APPENDIX A

MEMORANDUMS OF UNDERSTANDING

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MOU-NM-309

MEMORANDUM OF UNDERSTANDING

BETWEEN

U.S. DEPARTMENT OF THE INTERIOR - BUREAU OF LAND MANAGEMENT

NEW MEXICO

AND

U.S. DEPARTMENT OF THE ARMY

HEADQUARTERS, US ARMY AIR DEFENSE ARTILLERY CENTER
AND FORT BLISS

FORT BLISS, TEXAS

CONCERNING

POLICIES, PROCEDURES, AND RESPONSIBILITIES RELATED TO LAND USE PLANNING AND RESOURCE MANAGEMENT OF MCGREGOR RANGE

I. PURPOSE

This Memorandum of Agreement (MOU) establishes the basic principles and responsibilities of the Department of the Interior, Bureau of Land Management (BLM) and Department of the Army, Fort Bliss (Ft Bliss) for implementation of BLM's 1990 Resource Management Plan for the McGregor Range (Range) as mandated by Public Law 99-606. The plan was developed by BLM in consultation with Ft Bliss.

II. AUTHORITIES

Public Law 99-606, Military Lands Withdrawal Act of 1986
National Environmental Policy Act (P.L. 91-90, 42 U.S.C. Section 4321 et seq.).
Federal Land Policy and Management Act (P.L. 94-579, 43 U.S.C. Section 1701 et seq.).

III. PROCEDURES

A. GENERAL OPERATING PRINCIPLES

BLM will recognize Ft Bliss missions have priority of use on the Range and will secure Ft Bliss concurrence before authorizing any nonmilitary uses. At all times, the Army, through Fort Bliss,

reserves the right to close any or all of McGregor Range in accordance with Section 3(b), Public Law 99-606.

1. NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) COMPLIANCE

Both agencies are responsible for complying with the NEPA of 1969. As a part of the environmental assessment process, each Agency shall provide the other Agency the opportunity to comment on all proposed actions on the Range that require an environmental assessment or environmental statement.

2. COMMENT

When one Agency requests the review and comment by the other Agency, the requesting Agency will state a requested time period for review, depending on the urgency of the action. Upon receipt of a review request, the reviewing Agency will make every effort possible to meet the other's requested time frame.

3. ACCESS

a. BLM ACCESS TO THE RANGE. BLM employees may have access to portions of the Range that are not hazardous. To avoid interference with Ft Bliss missions and to ensure safety, BLM employees will call the Range Commander or his designee for a clearance. Prior to entry into a hazardous area, BLM employees will notify the Range Commander to make escort and other safety arrangements.

b. PUBLIC ACCESS TO THE RANGE. With the exception of State Road 506 and associated County Roads F052, F037, and E001 north of 506, when not closed by the military, the Range is closed to public use except for authorized activities.

BLM will serve as the processing agency and lead agency for public use of the withdrawn public land on the Range. BLM will provide a description of the activity to the Range Commander, the installation commander's designee for range activities for Ft Bliss. No authorizations will be granted by BLM if Ft Bliss determines they conflict with Ft Bliss use of the Range. Providing the activity is approved, the BLM will require authorized users to comply with Ft Bliss security and safety procedures and regulations when gaining access to the range.

4. MILITARY USE OF THE RANGE. The Range Commander or the appointed representative will serve as BLM's primary point

of contact for coordination involving military use of the Range. It is understood that the military has primary authority of the Range. It is understood that the BLM has managerial responsibilities for the public uses as enumerated in Public Law 99-606 of the withdrawn land, but that the daily uses are subordinate to military missions and uses of the Range.

5. INCOME RECEIVED FROM PUBLIC USE OF THE RANGE. When BLM receives income from the use of the Range, the income will be placed in a fund which can be drawn upon for management of the Range unless otherwise directed by law.

When BLM authorizes an activity that will occur on both withdrawn public land and Army fee-owned land, cost of administration will be allocated to BLM from the Army fee-owned land portion. Ft Bliss will be provided the opportunity to direct the use of the net income in proportion to the amount of income generated from Army fee-owned land for the specific activity that generated the funds.

6. REAL PROPERTY. Within two years, jointly the agencies will develop an inventory of real property (rangeland improvements, buildings, and structures) on the grazing area of the Range. The inventory will identify Army property, BLM property, and jointly owned property. In cases where no records are available showing the ownership of the real property, ownership will be determined by the Ft Bliss Real Property Management Branch and the Area Manager. Unless otherwise agreed to, Ft Bliss will be responsible for the maintenance of its real property and BLM will be responsible for maintenance of its real property irrespective of the location.

In cases where rangeland improvements, buildings, and structures are no longer useable or beyond repair, they may be removed or reconstructed with mutual concurrence unless otherwise directed by law or regulations.

B. SPECIFIC ACTIVITY COORDINATION

1. LANDS

a. BLM RESPONSIBILITIES. BLM will be the lead agency for NEPA compliance for proposed projects that involve both withdrawn public land and Army fee-owned land that meet the criteria for the designation of lead agency defined in Council of Environmental Quality (CEQ) Regulation 1505.1. The BLM will issue all public demand nonmilitary leases, easements, rights-of-way, and other land use authorizations on withdrawn public land. (Nonmilitary is defined as projects that are not owned by the

U.S. Government, not under administration or under contract to, a military agency.) The BLM will send a copy of the land use application to the Ft Bliss Real Property Management Branch for a review and concurrence of the proposed action.

b. FT BLISS RESPONSIBILITIES. Ft Bliss will review all land use applications submitted by BLM and determine if the applications conflict with military uses of, and responsibilities to, the Range.

Ft Bliss will issue all land use authorizations needed on or across Army fee-owned land.

2. MINERALS

a. SALABLE MINERALS (sand, gravel, fill dirt, borrow, caliche, and building stone).

(1) BLM RESPONSIBILITIES. The BLM is responsible for authorizing and managing salable materials for the Range, but all activities will be with the concurrence of Ft Bliss. Sales will be limited to those areas that are identified in the Proposed Resource Management Plan Amendment/Final EIS for McGregor Range, May 19, 1989, page 3 (hereinafter referred to as BLM's Proposed 1989 Resource Management Plan). Upon receiving an application for materials, BLM will provide the Ft Bliss Real Property Management Branch, a description of the proposal and request Ft Bliss review for consistency with military missions and public safety. If Ft Bliss does not concur with the application, BLM will not authorize or approve such a request.

(2) FT BLISS RESPONSIBILITIES. Ft Bliss will review applications for consistency with military missions, safety, and security requirements. Upon completion of the review and concurrence with Ft Bliss, Ft Bliss, will notify BLM if it concurs with the application and provide stipulations or modifications required.

b. LEASABLE MINERALS

(1) BLM RESPONSIBILITIES. The BLM will manage the oil and gas, and geothermal programs for the Range. Oil and gas, and geothermal programs will be limited to those areas identified as suitable in BLM's Proposed 1989 Resource Management Plan. Prior to offering a parcel or parcels for lease, BLM will provide Ft Bliss Real Property Management Branch a description of each parcel and request the appropriate surface management stipulations. The description of each parcel will include a real estate map showing range, township, and section(s).

Prior to processing pre-lease notices/permits or lease operations, BLM, in consultation with Ft Bliss and applicants, will schedule a field examination for each action.

In concurrence with Ft Bliss, BLM will determine every five years which land on the Range is suitable for opening. If areas are found to be suitable for opening to leasable minerals, BLM will comply with Section 12 of Public Law 99-606.

(2) FT BLISS RESPONSIBILITIES. Ft Bliss, through the Albuquerque District, Corps of Engineers, will provide stipulations to BLM for oil and gas, geothermal exploration and leasing operations. Ft Bliss will notify BLM of changes in security and safety requirements. Ft Bliss will assist BLM with inspection and enforcement and field examinations access, times of entry, and safety and security requirements. Additional administrative costs if necessary will be paid by BLM or the lessee.

Every five years, Ft Bliss will review military programs and determine which areas would be compatible with opening for leasable minerals.

c. LOCATABLE MINERALS

(1) BLM RESPONSIBILITIES. The BLM will conduct inventories for locatable minerals. In concurrence with Ft Bliss, BLM will determine every five years which land on the Range is suitable for opening for locatable minerals. If areas are found to be suitable for opening, BLM will comply with Section 12 of Public Law 99-606.

(2) FT BLISS RESPONSIBILITIES. Every five years, Ft Bliss will review military programs and determine which areas would be compatible for locatable minerals.

3. VEGETATION MANAGEMENT

a. BLM RESPONSIBILITIES. BLM will be responsible for vegetation on the withdrawn public land on the Range and will coordinate management with Ft Bliss. The special status species section of this MOU discusses management of special status plant species.

The BLM will be the lead agency for management of the Black Grama Area of Critical Environmental Concern (ACEC), sales of plant products, and prescribed burns. The actions will be limited to those areas identified in BLM's Proposed 1989 Resource Management Plan. Prior to authorizing activities, BLM will provide Ft Bliss with a description of the proposal and

request a Ft Bliss review for compatibilty with military missions, security, and safety. If Ft Bliss does not concur, BLM will not authorize such an activity. Administrative costs will be paid by BLM or the contractor/lessee.

The ACEC will be managed according to the existing cooperative agreement between the BLM, Ft Bliss, and New Mexico State University.

The BLM will be responsible for monitoring vegetation conditions on withdrawn public land and may assist on Army fee-owned land on the Range. The BLM will develop and implement a monitoring plan in consultation with Ft Bliss. BLM will coordinate monitoring methodology and results with Ft Bliss Environmental Management Office so that 1) data can be collected, if possible, in a way usable in natural resources/NEPA programs; and 2) monitoring activities are not duplicated by both agencies.

b. FT BLISS RESPONSIBILITIES. Ft Bliss will be responsible for vegetation management on Army fee-owned land.

Ft Bliss will review BLM proposals for vegetation management for consistency with military missions, safety, and security requirements. Upon completion of the review, Ft Bliss will notify BLM if Ft Bliss concurs with the proposal and provide stipulation or modifications.

4. RANGELAND MANAGEMENT

a. LIVESTOCK GRAZING

(1) BLM RESPONSIBILITIES. The BLM is responsible for management of the livestock grazing program on the Range and will continue the existing livestock grazing program on McGregor Range. Livestock grazing will be limited to the grazing area identified in the Draft White Sands Resource Management Plan and EIS, McGregor Range, September 88, page 3-15 and map 3-4, incorporated in BLM's Proposed 1989 Resource Management Plan.

Livestock grazing levels will be established annually and based on the principles of multiple use and sustained yield. BLM will continue to utilize the existing stipulations as needed by Ft Bliss and if changes are proposed, they will be coordinated with Ft Bliss. The current stipulations are attached as Appendix A.

Livestock use will be authorized through contracts and based on competitive bidding at public auction. Minimum bids will be established as a result of feasibility cost studies which will

determine the cost for continuing operation of the grazing program. The contracts will contain the terms and conditions as necessary to meet the requirements of BLM's Proposed 1989 Resource Management Plan and Ft Bliss requirements.

