8.4 to include these areas.
Issue: Water Resources: 4.3		
8	Page 155 4.3.3. Effects of Alternative C. Increased military mission requires the same discussion re water resources and water allocation as the following section, 4.3.4. Also discuss requirements for water conservation, effects on groundwater recharge, and water management planning.	Concur. These topics are addressed for the preferred alternative in the Final Range Wide Environmental Impact Statement.
8	Page 155 4.3.4 Effects of Alternative D. Discuss requirements for water conservation, effects on groundwater quality, effects on quality of groundwater recharge, and water management planning.	Concur. These topics are addressed for the preferred alternative in the Final Range Wide Environmental Impact Statement.
8	Page 156, 4.3.5 Same discussion as (15) and (16) above re water conservation, effects on groundwater recharge, and water management planning.	Comment noted.
8	Page 156, 4.3.6. Mitigation Measures Common to all Alternatives. Suggest adding discussion re water conservation, water management planning, meeting requirements for quality of groundwater recharge, etc.	Added text to section 4.3.2.

SOURCE	COMMENT	RESPONSE
Issue: Geological and Soil Resources 4.4		
8	Page 158, 4.4.3.1 What are the consequences of these activities?	The consequences are discussed in more detail for the preferred alternative in the Final Range Wide Environmental Impact Statement.
8	Page 160, 4-7, and 17-25. YPG is segregated from mineral entry - not open to mining. Where would the mining occur? We suggest that all references to a commercial mining operation be deleted from this section as well as other sections within this document. The Yuma Proving Ground is closed to mineral entry by virtue of the military withdrawal.	The National Environmental Policy Act requires consideration and evaluation of reasonable alternatives. Within alternative "D", mining and mineral development was evaluated as a possible activity. Stipulations incorporated into Public Land Orders can be changed and should not be considered to prohibit consideration of this type of activity in the Range Wide Environmental Impact Statement. Only through an open discussion of the topic could the public and affected agencies provide input to the eventual decision. The decision makers who will use the Range Wide Environmental Impact Statement benefit from the input on all sides of this issue.
8	Page 160, 4.4.4.3 Laguna Region. Encouraging or developing off-highway recreational use may not be consistent with the military withdrawal for the Yuma Proving Ground. Opportunities for off-highway vehicle use are provided on nearby public lands in the vicinity of Senator Wash Reservoir, and regionally at the Algodones (Imperial) dune complex in California and at the Ehrenberg Sandbowl south of Ehrenberg, Arizona.	Comment noted.
9	[pgs. 158 &159] "Nor is there an adequate explanation of mitigation measures to be undertaken in this region. For example in the Geological and Soil Section there is a discussion of open-trench RDTE demolition projects will disturb the terrain. Further, new desert pavement is will be created as new activities expand established roads, ranges and buildings. Alternative C (encompassed within Alternative E) RWEIS at 158, 159. The only mitigation measures discussed are those in a section devoted to Mitigation Measures Common to all Alternatives. This section discusses the ITAM program but in no way explains how the above mentioned specific harmful impacts will be mitigated." [S.I.C.]	Mitigation is more thoroughly developed for the preferred alternative in the Final Range Wide Environmental Impact Statement. Public and agency comments were considered in developing mitigation and monitoring methods. The Record of Decision will also feature mitigation procedures.

SOURCE	COMMENT	RESPONSE
Issue: Biological Resources 4.5		
8	Page 164, "razorback suckers recently discovered" - see previous comment.	Text changed in section 4.5.1.4.
8	Page 165, Line 9 Deer hunters are limited to hunting in only certain portions of YPG. Likewise, desert bighorn sheep hunters are also limited but to a lesser degree. This should be described in the document. Potential changes to the areas that hunters may occupy (such as on page 168, line 4) should also be described in the document. A map showing these areas would be helpful.	Text changed in section 4.5.1.2. In the Cibola Region these are the areas north of Cibola Lake Road, the area west of Yuma Wash, and east of U.S. Highway 95 between mileposts 60 and 72. Future changes to hunting area boundaries have not been proposed. The impacts of hunters on wildlife would be the same for any new areas as the existing hunting areas.
8	Page 165, Line 11 Nests and hatchlings would not have to be removed if the testing that was forcing the removal was conducted at a different time of the year than during the spring. Change the word "must" on line 12 to "may".	Correction accepted.
8	Page 165, Line 19 Delete the subtitle "*Sensitive Habitats*" since it does not adequately title the paragraph that follows.	Subtitle is retained and moved. Mines and wildlife watering sites are considered sensitive habitats in this document. Refer to sections 3.5.4.3 and 3.5.4.5.
8	Page 165 Line 31 It might be mentioned here that the YPG staff is currently participating in an interagency effort to write an interdisciplinary plan that covers this region. This plan, the Trigo Mountains and Imperial National Wildlife Refuge Cooperative Management Plan, will address appropriate management levels for wild horses and burros.	Section 4.5.1.3, added text.
8	Page 165, Line 36 Please define "burro bathtub."	Text changed in section 4.5.1.3.
8	Page 166, 4.5.1.5 Page 92 says stocked in 1988, page 164 says recently discovered, page 166 says found in 1995. Which is it? They were stocked in the Wash in the late 1970s.	Text changed in section 4.5.1.4.
8	Page 168, line 19 Could pesticide residuals enter the Colorado River system, or the groundwater? Please describe.	Due to the arid nature of the region , it is doubtful that pesticides residual runoff could reach the Colorado River. A full discussion of this issues would be explored in the National Environmental Policy Act process for any proposed project expected to use pesticides. Pesticides would be applied according to the *Yuma Proving Ground Pesticides Management Plan* and in accordance with federal regulations and requirements.

SOURCE	COMMENT	RESPONSE
8	Page 169, Line 12 The Yuma Proving Ground should consider constructing additional permanent sources of water for wildlife in cooperation with the Arizona Game and Fish Department, Arizona Desert Bighorn Sheep Society, and the Yuma and Brawley Chapters of Desert Wildlife Unlimited. The new sources of water might make up for impacts to existing water sources that are commonly disturbed.	Suggestion noted.
Issue : Cultural Resources 4.6		
7	We are still concerned to some extent about the categorization of risk to cultural resources as either "low risk" or "major risk" on the basis of the amount of soil disturbance, which has little practical utility; however we understood that YPG will continue to consult with this office, and with concerned Native American tribes and groups, regarding the potential impacts of specific undertakings as they are proposed.	The discussion of low and high risk is deleted from section 4.6.1.
7	THE RWEIS would be a more useful and informative document if it included substantive excerpts from the [*Integrated Cultural Resources Management Plan*] dated 1995.	The *Integrated Cultural Resources Management Plan* is in draft form, with completion expected in July 1999. Potential text changes in the document preclude using quotes from the *Integrated Cultural Resources Management Plan* in the Range Wide Environmental Impact Statement. The *Integrated Cultural Resources Management Plan* will be the primary planning document for management of cultural resources on Yuma Proving Ground.
10	Traditional cultural properties were specifically recognized as historic properties eligible to the *National Register of Historic Places* by Congress when the 1992 amendments to the National Historic Preservation Act were passed. Unfortunately, this document fails to recognize this class of historic property, important to Native American tribes, in the cultural resources section. What efforts will the U.S. Army Yuma Proving Ground take to identify, consider, and manage this class of historic properties located on the Yuma Proving Ground?	Yuma Proving Ground complies with the National Historic Preservation Act, its amendments, and other federal and state requirements. Text added and changed in section 3.6. The *Integrated Cultural Resources Management Plan* describes in detail the actions Yuma Proving Ground takes to identify, consider and manage historic properties on the installation.

SOURCE	COMMENT	RESPONSE
Issue: Socioeconomic 4.7		
8	Page 151, 4. The discussions of environmental effects lacks substance in identifying direct and indirect effects and their significance. Does not provide a scientific and analytical basis for comparing and contrasting alternatives. No measures, reference points.	Comment noted. The intent of the Environmental Impact Statement is discussed in the Introductory chapter. It outlines a broad-based program over a wide geographical area. The collection of socioeconomic data was limited to that immediately available from local sources. No new data were generated for this programmatic Environmental Impact Statement. Both beneficial and detrimental effects resulting from the action were described (40 CFR 1508.8). The Environmental Impact Statement is a tiering document. For specific proposed projects, Environmental Assessments and Environmental Impact Statements will be required. These documents will address substantive direct and indirect effects and their impacts, and provided the reference points for comparing and contrasting alternatives.
8	Page 174, 4.7.1.2 Environmental Justice. There are communities in California that are affected by activities and facilities at YPG. Suggest including Bard and Winterhaven. There are also hundreds of winter visitors at BLM's Imperial and La Posa LTVA "communities" who use facilities at YPG and could be affected by the alternatives discussed.	Added to discussion of impacts from the preferred alternative.
8	Page 175, 4.7.2, 4.7.3, 4.7.4, and 4.7.5. The alternatives could affect revenues at BLM's Hidden Shores concession and at Fisher's Landing/Martinez Lake, both negatively and positively depending on privatization efforts. This should be discussed.	Economic impacts to regional communities are discussed in section 4.7 of the Final Range Wide Environmental Impact Statement.
Issue: Land Use 4.8		
8	How will this increased use impact current recreational opportunities on the east arm?	Added discussion of impacts to section 4.8.1.1.
8	Page 179, 4.8.4., 28 YPG is segregated from mineral entry - not open to mining.	See previous response on mining, under "Issue: Geological and Soil Resources 4.4."
8	Page 179, 4.8.4.2., 17-21 YPG is segregated from mineral entry - not open to mining.	See previous response on mining, under "Issue: Geological and Soil Resources 4.4."

SOURCE	COMMENT	RESPONSE
8	Page 177, 4.8 Land Use. General comment. Alternatives C, D, and E would have effects on other land use patterns, such as recreational use of the Betty's Kitchen area, Mittry Lake area, BLM's recreation complex at Squaw Lake and Senator Wash, etc. Increased traffic on Highway 95, Mittry Lake Road and other local roads - safety, maintenance for other entities, etc. Existing development on private land adjacent to YPG.	Added to discussion of preferred alternative under section 4.8, Land Use. Transportation is addressed in section 4.14.
8	Page 180, 4.8.4.2 What authority does YPG have to permit mining on lands closed to mineral entry? YPG spent many years in the 1970s to get rid of the mining and mining claims on YPG, why would you open it again?	See previous response on mining, under "Issue: Geological and Soil Resources 4.4."
8	Page 181, 4.8.5.1 Expand hunting areas and introduce more long range artillery to the same area seems like conflicting uses.	These are not the same areas. Impact areas are closed to hunting. Hunting may be compatible to certain activities, especially when the timing of military activities does not coincide with the hunting season.
8	Page 182, 4.8.3 Off-post Locations Land Use. "Recreational activities may be introduced to areas surrounding Blaisdell Railroad Siding." This would not be an authorized use under the existing right-of-way reservation for the 40 acres of public land. Any recreational activity introduced on the military's land, would affect the adjoining public land unless the military fenced their land.	Introducing recreational activities at Blaisdell Railroad Siding was not included as part of the preferred alternative, alternative F.
8	Page 182, 4.8.6 Mitigating measures to address identified effects on adjacent lands?	Mitigation measures are discussed in the Final Range Wide Environmental Impact Statement and will be listed in the Record of Decision.
Issue: Noise 3.9		
	No comments received.	
Issue: Hazardous Substances and Waste Management 3.10		
11	3.10 Hazardous Wastes: Nothing is mentioned about the potential of perchlorates present.	Yuma Proving Ground has not used any perchlorates in the last six years. In 1992, 20,938 kilograms (46,063 lbs) of perchlorates were taken to an off-site hazardous waste facility. Tests were performed in 1992 to make tank traps which were unsuccessful with the use of perchlorates. There are currently no plans to use perchlorates at Yuma Proving Ground.

SOURCE	COMMENT	RESPONSE
Issue: Radiation 3.11		
11	3.11.3 Radiation by Region: It is noted on line 33, page 128 that approximately 10,000 DU projectiles fired, only 5,000, or 50% have been recovered. The report notes later that measures have been taken to improve recovery, but nothing is mentioned concerning the recovery or whereabouts of the unrecovered DU projectiles.	Unrecovered depleted uranium projectiles are found on the depleted uranium range. Recovery of as many of the projectiles as feasible is practiced at Yuma Proving Ground.
11	3.11.2.4 Low Frequency Emissions: The first statement (line 6, page 128) states, "[S]ome electrical systems....(with power levels typically less than 10MHZ)." "10 MHZ" is a measure of frequency, not power.	The word "power" is removed in the Final Range Wide Environmental Impact Statement.
Issue: Aesthetic Values 4.12		
	No comments received.	
Issue: Utilities and Support Infrastructure 4.13		
8	Page 196, 4.13.6. Mitigation Measures. Include discussion re quality of groundwater recharge.	See additions to discussion in section 4.3.2.
Issue: Transportation 4.14		
8	Page 197, 4.14. Transportation. More traffic ' increases mortality wild horse and burros. Mitigating measures?	Text added to discussion in section 4.14.2.
Issue: Health and Safety 4.15		
8	Page 199, Health and Safety. It may well be desirable to develop a safety briefing for people intending to hike, hunt, camp or observe wildlife on YPG.	The only recreational activity allowed at present on Yuma Proving Ground is hunting. Hunters are briefed on safety issues when they apply for their permit. Safety issues are also addressed in the hunting program brochure given to all hunters using Yuma Proving Ground.
Issue: Unavoidable Environmental Effects 4.16		
8	Page 200, 4.16. Discuss unavoidable, irreversible, and irretrievable effects on the landscape in general and visual resources. Also those related to some hazardous materials, radiation, and munitions.	Discussions added.

SOURCE	COMMENT	RESPONSE
11	P. 4.16 Unavoidable Environmental Conflicts: As mentioned in the "General Comments," YPG has a military mission of testing and training with a variety of troops, equipment and munitions. This type of activity cannot be avoided, as this is the reason YPG was established. As long as it continues its military mission, there will be environmental disturbances, particularly to wildlife and soils. The best mitigation is the development of munitions that are more "point effective" and less "area effective", increase the use of reclaimed water for washracks, etc, increase the use of solar power (both active and passive), and develop fuel efficient, or alternative fuel, vehicles.	Concur. Test and evaluation of new, more effective materiel is the mission of Yuma Proving Ground.
Issue: Cumulative Impacts 4.17		
8	Pages 203-205, 4.17.2, Regional Cumulative Impacts. Discuss foreseeable cumulative impacts on surrounding communities, similar business ventures on adjacent lands (such as socio-economic impacts on Hidden Shores), impacts on lands bordering the south end of YPG that may be developed into residential areas within the next 10 years (Dome Valley area and east of Dome Valley), increased visitor use at BLM recreation facilities, the wildlife refuges, etc. - e.g., impacts on infrastructure. Cumulative impacts on wildlife, on BLM-managed wild horses and burros.	Discussion added.
8	Also re Cumulative Impacts: If the base is closed at some future time, the lands will be returned to the administration of the Department of Interior. Cumulative impacts from development of private party ventures, along with those from the military mission, would become another agency's to manage. This is not addressed in any discussion in the RWEIS. The commentor understands that base closure is not an alternative in the RWEIS, but it could occur, nevertheless.	Closure would be addressed in a separate Environmental Impact Statement as reported in section 2.3.2. Each public-private partnership venture will be assessed under the National Environmental Policy Act for project and/or site specific impacts.

SOURCE	COMMENT	RESPONSE
9	Again it is difficult to assess the secondary impacts of Alternative E because the alternative itself has not been adequately explained. However, with the types of activities that are planned, certainly destruction of wilderness and native habitat are two impacts that Defenders is strongly opposed to and would like to see further explained, so as to demonstrate that the agency is making a reasoned decision. The impact of secondary impacts like increased traffic, roads, population on biological resources wildlife are not assessed in this document.	The details of the preferred alternative are discussed in greater detail in the Final Range Wide Environmental Impact Statement. No activities associated with this action have been determined to cause significant adverse impacts to adjacent wilderness areas.
9	The Cumulative Impact section is hardly that envisioned under NEPA or that which could be accomplished under a programmatic document. NEPA defines cumulative impacts as those that can result from individually minor but collectively significant action taking place over a period of time." 40 C.F.R. § 1508.7. Yet alternative C, D and E are lumped together in a short paragraph with a blanket statement that "[v]egetation and animals would be protected." RWEIS at 203. There is not discussion of cumulative impacts and it is wrapped up with the superficial statement that "mitigation strategies incorporated into an aggressive Conservation Program will avoid or minimize long term impacts to all resources." Id.	Yuma Proving Ground envisions the entire Environmental Impact Statement as a discussion of cumulative impacts. The section was revised to more clearly discuss cumulative impacts in the region (southwestern Arizona and the Sonoran Desert ecosystem).
9	We assume that the Conservation Program mentioned is the same ITAM program described RWEIS at 161. Discussion of this program explains little about how the Army plans to mitigate under Alternative C, D and E. This ambiguous, noncommittal statement fails to explain a very real serious issue and we believes it deserves further explanation with regard to the selected alternative. There is little discussion of how or what type of protection would be afforded wildlife. The justification that further NEPA documents will be completed as tiered documents is not sufficient to legitimize the RWEIS. If the agency does not have sufficient information about the impacts they are required to evaluate reasonably foreseeable significant adverse impacts and make clear that such information is lacking. 40 C.F.R. § 1502.22. The agency has sufficient information to mention that certain activities will likely occur yet they do not attempt to forecast what the impacts of these activities will be.	The Conservation Program is an organizational subsection of the Environmental Sciences Division. Integrated Training Area Management (ITAM) is a program to manage and conserve the environment. The Final Range Wide Environmental Impact Statement provides a better discussion of these issues, however the Range Wide Environmental Impact Statement is not intended to be encyclopedic in nature. It is a concise summary of the analysis of the material found in the administrative record, which is available for review by the public.

SOURCE	COMMENT	RESPONSE
9	The RWEIS discusses many projects which will have regional cumulative impacts yet the cumulative impacts of these activities are not considered anywhere in the document. For instance the increase in long-range artillery fire in the Barry Goldwater range is not discussed in relation to the activities that are already occurring on the Goldwater Range nor in relation to the increased impacts on wildlife in the Goldwater range. Defenders is rightfully concerned that the actions of the Army on or outside of the YPG, or the private individuals projects on the YPG, will increase activity on the Goldwater Range, Cibola, Kofa and Imperial National Wildlife Refuges as stated in the RWEIS. Thus wildlife and wildlife habitat in those areas will be affected. Bighorn sheep and Sonoran pronghorn will be indirectly and possibly directly impacted by the increased activities of Alternative E, yet are barely mentioned in the document (and only in the affected environment section). The RWEIS must address these impacts in order to comply with NEPA.	The Range Wide Environmental Impact Statement addresses only those activities that are under the operational or jurisdictional control of Yuma Proving Ground, with regard to mission diversification. This Range Wide Environmental Impact Statement addresses the concept of allowing munitions that are fired from remote sites (such as Barry M. Goldwater Range or naval vessels in the Pacific) to land or detonate at sites within Yuma Proving Ground. (For the most part, the impacts of projectiles are similar, no matter where they originate.) However this Environmental Impact Statement is not intended to address the total National Environmental Policy Act considerations of such projects. Such projects and activities would require separate National Environmental Policy Act documentation as well as a host of permits and authorizations specific to the project. The preferred alternative notes that Yuma Proving Ground has the capability to participate in such tests or activities, but does not attempt to provide a "National Environmental Policy Act clearance" for these actions, outside of the Yuma Proving Ground boundaries.

List of Exhibits to the Comment Response Document

Exhibit 1 - Notice of Availability

EXHIBIT-1

[Federal Register: August 18, 1998 (Volume 63, Number 159)]
[Notices]
[Page 44247-44248]
From the Federal Register Online via GPO Access [wais.access.gpo.gov]
[DOCID:fr18au98-69]

DEPARTMENT OF DEFENSE

217

Department of the Army

Draft Environmental Impact Statement for Changes to Utilization of Yuma Proving Ground, Arizona

AGENCY: Department of the Army, DoD.

ACTION: Notice of Availability.

SUMMARY: This notice of availability announces the public release of the Draft Environmental Impact Statement (EIS) for Yuma Proving Ground (YPG). The Draft EIS is programmatic in nature and discloses impacts associated with direct, indirect, and cumulative effects of the proposed action under a range of alternatives. New missions and programs require land use changes and construction of new facilities and military ranges. Examples of changes to YPG's mission that may result in this action include: combat systems testing, troop training, and private sector use of facilities. Activities to support this action include modernization of outdated facilities, improvements to infrastructure, installation of utilities, and land use changes. An environmental assessment prepared to evaluate the effect of the Installation Master Plan determined that significant effects were likely to result from these changes.

DATES: Written public comments received within 45 days of the date of publication of the Environmental Protection Agency's Notice of Availability in the Federal Register.

ADDRESSES: To receive a copy of this Draft EIS, or to submit comments, contact: Directorate of Environmental Sciences, STEYP-ES-C (ATTN: Mr.

[[Page 44248]]

Junior D. Kerns), Yuma Proving Ground, AZ 85365.

FOR FURTHER INFORMATION CONTACT: Mr. Junior D. Kerns at (520) 328-2148.

SUPPLEMENTARY INFORMATION: Resources discussed in the draft are climate, air, water, geology and soils, biology, cultural resources, socioeconomics, land use, noise, hazardous materials/waste management, radiation, health and safety, aesthetic values, utilities, and transportation. Situated in southwestern Arizona, the installation is a desert evaluation and test center with premier facilities for testing military materiel.

The proposed action is the conversion of YPG from a traditional Army test installation to a diversified, multipurpose test range. The multipurpose test installation will integrate training, privatization, and other mission-compatible uses with research, development, test, and evaluation activities indicated in the Installation Master Plan and

EXHIBIT-1

other applicable planning documents. This proposed action supports the defense mission of the United States to maintain a prepared and technologically advanced military.

Five alternatives are considered: (1) Maintain baseline activity levels (no action), (2) decreased military mission, (3) increased military mission, (4) modified nonmilitary mission, and (5) diversified mission. Impacts of each alternative are disclosed in accordance with the National Environmental Policy Act. The Army will develop a preferred alternative after consideration of impacts described in the Draft EIS and public comment.

Comments may also be submitted via phone at (800) 330-1348.

Dated: August 13, 1998.

Raymond J. Fatz,

Deputy Assistant Secretary of the Army (Environment, Safety and Occupational Health) OASA(I,L&E).

[FR Doc. 98-22187 Filed 8-17-98; 8:45 am]

BILLING CODE 3710-08-M

Exhibit 2 - Publicity Material

EXHIBIT-2

News Release

U.S. Army Yuma Proving Ground
Public Affairs Office
ATTN: Chuck Wullenjohn
Yuma, Arizona 85365-9107
Telephone: (520) 783-6189
(520) 328-6533
Fax: (520) 328-6039

For Immediate Release **September 8, 1998**

Note to media: for further information about this release or the process, contact Chuck Wullenjohn, Public Affairs Officer at: 328-6189 or 328-6533. Following is the text of the public release.

Draft Range Wide Environmental Impact Statement Public Release

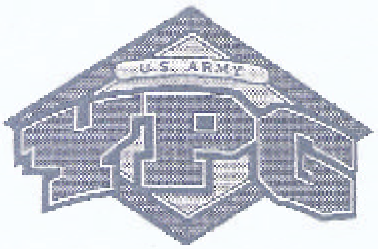
Yuma, Arizona — The United States Army, Yuma Proving Ground (YPG), in Yuma and La Paz counties, Arizona, announces release of the Draft Range Wide Environmental Impact Statement (RWEIS) for public comment. Alternatives examined in this programmatic document provide for future utilization of the installation into the 21st century. Military and nonmilitary needs include diversification, privatization and modernization for an expanded customer base. Ongoing environmental programs were assessed in this document to ensure protection and preservation of the environment through sound decisionmaking.

Yuma Proving Ground is a premier desert test and evaluation center. It encompasses more than 1,300 square miles with about 350 sunny days and about three inches of rain annually. Engineers, scientists and technicians staff its test facilities. They conduct an average of 100 tests and evaluations at any given time.

The Draft RWEIS examined the environmental effects of all uses on YPG. Public concerns, agency comment, and installation needs were incorporated into the findings of the Draft RWEIS. The document will serve as a baseline for preparing future environmental documents required by the National Environmental Policy Act (NEPA).

A Notice of Availability announcing public comment of this Draft RWEIS was published in the *Federal Register* on August 18, 1998. During the 45-day comment period beginning on this date, the public is invited to two public meetings. The first is on September 28, 1998, at Yuma Proving Ground, Palm Garden, Main Post (between 3:00 p.m. and 6:00 p.m.) and at the Yuma Convention Center on September 30, 1998 (between 2:00 p.m. and 8:00 p.m.). Draft RWEIS copies are available at the Yuma County Main Library, 350 South 3rd Avenue, Yuma. You may request a copy of the Draft RWEIS or provide comment by writing: U.S. Army Yuma Proving Ground, Division of Environmental Sciences, ATTN: STEYP-CD-ES (Kerns), Yuma, AZ 85365-9107. Phone: (520) 783-8801 or (800) 330-1348. E-mail: jkerns@yuma-emh1.army.mil or gpiyuma@primenet.com.

EXHIBIT-2



Comunicado de Prensa

La Fuerza Armada del terreno prueba de Yuma
ATTN: Chuck Wullenjohn
Yuma, Arizona 85365-9107
Teléfono: (520) 783-6189
(520) 328-6533
Fax: (520) 328-6039

Para ser publicado inmediatamente **Septiembre 8, 1998**

Note to media: For further information about this release or the process, contact Chuck Wullenjohn, Public Affairs Officer at: 328-6189 or 328-6533. Following is the Spanish text of the public release.

Primera edición del Informe sobre el Impacto al Medio Ambiente en toda el área (RWEIS) del terreno de prueba de Yuma (YPG)

Yuma, Arizona — La Fuerza Armada de Los Estados Unidos, El terreno de prueba de Yuma (YPG) en los condados de Yuma y La Paz en Arizona anuncia el inicio del periodo de comentario público para la primera edición del Informe sobre el Impacto al Medio Ambiente in toda el área (RWEIS). Como parte de sus programas sobre el medio ambiente, YPG ha evaluado sus actividades presentes y futuras militares y civiles con repercución hasta en el siglo XXI. La mejor acción del Gobierno Federal es la de diversificar y introducir companiass privadas para usar el terreno de prueba. La primera edición del Informe RWEIS evaluó cinco alternativas de acción Federal a diferentes niveleses de actividad.

YPG es una de las principales instalaciones militares de investigación y desarrollo. El terreno de prueba de Yuma tiene 3361 km^2 con un promedio de 350 días asoleados y cerca de 7.62 cm de lluvia anual. Ingenieros, Científicos y Técnicos son parte del personal de los sectores de prueba. Ellos llevan a cabo un promedio de 100 pruebas y evaluaciones en cualquier momento dado.

El Informe RWEIS se enfoca en los intereses específicos de la comunidad. Sirve también como base para le preparación de futuros documentos relacionados con el medio ambiente que el Código Nacional del Medio Ambiente (NEPA) puede requerir en un futuro.

Invitamos al público a participar en el periodo de comentario de la primera edición del Informe. Los comentarios seran incorporados en la edición final, la cual sería terminada en 1999.

Usted puede recibir una copia de la primera edición RWEIS con solamente escribir a la siguiente dirección: U.S. Army Yuma Proving Ground, División de las ciencias del medio ambiente, ATTN: STEYP-CD-ES (Kerns), Yuma Proving Ground, Yuma, AZ 85365-9107 o también puede llamar al (520) 328-2148 o al (800) 330-1348. Sus comentarios pueden ser enviados a la misma dirección, o usted puede dar un comentario oral en una conferencia público en 28 de Septiembre, 1998 desde las 3:00 hasta las 6:00 de la tarde en el Palm Garden Community Center, YPG o en el 30 de Septiembre, 1998 desde 2:00 hasta las 8:00 de la tarde en el Yuma Civic and Convention Center. Usted puede ver una copia del Informe en biblioteca principal Yuma County, 350 S 3 Avenida, Yuma, Arizona.

EXHIBIT-2

Yuma Proving Ground Public Comment Meetings for the Draft Range Wide Environmental Impact Statement

September 28, 1998 3 p.m. - 6 p.m.
Palm Garden Community Center
Building 530, Main Post, YPG

September 30, 1998 2 p.m. - 8 p.m.
Yuma Civic & Convention Center
1440 Desert Hills Drive, Yuma

You are invited to enter your comments into the public record during the meetings. Copies of the Draft Range Wide Environmental Impact Statement are available at Yuma County Main Library, the YPG Palm Garden Library and the YPG technical library. Send written comments to: Environmental Sciences Division, ATTN: STEYP-CD-ES (Kerns), Yuma Proving Ground, Yuma, Arizona 85365-9107. Call: Gutierrez-Palmenberg, Inc. (520) 783-8801, (800) 330-1348, fax (520) 783-2321. email: jkerns@yuma-emhl.army.mil or gpiyuma@primenet.com.