The revenues from livestock grazing contracts will be placed in a special account and generally be used for the management of the livestock grazing program which includes all administrative costs, construction, and maintenance of rangeland improvements. Ft Bliss will be provided the opportunity to direct expenditure of 10 percent of the revenues based on 10 percent Army fee-owned land within the withdrawn area. However, BLM may use a portion of the 10 percent revenue, with Army concurrence, for maintenance of rangeland improvements that are owned by Ft Bliss and where BLM has accepted maintenance responsibility. BLM will provide Ft Bliss an annual accounting of the revenues and expenditures generated from the livestock contracts.

BLM will ensure grazing use will be limited to cattle and horses and is responsible for livestock trespass abatement in nonimpact areas.

The BLM will keep Ft Bliss Provost Marshal's Office and Range Commander informed as to the name and address of each grazing contractor and will ensure the grazing contractors comply with Ft Bliss security and safety requirements.

(2) FT BLISS RESPONSIBILITIES. The Range Commander is responsible for issuing appropriate passes for grazing contractors. Additionally, Ft Bliss will provide firing schedules to BLM and a check out system to ensure grazing contractors comply with Ft Bliss security and safety requirements.

Ft Bliss will gather and remove livestock from impact areas at the request of BLM or for trespass abatement.

b. RANGELAND IMPROVEMENTS

(1) BLM RESPONSIBILITIES. The BLM will be responsible for the construction and maintenance of livestock control fences within and bordering the livestock grazing area with the exception of fences in impact areas.

The BLM will be responsible for providing livestock and wildlife water on the Range in concurrence with Ft Bliss. The primary source of water for the wildlife will be the Ft Bliss owned water rights out of the Sacramento River and Carrizo Spring. The Army, in cooperation with BLM, will retain and exercise complete

control of distribution and use of allocated water rights from the Sacramento River and Carrizo Spring. It is understood by both parties that the use of the water is for the benefit of wildlife.

The BLM has maintenance and construction responsibility to maintain and improve pipelines, tanks, tubs, wells, windmills, wildlife waters, etc, necessary to provide for wildlife and rangeland management. Prior to the construction of new rangeland improvements, maintenance of Ft Bliss owned improvements, or changes that affect water resources on the Range, BLM will submit the construction or maintenance plans and specifications to the Range Commander for concurrence.

(2) FT BLISS RESPONSIBILITIES. Ft Bliss will control construction and maintenance of rangeland improvements in impact and military use areas. Ft Bliss will construct and maintain firebreaks on those parts of the McGregor Range boundary which enclose land upon which grazing use will be authorized and at such other locations as may be determined to be necessary by Ft Bliss.

Firebreaks will usually be maintained contiguous with perimeter fences.

Personnel of Ft Bliss, in pursuit of their official functions, or other authorized purposes, will continue to have unlimited access to the land covered by this agreement. Ft Bliss may open gates and, if necessary, lower fences in order to accomplish missions or duties. However, Ft Bliss will leave gates as found (open or closed) and reposition any fences lowered, but Ft Bliss assumes no responsibility with a third party should gates not be left as found or should fences not be re-positioned. If routine utilization and/or modification of rangeland improvements are needed to accomplish military operations, Ft Bliss will coordinate with BLM, in advance when possible and practicable.

The Range Commander will review BLM's rangeland inprovement plans on withdrawn land for consistency with military missions, safety, security requirements, and for approval. Upon completion of the review, Ft Bliss will notify BLM if Ft Bliss concurs with the proposal and provide stipulations or modifications it requires.

5. WILDLIFE

a. GAME SPECIES POPULATION MANAGEMENT

(1) BLM RESPONSIBILITIES. BLM recognizes New Mexico Department of Game and Fish (NMDGF) as the agency

responsible for game species population management on all land on the Range.

BLM will be the lead agency in coordination of all recommendations with NMDGF on matters concerning wildlife population management as they affect BLM resource management and protection of wildlife on withdrawn public land on the Range.

Prior to making a recommendation to the NMDGF on game species population management, BLM will consult with Ft Bliss to coordinate respective management objectives for withdrawn public land and Army fee-owned land to ensure its activities are consistent with military missions, safety and security requirements.

(2) FT BLISS RESPONSIBILITIES. Ft Bliss recognizes NMDGF as the agency responsible for game species population management on all land on the Range.

Prior to making a recommendation to the NMDGF on game species population management, Ft Bliss will consult with BLM to coordinate respective management objectives for Army fee-owned land and withdrawn public land.

b. HABITAT MANAGEMENT.

(1) BLM RESPONSIBILITIES. The BLM will be responsible for wildlife habitat management on withdrawn public land and will coordinate such monitoring on Army fee-owned land.

The BLM will establish and conduct wildlife habitat management activities in accordance with BLM planning decisions, applicable laws and regulations.

The BLM will coordinate all habitat management activities with the Range Commander for consistency with military missions, safety and security requirements to obtain Ft Bliss concurrence.

The BLM is responsible for monitoring wildlife and wildlife habitat on withdrawn public land. BLM may conduct such activity on Army fee-owned land with the concurrence of the Range Commander. The BLM will develop and implement a monitoring plan in coordination with Ft Bliss. The monitoring studies would include coordination with Ft Bliss for annual field trips, flights, use of approved aerial photography, and Ft Bliss objectives for Army fee-owned land. BLM will coordinate monitoring, methodology and results with Ft Bliss Environmental Management Office so that, when possible, data can be collected in a way usable in Ft Bliss Natural Resources/NEPA Programs. The

objective of both agencies is to avoid duplicating each other's efforts.

(2) FT BLISS RESPONSIBILITIES. Ft Bliss will be responsible for wildlife habitat management on Army fee-owned land to the extent of resource availability.

Ft Bliss will establish and conduct wildlife habitat management activities in accordance with applicable laws and regulations.

Ft Bliss will coordinate all habitat management activities with BLM to ensure harmony in management direction for the Range as a whole.

c. SPECIAL STATUS SPECIES MANAGEMENT

(1) BLM RESPONSIBILITIES. The BLM will be responsible for compliance with the Federal and State laws affecting endangered, threatened, candidate or sensitive plants and animals with regard to all actions on withdrawn public land.

The BLM will also manage federal candidate and proposed species, state-listed species, and BLM sensitive species on withdrawn public land according to BLM policy.

The BLM will be responsible for implementation of recovery plans on withdrawn public land on the Range. Prior to implementation of recovery plans, BLM will request concurrence from the Range Commander to ensure consistency with military missions, safety, and security requirements.

The BLM will provide Ft Bliss data on inventories, consultation proceedings, and other information with regard to special status species on McGregor Range.

(2) FT BLISS RESPONSIBILITIES. Ft Bliss will be responsible for compliance with the Endangered Species Act and New Mexico endangered plant and animal laws with regard to its actions on withdrawn public land and for Army fee-owned land on the Range.

Ft Bliss will be responsible for implementation of recovery plans on Army fee-owned land on the Range. Prior to implementation of recovery plans, Ft Bliss will coordinate with BLM to ensure consistent management direction for the Range.

Where possible and practicable, Ft Bliss will support BLM management programs for federal candidate, proposed, state-listed, and BLM sensitive species on the Range.

Ft Bliss will provide BLM data on inventories, consultation proceedings, and other information with regard to special status species on the Range.

d. SIKES ACT STAMP PROGRAM

A Sikes Act Stamp Program will be established under Section 1 (military reservations) of the Sikes Act as amended (16 U.S.C. Title 670). Stamp fees and program specifics will be set by an additional Memorandum of Agreement between NMDGF, Ft Bliss, and BLM.

e. ANIMAL DAMAGE CONTROL

(1) BLM RESPONSIBILITIES. The BLM will be responsible for authorizing animal damage control (ADC) activities on withdrawn public land and Army fee-owned land.

Each year when the New Mexico ADC Program presents BLM with a proposed district wide ADC Plan, BLM will provide the Range Commander an opportunity to review and approve the draft to coordinate respective management objectives for withdrawn public land, Army fee-owned land, and to ensure consistency with military missions, safety, and security requirements prior to approval. The BLM will be responsible for monitoring predator populations, and other potentially damaging species as required by BLM planning decisions.

Requests from grazing contractors for ADC will be handled by the New Mexico ADC Program. Routine requests for control work received by ADC from the grazing contractors will be incorporated into the annual ADC plan. Requests for emergency control work received by ADC from the grazing contractors will be authorized by BLM on a case-by-case basis.

(2) FT BLISS RESPONSIBILITIES. Ft Bliss will review and comment on the draft district ADC plan for consistency with military missions, safety, and security requirements.

Ft Bliss will request ADC activities needed (except in the vicinity of military structures) on withdrawn public land through BLM prior to development of the district ADC plan. Ft Bliss will coordinate all Army initiated ADC activities on Army fee-owned land with the BLM to ensure consistent management direction for the Range.

6. CULTURAL RESOURCES:

a. The term "cultural resources" is understood to

have the same meaning as the term "historic resources" used in the Historic Preservation Act and in its implementing regulation 36 C.F.R. Section 800.

b. BLM's RESPONSIBILITIES:

(1) The BLM will comply with Section 106 of the Historic Preservation Act and 36 C.F.R. Section 800 for undertakings for which the BLM or third parties are the proponent.

(2) The BLM will be the lead agency for permits required by the Archaeological Resources Protection Act (ARPA) for survey, research, excavation, data recovery, and other cultural resources projects for which the BLM is the proponent and for all third party activities on withdrawn public lands.

(3) The BLM will mitigate the effects caused to cultural resources for activities conducted under BLM's administration.

(4) The BLM may be a consulting party in military undertakings involving cultural resources on withdrawn public lands. The BLM and Ft Bliss jointly will identify classes of undertakings for which the BLM will be a consulting party.

(5) Upon request, the BLM will provide Ft Bliss with draft, review copies of research proposals, survey and other field project reports, and with the results of analytical studies for which the BLM is the proponent. Additionally, the BLM will provide Ft Bliss with final copies of such proposals, reports, and studies.

(6) The BLM will meet with Ft Bliss on an annual basis, or more frequently as appropriate, to share information about planned cultural resources projects. Other topics to be discussed will include means to:

(a) Standardize field survey, recording techniques, and artifact classification criteria and codes to the maximum practical extent.

(b) Identify ways to make site and artifact file data compatible for interagency use to the maximum practical extent.

(c) Develop procedures to permit review of the design(s) of cultural resources projects and to incorporate

Ft Bliss analytical needs into those designs to the maximum practical extent.

c. FT BLISS RESPONSIBILITIES:

(1) Ft Bliss will comply with Section 106 of the Historic Preservation Act and 36 C.F.R. Section 800 for those undertakings for which the military is the proponent.

(2) Ft Bliss will be the lead agency for permits required by the Archaeological Resources Protection Act (ARPA) for survey, for research/excavation/data recovery, and for other cultural resources for which the military is the proponent on withdrawn public lands and all activities on Army fee-owned land.

(3) Ft Bliss will mitigate the effects caused to historic resources by military activities.

(4) Ft Bliss may be a consulting party in the BLM's undertakings involving cultural resources. Ft Bliss and the BLM jointly will identify classes of undertakings for which Ft Bliss will be a consulting party.

(5) Upon request, Ft Bliss will provide the BLM with draft, review copies of research proposals, survey and other field project reports, and with the results of analytical studies for which Ft Bliss is the proponent. Additionally, Ft Bliss will provide the BLM with final copies of such proposals, reports, and studies.

(6) Ft Bliss will meet with the BLM on an annual basis, or more frequently as appropriate, to share information about planned cultural resources projects. Other topics to be discussed include means to:

(a) Standardize field survey, recording techniques, and artifact classification criteria and codes to the maximum practical extent.

(b) Identify ways to make site and artifact file data compatible for interagency use to the maximum practical extent.

(c) Develop procedures to permit review of the design(s) of cultural resources projects and to incorporate BLM's analytical needs into those designs to the maximum practical extent.

7. RECREATION

a. GENERAL

(1) BLM RESPONSIBILITIES. The BLM is responsible for managing recreational use of the withdrawn public land on the Range.

Prior to authorizing a recreational use on the Range, BLM will provide the Range Commander with a description of the proposed action for review for consistency with military missions, safety, and security requirements, and obtain Ft Bliss concurrence.

The BLM will be responsible for developing a sign location plan and information plan that will provide the public reasonable information on locations and restrictions. Prior to approval of the plan, BLM will provide the Range Comander with a draft for approval so that the plan will be consistent with military missions, safety, and security requirements.

The BLM will limit recreational vehicle use on withdrawn public land to designated roads and trails. BLM will identify designated roads on a case-by-case basis with Ft Bliss concurrence. The designation will consider the need for access for the activity involved.

(2) FT BLISS RESPONSIBILITES. Ft Bliss will be responsible for establishing a safety and security program needed to provide for military security and public safety.

Ft Bliss will install and maintain signs for areas that are hazardous because of unexploded ordnance.

b. HUNTING

(1) BLM RESPONSIBILITIES. The BLM will be responsible for managing the recreational use of the Range by hunters in accordance with the Rescource Management Plan requirements. Each year BLM, in concurrence with the Range Commander and the NMDGF, will develop a McGregor Range hunting plan that will prescribe proposed recreational use of the Range by hunters. The plan shall be consistent with guidelines from the BLM's 1989 Proposed Resource Management Plan, recreation management capability of the agencies, multiple use mandates, and natural resource management objectives. Prior to approval of the plan, BLM will provide the Range Commander with a draft for review for consistency with military missions, safety, and security requirements. If the plan is not consistent with military missions, safety, and security, then BLM will not adopt

it as its hunting plan and will then so modify the plan to make it consistent with military missions.

(2) FT BLISS RESPONSIBILITIES. Ft Bliss will be responsible for providing BLM with information concerning the Ft Bliss Safety and Security Program prior to BLM approval of the Annual Hunting Plan. Hazardous areas and those areas that the public are not allowed to enter will be identified on maps. This in no way affects the Range Commander's right to later deny access to an area that has become a hazardous area.

8. WILDERNESS STUDY AREA MANAGEMENT

a. BLM RESPONSIBILITIES. The BLM will manage the Culp Canyon Wilderness Study Area (WSA) under the Interim Management Policy and Guidelines Under Wilderness Review (1987) until the area is either added to the National Wilderness Preservation System or removed from further wilderness consideration.

b. FT BLISS RESPONSIBILITIES. Ft Bliss will be responsible for compliance with the Interim Management Policy and Guidelines for Lands Under Wilderness Review (1987) until area is either added to the National Wilderness Preservation System or removed from further wilderness consideration.

Ft Bliss will generally limit surface use of the WSA to ground forces military maneuvers. All military activities which cause impairment to wilderness values will require reclamation prior to September 30, 1990. All vehicles should utilize existing vehicle ways. Ft Bliss will notify the Las Cruces District Manager 30 days prior to conducting any activities within the WSA whenever possible or immediately following the activity.

9. WATERSHED

a. BLM RESPONSIBILITIES. The BLM will be responsible for management of watershed resources on withdrawn public land on the Range. The BLM will develop and implement a monitoring plan in coordination with Ft Bliss. Monitoring studies for watershed will be conducted on withdrawn public land over the entire McGregor Range in coordination and concurrence with Ft Bliss. The monitoring studies will include coordination with Ft Bliss for annual field trips and use of approved ground and aerial photography.

The BLM will cooperatively develop and implement watershed management plans for the Grapevine, El Paso Canyon, and Cockleburr Watershed areas. Prior to approval of the watershed management plans, BLM will provide Ft Bliss with a draft for

concurrence for consistency with Army fee-owned land management objectives, military missions, safety, and security requirements.

b. FT BLISS RESPONSIBILITIES. Fort Bliss will be responsible for the management of watershed resources on Army fee-owned land.

10. FIRE

a. BLM RESPONSIBILITIES. The BLM will be responsible for monitoring and suppressing all nonmilitary fires on withdrawn public land and Army fee-owned land.

The BLM will initiate the most cost effective suppression or modified suppression tactics available on all nonmilitary fires except those designated as impact or military use areas.

Upon receiving a report of a fire and prior to beginning suppression actions, BLM will notify the Ft Bliss Fire Chief to establish fire control responsibility and hazards that may restrict control measures.

Agency jurisdiction will be assigned upon determining the ignition source. The BLM may initiate aerial suppression (air tanker/helicopter drops) on those military fires deemed threatening to life upon completion of an escaped fire analysis and coordination with the Ft Bliss Fire Chief. The BLM may, at its own expense, initiate aerial suppression on the military fires which are not deemed threatening to life.

The BLM will notify the Ft Bliss Fire Chief of its suppression actions within 24 hours of suppression actions being taken on the Range. Such notification will include when possible, but not be limited to, the following:

Date and time of action
Location and size of fire
Type and extent of suppression activities
Resources/structures damaged (if any)

1. Facilities
2. Structures (livestock, wildlife, or cultural)
3. Private or State property
4. Cultural resources
5. Livestock
6. Endangered species/habitat
7. Critical natural resource area

The BLM may use prescribed burning to improve rangeland condition and wildfire habitat on areas identified in the BLM's 1989

Proposed Resource Management Plan. The prescribed burn plans will meet all required BLM formats and regulations. Prior to approval of the plans, BLM will provide Ft Bliss Real Property Management Branch, for staffing to appropriate Ft Bliss activities) with a draft for concurrence for consistency with Army fee-owned land management objectives, military missions, safety, and security requirements.

b. FT BLISS RESPONSIBILITIES. Ft Bliss will have responsibility for suppressing and monitoring fires caused by military activities on withdrawn public land and Army fee-owned land.

Ft Bliss will serve as lead agency for monitoring or suppressing all fires in the impact and military use areas. Each year Ft Bliss will update BLM of the hazardous areas at the annual coordination meetings.

Ft Bliss will initiate suppression or modified suppression (monitoring) tactics on all fires caused by military actions on McGregor Range.

Consistent with P.L. 99-606, Section 3(d) Ft Bliss will request a transfer of funds from the Department of Army to the Bureau of Land Management as compensation for assistance on fire suppression actions of fires that resulted from a military activity.

Upon receiving a report of a fire, the Ft Bliss Fire Chief will notify the BLM of the fire. The Fire Chief will provide BLM with as much information as available at that time and of its suppression actions. Within 24 hours of suppression actions being taken on the Range, the Fire Chief will provide additional information if available. Such final report will include, when possible, but not be limited to, the following:

Date and time of report
Location and size of fire
Type and extent of suppression activities
Resources/Structures damaged (if any)

1. Facilities
2. Structures (livestock, wildlife or cultural)
3. Private or State property
4. Cultural resources
5. Livestock
6. Endangered species/habitat
7. Critical natural resource area

11. LAW ENFORCEMENT.

a. BLM RESPONSIBILITIES. The BLM will be responsible for enforcement of the federal laws that pertain to the use, management, and development of withdrawn public land on the Range.

Law enforcement personnel may exercise their enforcement authority over nonmilitary activities within the Range to the extent that such activities are consistent with BLM's 1989 Proposed Resource Management Plan. The BLM will exercise its enforcement authority over military personnel on the Range in coordination with the Provost Marshal's Office.

After BLM takes enforcement action on the Range, it will notify the Ft Bliss Provost Marshal's Office.

BLM will notify the Ft Bliss Provost Marshal's Office if persons are found on the Range with Ft Bliss authorizations but not conducting authorized activities.

b. FT BLISS RESPONSIBILITIES. Ft Bliss will be responsible for enforcing laws pertaining to military activities, public safety, and security on the Range.

Ft Bliss will notify the BLM if persons not on a military mission are found causing resource damage.

12. ROADS

a. BLM RESPONSIBILITIES. The BLM will share road maintenance responsibilities with Ft Bliss. Roads will be maintained to a standard that is consistent with levels of use, environmental factors, safety requirements, level of funding, and resource conditions.

The BLM will develop a road plan for the Range in consultation with the Range Commander. The plan will specify agency responsibilities for maintenance and maintenance standards. Prior to approval of the plan by Ft Bliss, BLM will provide the Range Commander with a draft for review for consistency with military missions, safety, security requirements, and Army fee-owned land management objectives.

b. FT BLISS RESPONSIBILITIES. Ft Bliss will share road maintenance responsibilities. Roads will be maintained to the standard that is consistent with levels of use, environmental factors, safety requirements, level of funding, and resource conditions.

Ft Bliss will assist in the development of a Road Plan for the Range.

IV. GENERAL PROVISIONS

A. TERMS OF AGREEMENT. The need for this MOU is expected to continue for 15 years from the date of enactment of the Military Lands Withdrawal Act of 1986 (November 6, 1986 until November 6, 2001). At the end of this period, the MOU will expire, unless it is cancelled or renewed before then.

B. DEFINITIONS.

1. CONCURRENCE. As utilized in this MOU, concurrence is the agreement of the other party involved. If there is no such agreement then no authorization can be given for such activity.

2. NONMILITARY USE. As utilized in this MOU, a nonmilitary use of the range is one which is an activity, not under administration of, or under contract to, a military agency.

3. RANGE COMMANDER. Wherever Range Commander is used in this MOU, Range Commander serves as the installation commander's designee and primary point of contact.

C. PERIODIC REVIEW. In addition to the reviews required under Section 12 of Public Law 99-606, the participants will review this MOU at least once every five years to determine its adequacy, effectiveness, and need for updating.

D. AMENDMENTS. Either participant may propose changes to this MOU during its term. Any change will be in the form of an amendment and will not take effect until both participants have agreed and signed the amendment. Any amendment must be within the framework of Public Law 99-606.

E. RENEWAL. Section 8(a) paragraphs (1) and (2) and Section 5(b) of Public Law 99-606 establish guidelines for renewal and continued use of the withdrawal as follows:

No later than three years prior to the termination of the withdrawal, Ft Bliss shall advise the BLM as to whether Ft Bliss will have a continuing military need for any of the land withdrawn after the termination date.

- If Ft Bliss concludes that there will be a continuing military need for any such land after the termination date, Ft Bliss shall

file an application for extension of the withdrawal and reservation of such needed land in accordance with regulations and procedures of the Department of the Interior applicable to the extension of withdrawal of land for military uses.

- No later than 12 years after the date of enactment of Public Law 99-606, Ft Bliss shall publish a draft Environmental Impact Statement (EIS) concerning continued or renewed withdrawal of any portion of the land withdrawn on the Range for which Ft Bliss intends to seek such continued or renewed withdrawal. Section 5(b) (1) of Public Law 99-606 establishes the guidelines for preparation of the EIS.