EXHIBIT-2

Terreno de Prueba de Yuma
Reunión Pública

La Primera Edición del Informe sobre el Impacto al Medio Ambiente

Septiembre 28, 1998 3 p.m.- 6 p.m.
Palm Garden Community Center
Edifício 530, Main Post, YPG

Septiembre 30, 1998 2 p.m.- 8 p.m.
Yuma Civic & Convention Center
1440 Desert Hills Drive, Yuma

Se le invita a someter sus comentarios officiales en el registro público durante las reuniones. Copias del Informe pueden ser revisadas en Yuma County Main Library, y en YPG en la biblioteca "Palm Garden" y la biblioteca técnica. Mande comentarios escritos a: Division of Environmental Sciences, ATTN: STEYP-CD-ES (Kerns), Yuma Proving Ground, Yuma, Arizona85365-9107.LLame:Gutierrez-Palmenberg, Inc. (520) 783-8801, (800) 330-1348, fax (520) 783-2321. email: jkerns@yuma-emhl.army.mil or gpiyuma@primenet.com

EXHIBIT-2

PUBLIC NOTICE
YUMA PROVING GROUND (YPG)
PUBLIC COMMENT MEETING

YPG invites its neighbors, interested individuals and community groups to attend one of two public comment meetings. The first will be held at the Palm Garden Community Center, building 530, YPG Main Post, on September 28, 1998 from 3:00 PM to 6:00 PM. The second will be held at the Yuma Civic and Convention Center, 1440 Desert Hills Drive on September 30, 1998, from 2:00 PM to 8:00 PM.

The purpose of the meetings is for YPG to obtain public comment on the Draft Range Wide Environmental Impact Statement (RWEIS). The RWEIS examines the environmental effects of all current and proposed military and non-military uses of YPG. Copies are available at the Yuma County Main Library, YPG Palm Garden library and YPG technical library.

Written comments or requests for a copy should be directed to the U.S. Army Yuma Proving Ground, Division of Environmental Sciences, ATTN: STEYP-CD-ES (Kerns), Yuma, AZ 85365-9107, (520) 328-2148. Environmental documents may be reviewed at Gutierrez-Palmenberg, Inc., ATTN: STEYP-ES-GPI (Reichhardt), building 3021-D, Yuma Proving Ground, Yuma, AZ 85365-9107, (520) 783-8801, or (800) 330-1348.

EXHIBIT-2

AVISO de REUNION PÚBLICA
TERRENO DE PRUEBA DE YUMA

El terreno de prueba de Yuma, (YPG) invita a la comunidad, personas interesadas y al público en general a tomar parte en una de dos reuniones. La primera reunión se efectuará el día miércoles, 28 de Septiembre de 1998 de 3:00am a 6:00pm en el Centro Comunitario "Palm Garden", edificio 530, area principal (main post). La segunda reunión se llevará a cabo el día jueves, 30 de Septiembre de 1998 de 2:00pm a 8:00pm en el Centro Cívico de Convenciones de Yuma ubicado en el 1440 Desert Hills Drive.

El propósito de estas reuniones es para que el público comente en la primera edición del Informe sobre el Impacto al Medio Ambiente (RWEIS). El Informe RWEIS esta enfocado en los efectos en el medio ambiente causados por las actividades militares o civiles que se desempeñan actualmente en YPG y aquellas por realizarse en el futuro. Copias del RWEIS pueden ser revisado en el Yuma County Main Library, y en las bibliotecas de YPG "Palm Garden" y "biblioteca técnica".

Comentarios, preguntas y peticiones para obtener una copia del RWEIS deben ser enviados a las siguientes direcciones y teléfonos: U.S. Army Yuma Proving Ground, Division of Environmental Sciences, ATTN: STEYP-CD-ES (Kerns), Yuma, AZ 85365-9107, (520) 328-2148. Documentos sobre el medio ambiente pueden ser revisados en Gutierrez-Palmenberg, Inc., ATTN: STEYP-CD-GPI (Reichhardt), edificio 3021-D, Yuma Proving Ground, Yuma, AZ 85365-9107, (520) 783-8801, (800) 330-1348.

Exhibit 3 - Original Comment Letters

EXHIBIT-3

554 S. 6th Avenue
Yuma, AZ 85364
September 20, 1998

U. S. Army Proving Ground
Attn: STEYP-ES-C (Kerns)
Yuma, AZ 85365-9107

Attn: Environmental Sciences Division

Re: Draft Range Wide EIS

Brief comments on a well done document might help move it on.

Para. 1.4.5 "Issues" on page 7 indicates the possibility of extensive number of agencies being involved. That would be expected in the scoping phase of planning future activities and expanded responsibilities. Decisions should be left to the managing unit. In this case, mostly YPG with reasonable technical input from the appropriate or supporting discipline when requested.

The same concept applies when fully operational: "Don't call us, we'll call you.". A good public relations and publicity agenda will keep you out of trouble.

Presence of burros is unnecessary and interferes with day to day activities. They should be removed entirely. Horses should also be eliminated from YPG. They are a nuisance and create hazards for highway traffic.

We appreciate an opportunity to comment, however briefly, and again must commend the effort for a well done report.

John F Colvin Jr.

John F. Colvin, Jr.
(520)783-3686

Reference # 1 John Colvin Jr., Yuma, AZ September 20, 1998.

EXHIBIT-3

ARIZONA DESERT BIGHORN SHEEP SOCIETY
P.O. Drawer 7545
Phoenix, Arizona 85011

25 September 1998

U.S. Army Proving Grounds
Attn: STEYP-ES-C (Kerns)
Yuma, AZ 85365-9107

Re: Draft Range Wide Environmental Impact Statement (RWEIS)

Dear Mr. Kerns:

The Arizona Desert Bighorn Sheep Society, Inc. (ADBSS) reviewed the above referenced document and would like to offer the following comments as part of the official public record.

The ADBSS is a wildlife conservation organization dedicated to the conservation and protection of desert bighorn sheep and their habitat. Since the Yuma Proving Ground contains both desert bighorn sheep and desert bighorn sheep habitat, we are concerned about the potential impacts to both from a change in mission direction and the conversion of Yuma Proving Ground into a multipurpose installation.

The RWEIS does not provide an adequate comparison of the impacts to desert bighorn sheep and their habitat by each of the alternatives. Environmental consequences in Table 2-6 are determined to be low, moderate or high to migration corridors and lambing areas. Unfortunately, the text for each alternative does not adequately address how the low, moderate or high ratings were achieved.

The ADBSS does not feel there was enough information provided in the RWEIS to help us assess impacts to desert bighorn sheep and their habitat. Due to this dearth of information in the document, we relied on the collective knowledge of our members who are familiar with the Yuma Proving Ground. It is upon this knowledge that we base our recommendation.

The ADBSS recommends the selection of Alternative B, the reduction of baseline activities, as the alternative that would be the least impacting to desert bighorn sheep and their habitat.

Thank you for the opportunity to comment.

Sincerely,

Gary E. Allen

Gary E. Allen, President

Reference # 2 Arizona Desert Bighorn Sheep Society September 25, 1998.

EXHIBIT-3

The Yuma Valley Rod & Gun Club, Inc.

ORGANIZED 1936 — INCORPORATED 1938

September 28, 1998 — P. O. BOX 10450 • YUMA, ARIZONA 85366

U.S. Army Yuma Proving Ground (YPG)
Attn: STEYP-ES-C (Kems)
Yuma, Az 85365-9107

RE: YPG Range Wide Environmental Impact Statement (RWEIS)

Dear Mr. Kems,

On behalf of the Yuma Valley Rod and Gun Club (YVRGC), I would like to thank the United States Army for the opportunity to provide comment to the RWEIS for YPG. Although the YVRGC received this document on Saturday, September 26, 1998, and understanding that the comment period ends on October 1, 1998, the following comments will pertain to preferred alternative "E". At this time, the YVRGC respectfully request that an extension to the October 1st deadline for public comment be made available.

After reviewing alternative E-Diversified Mission, the YVRGC provides the following comment(s).

Page 48
2.6
1) Expansion of hunting opportunity into more areas of YPG is supported by the YVRGC.
2) In regard to examples of non-military activities under this alternative, we are not supportive about eliminating or reducing public access to sensitive habitat or conservation areas. More information is needed in order to understand where and why this may be necessary.

Page 51
2.6.1.2

1) Recreational activities discussed under this heading are already allowed by YPG, including hunting, provided that we have the necessary permit issued by YPG. If this is indicating that hunting will no longer be allowed in the East Arm of YPG in the White Tank area, it will not be supported by the YVRGC.

The Department of Arizona Game & Fish is financed 100% by the revenue from Fishing & Hunting Licenses, plus the Federal Tax on Ammunition, Guns & Fishing Tackle.

Reference # 3 (Page 1) Yuma Valley Rod & Gun Club, Inc. September 28, 1998.

EXHIBIT-3

Mr. Junior Kerns
September 28, 1998
Page Two

2) Designating shooting ranges on areas of the Kofa region needs to be better explained, so that comment can be provided.
3) Emergency communication networks also needs better explanation provided.

Page 52
2.6.2.2

1) Expansion of additional hunting opportunity expanding as far south as Crazy Woman Wash is supported by the YVRGC.
2) Public road access to Hidden Valley is supported by the YVRGC.
3)Emergency communication needs to be better explained.

Page 54
2.6.3.2

1) Expansion of hunting opportunities in the Laguna region is supported by the YVRGC.
2) Emergency communications needs to be better explained.

Page 56
2.6.5.2

1) Expansion of hunting opportunity around the Blaisdell Railroad Siding is supported by the YVRGC. We are concerned however, that this area also being utilized for off-road vehicle use at the same time, may not be compatible. More information is needed.

In summary, the YVRGC will support DOD expanding hunting opportunities on YPG. What we, as an outdoor wildlife-dependent and recreational organization, will not generally support is two-fold. First, in regard to expanding activities not relating to military preparedness, it will hard for our organization to support destruction of wildlife habitat. Second, our organization will never support the expansion of any activity on YPG when responsibilities, wildlife habitat or outdoor wildlife-dependent recreational activities managed by the Arizona Game and Fish Department (AGFD) are removed from YPG, **without prior consultation with the AGFD.**

Sincerely,

Jon Fugate, Chairman
Legislative Affairs

Reference # 3 (Page 2) Yuma Valley Rod & Gun Club, Inc. September 28, 1998.

EXHIBIT-3

YUMA PROVING GROUND
RANGE WIDE ENVIRONMENTAL IMPACT STATEMENT
(RWEIS)

PUBLIC INVOLVEMENT COMMENT SHEET

YPG values your comments on this on-going RWEIS process. Your prompt reply is greatly appreciated. Replies may be FAXED to: (520) 783-7026 or mailed to:

U.S. ARMY YUMA PROVING GROUND
GUTIERREZ-PALMENBERG, INC.
STEYP-CD-ES-GPI: MS. KAREN REICHHARDT
YUMA, ARIZONA 85364

Please indicate in the boxes provided below if you would like your name to be placed on the mailing list to receive our newsletters, the final draft of the RWEIS, or both. If you require further assistance, please call (520) 783-8801.

Wanted Both Newsletters and a Final Copy of RWEIS

COMMENTS:

Excellent Draft, no discrepancies. Transition to the draft RWEIS to next level should be acceptable.

Bryan Morrill
8816 S. Ave Del Prado # 118
Yuma, AZ 85365

09/30/98

Reference # 4 Brian Morrill, Yuma, AZ September 30, 1998.

EXHIBIT-3

United States Department of the Interior

FISH AND WILDLIFE SERVICE
KOFA NATIONAL WILDLIFE REFUGE
356 W. First Street
Yuma, Arizona 85364

September 28, 1998

U.S. Army Proving Ground
Attn: STEYP-ES-C (Kerns)
Yuma, AZ 85365-9107

Dear Sir:

Thank you for allowing me the opportunity to review and comment on the Draft Range Wide Environmental Impact Statement (RWEIS).

As the nation's leading agency in protecting and preserving wildlife and its habitat, the U.S. Fish and Wildlife Service (FWS) is concerned first and foremost with any impacts to our natural resources which may result from your military realignment. Although the RWEIS addresses many of our concerns, I never-the-less feel a few remarks are appropriate.

On page S-3 of the Executive Summary you make the statement, "The negative impacts of diversifying YPG are outweighed by positive management of resources and mitigation of negative impacts." This statement seems to me to be a subjective value judgement and somewhat premature. Regardless of which alternative action is undertaken, time will be the ultimate judge of whether or not the positive impacts outweigh the negative.

Under Section 1.3, Purpose of and Need for Action, on line 30, you allude to the possible construction of a 27-hole golf course. I would seriously recommend that no further consideration be made for such a facility. In the desert southwest, where water is such a precious commodity, I don't believe it should be used to maintain a golf course. On Kofa National Wildlife Refuge (NWR), we struggle to maintain water for the flora and fauna that depend upon it for their very survival. To irrigate a golf course seems to me to be a frivolous and wasteful use of the region's limited water supply.

We are concerned also to learn of the expected increase in military activities associated with Alternative E - Diversified Mission (your preferred alternative). Despite your thorough discussion and positive approach to mitigating negative impacts, an increase in military activity over and around Kofa NWR would be contrary to our mission and objectives. The FWS cannot control military overflights, indeed, agreements are in place which specifically address the issue. None-the-less, the wilderness and wildlife values that we at Kofa NWR are charged with protecting cannot be best served by continued increasing levels of disturbance.

Reference # 5 (Page 1) U.S. Fish and Wildlife Service; Kofa National Wildlife Refuge September 28, 1998.

EXHIBIT-3

We would support Alternative B - Decreased Military Mission. The primary purpose for Kofa NWR is to protect and enhance the population of desert bighorn sheep within the refuge. Although some literature suggests that sheep are only marginally disturbed by military overflights, certainly the fewer, the better as far as the sheep are concerned.

I recognize and understand the importance of maintaining and enhancing our nation's military readiness capabilities. I simply hope and urge that all necessary alternatives are considered and that the least intrusive option is employed.

Once again, thank you for the opportunity to provide my comments. As a relative newcomer to Kofa NWR, I look forward to working with YPG as a refuge neighbor, and continuing the spirit of cooperation which has been established over the past years.

Respectfully,

Raymond N. Varney

Raymond N. Varney
Refuge Manager

Reference # 5 (Page 2) U.S. Fish and Wildlife Service; Kofa National Wildlife Refuge September 28, 1998.

EXHIBIT-3

ADMMR
Arizona Department of Mines and Mineral Resources
1502 West Washington, Phoenix, AZ 85007 Phone (602) 255-3795
Toll Free in Arizona 1-800-446-4259 FAX (602) 255-3777

Sep. 29, 1998

U.S. Army Yuma Proving Ground
Attn: STEYP-ES-C (Kerns)
Yuma, AZ 85365-9107

Dear Mr. Botdorf:

Nothing in your document would lead me to believe that the Yuma Provings Ground isn't taking from Arizona the potentially largest and best mineral deposit in the state. Minerals were ignored by your report and your committee except for some small and insignificant referencing that minerals were being withdrawn.

This land has been withdrawn from mineral exploration for over 50 years. Your references are 50 years old and mineral discovery was not the purpose of the study. In fact the way it was done almost suggests that they and their potential benefit to Arizona were specifically excluded from consideration.