F. CANCELLATIONS. Section 8(2)(3) of Public Law 99-606 establishes guidelines for cancellation or relinquishment of the withdrawal as follows:

- If during the period of withdrawal and reservation, Ft Bliss decides to relinquish any or all of the land withdrawn and reserved by Public Law 99-606, Ft Bliss shall file a notice of intention to relinquish with the BLM following the procedures set forth in Section 8(b) through (f) of Public Law 99-606.

- In addition to the above, Section 12(e) of Public Law 99-606 provides that in the event of a national emergency or for purpose of national defense or security, the BLM at the request of Ft Bliss, shall close any land that has been opened to mining or to mineral or geothermal leasing. If the closure becomes necessary, a determination of the effect on any ongoing operations will be made at that time.

G. DECONTAMINATION. Decontamination of withdrawn public land on the Range will be in accordance with Section 7 and 8 of Public Law 99-606.

H. MEETINGS AND COORDINATION. The agencies shall meet at least annually prior to August 1 to review the MOU and expected issues. The meeting host shall alternate between the agencies.

The topics discussed at the meeting should include:

1. Enforcement issues
2. Fire
3. NEPA documents
4. BLM activities planned for next period
5. Army activities planned for next period
6. Setting hunting and recreation dates
7. Cultural resource reports during past period
8. Problems

9. Monitoring
10. Budget/accounting
11. Natural resources management projects
12. Water/water management/water monitoring

I. EFFECT ON OTHER MOU'S. Unless a specific provision of an existing MOU is specifically superseded by any part of this MOU, the remaining terms of the MOU's are still in effect until that MOU is wholly superseded. These MOU's are dynamic documents and both parties agree to work together to reach new updated MOU's.

- WO-19 MOU between the Departments of the Interior and Army dated September 9, 1966, which provides co-use grazing on the Range, New Mexico.

- NMSO-30 MOU dated July 22, 1976, on the proposed agreed upon changes to the MOU between the Departments of Interior and Army to provide for co-use grazing on the Range, New Mexico.

- NMSO-36 MOU signed in October 1972, is a Cooperative Plan Agreement for conservation and development of fish and wildlife resources on the Range (Ft Bliss) between BLM, Ft Bliss, New Mexico Department of Game and Fish and Wildlife Service. Also includes the July 22, 1976 MOU between BLM and Ft Bliss on proposed changes to the October 1972 MOU.

In order to fully implement the MOU required by Public Law 99-606 between BLM and Ft Bliss, it is anticipated that additional MOU'S will be required to implement specific resource management programs on the Range. Both BLM and Ft Bliss will sign these MOU'S along with the cooperating agency(ies).

J. PRINCIPAL CONTACTS

- BLM Caballo Resource Area Manager, (505) 525-8228, 1800 Marquess, Las Cruces, NM 88005

- Ft Bliss McGregor Range Commander, (915) 569-9206, ATZC-B-CO, Ft Bliss 79916-7400

K. DISPUTE RESOLUTION. In any and all disputes, the participants in this MOU shall exercise good faith and shall endeavor to resolve all problems amicably and quickly. In the event of any unresolved conflicts the next higher agency/headquarters shall attempt resolution. Final resolution rests with the Secretary of Interior and Secretary of Army.

L. RESERVATION OF RIGHTS. This MOU does not waive any rights or responsibilities the BLM or Ft Bliss may have except as provided by this MOU.

M. BINDING EFFECTS. This MOU is binding on BLM and Ft Bliss and their agents, successors, and assigns.

N. NONDISCRIMINATION. During the performance of this MOU, participants agree to abide by the terms of Executive Order 11246 and will not discriminate against any person because of race, color, religion, sex, or national origin. The participants will take affirmative action to ensure that applicants are employed without regard to race, color, religion, sex or national origin.

O. OFFICIALS. No member or delegate to Congress or Resident Commissioner shall be admitted to any share or part of this agreement, or to any benefit that may arise therefrom, but this provision shall not be construed to extend to this MOU if made with a corporation for its general benefit.

P. EFFECTIVE DATE. This MOU shall take effect on the date when all parties have signed and will continue until November 6, 2001, unless terminated as described in Section E of this MOU.

APPROVED:

By Larry L. Woodard Date 2-22-90
Larry L. Woodard
State Director, New Mexico
Bureau of Land Management

APPROVED:

By Richard J. Galliers Date 22 February 1990
Richard J. Galliers
Colonel, U.S. Army
Chief of Staff

APPROVED:

By Donald N. Satz Date 3-1-90
Donald N. Satz
Chief, Real Estate Division
Albuquerque District, Corp of Engineers
Albuquerque, New Mexico

MEMORANDUM OF UNDERSTANDING
Between
UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
And
DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS

This memorandum of understanding is made by and between the United States Department of Agriculture, Forest Service, acting through the Regional Forester, Southwestern Region, hereinafter called the SERVICE and the United States Department of Defense, Corps of Army Engineers, acting for the United States Army Air Defense Center, hereinafter called the CENTER.

WHEREAS, Public Land Order No. 1470, dated August 21, 1957, as amended by Public Land Order No. 1547, dated November 7, 1957, issued under the provisions of Executive Order 10355, withdrew certain lands, hereinafter called the LANDS, within the Lincoln National Forest from all forms of entry, for use by the Department of the Army as a part of the McGregor Missile Range, and

WHEREAS, the Department of the Army and the Department of Agriculture on July 3, 1951, entered into a Joint Policy Statement relating to use of National Forest lands for defense purposes, and

WHEREAS, Public Land Orders 1470 and 1547 expired August 21, 1967, except that application for renewal was timely made, and publication of an Extension Order in the Federal Register has not been done, and

WHEREAS, the laws, regulations, and policies governing the multiple use management of National Forests contemplates use of the lands and resources to produce the greatest benefits in goods and services to the people, and

WHEREAS, it has been mutually determined that grazing use by livestock and wildlife is compatible with the use of the land for missile training purposes, and

WHEREAS, it is desirable that the Service continue to administer all National Forest resources in keeping with the Center's requirements for its missile program,

NOW, THEREFORE, the Service and the Center mutually agree as follows:

Section A. The Center agrees:

1. The Service will administer the Lands for all non-defense purposes and all activities which are not related to the use of the Lands for missile range purposes, HOWEVER, the Service will coordinate all uses and activities on the lands with the Center in a manner consistent with the needs of the Center.

2. The Lands will be open to all Forest users on days when no firing is scheduled.

3. The Service will not authorize uses of those lands purchased by the Army within the area without the concurrence of the Center, EXCEPT, for those uses not separable from the area as a whole. There are approximately 1,360 acres of purchased and 18,004 acres of withdrawn Lands out of the total of 19,364 acres of missile range within the National Forest boundary. Uses such as livestock

grazing will be authorized on the area as a whole and the Service will issue a permit for all Government owned lands with fees to be handled as specified in Subsection 4, below.

4. All fees for use of National Forest lands shall be assessed and collected by the Service in accordance with the regulations of the Secretary of Agriculture and deposited into the National Forest Fund, miscellaneous receipts, EXCEPT, those fees earned on lands purchased by the Defense Department shall be transferred to the U. S. Corps of Engineers for deposit where such fees are collected by the Service.

The basis for apportioning fees between the Service and the Center will be the proportion of use attributable to the purchased lands to the proportion of use attributable to the withdrawn lands.

The collection of use fees does not pertain to licenses or permits required by State law.

5. That management of wildlife and its habitat shall conform to the regulations of the Secretary of Agriculture; to all applicable laws, and to existing agreements between the Service and the New Mexico Department of Game and Fish.

Harvest of wildlife will be accomplished in a manner covered by the proclamations and regulations of the New Mexico Department of Game and Fish, EXCEPT, the harvest will not conflict with public safety or the firing schedules set by the Center.

6. That improvements constructed and maintained by the Service, its contractors, or permittees, for resources management purposes will remain in the Lands unless the sites so used are needed for missile range installations. These improvements include, but are not limited to livestock control fences, range and wildlife water catchments, and watershed structures.

7. The Service will administer all archeological and paleontological activities on the Lands in conformance with the Uniform Rules and Regulations prescribed by the Secretaries of the Interior, Agriculture, and Army; and the Antiquities Act (34 Stat. 225; 16 U.S.C. 432-433).

Section B. The Center will therefore:

1. Take action to prevent and suppress fires resulting from the Center's operations and also suppress any fire on the Lands; check for fires after completion of each daily scheduled firing; and report all fires to the Service as soon as possible.

2. Furnish the Service with firing schedules on a regular basis so that the Service may keep its employees, contractors, and permittees advised when entry to the Lands is allowed or denied. The Center will also furnish the Service with the names, addresses, and telephone numbers of the Commanding General and his designated representatives.

3. Take all necessary precautions to minimize damage to soil and vegetative resources in connection with the conduct of defense oriented activities. The Center will coordinate with the Service the development of launching sites, fire towers, radar sites, and other similar construction within the Lands.

4. Submit to the Forest Supervisor, Lincoln National Forest, for his concurrence all proposals for constructing roads prior to undertaking construction.

5. Assume the responsibility for the actions of its employees and contractors in the conduct of Center Activities on the Lands.

The Center will require said personnel to leave gates as found (open or closed) and will not be responsible should gates or fences be left as found.

Section C. The Service agrees:

1. The Center will administer the Lands for all defense purposes and all activities which are directly related to the use of the Lands for missile range purposes, HOWEVER, the Center will coordinate those activities having a permanent impact on the soil and vegetative resource with the Service.

2. That personnel of the Center, in pursuit of their official functions, will continue to have unlimited access to the Lands. Said personnel may open gates, and if necessary, lower fences in order to accomplish their assigned missions or duties. Gates will be left as found (open or closed) and lowered fences will be repositioned by the Center.

3. That the Center reserves the right to deny access to the Lands to anyone should security or safety considerations of the assignment of any mission require such action. The Center may exercise this right without prior notice to the Service, EXCEPT, that the Service will be notified at the earliest opportunity when such a closure is in conflict with previously announced firing schedules. Under no circumstances will persons be granted permission to enter or remain on McGregor Range during periods when firing is being conducted, or scheduled, even should they be willing to assume any and all risks inherent in such activities.

coordinate construction of such facilities with the Service.

Section D. The Service will therefore:

1. Furnish the Commanding General of the Center as to the name of the District Ranger who is currently responsible to the Service for the management of the Lands, and the names and addresses of all permittees and contractors, if any.

2. Assume the responsibility for the actions of its employees, permittees, and contractors authorized by the Service to conduct business on the Lands.

3. In pursuit of range management objectives, issue grazing permits for livestock numbers limited to the grazing capacity as determined by the Service.

4. Coordinate all uses and activities on the Lands in a manner consistent with the needs of the Center.

5. Refrain from touching, tampering with, or disturbing any shell, casing, missile, target, or components thereof which may be found upon the Lands. Upon discovery of any of these items, Service employees, permittees, or contractors will report said discovery to the Commanding General, United States Army Air Defense Center, or his designated agent.

6. Issue all permits and contracts for uses and activities which are not related to defense purposes. Said permits and contracts will contain stipulations consistent with the needs of the Center. Permits may be terminated by the Service, and by request of the Center, should

permittees breach any of the terms or conditions outlined in this MEMORANDUM OF UNDERSTANDING.

7. Protect the Lands and resources from destruction by fire and other forms of depredation including trespass, not incident to military use.

Section E. General

1. This Memorandum of Understanding shall serve to guide the administration of the Lands herein described under the proposed new Public Land Order and shall remain in full force and effect until terminated by mutual agreement or expiration of the new Land Order.

2. The Forest Supervisor, Lincoln National Forest, or his designated representative, will represent the Forest Service in the administration of this Memorandum of Understanding.

3. If amendments to this agreement are needed, a meeting may be called by either party.

4. The legal description of National Forest lands contained within the McGregor Missile Range are shown on Exhibit 1, attached hereto.

UNITED STATES ARMY AIR DEFENSE CENTER
and FORT BLISS, TEXAS

11 Nov. 1971
(Date)

By: L. A. Guenther
Chief, Real Estate Division,
Albuquerque District, Corps of
Engineers, Department of the Army

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE

11/5/71
(Date)

By: W=D Hurst

Regional Forester

EXHIBIT I

Acreage within Lincoln National Forest, McGregor Range, N.M.

New Mexico Principal Meridian

PLO 1547	Acres	
T. 19 S., R. 10 E:		
Section 1 - $SW\frac{1}{4}$, $W\frac{1}{2}W\frac{1}{2}SE\frac{1}{4}$	200.00	(Called $S\frac{1}{2}$ sec. 1 in Orc
*Section 12 - $W\frac{1}{2}W\frac{1}{2}E\frac{1}{2}$	80.00	(Probably $E\frac{1}{2}$)

PLO 1470	
T. 19 S., R. 11 E:	
Section 6 - Lots 6,7, $E\frac{1}{2}SW\frac{1}{4}$, $SE\frac{1}{4}$	324.56
Section 7 - Lots 1,2,3,4, $E\frac{1}{2}W\frac{1}{2}$, $E\frac{1}{2}$	648.00
Section 8 - All	640.00
Section 9 - $S\frac{1}{2}$	320.00
Section 14 - $SW\frac{1}{4}$	160.00
Section 15 - All	640.00
Section 16 - All	640.00
Section 17 - All	640.00
Section 18 - Lots 1,2,3,4, $E\frac{1}{2}$, $E\frac{1}{2}W\frac{1}{2}$	647.60
Section 19 - Lots 1,2,3,4, $E\frac{1}{2}$, $E\frac{1}{2}W\frac{1}{2}$	647.20
Section 20 - All	640.00
Section 21 - All	640.00
Section 22 - All	640.00
Section 23 - All	640.00
Section 24 - $S\frac{1}{2}$	320.00
Section 25 - $E\frac{1}{2}$, $NW\frac{1}{4}$, $NW\frac{1}{4}SW\frac{1}{4}$, $S\frac{1}{2}SW\frac{1}{4}$	600.00
Section 26 - All	640.00
Section 27 - All	640.00
Section 28 - All	640.00
Section 29 - All	640.00
Section 30 - Lots 1,2,3,4, $E\frac{1}{2}$, $E\frac{1}{2}W\frac{1}{2}$	645.12
Section 31 - Lots 1,2,3,4, $E\frac{1}{2}$, $E\frac{1}{2}W\frac{1}{2}$	644.32
Section 32 - All	640.00
Section 33 - All	640.00
Section 34 - $N\frac{1}{2}$	320.00
Section 35 - $E\frac{1}{2}$, $NW\frac{1}{4}$, $NW\frac{1}{4}SW\frac{1}{4}$, $S\frac{1}{2}SW\frac{1}{4}$	600.00
Section 36 - All	640.00
T. 19 S., R. 12 E:	
Section 29 - $S\frac{1}{2}$	320.00
Section 30 - Lots 1,2,3,4, $E\frac{1}{2}$, $E\frac{1}{2}W\frac{1}{2}$	642.08
Section 31 - Lots 1,2,3,4, $E\frac{1}{2}$, $E\frac{1}{2}W\frac{1}{2}$	645.18
Section 32 - All	640.00
Acres in Withdrawals	17,924.06
*Not in withdrawals	- 80
Total	18,004.06

*PLO 1470 withdrew only $W\frac{1}{2}$ of sec. 12 on Public Domain. No reference to these 80 acres of National Forest land in either of the PLO's

No. 70-8C30-8-529

DEPARTMENT OF THE ARMY
HEADQUARTERS, U.S. ARMY AIR DEFENSE ARTILLERY CENTER AND FORT BLISS
1733 PLEASONTON ROAD
FORT BLISS, TEXAS 79916-6816

REPLY TO
ATTENTION OF

30 September 1997

INTERAGENCY AGREEMENT
BETWEEN
DEPARTMENT OF ARMY-FORT BLISS
AND
U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

This Interagency Agreement is made in accordance with the Memorandum of Understanding (MOU) between the U.S. Army Environmental Center (USAEC) and the Natural Resources Conservation Service (NRCS) The MOU is entitled "Watershed and Environmental Enhancement of U.S. Army (ARMY) Installations." 1 December 1993, amended 16 June 1995.

In furtherance of the MOU, Article VI, paragraph "b" states the NRCS agrees to support Interagency Agreements (IAGs) by providing technical expertise, review or consultation in areas of ecosystem management, subject to priorities and budget constraints and other limitations placed on funds by the Army. An amendment pursuant to this MOU allows for subsequent development of Interagency Agreements directly between installations and NRCS State Offices.

The U.S. Army carries out part of its mission through the use of substantial land areas throughout the United States. These activities may impact the natural or naturalized ecosystems in a negative way. The U.S. Army-Fort Bliss desires to protect and enhance the natural environment by preventing or mitigating soil erosion, maintaining vegetative cover, improving water quality, restoring impacted areas, and reducing adverse impacts. The Natural Resources Conservation Service (NRCS) provides national leadership in the conservation and wise use of soil, water, and related resources through a balanced ecosystem approach that protects, restores, and improves natural resources.

As the U.S. Army-Fort Bliss fulfills its responsibilities to protect and enhance military lands, improvements are needed which require natural resources planning assistance. NRCS will furnish this professional and technical expertise to Fort Bliss as defined in this Interagency Agreement (IAG).

ARTICLE I: PURPOSE

The purpose of this IAG is to:

Implement training land rehabilitation prescriptions on Fort Bliss.

Solve non-point land management resource concerns that exist at Fort Bliss.

Improve overall management of natural resources in support of training requirements on Fort Bliss.

ARTICLE II: AUTHORITY

This agreement is made under the authority of the Economy Act 1932 (31 U.S.C. 1535), the Soil Conservation Act, P. L. 74-46 (16 USC 590 a-f), and the USAEC/NRCS MOU for the purpose of obtaining "in-house" ecosystem support from NRCS.

Points of Contact for this IAG are:

POC - Fort Bliss
COMMANDER, USAADACENFB
ATZC-DPT-IT
Dave Hall, Integrated Training Area Management (ITAM) Coordinator
Building 2, Room 31
1733 Pleasonton Road
Fort Bliss, Texas 79916-6816
Phone: 915-568-2193
Fax: 915-568-2193

POC - USDA, NRCS (New Mexico)
NEW MEXICO STATE OFFICE, NRCS
Troy Hood, Assistant State Conservationist
Room 305
6200 Jefferson, NE
Albuquerque, New Mexico 87106-3734
Phone: 505-761-4411
Fax: 505-761-4463

ARTICLE III: SCOPE

The provisions of this agreement extend to those activities that impact the need for natural resources planning and application to address and solve problems on Fort Bliss. The resultant works in relation to training areas and requirements will include treatment of severely eroding sites at Fort Bliss. This will help prevent excess movement of sediment and also control erosion within training areas.

ARTICLE IV: THE NRCS AGREES TO:

1. Provide to Fort Bliss assistance for the treatment of training areas on Fort Bliss property. This assistance may include conservation planning, surveys needed for conservation practice designs, engineering designs, contracting for conservation treatment, and inspection assistance on sites identified and prioritized by Fort Bliss. Identified sites will be provided to NRCS on a clearly marked map prior to commencement of planning or other work activities.

2. Appoint a project coordinator who will arrange for NRCS personnel with the needed discipline to conduct the work identified in IV - 1.

3. Provide qualified personnel to conduct the work described in IV - 1.

4. Adhere to Range Safety and Range Standing Operating Procedures (SOP).

ARTICLE V: FORT BLISS AGREES TO:

1. Reimburse NRCS for costs incurred by NRCS for providing the assistance listed in IV. Other costs will include salaries and benefits, travel, and related support costs necessary for the performance of this agreement. Such cost shall not exceed $200,000.00 per fiscal year unless a greater amount is approved in advance.

2. Provide to employees of NRCS or the contractors necessary ingress and egress routes to selected sites.

3. Review NRCS rehabilitation project designs for sites examined and order rehabilitation projects by providing to NRCS a list of sites to be rehabilitated.

4. Provide funding to NRCS as early in the fiscal year as practical by means of Military Interdepartmental Purchase Request (MIPR).

5. Provide Emergency Ordinance Disposal (EOD)/ Safety Briefings.

ARTICLE VI: PAYMENT

1. Fort Bliss will reimburse NRCS for all pre-negotiated costs incurred in carrying out activities agreed to under this agreement, and included deliverables.

2. Payments will be made to NRCS in accordance with the following:

a. Technical assistance - payment will be made quarterly for costs incurred by NRCS during the previous quarter.

b. Financial assistance - payment will be made for each progress payment as billed by NRCS. Payment will be made in accordance with payment due dates stated in the financial assistance contracts. Final payments will be made after the release of claims have been given by the contractor. All contract costs including financial assistance amounts obligated by contracts or purchase orders and costs incurred by the preparation and administration of said contracts or purchase orders will not exceed 5% of the amount of the contract or purchase order. Contract claims that are determined allowable by contracting officer decision or board of contract appeals will be paid by Fort Bliss. Decisions of the contracting officer for claims submitted by contractors will be reviewed with Fort Bliss prior to the issuance of said decision.

3. Billings by NRCS will be sent on FNM-15, Bill. Billings under this agreement will be mailed by NRCS to the following address:

DFAS (OPLOC) LAWTON, FORT SILL, OK.
4700 MOWWAY ROAD
DEPT. 1791
FORT SILL, OK. 73503

ARTICLE VII: AGREEMENT TERMS AND REVIEW

1. This agreement will become effective upon the date of the last affixed signature, and shall remain in force for as long as the underlying MOU is valid. This agreement may also be renewable after appropriate review and determination of effectiveness. This agreement can be terminated by either agency upon 45 days written notice. The designated persons (through the POCs listed herein) responsible for executing and accepting orders will periodically review this agreement and recommend and execute any modifications or adjustments that would be desirable. All changes or modifications to this agreement must be approved in writing by the persons responsible for executing and accepting orders or the POCs designated to act on their behalf.

2. This agreement is executed in accordance with procedures established by the Economy Act (31 U.S.C. 1535) and the previsions of the Federal Acquisition Regulation System. The procedures set forth in the Army Acquisition Letter 94-5, Economy Act Orders Outside DoD, have been followed.