The experts in your list of preparers did not indicate that they could identify a mineral exploration target if they were sitting on its iron stained outcrop. Although you have communicated with me at the Department of Mines and Mineral Resources and the State Geologist at the Arizona Geological Survey, it appears that you did not bother to follow up on our recommendation or review our resources in the Statement. For example the Mine Files at the Arizona Department of Mines and Mineral Resources and the MILS index were not listed. The Arizona Geological Survey could have provided and extensive list of geological materials for your review if they had been asked. In short your experts don't know how to make a mineral appraisal and don't seem to appreciate their failing.

In 1979 the Luke Air Force Base hired and paid for an extensive study of the mineral resources for their withdrawal, and from these documents we

Reference # 6 (Page 1) Arizona Department of Mines and Mineral Resource September 29, 1998.

EXHIBIT-3

have an idea what we lost to Luke. Until your Statement includes a detailed study of the mineral potential of the Yuma Testing Range it should remain open for mineral exploration and mineral location. The 1,300 square miles that you have selected are adjacent to one of the largest gold mines in Arizona. The area once produced manganese for the war effort and there is a long history of lead and silver production from the area. There are several large deposits of Zeolites in the area and these minerals may hold the answer for medical research.

You have taken a low view of the area's mineral production potential without having a good reason. I urge you to hold your statement until the area has been explored by competent mineral explorationists. By locking up this property you may be robbing Arizona of an opportunity to find and develop a large mineral deposit. There are plenty, perhaps too many, other tax consuming proving and bombing grounds in other states that are not a lot different than this one. Why can't you test and prove what you want in Nevada and leave Arizona's mineral producing economic base alone until you have explored the area?

H. Mason Coggin

H. Mason Coggin III

Director

Arizona Department of Mines and Mineral Resources

CC: Arizona Congressional Delegation

Reference # 6 (Page 2) Arizona Department of Mines and Mineral Resource September 29, 1998.

EXHIBIT-3

FAXED 7/30/98

September 29, 1998

Charles Botdorf, Acting Chief
Environmental Sciences Division
Department of the Army
United States Army Yuma Proving Ground
Yuma, Arizona 85365

RE: Yuma Proving Ground (YPG); Draft Range-Wide Environmental Impact Statement (RWEIS); DOD--Army

Dear Mr. Botdorf,

Thank you for providing this office with a copy of the draft RWEIS. It appears that most of the comments offered in my letter to you of March 20, 1997, have been addressed in the revised document.

The assessment of impacts to cultural resources is largely limited to a brief cultural historical overview and the categorization of "risk" to cultural resources associated with broad classes of undertakings. We are still concerned to some extent about the categorization of risk to cultural resources as either "low risk" or "major risk" on the basis of the amount of soil disturbance, which has little practical utility; however, we understand that YPG will continue to consult with this office, and with concerned Native American tribes and groups, regarding the potential impacts of specific undertakings as they are proposed. We agree that avoidance and preservation in place is the preferred treatment of historic properties.

The RWEIS refers frequently to a *Resource Management Plan/Historic Preservation Plan* dated 1995. The RWEIS would be a more useful and informative document if it included substantive excerpts from that document. In particular, the nature of the archaeological record at YPG should be better understood before the effects of continued or expanded military and civilian use of the area can be accurately assessed. The Executive Summary states that future environmental documents "will tier by reference to this Programmatic RWEIS." We suggest that a similar strategy is appropriate for consideration of historic properties. For example, some kinds of resources may not appear to be individually eligible for inclusion on the National Register of Historic Places, but if those places characterize the broad pattern of history or prehistory in an area, then as a whole, they may in fact be eligible. We urge you to develop historic

Reference # 7 (Page 1) Arizona State Historic Preservation Office September 29, 1998.

EXHIBIT-3

contexts for YPG that examine this and other complex eligibility issues, so that eligible properties are not inadvertently destroyed.

We appreciate your continued cooperation with this office. If you have any questions, please call me at (602) 542-7137 or 542-4009.

Sincerely,

Carol Heathington
Compliance Specialist
State Historic Preservation Office

Reference # 7 (Page 2) Arizona State Historic Preservation Office September 29, 1998.

EXHIBIT-3

United States Department of the Interior
BUREAU OF LAND MANAGEMENT
Yuma Field Office
2555 East Gila Ridge Road
Yuma, AZ 85365-2240

In reply refer to:
1780 (050)
6500

September 30, 1998

Mr. Charles Botdorf, Acting Chief
Environmental Sciences Division
U.S. Army Yuma Proving Ground
Yuma, AZ 85365-9107

Dear Mr. Botdorf:

We appreciate the opportunity to comment on the *Draft Range Wide Environmental Impact Statement (RWEIS).* We found the document to be quite comprehensive and well-written. We have enclosed several pages of comments which constitute comments from the Yuma Field Office of BLM.

If you have any questions, please contact Kent Biddulph at 520-317-3267.

Sincerely,

Gail Acheson

Gail Acheson
Field Manager

1 Enclosure
Comments on the EIS

Reference # 8 U. S. Department of the Interior; Bureau of Land Management September 30, 1998.

EXHIBIT-3

COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT U.S. ARMY - YUMA PROVING GROUND

GENERAL COMMENTS

The draft EIS is generally easy to read and shows good editing. The maps and layout of the document are pleasing.

SPECIFIC COMMENTS

Page 1, 1.1 INTRODUCTION should include a statement regarding ownership and status of YPG, similar to the following:

> Public Land Order (PLO) 848, dated July 1, 1952, withdrew and reserved certain public lands in Arizona for the use of the Department of the Army (DOA) in connection with the Yuma Test Station, pursuant to Executive Order (EO) No. 10355 of May 26, 1953. YPG lands are withdrawn from all forms of appropriation under the public land laws, including the mining and mineral leasing laws. PLO 848 provides that YPG lands shall be returned to the administration of the Department of Interior when they are no longer needed for the purposes for which they are reserved.
>
> PLO 8476 dated September 28, 1983, withdrew 253 acres in Tps. 7 and 8S., R.21W., G&SRM, from surface entry and mining for use by DOA for military purposes. The land remains open to mineral leasing.

Also, somewhere in this section, a reference should be made to the following, and the RWEIS should state that the RWEIS and decisions/management actions will not affect agreements set forth in the MOA and CMA.

> In July 1978, YPG, U.S. Army, and BLM entered into a Memorandum of Agreement relative to the management of wild, free roaming horses and burros on YPG. In September 1988 the two agencies entered into a Cooperative Management Agreement (CMA) for improving the management efficiency of land, natural resources, and facilities of interest to both parties. The CMA does not supersede the 1978 MOA; it expands on it to touch all facets of the working relationship.

Somewhere in the INTRODUCTION section - or possibly on page 12, Development Criteria for Alternatives Considered - it should be pointed out that YPG lands would be returned to the administration of the Department of Interior when they are no longer needed for the purpose for which they are reserved. Privatization ventures would then be turned over to BLM or phased out.

Page 15, 2.1.4.1 Kofa Region. Add the following as a last sentence:

> The eastern and southern outer boundaries of the Kofa Region border Bureau of Land Management (BLM), state, and privately owned lands.

Reference # 8-Encl (Page 1) U. S. Department of the Interior; Bureau of Land Management September 30, 1998.

EXHIBIT-3

Page 15, 2.1.4.2 Cibola Region, 16,17. Delete the words "Bureau of Land Management" and the parens around BLM. See (3) above, which addresses the acronym. The sentence should now read: ". . . western border of YPG and the inner eastern border adjacent to BLM and privately owned lands."

Page 15, 2.1.4.2 Add BLM in front of Trigo Mountain Wilderness.

Page 15, 2.1.4.3 Laguna Region. Add the following as a last sentence:

> The Laguna Region is bordered on the west and south by BLM and privately owned lands.

Page 21, 2.2 Alternative A - Baseline Activity Levels. Include a discussion of the U.S. Customs Aerostat ground facility and Special Use Airspace.

Page 23, 2.2.1.2 Areas need to be shown on a map.

Page 24, 2.2.2.2 Areas need to be identified on a map.

Page 29, 2.2.5.2. Blaisdell Railroad Siding. Unless YPG leases or owns some of the private land at the Blaisdell Railroad Siding, the YPG site is now approximately 40 acres - the 554-acre site was reduced to 40 acres when the site authorization was renewed in January 23, 1998. Revise the paragraph to read:

> This area comprises approximately 40 acres located south of the installation along U.S. Highway 95. The site is on BLM land, utilized by the Army under BLM Right-of-Way AZA 30293.

Page 38, 2.4.1.1 How will this increased use impact current recreational opportunities on the east arm?

Page 44, 2.5.1.2 Will additional areas in the east arm be opened or not? May be opened isn't much of a commitment.

Page 45, 2.5.2.3 Privatization Ventures, 26. There is no Public Law 848. PLO 848 is a Public Land Order. This is an important distinction. A Public Land Order is not enacted by Congress - it is at the direction of the Secretary of Interior. See item (1) above, which recommends citing PLO 848 in the Introduction portion of this document. PLO 848 states that it is "subject to valid existing rights." PLO 848 does more than "exclude" mining and agriculture. Lands withdrawn under PLO 848 are not open to entry under the public land laws, including the mining and mineral leasing laws. This means that the lands are <u>not</u> open to proposals by the public. Revise the first sentence to read:

> Public Land Order (PLO) 848 withdrew and reserved public lands in Arizona for the use of the DOA in connection with the Yuma Test Station, pursuant to Executive Order (EO) No. 10355 of May 26, 1953. YPG lands are withdrawn from all forms of appropriation under the public land laws, including the mining and mineral leasing laws.
>
> **Note:** Do a document search for the term "P.L. 848" or "Public Law 848" and edit to "PLO 848" or "Public Land Order 848."

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Reference # 8-Encl (Page 2) U. S. Department of the Interior; Bureau of Land Management September 30, 1998.

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Page 50, 2.6.1.1 If the use is increased in the east arm, how is public access going to be controlled? Due to the remoteness of the area and lack of an identifiable YPG boundary many times you can be on YPG and not know it.

Page 50, 2.6.2.2, Line 40 Does this imply that a road would be constructed into Hidden Valley? Please clarify.

Page 51, 2.6.1.2 The idea of putting call boxes in the area of White Tanks is not appropriate. The entire area is sacred to the Native Americans.

Page 52, 2.6.2.2 Why is there a sudden need for call boxes in the Cibola region? Whether it is legal or not the area north of Cibola road already receives intensive recreation use.

Page 56, 2.6.5.2 Recreational Activities. The RWEIS states, "There is potential for opening acreage around Blaisdell Railroad Siding for hunting or off-road vehicle use." Note that the Blaisdell site is on BLM land, authorized under a BLM Right-of-Way to Army. The Right-of-Way grant states that the people of the United States generally have access to lands owned, administered, or controlled by the United States. The BLM has retained the right to authorize use of the area for compatible uses, for access, and so forth. The RWEIS indicates that YPG may open the area for hunting or off-road vehicle use, while in fact, those hunting would be guided by State law and off-highway vehicle use would be guided by BLM regulations and policies. Also change "off-road" to "off-highway."

Page 73, 3.3 Water Resources. Needs a discussion about water rights; e.g., Colorado River water rights (perfected?) groundwater flow and/or surface flow - quantity and availability will affect development and privatization efforts. Needs expanded discussion about requirements for water conservation, groundwater quality, quality of groundwater recharge, and water management planning, per Bureau of Reclamation's mission to improve water resource management and the efficiency of water use throughout the western United States.

Page 76, 3.3.1.3, Line 11 "bedrock ormation" should be "formation."

Page 92, Line 1 Peregrine falcons are not known to nest on YPG. This should be made clear.

Page 92, Line 7 The line might be changed to read "....white-winged doves and mourning doves, have become habituated to artillery testing disturbances while on YPG." Doves are migratory birds and may be exposed to human activities during the winter when they occupy other areas.

Page 92, Line 22 This sentence does not make sense. Does it mean that YPG is not required to consult with the U.S. Fish and Wildlife Service? Perhaps it should read: "The installation has determined that past activities have not required consultation with the USFWS."

Page 92, Line 44, Page 164, Line 16 and Page 166, Line 12 Razorback suckers have been in Senator Wash Reservoir since its creation in the early 1960s, although additional stocking may have occurred. The lake was gill netted prior to the introduction.

Page 94, Line 44 Bats are predatory mammals. We suggest striking the word "predatory" at the beginning of this sentence.

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Page 97, 3.6.2 Why is there no mention of White Tanks in the cultural section?

Page 110, 3.8.2 Fourth sentence - the information from Yuma County Planning Department is incorrect, if this is talking about Hidden Shores.

Page 110, 3.8.2 Adjacent Land Use, 38-46. Hidden Shores is on BLM land, authorized by a BLM lease. Hidden Shores is not developing condominiums. They are park model trailers. Beginning at line 41, revise to read:

> Hidden Shores RV Village, a BLM/private party recreation concession, is located adjacent to the west side of YPG with access through YPG from U.S. Highway 95. Information received from the BLM indicates that private entrepreneurs are expanding and redeveloping recreational facilities by developing a resort-type RV trailer park with associated facilities.

Page 110, Line 38 and 39 This is debatable - there may well be incompatibilities between proposed developments on YPG and Hidden Shores.

Page 110, 3.8.2 Adjacent Land Use. What about Fisher's Landing/Martinez Lake?

Page 112, 3.8.3 YPG does not own the Blaisdell siding. The Bureau of Land Management has issued a right-of-way for 40 acres for a portion of the Blaisdell Siding (BLM serial number AZA 30293). The 40 acres are located in the NE1/4SW1/4 of section 28, T. 8 S., R. 21 W.

Page 112, 3.8.4 Regional Recreation Resources. This section needs to mention nearby BLM and USFWS wilderness areas, BLM's recreation complex at Squaw Lake and Senator Wash, BLM's Hidden Shores recreation concession, and Martinez Lake/Fisher's Landing. Also BLM's La Posa and Imperial Long-Term Visitor Areas (LTVAs), which bring many winter visitors to the area - the winter visitors enjoy facilities and amenities at YPG.

Page 151, 4. Environmental and Socioeconomic Consequences. The discussions of environmental effects lacks substance in identifying direct and indirect effects and their significance. Does not provide a scientific and analytical basis for comparing and contrasting alternatives. No measures, reference points.

Page 155, 4.3.3. Effects of Alternative C. Increased military mission requires the same discussion re water resources and water allocation as the following section, 4.3.4. Also discuss requirements for water conservation, effects on groundwater quality, effects on quality of groundwater recharge, and water management planning.

Page 155, 4.3.4. Effects of Alternative D. Discuss requirements for water conservation, effects on groundwater quality, effects on quality of groundwater recharge, and water management planning.

Page 156, 4.3.5. Same discussion as (15) and (16) above re water conservation, effects on ground water quality, effects on quality of groundwater recharge, and water management planning.