3. Nothing in this agreement will be construed as limiting or affecting the legal authority of Fort Bliss or the NRCS, or as binding upon the Installation or NRCS to perform beyond their respective authorities, or to require any of the parties to assume or expend funds in excess of available appropriations. The NRCS will fulfill its obligations stated in this agreement to the extent that appropriated funds are authorized by law and administratively made available for this purpose. The NRCS may terminate or temporarily suspend the agreement if it cannot fulfill its obligations because of an insufficient appropriation of funds.

4. No member of or delegate to Congress or resident commissioner shall be admitted to any share or part of this agreement, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this agreement if made with a corporation from its general benefit.

5. The program or activities conducted under this agreement will be in compliance with the non-discrimination provision contained in the Title VI and VII of the Civil Rights Act of 1964, as amended; the Civil Rights Restoration Act of 1987 (Public Law 100-259); and other non-discrimination statues; namely, Section 504 of the Rehabilitation Act of 1973, Discrimination Act of 1975. They will also be in accordance with the regulations of the Secretary of Agriculture (7 CFR-15, Subparts A & B), which provides that no person in the United States shall on the grounds of race, color, national origin, age, sex, religion, marital status, or handicap be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity receiving federal financial assistance from the Department of Agriculture or any agency thereof.

6. Each employee who is assigned to work under this agreement remains under the administrative control of his/her employing organization and is entitled to receive only the salary and other benefits provided by the employing organization.

ACCEPTANCE for Fort Bliss

By: For James D Caven BG acting Cdr Date: 23 Dec 1997
JOHN COSTELLO
Major General, U.S. Army
Commanding

ACCEPTANCE for the Natural Resources Conservation Service

By: [signature] /acting Date: 1/6/98
ROSENDO TREVINO III
State Conservationist
New Mexico

C.A. #NMSO-100

COOPERATIVE AGREEMENT
Between
THE BUREAU OF LAND MANAGEMENT

U.S. ARMY AIR DEFENSE CENTER, FORT BLISS
and
NEW MEXICO STATE UNIVERSITY
for PRESERVATION OF STUDY SITES ON
McGREGOR RANGE (FORT BLISS)

I. Authority

In accordance with the authority contained in Federal Land Policy and Management Act, P.L. 94-579, October 21, 1976, (90 Stat. 2744, 43 U.S.C. 1701, et seq.), the use of Cooperative Agreements is authorized, and the Department of Defense, the Department of Interior, and Board of Regents of New Mexico State University, through their designated representatives whose signatures appear below, approved the following cooperative plan for the protection, development, management, enhancement, and systematic inventory of three highly productive black grama grassland areas of McGregor Range.

II. Definitions

Hereinafter in the agreement, the following will apply:

1. The Bureau of Land Management will be referred to as the "Bureau."

2. The U.S. Army Air Defense Center and Fort Bliss will be referred to as the "Center."

3. New Mexico State University will be referred to as "NMSU."

III. Purpose

It will be the purpose of this Cooperative Agreement to provide for a general inventory review of the flora and fauna of three grassland areas, to protect and preserve the areas, to determine ecological changes, and to report causes and effects of the changes by the use of accepted fundamental techniques. The inventory, when completed, will be attached and made a part of this agreement.

Portions of the McGregor Range include some of the most outstanding examples of black grama grassland in the United States. Such grassland was once commonplace in the southwest and provided a major forage resource for wildlife and livestock. Grassland ecosystems in virtually ungrazed state are very rare today in southern New Mexico.

Preservation of these areas will provide sites where natural ecosystem processes can be monitored in black grama grasslands of pristine condition. They can serve a bench marks for comparison of managed or impacted black grama lands. The effects of livestock grazing on other lands can be assessed by measuring populations of grama and other desirable forage grasses as departures from populations in the ungrazed areas. They will provide a natural laboratory for studies of ecosystem processes responsible for maintaining productivity in black grama grasslands. The sites will serve as a refuge for populations comprising the natural, self-maintaining diversity of black grama grassland.

IV. Description of the Areas Covered by this Agreement

The proposed areas are all located on McGregor Range outside current grazing units. The sites are as follows:

Site A. A narrow strip paralleling State Road 506 to the north. The north boundary is the fence, approximately 470 m north of the road; the south boundary is the fence paralleling the road. The linear distance along the orad is more or less 7,420 m (4 miles).

NW boundary coordinates: 13SDF238954
SE boundary coordinates: 13SDF303935

The tract includes portions of Sections 10, 11, 12, and 13 in T. 21 S., R. 11 E., and Section 17 and 18 in T. 21 S., R. 12 E.

Site B. Peninsular portion, generally along the 5,240 foot contour at the western edge of the Otero Mesa escarpment near the head of Rough Canyon and north of Hay Meadow Canyon. The east boundary is the fence of Grazing Unit 12.

NW boundary coordinates: 13SDF186851
SE boundary coordinates: 13SDF215818

The tract includes portions of Sections 7, 17, and 20 in T. 22 S., R. 11 E.

Site C. Peninsular portion along the 5,240 foot contour at the western edge of the escarpment about 200 m north of Martin Canyon. East boundary is along the fence.

NW boundary coordinates: 13SDF197782
SE boundary coordinates: 13SDF196751

Site D. Peninsular portions along the 5,300 foot contour, more or less, at the western edge of the Otero Mesa escarpment commencing about 3,000 m south of Martin Canyon, thence south about 600 m. East boundary is along the fence of Grazing Units 10 and 11.

NW boundary coordinates: 13SDF192697
SE boundary coordinates: 13SDF205636

The tract includes portions of Section 31, T. 23 S., R. 11 E., and 6, 7, and 18, in T. 24 S., R. 11 E.

The total land involved in all of these sites is a little over 6 section.

V. Working Agreement

All parties to this Agreement will be concerned with the protection, preservation, study, and reporting of research, and the continuation of the ecosystem processes without undue disturbance.

A. The Bureau agrees to:

1. Contact NMSU prior to construction of any facilities within these study sites.

2. Continue to exclude livestock from the study sites.

3. Discourage all activities which will cause disturbance to the vegetative cover and soil surface of the study sites.

B. The Center agrees to:

1. Contact NMSU prior to construction of any facilities within these study sites.

2. Cause as little disturbance to the vegetative cover and soil surface as is practically possible during activities such as drone retrieval and fire control.

C. NMSU agrees to:

1. Contact the Center prior to entry onto the site.

2. Not construct any improvements.

3. Furnish the Bureau and Center copies of the data and reports resulting from research or study.

4. Limit the use of the sites for research or study and investigations to advanced students and qualified professionals.

This agreement will in no way impose any controls over the Center with regard to access and continued use as established in the procedures for governing security and military operations.

This agreement shall become effective upon the date of approval by all three parties concerned and shall continue in effect indefinately or until a desire to terminate it is served on any of the signatory parties by another.

Recommended for approval:

David C. E. Fackler — June 7, 1978
District Manager — Date
Las Cruces District
Bureau of Land Management

Approved:

William W. Finnerman — July 15 1978
State Director — Date
New Mexico State Office
Bureau of Land Management

William H. Emrich — 14 July 78
U.S. Army Air Defense Center — Date
and Fort Bliss

J. C. Rand — 31 July 78
New Mexico State University — Date
Board of Regents

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APPENDIX B

BIOLOGY

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B.0 BIOLOGY

This appendix provides detailed information on the biological resources summarized in Section 6.7, *Biological Resources,* of this INRMP. This appendix includes reviews of past and on-going ecological studies on the installation that are describing the biological resources on Fort Bliss. An adequate description of baseline biological resources on Fort Bliss is required to develop and implement ecosystem management strategies that are the primary approach being taken to manage the natural resources on the installation. The major focus of this appendix is to provide detailed discussion of the available data (especially tabular data) that is too extensive to include in Section 6.7.

B.1 VEGETATION

A thorough description of the upland plant communities on Fort Bliss, including vegetation maps, appear in Section 6.7.1 of this document. Table 6-4 includes descriptions of the 36 unique mapping units and estimates of the amount of land on Fort Bliss with that plant community. Table 6-5 provides a summary of how the 36 mapping units are combined to create the 11 mapping units shown in figures 6-8, 6-9 and 6-10. The following detailed description of riparian areas on the installation is summarized in Section 6.6. Table B-1 includes an account of known and expected plants on Fort Bliss. The list includes nonvascular (lichen, mosses, liverworts) and vascular (ferns, fern allies, ephedras, conifers, flowering plants) groups.

Wetlands and arroyo-riparian drainages have been studied on Fort Bliss. The U.S. Army Corps of Engineers (USACE) Waterways Experiment Station is currently mapping and characterizing all Waters of the U.S., including wetlands on Fort Bliss (U.S. Army, 1998j). Wetlands delineation follows the USACE protocol in the *Army Corps of Engineers Wetlands Delineation Manual* (U.S. Army, 1987). To qualify as a USACE jurisdictional wetland, it must have hydric soil, be saturated to within 12 inches of the surface sometime during the growing season, and contain wetland plant species (U.S. Army, 1987). Waters of the U.S. include "water such as intrastate lakes, rivers, streams (including intermittent streams)" (33 CFR 328.3[a][3]). Probable Waters of the U.S. have been mapped on the South Training Areas, McGregor Range, and Doña Ana Range–North Training Areas (see Figure 6-7 in Section 6-6) and are being mapped on the remainder of Fort Bliss. These inventories of wetlands and Waters of the U.S. are provided for planning purposes and the boundaries of the wetlands and Waters of the U.S. have not been determined. The boundaries of wetlands and Waters of the U.S. will be delineated for site-specific projects and a final determination by the USACE district engineer is needed before a delineation is confirmed. Actively maintained man-made features such as stock tanks are not regulated by the USACE, because they are not considered jurisdictional wetlands. However, abandoned stock tanks and other man-made features may be regulated if they conduct and/or hold surface water (U.S. Army, 1998g).