Page 156, 4.3.6. Mitigation Measures Common to all Alternatives. Suggest adding discussion re water conservation, water management planning, meeting requirements for quality of groundwater recharge, etc.

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Page 158, 4.4.3.1 What are the consequences of these activities?

Page 160, 4-7, and 17-25. YPG is segregated from mineral entry - not open to mining. Where would the mining occur? We suggest that all references to a commercial mining operation be deleted from this section as well as other sections within this document. The Yuma Proving Ground is closed to mineral entry by virture of the military withdrawal.

Page 160, 4.4.4.3 Laguna Region Encouraging or developing off-highway recreational use may not be consistent with the military withdrawal for the Yuma Proving Ground. Opportunities for off-highway vehicle use are provided on nearby public lands in the vicinity of Senator Wash Reservoir, and regionally at the Algodones (Imperial) dune complex in California and at the Ehrenberg Sandbowl south of Ehrenberg, Arizona.

Page 164, "razorback suckers recently discovered" - see previous comment.

Page 165, Line 9 Deer hunters are limited to hunting in only certain portions of YPG. Likewise, desert bighorn sheep hunters are also limited but to a lesser degree. This should be described in the document. Potential changes to the areas that hunters may occupy (such as on page 168, line 4) should also be described. A map showing these areas would be helpful.

It should also be made clear what portions of YPG are currently open to visitors for other reasons, such as wildlife observation, hiking, and camping and what areas might be made open in the future in the different alternatives. This is mentioned briefly on page 180, line 1 and on page 51, line 16 with respect to White Tanks, but should be described more completely. A map showing these areas would be helpful.

Page 165, Line 11 Nests and hatchlings would not have to be removed if the testing that was forcing the removal was conducted at a different time of year than during the spring. Change the word "must" on line 12 to "may."

Page 165, Line 19 Delete the subtitle *"Sensitive Habitats"* since it does not adequately title the paragraph that follows.

Page 165, Line 31 It might be mentioned here that the YPG staff is currently participating in an interagency effort to write an interdisciplinary plan that covers this region. This plan, the Trigo Mountains and Imperial National Wildlife Refuge Cooperative Management Plan, will address appropriate management levels for wild horses and burros.

Page 165, Line 36 Please define "burro bathtub."

Page 166, 4.5.1.5 Page 92 says stocked in 1988, page 164 says recently discovered, page 166 says found in 1995. Which is it? They were stocked in the Wash in the late 1970s.

Page 168, Line 19 Could pesticide residuals enter the Colorado River system, or the groundwater? Please describe.

Page 169, Line 12 The Yuma Proving Ground should consider constructing additional permanent sources of water for wildlife in cooperation with the Arizona Game and Fish Department, Arizona

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Desert Bighorn Sheep Society, and the Yuma and Brawley Chapters of Desert Wildlife Unlimited. The new sources of water might make up for impacts to existing water sources that are commonly disturbed.

In addition, the Trigo Mountains and Imperial National Wildlife Refuge Cooperative Management Plan may conclude that additional water sources accessible to wild burros may need to be developed.

Page 174, 4.7.1.2 Environmental Justice. There are communities in California that are affected by activities and facilities at YPG. Suggest including Bard and Winterhaven. There are also hundreds of winter visitors at BLM's Imperial and La Posa LTVA "communities" who use facilities at YPG and could be affected by the alternatives discussed.

Page 175, 4.7.2, 4.7.3, 4.7.4, and 4.7.5. These alternatives could affect revenues at BLM's Hidden Shores concession and at Fisher's Landing/Martinez Lake, both negatively and positively depending on privatization efforts. This should be discussed.

Page 179, 4.8.4., 28. YPG is segregated from mineral entry - not open to mining.

Page 179, 4.8.4.2., 17-21. YPG is segregated from mineral entry - not open to mining.

Page 177, 4.8 Land Use. General comment. Alternatives C, D, and E would have effects on other land use patterns, such as recreational use of the Betty's Kitchen area, Mittry Lake area, BLM's recreation complex at Squaw Lake and Senator Wash, etc. Increased traffic on Highway 95, Mittry Lake Road and other local roads - safety, maintenance for other entities, etc. Existing development on private land adjacent to YPG.

Page 180, 4.8.4.2 What authority does YPG have to permit mining on lands closed to mineral entry? YPG spent many years in the 1970s to get rid of the mining and mining claims on YPG, why would you open it again?

Page 181, 4.8.5.1 Expand hunting areas and introduce more long range artillery to the same area seems like conflicting uses.

Page 182, 4.8.3 Off-post Locations Land Use "Recreational activities may be introduced to areas surrounding Blaisdell Railroad Siding." This would not be an authorized use under the existing right-of-way reservation for the 40 acres of public land. Any recreational activity introduced on the military's land, would affect the adjoining public land unless the military fenced their land.

Page 182, 4.8.6. Mitigating measures to address identified effects on adjacent lands?

Page 196, 4.13.6. Mitigation Measures. Include discussion re quality of groundwater recharge.

Page 197, 4.14. Transportation. More traffic = increased mortality wild horses and burros. Mitigating measures?

Page 199, Health and Safety It may be desirable to develop a safety briefing for people intending to hike, hunt, camp, or observe wildlife on YPG.

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Page 200, 4.16. Discuss unavoidable, irreversible, and irretrievable effects on the landscape in general and visual resources. Also those related to some hazardous materials, radiation, and munitions.

Pages 203-205, 4.17.2, Regional Cumulative Impacts. Discuss foreseeable cumulative impacts on surrounding communities, similar business ventures on adjacent lands (such as socio-economic impacts on Hidden Shores), impacts on lands bordering the south end of YPG that may be developed into residential areas within the next 10 years (Dome Valley area and east of Dome Valley), increased visitor use at BLM recreational facilities, the wildlife refuges, etc. - e.g., impacts on infrastructure. Cumulative impacts on wildlife, on BLM-managed wild horses and burros.

Also re Cumulative Impacts: If the base is closed at some future time, the lands will be returned to the administration of the Department of Interior. Cumulative impacts from development of private party ventures, along with those from the military mission, would become another agency's to manage. This is not addressed in any discussion in the RWEIS. The commentor understands that base closure is not an alternative in the RWEIS, but it could occur, nevertheless.

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U.S. Army Proving Ground
Attn: STEYP-C (Kerns)
Yuma, AZ 85365-9107

October 1, 1998

RE: COMMENTS ON THE DRAFT RANGE WIDE ENVIRONMENTAL IMPACT STATEMENT, YUMA ARMY PROVING GROUND

On behalf of Defenders of Wildlife (Defenders) and its 280,000 members and supporters, we are submitting comments on the Draft Range Wide Environmental Impact Statement (RWEIS) for the U.S. Army Proving Ground.

The goal of the National Environmental Policy Act (NEPA) is to promote environmentally sensitive decision making.[1] Yet Charles Botdorf's cover letter indicates that the preferred alternative will be Alternative E. Letter from Botdorf, Environmental Service Division, Department of the Army, 8/19/98. This is quite disturbing as Alternative E is the alternative least explained in the RWEIS, with the minimal assessment of environmental impacts. Furthermore it is the alternative with the most environmentally harmful impacts. As noted under the summary of Alternative E, "significant impacts could occur to geology and soils, biological resources, cultural resources, and socioeconomic." RWEIS at S-3.[2]

The RWEIS requires serious revision with a much more thorough explanation of what exactly the Department of the Army envisions under Alternative E . As the RWEIS stands, Defenders believes that it was

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1. 40 C.F. R. §§1500.1, 1500.2.

2. *See also* Table 2-5 and 2-6, Comparatively Alternative E has the most harmful environmental consequences of all of the alternatives. Furthermore, Defenders believes that this Table may underestimate the negative impacts of the Alternatives considered.

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produced "without observance of procedure as required by law" and constitutes a violation of the Administrative Procedure Act.[3]

A. Selection of Alternative E

Our primary concern with Alternative E is that it fails to explain why the Army is choosing to privatize on federal land. This decision alone requires careful analysis to determine if this is within the scope and mission of the agency and is preferable to returning sections of the Yuma Proving Ground (YPG) to the public for wilderness values -- an alternative that is not even considered in this document but is an equally valid alternative. Secondly, the type of activities that will occur under privatization are not sufficiently developed for public analysis.

The RWEIS does not come close to explaining the myriad of impacts that associated with privatization as required at NEPA and is clearly not useful as a planning document. The RWEIS states that the selected alternative includes, "a technology and conference complex center with a 27-hole golf course, a hot-weather automotive test center, and a cogeneration energy plant. Increased on site civilian population and related support facilities (markets, service stations, pharmacies, etc..) and infrastructure (electrical, facilities, water plant, wastewater treatment plant, etc..)" RWEIS at 5. Throughout the document, the Army superficially refers to these projects yet fails to provide the least sort of detail making it impossible to make a rational decision.

We understand that this is a programmatic document and that the Army plans to tier project specific NEPA documents under this RWEIS. However, for this document to be an accurate planning document, NEPA requires that impacts be assessed at this stage.[4] How can one make a reasoned assessment of the alternatives, when not even a complete list of the projects to be undertaken is give? How can one propose mitigation measures if the effects of the selected alternative are unknown (or undescribed)?

B. Cibola Region

Defenders is particularly concerned about the impacts to the Cibola region. This area abuts the Kofa National Wildlife Refuge and the Colorado River, and contains significant riparian areas-- all areas with heightened wildlife values. Therefore, activities

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[3] 5 U.S.C. § 706(2)(D).

[4] The purpose of the alternatives section is to, "sharply define[e] the issues and provid[e] a clear basis for choosing among the options by the decision makers and the public. 40 C.F.R. § 1502.4.

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in this area are more likely to affect wildlife resources and wilderness. The short paragraph describing privatization measures does not begin to describe the activities to be undertaken pursuant to Alternative E. RWEIS at 53. The RWEIS suggests that the Cibola area will be available to the motion picture industry, private aviation companies to test and evaluate aircraft, and the automotive industry to test and evaluate products, as well as for private and commercial testing of small arms, track pads, tracked-vehicles, ride dynamics, tires, demolition equipment and techniques. Id. The impacts of these activities are unassessed.

Nor is there an adequate explanation of mitigation measures to be undertaken in this region.[5] For example in the Geological and Soil Resources Section there is a discussion of open-trench RDTE demolition projects will disturb the terrain. Further, new desert pavement is will be created as new activities expand established roads, ranges and buildings. Alternative C (encompassed within Alternative E) RWEIS at 158, 159. The only mitigation measures discussed are those in a section devoted to Mitigation Measures Common to all Alternatives. This section discusses the ITAM program but in no way explains how the above mentioned specific harmful impacts will be mitigated.

Mitigation measures of Biological Resources in this area are similarly not specific enough to base a reasoned decision. The Alternative E mitigation measure provides that "Yuma Proving Ground will consider implementing a mitigation plan which integrates environmental sustainability and carrying capacity of ranges and consider setting aside sensitive habitats to ensure protection of those area. " RWEIS at 169. This is an entirely non-committal statement which does not provide informed discretion afforded to an agency's decision-making, and is subject to challenge.

The RWEIS states that the effects are unknown or have yet to be developed or "will require more detailed evaluation in future environmental documentation." RWEIS at 58. Yet NEPA requires that the agency make projections now, "[r]easonable forecasting and speculation is thus implicit in NEPA and we must reject any attempt by agencies to shirk their responsibilities under NEPA by labeling any all discussion of future environmental effects a "crystal ball" inquiry." Scientists for Public Information v. Atomic Energy Comm'n., 481 F.2d 1079, 1091-2 (D.D.C. Cir. 1973). Until these projects have been further fleshed out it is impossible to assess the impacts, the cumulative impacts or establish mitigation measures for this region.[6]

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[5] Mitigation is an integral element of NEPA. *See* C.A.R.E. NOW , Inc. v. Federal Aviation Administration, 844 F.2d 1569 (11th Cir. 1988).

[6] The vague references to the introduction of commercial mining in the Cibola region require a full discussion in order to assess if Alternative E is the preferred alternative.

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C. Laguna Region

The types of proposed activity on the Laguna region are troubling. We are shocked that the Army would even consider building a golf-course and 300 room hotel in the Sonoran Desert. This ecosystem, fragile and geographically limited, is host to a diverse wildlife that is not found anywhere else in the world. We find it outrageous that in a time of recognized conservation, the Army would suggest such a flagrant consumption of resources at the expense of an imperiled ecosystem.

The use of Laguna Army Airfield will result in increased use of airspace over the Kofa National Wildlife Refuge. Furthermore, Alternative E states that there will be an increase in long-range artillery firing into the Barry Goldwater Air Force Range and the Chocolate Mountains Aerial Gunnery Range. The impacts of the increases are not discussed in the impact section. We are aware that wildlife considerations exist in each of these areas, yet they are not considered in the RWEIS. Furthermore, the associated impacts of noise are harmful to both wildlife and recreational use though mentioned in the impacts section with regard to the YPG, they are not mentioned with regard to the increased impacts in the BMGR or CMAGR.

Under Alternatives D and E, the RWEIS states that water allocation for the Colorado River continues to be negotiated with BOR. RWEIS at 155. We do not think that it is possible to make a reasoned determination of alternatives until you have completed those negotiations and informed the public of the outcome. Defenders believe that no water should be withdrawn from the Colorado River, unless it is done through the Lower Colorado River Multispecies Conservation Program. Therefore selection of Alternative C, D or E is a violation of the Endangered Species Act.[7]

Proposed luxury developments like a golf-course, hotel and private-vehicle testing

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(Alternative D, included in Alternative E) RWEIS at 180. Although the Army states that specific impacts would be addressed in lower tiered documents, the Agency is required to make a reasonable forecast as to impacts.

[7] Pursuant to the citizen suit provision of the Endangered Species act, we hereby provide 60 day notice of intent to sue upon the Army's selection of Alternative C, D or E. It is a violation of Sections 7 and 9 of the ESA to increase water usage --even by a small amount-- without formal consultation with the Fish and Wildlife Service. The extreme over allocation of the water on the Colorado River and the dire lack of water for species conservation needs such as the southwestern willow flycatcher, razorback sucker and bonytail fish. Since all of these species are below the "jeopardy" threshold already, any action which reduces water availability for wildlife restoration projects, will likely adversely affect the species and result in a taking.

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facility are heavily dependent on water and the RWEIS states that they will derive this from groundwater withdrawals. The Sonoran Desert ecosystem depends on these same sources of water and should take priority. The RWEIS does not discuss the conflict of resources.

Defenders believes that there should be no increases in withdrawals from the aquifer. It is misleading to allege that "Increased ground water withdrawal amounts would corresponds with increased waste water discharges." RWEIS at 156. Very little water would return to the aquifer after being used on a golf course or to mitigate dust caused by the increased number of off-road vehicles. Evaporation and use in a hot arid environment would account for the majority.

Water contamination, though an issue of great concern, is barely touched on. How can the Army reasonably propose automobile testing and earth moving equipment testing in this region without considering the hazard substances from fuel spills into both riparian areas and groundwater and the many affects that these activities can have on wildlife.

The Biological Resources section fails to address the specific impacts of Alternative E on wildlife in this region. "The golf course could impact desert washes." RWEIS at 168. This in no measure describes the effect of an unnatural oasis in the desert on wildlife, nor the associated impacts of discharge of pesticides on wildlife. There are no mitigation measures described which would addresses these impacts. Mitigation measures for this region are either combined or exactly the same as those specified for the Cibola Region.

E. Secondary Impacts

Again it is difficult to assess the secondary impacts of Alternative E because the alternative itself has not been adequately explained. However, with the types of activities that are planned, certainly destruction of wilderness and native habitat are two impacts that Defenders is strongly opposed to and would like to see further explained, so as to demonstrate that the agency is making a reasoned decision. The impact of secondary impacts like increased traffic, roads, population on biological resources wildlife are not assessed in this document.

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F. Cumulative Impacts

The Cumulative Impact section is hardly that envisioned under NEPA or that which could be accomplished under a programmatic document.[8] NEPA defines cumulative impacts as those that can result from individually minor but collectively significant action taking place over a period of time." 40 C.F.R. § 1508.7. Yet alternative C, D and E are lumped together in a short paragraph with a blanket statement that "[v]egetaion and animals would be protected." RWEIS at 203. There is not discussion of cumulative impacts and it is wrapped up with the superficial statement that "mitigation strategies incorporated into an aggressive Conservation Program will avoid or minimize long term impacts to all resources." Id.

We assume that the Conservation Program mentioned is the same ITAM program described RWEIS at 161. Discussion of this program explains little about how the Army plans to mitigate under Alternative C, D and E. This ambiguous, noncommittal statement fails to explain a very real serious issue and we believes it deserves further explanation with regard to the selected alternative. There is little discussion of how or what type of protection would be afforded wildlife. The justification that further NEPA documents will be completed as tiered documents is not sufficient to legitimize the RWEIS. If the agency does not have sufficient information about the impacts they are required to evaluate reasonably foreseeable significant adverse impacts and make clear that such information is lacking. 40 C.F.R. § 1502.22. The agency has sufficient information to mention that certain activities will likely occur yet they do not attempt to forecast what the impacts of these activities will be.

The RWEIS discusses many projects which will have regional cumulative impacts yet the cumulative impacts of these activities are not considered anywhere in the document. For instance the increase in long-range artillery fire in the Barry Goldwater range is not discussed in relation to the activities that are already occurring on the Goldwater Range nor in relation to the increased impacts on wildlife in the Goldwater range. Defenders is rightfully concerned that the actions of the Army on or outside of the YPG, or the private individuals projects on the YPG, will increase activity on the Goldwater Range, Cibola, Kofa and Imperial National Wildlife Refuges as stated in the RWEIS. Thus wildlife and wildlife habitat in those areas will be affected. Bighorn sheep and Sonoran pronghorn will be indirectly and possibly directly impacted by the increased activities of Alternative E, yet are barely mentioned in the document (and only in the affected environment section). The RWEIS must address these impacts in order to

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[8] 40 C.F.R. 1508.7, 1508.25; Resources Ltd. v. Robertson, 8 F.3d 1394, 1400 (9th Cir. 1993) requiring consideration of cumulative impacts not under federal control.

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comply with NEPA.

C. Conclusion

These comments only scratch the surface of our concerns with the RWEIS. As discussed above the RWEIS does not fulfill the requirements of NEPA, it does not include an adequate explanation of alternatives, effects of alternatives, cumulative impacts, nor mitigation measures.

Defenders of Wildlife supports selection of Alternative B, Decreased Baseline Activities as a starting point. Based on the RWEIS this is the alternative with the least harmful impacts to wildlife, native habitat and the environment. Additionally, it is the only alternative that is adequately described for which the Army to make a reasoned decision.[9] If the Army selects Alternative E as the preferred alternative, which is by its own account admittedly the least environmentally satisfactory of the proposed alternatives, Defenders will request that the EPA or US Fish and Wildlife Service refer the proposed action to CEQ.[10]

Thank you for the opportunity to participate in the RWEIS process.

Sincerely,

Chandra R.

Chandra Rosenthal
Litigation Associate

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[9] Under 40 C.F.R. § 1502.15, "[v]erbose descriptions of the affected environment are themselves no measure of the adequacy of an environmental impact statement." We recommend that in the revision the description of the affected environment is halved and more thought and discussion is devoted to the impacts and selection of the alternative sections. Furthermore, why limit the substance of the document to 200 pages? For a complex programmatic EIS a thorough discussion is necessary, NEPA permits an EIS up to 300 pages for proposals of unusual scope or complexity. 40 C.F.R. § 1502.7

[10] 42 U.S.C. § 7609, 40 C.F.R.§ 1504.1(b). If the EPA determine that the action is environmentally unsatisfactory, the EPA may refer the unsatisfactory proposed actions to the CEQ.

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THE HOPI TRIBE

Wayne Taylor, Jr.
CHAIRMAN

Phillip Quochwytewa Sr.
VICE-CHAIRMAN

02 October 1998

U.S. Army Yuma Proving Ground
Environmental Sciences Division
Tracey Epperley or Junior Kerns, Project Officers
ATTENTION: STEYP-CD-ES
Yuma, AZ 85365

RE: The Hopi Tribe's Comments Regarding the *Draft Range Wide Environmental Impact Statement U.S. Army Yuma Proving Ground.*

Dear Tracey Epperley or Junior Kerns,

The Cultural Preservation Office of the Hopi Tribe has received and reviewed the submitted *Draft Range Wide Environmental Impact Statement U.S. Army Yuma Proving Ground* and have the following comments.

The Hopi people have a long historical connection to the area of the Yuma Proving Ground. This connection is founded on the traditional migration histories of the Hopi Rattlesnake, Water, Bow, Greasewood, Reed, Bear, Bearstrap, Spider, Sand, and Lizard Clans, among others, who traveled through and resided in villages on or near the Yuma Proving Ground. As such, these specific Hopi clans may retain contemporary cultural and religious affiliations with specific areas, including archaeological sites, sacred places, and traditional cultural properties, located within the area of the Yuma Proving Ground. However, This document fails to adequately consider the concerns and interests of the Hopi Tribe and other Native Americans with respect to each of the alternatives. At best, this document provides little more than cursory lip service to these issues.

Specifically, this document fails to recognize the *trust responsibility* of the U.S. Army to Native American tribes in providing access to and protection of sacred places as directed under Executive Order 13007. It appears that there has been a significant failure by the U.S. Army Yuma Proving Ground to contact Native American tribes, that may have ancestral, historical, and contemporary connections to the Yuma Proving Ground, regarding the identification, protection, and future management of sacred sites located within the area covered by this draft EIS. This situation needs to be rectified prior to the finalization of this environmental document.

Additionally, the Cultural Resource Section of this document is by far too vague and does not address

P. O. BOX 123 — KYKOTSMOVI, ARIZONA — 86039 — (520) 734-2441

Reference # 10 (Page 1) The Hopi Tribe, Kykotsmovi, AZ October 2, 1998.

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the responsibility of the U.S. Army Yuman Proving Ground to initiate, coordinate, and integrate compliance with other relevant historic preservation and cultural resource legislation [i.e., National Historic Preservation Act (NHPA), Archaeological Resources Protection Act (ARPA), and the Native American Graves Protection and Repatriation Act (NAGPRA)], with the NEPA process outlined in this document. Even more surprisingly, this document fails to recognize the Department of the Army's ongoing efforts to develop counterpart regulation, in consultation with the Advisory Council on Historic Preservation, to stand in place of 36 CFR Part 800, for purposes of Army compliance with Section 106 of the National Historic Preservation Act. Each of these identified federal historic preservation and cultural resource legislations mandate the federal agency to consult, on a government to government relationship, with Native American tribes regarding the effects of the federal agency's undertaking on resources of traditional importance to Native American tribes. Again, this document fails to recognize or address this responsibility of the U.S. Army Yuma Proving Ground.

Traditional cultural properties were specifically recognized as historic properties eligible to the *National Register of Historic Places* by Congress when the 1992 amendments to the National Historic Preservation Act were passed. Unfortunately, this document fails to recognize this class of historic property, important to Native American tribes, in the cultural resources section. What efforts will the U.S. Army Yuma Proving Ground take to identify, consider, and manage this class of historic properties located on the Yuma Proving Ground?

It is the Hopi Tribe's position that until the U.S. Army Yuma Proving Ground appropriately addresses the Native American issues presented in this letter, this entire draft EIS is considered inadequate, in need of serious revisions, and should not be finalized. Should you have any questions or comments regarding the contents of this letter please contact Mr. Kurt Dongoske, Tribal Archaeologist, or me at 520/734-3761 or 520/734-3751, respectively. Thank you for consulting with the Hopi Tribe.

Sincerely,

Leigh J. Kuwanwisiwma, Director
Cultural Preservation Office
The Hopi Tribe

Reference # 10 (Page 2) The Hopi Tribe, Kykotsmovi, AZ October 2, 1998.

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ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

Governor Jane Dee Hull Russell F. Rhoades, Director

October 8, 1998
RPU99.085 4270.3.5

Mr. Chuck Botdorf, C.P.G.
U.S. Army Yuma Proving Ground
Attn: STEYP-ES-E
Yuma, AZ 85365-9107

SUBJECT: Yuma Proving Ground (YPG) Draft Range-Wide Environmental Impact Statement (RWEIS), dated August, 1998

Dear Mr. Botdorf;

ADEQ has received and reviewed the above document and provide the following comments.

General Comments

Overall, the RWEIS is a well-written, well organized document. It clearly covers all of the requirements of NEPA. However, the documents use a number of acronyms and initials. It is normal writing style to define these the first time they are used; however, the reader must make frequent use of the appendices throughout the document to figure out the meaning of many terms, acronyms and initials. It is a good practice to have both; a list of defined acronyms used in the text, and to define the acronym the first time they are used.

What contingencies and protocol are in place if Alternative C, Increased Military Mission, were to occur. Military operations could increase 100 percent, or more, if YPG is involved with mobilization for war or national emergency. The sudden influx of large number of troops would have a substantial impact on the environment and infrastructure.

Mining receives almost no mention. How have past mining activities impacted the environment at YPG. Also, do current mining activities occur for Base activities? How is the sand and gravel used for construction and roads obtained?

The mission of YPG is military in nature involving training and testing with a variety of munitions, vehicles (both wheel and track), fixed and rotary wing aircraft, etc. It is difficult to interface this mission with environmental stewardship. However, actions can be taken to prevent unnecessary degradation to the environment, and those activities should be sought

Specific comments

A. Cover: The statement, "[.]...in concert with the environment" is contradictory to the mission of YPG. While YPG has an obligation to comply with environmental laws, and be as "environmentally

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Reference # 11 (Page 1) Arizona Department of Environmental Quality October 8, 1998.

EXHIBIT-3

friendly" as possible, its mission is primarily for testing a variety of military materiel, particularly munitions. The RWEIS points out many instances where training and operations cause impacts on (particularly) animals, birds and plants.

B. The document does not select a preferred alternative. Instead, Alternative E - Diversified Mission, is implied as the preferred alternative in the Executive Summary. If Alternative E is the preferred alternative, or goal of the RWEIS, it should be declaratively stated.

C. 2.1.4.5 Off-post Locations: The Barry M. Goldwater Range (BMGR) is mentioned throughout the document, but is not included here as a location used by YPG.

D. 2.4.1.1 Munitions and Weapons; It mentions here and elsewhere that, "[F]iring sources may originate from offshore naval ships,...". Presumably these would be cruise or other guided missiles. Please identify the types of munitions addressed.

E. 2.5.2.3 Privatization Ventures: It is noted there are 410 acres of private patented mining claims, yet no mention if they are active, dormant or abandoned. No mention or recommendation is made to the acquisition of these private lands by purchase, exchange or donation. Also, no mention to the impact to YPG's mission of the location of these areas.

F. 2.6.1.1 Military activities: An "EM gun" (Electromagnetic gun) is mentioned, but nothing about its operation or potential environmental impacts.

G. 3.1.2 Topography: Topography is related to landforms. The discussion starts out with the geologic history of the area. There is no discussion about topographic relief, drainage patterns, high and low points, topographic features, etc. A generalized topographic map of YPG would have been useful for interpretation. The statement, "[w]hen mountains were carved from large uplifted earth blocks bounded by faults-" is not correct and makes no sense. The mountains were formed by uplifting fault blocks and carved by physical and chemical erosion.

H. 3.3.2.2 Groundwater Quality:

1. The comment about the sanitary landfill (line 34, page 78) does not go into further discussion on whether or not the landfill is lined, has monitoring wells, etc to support the conclusion made.

2. Same page, line 42: "POL bladder test spill site". No mention is made of site remediation intentions.

I. 3.4 Geological and Soil Resources:

1. The basin and range description found in the Topography Section may be better

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suited here.

2. A generalized geologic map would have been a good complement to the cross-section.

3. The average monthly temperature table (Table 3-1) does not appropriately reflect the possible temperature extremes. To convey to the reader a more accurate representation of temperature variations and the environmental stress that it creates, a mention of potential highs and lows, based on the 33 years of data collaborated, is advised.

J. 3.4.2 Geologic Resources:

1. No mention is made of common variety minerals: uses, sources, etc. Quarrying can also have impacts on air and water resources.

2. A map identifying the active mine locations would be useful.

K. 3.4.5 Seismicity: ADEQ agrees with the assessment; however, with the number of structures holding munitions and POL (USTs and AST's), some mention of resistance to seismic events would be useful. For example, what would be the horizontal acceleration required to rupture tanks or cause a release of a hazardous substance stored?

L. 3.4.6 Geological and Soil Resources by Region: What is impact of smoke testing to geological resources? This topic needs to be moved to another section.

M. 3.10 Hazardous Wastes: Nothing is mentioned about the potential of perchlorates present.

N. 3.11.2.4 Low Frequency Emissions: The first statement (line 6, page 128) states, "[S]ome electrical systems.....(with power levels typically at less than 10 MHZ)." "10 MHZ" is a measure of frequency, not power.

O. 3.11.3 Radiation by Region: It is noted on line 33, page 128 that of approximately 10,000 DU projectiles fired, only 5,000, or 50% have been recovered. The report notes later that measures have been taken to improve recovery, but nothing is mentioned concerning the recovery or whereabouts of the unrecovered DU projectiles.

P. 4.16 Unavoidable Environmental Conflicts: As mentioned in the "General Comments", YPG has a military mission of testing and training with a variety of troops, equipment and munitions. This type of activity cannot be avoided, as this is the reason YPG was established. As long as it continues its military mission, there will be environmental disturbances, particularly to wildlife and soils. The best mitigation is the development of munitions that are more "point effective" and less "area

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effective", increase the use of reclaimed water for washracks, etc, increase the use of solar power (both active and passive), and develop fuel efficient, or alternative fuel, vehicles.