Observations were made at 226 locations on McGregor Range and the South Training Areas, including dry washes, stock tanks, and other water resources. Data such as major plant species, and depth and width of channel, were recorded. A total of 49 sites were analyzed in greater detail, including the collection of data on plant species and percent cover, hydrology, soils, and surrounding upland vegetation. Based on this analysis, the Waters of the U.S. on McGregor Range and the South Training Areas included 1,228 dry washes with distinct stream beds and stream banks covering 1,874 miles. In addition, 11 natural dry lakes with distinct ordinary high water marks totaling 127 acres, and 79 artificial bodies of water such as sewage treatment ponds, storm water retention basins, and stock tanks totaling 802 acres were mapped (U.S. Army, 1998g). Data were collected from 117 observation points and 21 sample locations on Doña Ana Range–North Training Areas and based on this, 142 dry washes with distinct stream beds and stream banks comprising 645 miles were mapped. Seventeen dry lakes and ponds with

Table B-1. Nonvascular and Vascular Plants Groups Expected on Fort Bliss

Family	*Species*		*Occurrence on Fort Bliss*[b]
	Scientific Name	*Common Name*[a]	
NONVASCULAR PLANTS (LICHENS, MOSSES, LIVERWORTS)			
ACAROSPORACEAE			
	Acarospora badiofusca	Cracked lichen	K
	Acarospora fuscata	Cracked lichen	K
	Acarospora glaucocarpa	Cracked lichen	K
	Acarospora novomexicana	Cracked Lichen	K
	Acarospora schleicheri	Schleicher's cracked lichen	K
	Acarospora smaragdula	Cracked lichen	K
	Acarospora texana	Cracked lichen	E
	Sarcogyne clavus	Sarcogyne	K
	Sarcogyne regularis	Sarcogyne	K
AMBLYSTEGIACEAE			
	Amblystegium serpens	Amblystegium moss	K
	Amblystegium varium	Amblystegium moss	K
	Campylium sophyllum	Moss	E
	Cratoneuron filicinum	Cratoneuron moss	K
	Hygroamblystegium tenax	Hygroamblystegium moss	K
	Hygrohypnum luridum	Hygrohypnum moss	K
	Leptodictyum riparium	Streamside leptrodictym moss	K
	Leptodictyum trichopodium	Leptodictyum moss	K
	Platydictya jungermannioides	Jungermann's platydictya moss	E
AYTONIACEAE			
	Asterella bolanderi	Liverwort	E
	Mannia fragrans	Liverwort	E
	Mannia pilosa	Liverwort	E
	Plagiochasma rupestre	Liverwort	K
	Plagiochasma wrightii	Liverwort	K
	Reboulia hemisphaerica	Liverwort	K
BARTRAMIACEAE			
	Anacolia laevisphaera	Anacolia moss	K
	Anacolia menziesii	Menzies' anacolia moss	K
	Philonotis fontana	Philonotis moss	K
BIATORACEAE			
	Speerschneidera euploca	Speerschneidera	E
	Toninia ruginosa	Bruised lichen	E
	Toninia sedifolia	Bruised lichen	E
BRACHYTHECIACEAE			
	Brachythecium albicans	Brachythecium moss	E
	Brachythecium collinum	Brachythecium moss	K
	Brachythecium fendleri	Fendler's brachythecium moss	K

Table B-1. Nonvascular and Vascular Plants Groups Expected on Fort Bliss (Continued)

Family	*Species*		*Occurrence on Fort Bliss*[b]
	Scientific Name	*Common Name*[a]	
NONVASCULAR PLANTS (LICHENS, MOSSES, LIVERWORTS)			
	Brachythecium rivulare	Brachythecium moss	E
	Brachythecium stereopoma	Brachythecium moss	E
	Eurhynchium hians	Eurhynchium moss	E
	Eurhynchium pulchellum	Eurhynchium moss	E
	Rhynchostegium serrulatum	Steerecleus moss	E
BRYACEAE			
	Brachymenium systylium	Brachymenium moss	E
	Bryum andicola	Billarder's bryum moss	E
	Bryum billardieri	Billarder's moss	E
	Bryum capillare	Bryum moss	K
	Bryum cyclophyllum	Byrum moss	E
	Bryum gemmiparum	Bryum moss	E
	Bryum lanatum	Silvergreen bryum moss	K
	Bryum pallescens	Bryum moss	K
	Bryum pseudotriquetrum	Common green bryum moss	E
	Bryum turbinatum	Bryum moss	E
	Leptobryum pyriforme	Leptobryum moss	E
	Pohlia elongata	Elongate pohlia moss	E
	Pohlia nutans	Pohlia moss	E
	Pohlia wahlenbergii	Wahlenberg's pohlia moss	E
CANDELARIACEAE			
	Candelaria concolor	Orange lichen	E
	Candelariella deflexa	Deflexed eggyolk lichen	K
	Candelariella rosulans	Eggyolk lichen	E
	Candelariella subdeflexa	Eggyolk lichen	E
	Candelina submexicana	Candelina	E
CEPHALOZIELLACEAE			
	Cephaloziella divaricata	Liverwort	K
CLADONIACEAE			
	Cladonia coniocraea	Cup lichen	E
COCCOCARPIACEAE			
	Coccocarpia palmocola	Coccocarpia	E
	Spilonema revertens	Spilonema	E
COLLEMATACEAE			
	Collema coccophorum	Jelly lichen	K
	Collema conglomeratum	Conglomerate jelly lichen	E
	Collema furfuraceum	Jelly lichen	E
	Collema polycarpon	Jelly lichen	K

Table B-1. Nonvascular and Vascular Plants Groups Expected on Fort Bliss (Continued)

Family	*Species*		*Occurrence on Fort Bliss*[b]
	Scientific Name	*Common Name*[a]	
NONVASCULAR PLANTS (LICHENS, MOSSES, LIVERWORTS)			
	Collema tenax	Jelly lichen	K
	Collema texanum	Texas jelly lichen	K
	Leptogium denticulatum	Toothed skin lichen	K
	Leptogium furfuraceum	Skin lichen	E
	Leptogium saturninum	Saturn skin lichen	K
DITRICHACEAE			
	Ceratodon purpureus	Ceratodon moss	E
ENCALYPTACEAE			
	Encalypta ciliata	Fringed candle snuffer moss	E
	Encalypta vulgaris	Common candle snuffer moss	K
FABRONIACEAE			
	Fabronia ciliaris	Fabronia moss	K
	Fabronia pusilla	Fabronia moss	E
FISSIDENTACEAE			
	Fissidens bryoides	Bryoid fissidens moss	K
	Fissidens obtusifolius	Obtuseleaf fissidens moss	E
FUNARIACEAE			
	Entosthodon rubiginosus	Entosthodon moss	E
	Entosthodon tucsonii	Tucson entosthodon moss	K
	Funaria apiculatopilosa	Apiculate funaria moss	K
	Funaria flavicans	Funaria moss	E
	Funaria hygrometrica	Funaria moss	K
	Funaria muehlenbergii	Muhlenberg's funaria moss	K
	Physcomitrium pyriforme	Physcomitrium moss	E
GRIMMIACEAE			
	Grimmia alpestris	Grimmia dry rock moss	E
	Grimmia anodon	Grimmia dry rock moss	E
	Grimmia arizonae	Arizona dry rock moss	K
	Grimmia laevigata	Grimmia dry rock moss	E
	Grimmia ovalis	Oval dry rock moss	E
	Grimmia pilifera	Grimmia dry rock moss	E
	Grimmia poecilostoma	Grimmia dry rock moss	E
	Grimmia pulvinata	Pulvinate dry rock moss	K
	Grimmia trichophylla	Grimmia dry rock moss	K
	Jaffueliobryum wrightii	Wright's jaffueliobryum moss	K
	Schistidium apocarpum	Schistidium moss	K
	Schistidium rivulare	Wideleaf schistidium moss	K

Table B-1. Nonvascular and Vascular Plants Groups Expected on Fort Bliss (Continued)

Family	*Species*		*Occurrence on Fort Bliss*[b]
	Scientific Name	*Common Name*[a]	
NONVASCULAR PLANTS (LICHENS, MOSSES, LIVERWORTS)			
HEDWIGIACEAE			
	Hedwigia ciliata	Ciliate hedwigia moss	K
HEPPIACEAE			
	Heppia lutosa	Heppia	K
HYMENELIACEAE			
	Aspicilia caesiocinerea	Rimmed lichen	K
	Aspicilia desertorum	Desert aspicilia	K
	Lobothallia alphoplaca	Lobothallia	K
HYPNACEAE			
	Homomallium mexicanum	Mexican homomallium moss	K
	Hypnum cupressiforme	Hypnum moss	E
	Isopterygium pulchellum	Isopterygium moss	E
	Taxiphyllum deplanatum	Taxiphyllum moss	E
	Taxiphyllum taxirameum	Taxiphyllum moss	E
JUBULACEAE			
	Frullania brittoniae	Liverwort	E
	Frullania eboracensis	Liverwort	E
	Frullania inflata	Liverwort	K
	Frullania riparia	Liverwort	K
LECANORACEAE			
	Lecanora carpinea	Rim lichen	E
	Lecanora chlarotera	Rim lichen	K
	Lecanora garovaglii	Garovagl's rim lichen	E
	Lecanora impudens	Rim lichen	E
	Lecanora muralis	Rim lichen	K
	Lecanora saligna	Rim lichen	K
	Lecanora symmicta	Rim lichen	E
	Lecanora valesiaca	Rim lichen	K
	Lecidella euphorea	Lecidella	K
	Lecidella stigmatea	Leicidella	K
	Tephromela atra	Lichen	K
LESKEACEAE			
	Anomodon attenuatus	Anomodon moss	E
	Anomodon rostratus	Anomodon moss	E
	Lindbergia brachyptera	Lindbergia moss	E
	Lindbergia mexicana	Mexican lindbergia moss	E
	Pseudoleskea radicosa	Pseudoleskea moss	E
	Pseudoleskeella tectorum	Pseudoleskeella moss	E

Table B-1. Nonvascular and Vascular Plants Groups Expected on Fort Bliss (Continued)

Family	*Species*		*Occurrence on Fort Bliss*[b]
	Scientific Name	*Common Name*[a]	
NONVASCULAR PLANTS (LICHENS, MOSSES, LIVERWORTS)			
LICHINACEAE			
	Lichinella nigritella	Lichinella	E
	Peccania arizonica	Peccania	K
	Phloeopeccania major	Lichen	K
	Phylliscum tenue	Phylliscum	K
	Thyrea girardii	Thyrea	K
	Thyrea pulvinata	Thyrea	E
LOBARIACEAE			
	Sticta beauvoisii	Beauvois' spotted felt lichen	E
MARCHANTIACEAE			
	Marchantia polymorpha	Liverwort	E
MNIACEAE			
	Mnium arizonicum	Arizona calcareous moss	E
	Plagiomnium cupidatum	Toothed plagiomnium moss	E
NECKERACEAE			
	Neckera pennata	Neckera moss	E
NEPHROMATACEAE			
	Nephroma helveticum	Swiss kidney lichen	E
	Nephroma parile	Kidney lichen	E
ORTHOTRICHACEAE			
	Orthotrichum alpestre	Orthotrichum moss	E
	Orthotrichum anomalum	Orthotrichum moss	E
	Orthotrichum cupulatum	Orthotrichum moss	E
	Orthotrichum diaphanum	Orthotrichum moss	E
	Orthotrichum hallii	Hall's orthotrichum moss	E
	Orthotrichum pumilum	Orthotrichum moss	E
	Orthotrichum rupestre	Orthotrichum moss	E
PANNARIACEAE			
	Fuscopannaria leucophaea	Fuscopannaria	E
	Pannaria tavaresii	Tavares' matted lichen	E
	Parmelia saxatilis	Shield lichen	E
PARMELIACEAE			
	Flavoparmelia baltimorensis	Flavoparmelia	E
	Flavoparmelia caperata	Flavoparmelia	K
	Flavopunctelia flaventior	Flavopunctelia	K
	Flavopunctelia praesignis	Flavopunctelia	E
	Flavopunctelia soredica	Flavopunctelia	K
	Melanelia elegantula	Melanelia	E
	Melanelia fuliginosa	Melanelia	E

Table B-1. Nonvascular and Vascular Plants Groups Expected on Fort Bliss (Continued)