Please contact Lou Minkler, Project Manager, at 602-207-4187, if you have any questions regarding these comments.

Sincerely,

Nancy Lou Minkler, Project Manager
Remedial Projects Unit

RO/nlm

cc: Louis Martino, Environmental Systems Engineer, Argonne National Laboratory
Nancy Kosko, EPS, HQ, U.S. Army Test and Evaluation Command, Environmental Quality Division
Dr. Moses Olade, Manager, Federal Projects Unit, ADEQ
John M. Kivett, Remedial Investigations Hydrology Unit, ADEQ
Robert Oldfield, Project Manager, Federal Projects Unit, ADEQ
Project and Reading Files

Reference # 11 (Page 4) Arizona Department of Environmental Quality October 8, 1998.

EXHIBIT-3

UNITED STATES MARINE CORPS
MARINE CORPS AIR STATION
BOX 99100
YUMA, ARIZONA 85369-9100

IN REPLY REFER TO:
6280/60
3VA4
15 OCT 1998

From: Commanding Officer, Marine Corps Air Station, Yuma
To: Commander, U.S. Army, Yuma Proving Ground, Attn: Ms. Karen Reichardt, STEYP-CD-ES-GPI, Yuma, AZ 85365-9107

Subj: DRAFT RANGE WIDE ENVIRONMENTAL IMPACT STATEMENT

Ref: (a) U.S. Army, YPG, Environmental Sciences Division ltr of 19 Aug 98

1. Per the reference, Marine Corps Air Station (MCAS) Yuma, Environmental Impact Review Board (EIRB), completed a thorough review of the Draft Range Wide Environmental Impact Statement (RWEIS). Based on the EIRB's review of this document, the following comments and concerns are provided:

a. MCAS Yuma is referenced on several pages as MCAS-Yuma. Please remove the "-".

b. Regarding Alternative B: This type of alternative is a major concern to this command since a decrease in any aircraft operations over the Yuma Training Ranges would affect the training mission of MCAS Yuma.

2. Overall your Draft RWEIS is well written and of excellent quality. It is a good example of what a Programmatic EIS should look like, and you have adequately covered all the important environmental issues for Yuma County.

3. Please include MCAS Yuma on all future mailing lists, and forward the Final Range Wide EIS along with a copy of the signed Record of Decision to the following address: Environmental Department, Attn: Environmental Planner, Box 99110, Yuma, AZ 85369-9110. If you have any questions, please contact Chris Bates, Environmental Planner, at (520) 341-2675 or e-mail at batesc@yuma.usmc.mil.

C. J. TURNER

Reference # 12 United States Marine Corp; Marine Corps Air Station, Yuma, AZ October 15, 1998.

EXHIBIT-3

THE STATE OF ARIZONA

GAME & FISH DEPARTMENT

2221 West Greenway Road, Phoenix, Arizona 85023-4399 (602) 942-3000
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Deputy Director
Thomas W. Spalding

October 16, 1998

Mr. Charles E. Botdorf
Acting Chief, Environmental Sciences Division
U.S. Army Yuma Proving Ground
Attn: STEYP-CD-ES
Yuma, Arizona 85365

Re: Draft Range Wide Environmental Impact Statement (RWEIS) for U.S. Army Yuma Proving Ground (YPG)

Dear Mr. Botdorf:

The Arizona Game and Fish Department (Department) has reviewed the above-referenced Draft RWEIS. We appreciate the opportunity to provide comments and be involved in YPG's RWEIS process. The following comments are provided for your consideration.

The Department is concerned about the adequacy of this document as an Environmental Impact Statement (EIS) and its usefulness for incorporating environmental consequences into the decision making process. One of the primary purposes of the National Environmental Policy Act (NEPA) is to ensure that environmental consequences are considered in decision making processes. Consistent with NEPA, the Department believes that this document should provide a detailed description of the proposed action, alternatives, associated impacts, mitigation (if necessary), and monitoring. In addition, the Department does not believe that this document adequately describes specific actions related to the various alternatives. This leads to inadequacies in the document for describing and quantifying impacts (direct, indirect, short-term, long-term and cumulative), developing and describing mitigation and monitoring, and making comparisons of environmental impacts associated with the various alternatives. These concerns are consistent with comments provided in the Department's letter on the Preliminary Draft RWEIS, dated August 12, 1996 (Department letter enclosed).

It is difficult to evaluate impacts to wildlife resources associated with the alternative actions presented in the Draft RWEIS because these actions are not adequately described and related potential impacts are not quantified. Since proposed military activity and potential impacts to wildlife resources are not quantified for each alternative, environmental consequences can not be used as a decision factor for selecting an alternative as presented in this document. If an alternative is selected from this document, any future actions will still have to undergo the

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NEPA process (i.e., on a project-by-project basis).

The Department would like to meet with representatives from YPG to discuss the following concerns regarding the RWEIS:

- Inadequate detail describing the proposed action, alternatives, associated impacts, mitigation, and monitoring.
- Inability to select an alternative based on information provided.
- Consistency with Part 4 of the YPG Integrated Natural Resources Management Plan, signed by YPG, the Department, and the U.S. Fish and Wildlife Service.
- Addressing comments provided in the Department's letter, dated August 12, 1996.

Thank you for the opportunity to review and comment on the Draft RWEIS. If you have any questions regarding this letter, please contact John Kennedy, Project Evaluation Program Supervisor, at (602) 789-3602. To schedule a meeting to discuss the RWEIS and the Department's concerns, please contact Russ Engel, Region IV Habitat Program Manager, at (520) 342-0091.

Sincerely,

John Kennedy

John Kennedy
Project Evaluation Program Supervisor
Habitat Branch

JK:RE:re

cc: Larry Voyles, Regional Supervisor, Region IV
Russ Engel, Habitat Program Manager, Region IV
Tracey Epperley, Environmental Sciences Division, YPG
Junior Kerns, Environmental Sciences Division, YPG
Karen Reichhardt, Gutierrez-Palmenberg, Inc., YPG

Enclosure

AGFD# 08-17-98(04)

Reference # 13 (Page 2) Arizona Game & Fish Deratment, Habitat Branch October 16, 1998.

EXHIBIT-3

18-96(01)

THE STATE OF ARIZONA

GAME & FISH DEPARTMENT

2221 West Greenway Road, Phoenix, Arizona 85023-4399 (602) 942-3000
Yuma Office, 9140 E County 10½ Street, Yuma, AZ 85365-3596

August 12, 1996

Commander, U.S. Army Yuma Proving Ground
ATTN: STEYP-ES-C; Mr. Junior D. Kerns
Yuma, Arizona 85365-9107

Re: Preliminary Draft Rangewide Environmental Impact Statement (RWEIS), Yuma Proving Ground (YPG)

Dear Mr. Kerns:

The Arizona Game and Fish Department (Department) has reviewed the above-referenced RWEIS, dated May 22, 1996. We appreciate the opportunity to be involved in YPG's RWEIS process.

On March 3, 1996, the Department met with representatives of Gutierrez-Palmenberg, Inc. to discuss wildlife resource issues to be considered during the RWEIS process. Those issues were documented in the Department's April 25, 1996 comment letter, a copy of which is enclosed for your reference. The Department also discussed general wildlife resource issues with Gutierrez-Palmenberg at the scoping workshop held on July 24, 1996.

Based on our review of the RWEIS, additional page-specific comments are enclosed.

Thank you for the opportunity to participate in the development and review of this RWEIS. The Department would like to provide additional comments on the document when it is more complete. If you have any questions, please contact me at (520) 342-0091.

Sincerely,

John Kennedy

John Kennedy
Regional Habitat Program Manager

Enclosures (2)

cc: Larry Voyles, Regional Supervisor, Region IV
Larry Phoenix, Field Supervisor, Region IV
Ron Christofferson, Proj. Eval. Coordinator, Habitat Branch
Jim Mitchell, Director, Env. Sciences, Yuma Proving Grounds
Karen Reichhardt, RWEIS Task Manager, Gutierrez-Palmenberg

AGFD# 6-18-96(01)

Reference # 13 Encl-1 (Page 1) Arizona Game & Fish Deratment, Habitat Branch October 16, 1998.

EXHIBIT-3

ARIZONA GAME AND FISH DEPARTMENT
PAGE-SPECIFIC COMMENTS ON THE
PRELIMINARY DRAFT RWEIS, YPG

August 12, 1996

Page 1, Section 1.2 - Proposed Action

It is not clear what specific actions and/or projects will be addressed in this document. Based on our review, this RWEIS will address on-going activities and those actions which have been identified for implementation. Therefore, future actions will need to be analyzed at a later date and in subsequent environmental documentation.

The Department is pleased that YPG proposes to allow continued use by hunters and the recreational community within portions of YPG. We would appreciate being referenced as a cooperator in YPG's hunt program and other wildlife resource programs.

Page 11, Table 1.7-1

Changes in flight patterns where low-level flights occur may also affect golden eagles, waterfowl, desert bighorn sheep, and mule deer.

Page 27, Non-Military Uses, Recreational

The Department would like to continue to work with YPG on the possible addition of hunting areas, such as the Gould Wash and Crazy Woman Wash areas (northwest portion of the Cibola Range).

Page 38, Section 2.5, Alternative C

Specific sites and complete description of the proposed activities have not been identified for Alternative C. It is difficult to evaluate potential impacts to wildlife habitat without this information. The Department would like the opportunity to work closely with YPG to identify and address wildlife resource issues associated with sites selected for proposed military activities.

Page 67, Desert Arroyos

Los Angeles Wash, Crazy Woman Wash, Gould Wash, and Mohave Wash are comparatively major arroyos which represent important habitat for wildlife on YPG and should be acknowledged as such in the RWEIS.

Page 68, Enhanced Tinaja

In the second sentence, the wording "Some of these may" should be replaced with "most should" to more accurately reflect the management strategy for these wildlife water developments.

Reference # 13 Encl-1 (Page 2) Arizona Game & Fish Deratment, Habitat Branch October 16, 1998.

EXHIBIT-3

Page 68, Water Catchments

Fiberglass tanks were also used as components of wildlife water developments in the Cibola Range and KOFA Range.

Page 69, Figure 3.3-2

The Department prefers the term "wildlife water developments" instead of "AGFD watering sites".

The Department notes that Figure 3.3-2 shows the locations of mule deer water developments but does not include the locations of desert bighorn sheep water developments. Wildlife water developments should be identified on a map and used during the RWEIS process for project planning and evaluation purposes.

Potential impacts to wildlife that depend on these sources of water should be addressed in the RWEIS. The Department would like to meet with YPG to discuss possible avoidance measures that could minimize disturbance to wildlife in the vicinity of these water developments.

The Department would be willing to identify (map) the exact locations of all bighorn sheep and mule deer water developments within YPG. Based on our recent conversation with Gutierrez-Palmenberg regarding this issue, a map will be sent to our regional office for the purpose of identifying these locations.

Page 79, Figure 3.4-1

The Department recommends documentation of other major topographic features; including Los Angeles Wash, Mohave Wash, the Trigo Mountains, and Mohave Peak.

Page 91, Section 3.5.2 - Wildlife

The Department recommends clarification of wildlife management actions on YPG. We suggest the following wording be used for this description: "Wildlife management focuses on the conservation, enhancement, and restoration of wildlife resources and habitats. In cooperation with the Arizona Game and Fish Department, YPG allows hunting of big game and small game animals. The most common types of wildlife found on YPG include big game mammals, small game birds and mammals, predator and furbearing mammals, and migratory and resident birds.

Additional comments regarding nongame wildlife are enclosed for your reference.

Reference # 13 Encl-1 (Page 3) Arizona Game & Fish Deratment, Habitat Branch October 16, 1998.

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Page 120, Section 3.8.2 - Regional Recreation Resources

The the following wording (in bold) should be added to the appropriate statements.

> The Gila Mountains and the Tinajas Altas Mountains in the southern part of Yuma County offer opportunities for camping, hiking, **big game** and small game hunting, and rock hounding.
>
> The Colorado River provides **boating, hunting**, fishing, etc.

The reference to Figure 3.8-1 appears to be inaccurate, as this map does not appear to be pertinent to recreation resources.

Page 122, first paragraph

The Department recommends clarifying this description of wildlife-related recreation. Specifically, we recommend the following wording: "Within YPG, hunting is allowed in specific areas at specified times throughout the year. There are no deliniated areas for hiking or camping other than for YPG-permitted hunters. However, neighboring Cibola, Kofa, and Imperial National Wildlife Refuges provide opportunities for picnicking, camping (Kofa NWR), and hiking".

Off-road vehicle use is not permitted on the National Wildlife Refuges.

The Department is not aware of any areas on YPG where "rock hunting" is allowed.

Page 142, Adjacent Wilderness Areas

The Department recommends deleting "(except for the Trigo Mountains)" from the second sentence. Although there are no developed facilities within the Trigo Mountains, as with the Kofa and Muggins Mountains Wilderness areas, these mountains provide areas for picnicking, camping, hunting, and other wildlife-related recreation.

Page 143

A description of Mohave Peak should be added to this list of areas of aesthetic and visual interest (section 3.13.1).

Page 144

Los Angeles Wash, which flows into the Colorado River, is also a major drainage feature in the Cibola Range.

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Page 172, Wildlife

Predator mammals also include the gray fox and mountain lion.

Destruction of wash habitat would affect most wildlife species found within YPG.

Page 173, Big Game

As written, this description of big game species and associated habitat use is confusing. Bighorn sheep are found in the mountainous areas within YPG, and they utilize the washes for cover and forage, and as movement corridors from one mountain to another. Bighorn sheep are anticipated to be affected by activities occurring in these habitats.

Reference # 13 Encl-1 (Page 5) Arizona Game & Fish Deratment, Habitat Branch October 16, 1998.

EXHIBIT-3

THE STATE OF ARIZONA

GAME & FISH DEPARTMENT

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Director
Duane L. Shroufe

Deputy Director
Thomas W. Spalding

April 25, 1996

Ms. Karen Reichhardt, Task Manager
Gutierrez-Palmenberg, Inc.
Attn: STEYP-ES-GPI
Yuma Proving Ground
Yuma, Arizona 85365

Re: Preliminary Comments; Rangewide Environmental Impact Statement (RWEIS), Yuma Proving Ground

Dear Ms. Reichhardt:

The Arizona Game and Fish Department (Department) has reviewed the materials provided on the preparation of the above-referenced RWEIS. Yuma Proving Ground (YPG) proposes to identify and evaluate potential environmental impacts associated with on-going and future activities on YPG. The Department discussed some of the issues provided in this letter with Gutierrez-Palmenberg during the March 3, 1996 meeting.

Based on our preliminary review, the following issues are provided for consideration during the RWEIS process:

1. There is a need for cooperative research projects between YPG and natural resource agencies to evaluate military activities and potential effects to wildlife, including potential impacts to special status species.

   We are providing an updated special status species list (see enclosure) for your reference. Please note that effective March 16, 1996, the Department's listing of special status species includes only one status type, which is "Wildlife of Special Concern in Arizona". This status replaces the previous categories of State Endangered, State Threatened and State Candidate, as described in the Department's publication **Threatened Native Wildlife in Arizona** (1988).

2. Continued access within the YPG for wildlife research and management purposes and portions of YPG for wildlife-related recreation should be addressed. In addition, the Department currently enjoys a good working relationship with YPG in the coordination of wildlife research projects and survey flights. We would like to insure this cooperation continues in the future.

Reference # 13 Encl-2 (Page 1) Arizona Game & Fish Deratment, Habitat Branch October 16, 1998.

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Ms. Karen Reichhardt
April 25, 1996
2

Scoping Issues Provided for Consideration (continued)

3. Agency roles and responsibilities should be clearly described for natural resource management issues within the YPG.

4. Distribution and habitat use by feral burros on the YPG should be addressed. The need for burro management actions and/or studies to document potential burro-related resource impacts should be considered.

5. The Department is responsible for several wildlife water developments on the YPG. Continued operation and maintenance of these waters should be addressed in the RWEIS. In addition, the Department may seek to modify or relocate water developments on the YPG in the future.

The Department appreciates the efforts undertaken by YPG and Gutierrez-Palmenberg to coordinate with our agency during this RWEIS process. The Department will provide additional comments on the Draft RWEIS when it becomes available for review. If you have any questions, please contact me or Larry Phoenix, Field Supervisor, at 342-0091.

Sincerely,

John Kennedy
Regional Habitat Program Manager

JK:jk

Enclosure

cc: Lance Vander Zyl, Director of Environmental Sciences, YPG
Larry Voyles, Regional Supervisor, Region IV
Ron Christofferson, Proj. Eval. Coordinator, Habitat Branch

AGFD# 2-5-96(02)

Reference # 13 Encl-2 (Page 2) Arizona Game & Fish Deratment, Habitat Branch October 16, 1998.

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ARIZONA GAME AND FISH DEPARTMENT
HERITAGE DATA MANAGEMENT SYSTEM - SPECIAL STATUS SPECIES
YUMA PROVING GROUND
April 25, 1996

COMMON NAME	SCIENTIFIC NAME	STATUS
California leaf-nosed bat	Macrotus californicus	WC,S
Sonoran desert tortoise	Gopherus agassizii	WC,S

STATUS DEFINITIONS

WC - **Wildlife of Special Concern in Arizona.** Species whose occurrence in Arizona is or may be in jeopardy, or with known or perceived threats or population declines, as described by the Department's listing of **Wildlife of Special Concern in Arizona** (WSCA, in prep.). Species included in WSCA are currently the same as those in **Threatened Native Wildlife in Arizona** (1988).

S - **Sensitive.** Species classified as "**sensitive**" by the Regional Forester when occurring on lands managed by the U.S.D.A. Forest Service.

Reference # 13 Encl-2 (Page 3) Arizona Game & Fish Deratment, Habitat Branch October 16, 1998.

EXHIBIT-3

Comments on the Yuma Proving Ground's Draft Rangewide EIS for Projects and Activities Associated with Future Programs.
by Nongame Branch

1. **Bald Eagle**

a. Nesting bald eagles

Reports of the presence of wintering and nesting eagles at Gene Wash Reservoir one mile west of Parker Dam in 1996 caused the Department to examine the area on April 17 and 18, 1996. A large eagle-sized cliff nest was found at Gene Wash Reservoir. At Copper Basin Reservoir, approximately 3 miles west of the Colorado River, we found a perched adult eagle. A local worker at Copper Basin said he has seen a pair of eagles continuously for the past year and a half. All indications point to this being a bald eagle breeding area.

With the recent increase of new and reoccupied bald eagle breeding areas being discovered in Arizona over the last 4 years (8 sites), it would not be unexpected to find bald eagles breeding at other sites along the lower Colorado River in the near future.

Although there are no known pairs of breeding eagles along the lower Colorado River near or on the Imperial National Wildlife Refuge, it is worth noting to land managers that this may indeed change in the near future.

b. Wintering bald eagles

The bald eagle is a common visitor to the lower Colorado River. Wintering eagles begin to enter Arizona in September, peak in numbers in December, January and February, and normally leave Arizona by April. Annual winter counts conducted in the first two weeks of January since 1992 (Beatty 1992, Beatty and Driscoll 1994, Beatty et al. 1995a, 1995b) have documented 86 bald eagles along the lower Colorado River between Lake Mead and Martinez Lake (Table 1).

Because our winter counts are conducted over a short period of time, it can be expected that our numbers are the minimum number of wintering birds using the lower Colorado River. Wintering eagles found on Lake Mead in Clark County, Nevada were not reported in the Arizona winter counts.

Throughout the breeding bald eagle population in central Arizona, a FAA recommended 2000 foot ceiling is marked on the Phoenix Sectional Aeronautical Chart. Additionally, the U.S. Fish and Wildlife Service has recently completed

Reference # 13 Encl-2 (Page 4) Arizona Game & Fish Deratment, Habitat Branch October 16, 1998.

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a biological opinion on impacts to breeding bald eagles by low-flying jets from Luke Air Force Base.

Wintering eagles must also be protected from adverse affects of repeated disturbances (Stalmaster 1987). Consistent numbers of low-flying aircraft may cause disruptions of normal behavior and displacement. Disturbed eagles may be forced to marginal, non-preferred habitat. Eagles repeatedly flushed can also unnecessarily expend energy needed for return migration.

We recommend that a ceiling of 2000 feet above ground level be maintained when flying within a mile of the Colorado River. At this elevation, aircraft can fly in any direction. If low-flying aircraft is forced to fly near the Colorado River, we recommend that they never fly the length of the river, but only perpendicular to the river. Flying across the river minimizes the disturbance to the shoreline and sandbars where eagles are most commonly perched. The perch locations of wintering eagles are known, thus the Department could help delineate preferred crossing locations should low-level flight across the river be necessary. Further consultation may be needed with the U.S. Fish and Wildlife Service.

2. Neotropical Migratory Birds and Bats

Results from recent avian and bat surveys (Breeding Bird Surveys, Arizona Breeding Bird Atlas) (Castner et al. 1995) in Sonoran Desert washes indicate how important this habitat is to bats and neotropical migratory birds (NTMBs). In otherwise very inhospitable environs, NTMBs and bats use desert washes extensively for foraging, resting, shade, cover, and (for some bird species) nesting. Whenever possible, protection and enhancement of springs and larger more vegetated washes would greatly benefit not only bats, NTMBs and resident birds, but the majority of desert dwelling wildlife.

In addition, mines found on the Yuma Proving Ground provide bats with roosting and whelping areas. Destruction or closure of mines should be avoided if they have not been surveyed for bats.

3. Sand dunes

Sand dune (dunescrub) habitats are among the most sensitive and uncommon habitats in the low deserts of southwestern Arizona. They host a broad diversity of plants and wildlife, many of which occur in no other habitat. Military activities should avoid impacts to dune areas whenever possible and practical.

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Table 1. Summary of bald eagles sighted during winter counts along the lower Colorado River 1992-1996, Arizona.

Year	Location	Subadult	Adult	Total
1992	Cibola Lake	1	1	2
1992	Lake Mead, Temple Bar	1	2	3
1992	Lake Mohave	0	3	3
1992	Havasu National W.R.	0	1	1
1993	Lake Mead, Temple Bar	0	4	4
1993	Lake Mead, Boulder Basin, Boulder Canyon, Lower Virgin Beach	1	1	2
1993	Havasu National W.R.	0	0	0
1993	Lake Mohave	4	0	4
1993	Cibola to Martinez Lake	6	3	9
1994	Lake Mead, Temple Bar	0	3	3
1994	Havasu National W.R.	0	0	0
1994	Cibola to Martinez Lake	9	5	14
1995	Lake Mohave	0	1	1
1995	Havasu National W.R.	0	0	0
1995	Lake Mead, Temple Bar	2	9	11
1995	Cibola to Martinez Lake	1	4	5
1995	Havasu National W.R.	0	0	0
1996	Cibola to Martinez Lake	4	1	5
1996	Lake Mead Temple Bar	4	7	11
1996	Lake Mohave	4	4	8
1992-1996	Totals	37	49	86

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2
290 BROADWAY
NEW YORK, NY 10007-1866

OCT 16 1998

Class: EC-2

Tracey Epperly
Project Officer
U.S. Army Proving Ground
Environmental Sciences Division
ATTN: STEYP-CD-ES
Yuma, AZ 85635

Dear Ms. Epperly:

The Environmental Protection Agency (EPA) has reviewed the draft range wide environmental impact statement (RWEIS) for the U.S. Army Yuma Proving Ground's Diversification of Mission and Changes to Mission located in Yuma and La Paz Counties, Arizona. This review was conducted in accordance with Section 309 of the Clean Air Act, as amended (42 U.S.C. 7609, PL 91-604 12 (a), 84 Stat. 1709), and the National Environmental Policy Act. Note that EPA Region 2 reviewed this document at the request of EPA Region 9 and the Office of Federal Activities.

The draft RWEIS examines the impacts associated with the proposed diversification of the Yuma Proving Ground (YPG) operations. The proposal by the U.S. Army would convert the YPG into a multipurpose installation, incorporate new management practices, update operational concepts, and change mission direction to meet the demands of a broader customer base. Alternatives examined in the document include: Alternative A (no action alternative)- military operations and resource management levels would remain comparable to those experienced for all functional units during the five-year period 1991-1995; Alternative B- military operations would decrease by as much as 50 percent below baseline levels of alternative A; Alternative C- military operations would increase up to 100 percent above baseline levels of alternative A; Alternative D- nonmilitary activities such as private industry testing, commercial developments, mining, and hunting would expand in support of, or be compatible with military missions; and Alternative E- military and nonmilitary activities would increase and diversify to provide a broad spectrum of capabilities to an expanded customer base. Based on our review of the draft RWEIS, we offer the following comments.

According to the draft RWEIS, the document will be used as a document to tier off of when individual actions, as part of a selected alternative, are examined further in individual NEPA documents. As such, the draft RWEIS evaluates the environmental impacts that would be associated with the various alternatives in a general manner. EPA believes that the draft RWEIS adequately evaluates the resources of concern (e.g., ground water, biological resources, riparian areas) in the potentially impacted environment; however, we agree that more specific environmental analyses will need to be prepared, and mitigation measures developed, in order for

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EPA to fully evaluate the potential adverse impacts associated with the potential action(s). With this in mind, we strongly recommend that the final RWEIS and Record of Decision document the Army's commitment to prepare more detailed NEPA analyses for specific actions pertaining to the selected alternative.

In conclusion, based on our review and in accordance with EPA policy, we have rated this draft RWEIS as EC-2, indicating that we have environmental concerns due to the lack of detailed analyses pertaining to actions associated with the implementation of a preferred alternative, and that additional information should be presented in the final RWEIS (if possible), Record of Decision, and subsequent NEPA documents tiered off the RWEIS in order to address our concerns.

Thank you for the opportunity to comment. Should you have any questions concerning this letter, please contact Mark Westrate of my staff at (212) 637-3789.

Sincerely yours,

Grace Musumeci for

Robert W. Hargrove, Chief
Strategic Planning and Multi-Media Programs Branch

cc: D. Farrel, Region 9

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Strategic Planning and Multi-Media Programs Branch

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Kerns, Junior D.

From: r2rw_ko
To: jkerns
Subject: No subject given
Date: Saturday, October 17, 1998 2:13PM

To: Junior Kerns, YPG Biologist

From: Ron Kearns, Kofa NWR Biologist

Subject: Comments on Range Wide EIS for YPG

Following our discussion at the public hearing at the Yuma Convention Center on the RWEIS, I wanted to document my comments, at least informally, by this email. My understanding is this EIS is an umbrella document and the refuge staff will be notified of the availability to comment on lower tier documents disclosing "site-specific impacts, especially for cultural and biological resources". I've been involved in law enforcement duties, hence the delay in my correspondence.

The RWEIS was well written, organized, and mostly complete. Ms. Reichhardt's effort is to be commended. Before I express some concerns, I want to give a brief history of my contact over the years with YPG personnel.

I've been scheduling airspace over Kofa with Range Operations personnel, for deer and sheep surveys, since 1982. My first contact was with Red (whose last name I've forgotten) then Larry Swinford and Doug Sorenson. All three men have accommodated the refuge staff when ever possible over the sixteen year period. I have not ever been disappointed by their scheduling of our flights. The Fish and Wildlife regional pilot/biologist has commented that we have established a unique rapport with YPG Range Operations, seldom seen elsewhere. Larry and Doug have shown professional excellence and I appreciate the assistance they have provided. I usually give a week or two notice before scheduling flights, but many times they have rescheduled the airspace with just a one hour notice. Additionally, I've had a good professional working relationship with you and Valeri Morril, especially dealing with the desert tortoise. I want to continue this respectful relationship as YPG seeks to diversify, even though our missions are very different. As a veteran, I understand your efforts to expand operations and appreciate the opportunity to comment.

In our discussion at the public meeting, I expressed concern of expanded artillery firing over the refuge in R-2307. The trajectories go over some of the prime bighorn sheep habitat in the Castle Dome Mountains. With diversification I'm concerned that research and development (R&D) artillery firing, with it's inherent uncertainties,

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will increase to unacceptable levels. At present, we don't know the frequency of R&D firing and how many rounds, if any, fall into wilderness areas on Kofa. I would propose that an accurate accounting of errant rounds that may have impacted refuge lands be documented and shared with the refuge manager. I don't know if such information is kept or if it is classified, but the manager would need it for determining the minimum tool needed to remove rounds from wilderness areas. I assume that artillery and munitions engineers have confidence limits for anticipated impacts and that data would be available in detailed form in a lower tier document that we could comment on later. For similar reasons, I would oppose artillery firing (with trajectories traversing King Valley) to the East Arm of Kofa Firing Range. R&D firing would be especially opposed. Again, the refuge staff would need further information when and if firing is considered in this area that has not yet been impacted. I would be opposed to closing the road that crosses the East Arm leading to the refuge (towards refuge marker #48 intersection) and closure of existing hunting opportunities.

Please keep the refuge staff informed (as you have done previously) when the more detailed lower tier documents are available for review.

Respectfully,

Ron Kearns

Junior,

I have reviewed Ron's comments and I concur with his assessments. Being relatively new to Kofa, I'm relying on my staff to keep me up to speed on the impacts to refuge resources and how I should respond. I could have set my name to Ron's message, but I think it will mean more to you knowing he penned it. As Ron requests, please keep us informed of future developments.

Sincerely,

Ray Varney
Refuge Manager

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Reference # 15 (Page 2) Ron Kearns, Kofa National Wildlife Refuge October 17, 1998