Family	*Species*		*Occurrence on Fort Bliss*[b]
	Scientific Name	*Common Name*[a]	
NONVASCULAR PLANTS (LICHENS, MOSSES, LIVERWORTS)			
	Melanelia subolivacea	Melanelia	K
	Melanelia tominii	Melanelia	K
	Parmotrema praesorediosum	Shield lichen	K
	Pseudevernia intensa	Intense light and dark lichen	E
	Punctelia bolliana	Lichen	E
	Punctelia perreticulata	Punctelia	K
	Punctelia rudecta	Punctelia	E
	Punctelia subrudecta	Punctelia	E
	Rhizoplaca chrysoleuca	Golden rimmed navel lichen	K
	Rhizoplaca melanophthalma	Rimmed navel lichen	K
	Rhizoplaca peltata	Pelate rimmed navel lichen	K
	Rimelia reticulata	Rimelia	E
	Tuckermnannopsis coralligera	Tuckermannopsis	E
	Usnea arizonica	Arizona beard lichen	E
	Usnea cavernosa	Cavern beard lichen	E
	Usnea hirta	Beard lichen	E
	Xanthoparmelia psoromifera	Lichen	K
PELTIGERACEAE			
	Peltigera canina	Felt lichen	E
	Peltigera diadactyla	Felt lichen	E
	Peltigera elizabethae	Elizabeth's felt lichen	E
	Peltigera praetextata	Felt lichen	K
	Peltigera rufescens	Felt lichen	K
PELTULACEAE			
	Peltula euploca	Peltula lichen	K
	Peltula michoacanensis	Peltula lichen	E
	Peltula obscurans	Peltula lichen	E
PHYSCIACEAE			
	Buellia novomexicana	New Mexico disc lichen	E
	Buellia retrovertens	Disc lichen	E
	Buellia spuria	Disc lichen	E
	Dimelaena oreina	Mountain lichen	E
	Heterodermia albicans	Shield lichen	K
	Heterodermia rugulosa	Rugulose shield lichen	K
	Phaeophyscia cernohorskyi	Cernohorsky's wreath lichen	K
	Phaeophyscia constipata	Wreath lichen	K
	Phaeophyscia hirsuta	Hairy wreath lichen	E
	Phaeophyscia hirtella	Wreath lichen	E

Table B-1. Nonvascular and Vascular Plants Groups Expected on Fort Bliss (Continued)

Family	*Species*		*Occurrence on Fort Bliss*[b]
	Scientific Name	*Common Name*[a]	
NONVASCULAR PLANTS (LICHENS, MOSSES, LIVERWORTS)			
	Phaeophyscia kiramoi	Kihlman's wreath lichen	K
	Phaeophyscia orbicularis	Wreath lichen	K
	Physcia aipolia	Rosette lichen	E
	Physcia albinea	Rosette lichen	E
	Physcia biziana	Rosette lichen	K
	Physcia callosa	Rosette lichen	K
	Physcia dimidiata	Rosette lichen	E
	Physcia magnussonii	Magnusson's rosette lichen	E
	Physcia phaea	Rosette lichen	E
	Physcia stellaris	Stellaris rosette lichen	E
	Physciella nepalensis	Lichen	K
	Physconia elegantula	Frosted lichen	E
	Physconia enteroxantha	Frosted lichen	E
	Physconia muscigena	Frosted lichen	E
	Physconia perisidiosa	Frosted lichen	E
	Rinodina conradii	Lichen	K
PLACYNTHIACEAE			
	Koerberia biformis	Koerberia	E
	Placynthium nigrum	Blackthread lichen	K
PORELLACEAE			
	Porella platyphylla	Liverwort	K
POTTIACEAE			
	Bryoerythrophyllum recurvirostre	Bryoerythrophyllum moss	E
	Crossidium aberrans	Crossidium moss	E
	Crossidium crassinerve	Crossidium moss	E
	Didymodon luridus	Didymodon moss	E
	Didymodon revolutus	Revolute didymodon moss	E
	Didymodon rigidulus	Rigid didymodon moss	E
	Didymodon tophaceus	Didymodon moss	E
	Didymodon vinealis	Didymodon moss	E
	Gymnostomum aeruginosum	Gymnostomum moss	E
	Leptodontium flexifolium	Leptodontium moss	E
	Microbryum davallianum	Moss	K
	Molendoa sendtineriana	Sendtner's moss	E
	Pottia arizonica	Arizona pottia moss	E
	Pseudocrossidium aureum	Pseudocrossidium moss	E
	Pseudocrossidium crinitum	Pseudocrossidium moss	K
	Pterygoneurum subsessile	Sessile pterygoneurum moss	E

Table B-1. Nonvascular and Vascular Plants Groups Expected on Fort Bliss (Continued)

Family	*Species*		*Occurrence on Fort Bliss*[b]
	Scientific Name	*Common Name*[a]	
NONVASCULAR PLANTS (LICHENS, MOSSES, LIVERWORTS)			
	Syntrichia bartramii	Bartram's tortula moss	E
	Syntrichia inermis	Tortula moss	K
	Syntrichia intermedia	Tortula moss	K
	Syntrichia norvegica	Norwegian tortula moss	E
	Syntrichia obtusissima	Obtuse tortula moss	E
	Syntrichia pagorum	Tortula moss	E
	Syntrichia papillosa	Papillose tortula moss	E
	Syntrichia ruralis	Tortula moss	K
	Timmiella anomala	Timmiella moss	E
	Tortula euryphylla	Wide leaf desmatodon moss	K
	Tortula guepinii	Guepin's desmatodon moss	K
	Tortula muralis	Tortula moss	E
	Tortula plinthobia	Desmatodon moss	E
	Tortula ruralis	Tortula moss	E
	Trichostomum crispulum	Trichostomum moss	E
	Weissia andersoniana	Anderson's weissia moss	E
	Weissia condensa	Condensed weissia moss	K
	Weissia controversa	Controversial weissia moss	K
	Weissia ligulaefolia	Ligule leaf weissia moss	K
PSORACEAE			
	Psora crenata	Crenate fishscale lichen	K
	Psora icterica	Fishscale lichen	K
	Psora pseudorussellii	False Russell's fishscale lichen	E
PTYCHOMITRIACEAE			
	Ptychomitrium sinense	Ptychomitrium moss	K
RAMALINACEAE			
	Ramalina pollinaria	Cartilage lichen	E
	Ramalina sinensis	Cartilage lichen	E
RHIZOCARPACEAE			
	Rhizocarpon disporum	Map lichen	E
RHYTIDIACEAE			
	Rhytidium rugosum	Rhytidium moss	K
TELOSCHISTACEAE			
	Caloplaca arenaria	Sandwort orange lichen	E
	Caloplaca arizonica	Orange lichen	E
	Caloplaca cerina	Orange lichen	E
	Caloplaca chrysopthalma	Orange lichen	E
	Caloplaca citrina	Lichen	E

Table B-1. Nonvascular and Vascular Plants Groups Expected on Fort Bliss (Continued)

Family	*Species*		*Occurrence on Fort Bliss*[b]
	Scientific Name	*Common Name*[a]	
NONVASCULAR PLANTS (LICHENS, MOSSES, LIVERWORTS)			
	Caloplaca flavorubescens	Orange lichen	E
	Caloplaca herbidella	Orange lichen	E
	Caloplaca microphyllina	Orange lichen	E
	Caloplaca modesta	Orange lichen	E
	Caloplaca ochraceofulva	Lichen	E
	Caloplaca pellodella	Orange lichen	E
	Caloplaca rubelliana	Orange lichen	E
	Caloplaca saxicola	Orange lichen	E
	Caloplaca ulmorum	Orange lichen	E
	Xanthoria elegans	Elegant orange wall lichen	E
	Xanthoria fallax	Orange wall lichen	E
	Xanthoria montana	Orange wall lichen	E
THELOTREMATACEAE			
	Diploschistes scruposus	Crater lichen	E
TIMMIACEAE			
	Timmia megapolitana	Timmia moss	E
UMBILICARIACEAE			
	Lasallia papulosa	Blistered naval lichen	E
	Lasallia pensylvanica	Blistered naval lichen	E
	Umbilicaria americana	Navel lichen	E
	Umbilicaria cinereorufescens	Navel lichen	E
	Umbilicaria phaea	Navel lichen	E
VERRUCARIACEAE			
	Catapyrenium chilense	Earth lichen	K
	Catapyrenium lachneum	Earth lichen	E
	Catapyrenium lacinulatum	Lichen	K
	Catapyrenium squamulosum	Earth lichen	E
	Catapyrenium tuckermanii	Tuckerman's earth lichen	E
	Dermatocarpon miniatum	Silverskin lichen	K
	Endocarpon pusillum	Chalice lichen	E
	Staurothele drummondii	Drummond's wart lichen	K
	Staurothele verruculosa	Wart lichen	E
	Staurothele effigurata	Wart lichen	E

Table B-1. Nonvascular and Vascular Plants Groups Expected on Fort Bliss (Continued)

Family	*Species*		*Occurrence on Fort Bliss*[b]
	Scientific Name	*Common Name*[a]	
VASCULAR PLANTS (FERNS AND FERN ALLIES, EPHEDRAS, CONIFERS, FLOWERING PLANTS)			
ACANTHACEAE			
	Carlowrightia linearifolia	Heath wrightwort	K
	Carlowrightia serpyllifolia	Trans-Pecos wrightwort	E
	Dyschoriste decumbens	Spreading snakeherb	E
	Ruellia parryi	Parry's wild petunia	K
	Stenandrium barbatum	Shaggy stenandrium	K
ACERACEAE			
	Acer grandidentatum	Bigtooth maple	K
	Acer negundo	Boxelder	K
AGAVACEAE			
	Agave gracilipes	Slimfoot century plant	E
	Agave lechuguilla	Lechuguilla	K
	Agave neomexicana	New Mexico agave	K
	Dasylirion heteracanthum	Trans-Pecos sotol	E
	Dasylirion wheeleri	Common sotol, wheeler sotol	K
	Nolina micrantha	Sacahuista	E
	Nolina microcarpa	Smallseed sacahuista	K
	Nolina texana	Texas sacahuista	K
	Yucca baccata	Banana yucca, datil	K
	Yucca elata	Soap-tree yucca	K
	Yucca torreyi	Torrey's yucca	K
AIZOACEAE			
	Trianthema portulacastrum	Desert horsepurslane	K
AMARANTHACEAE			
	Alternanthera caracasana	Washer woman, matt chaff flower	K
	Amaranthus acanthochiton	Green stripe, pigweed	K
	Amaranthus bigelovii	Bigelow's amaranth	K
	Amaranthus blitoides	Mat amaranth	K
	Amaranthus crassipes	Spreading amaranth	E
	Amaranthus fimbriatus	Fringed amaranth	K
	Amaranthus hybridus	Slim amaranth	K
	Amaranthus palmeri	Carelessweed, Palmer amaranth	K
	Amaranthus retroflexus	Redroot amaranth	K
	Amaranthus wrightii	Wright's amaranth	K
	Froelichia airzonica	Arizona snakecotton	K
	Froelichia floridana	Florida snakecotton	K
	Froelichia gracilis	Slender snakecotton	K
	Gomphrena caespitosa	Tufted globe amaranth	K

Table B-1. Nonvascular and Vascular Plants Groups Expected on Fort Bliss (Continued)

Family	*Species*		*Occurrence on Fort Bliss*[b]
	Scientific Name	*Common Name*[a]	
VASCULAR PLANTS (FERNS AND FERN ALLIES, EPHEDRAS, CONIFERS, FLOWERING PLANTS)			
	Gomphrena nitida	Pearly globe amaranth	K
	Guilleminea densa	Cottonflower	K
	Iresine heterophylla	Standley's bloodleaf	K
	Tidestromia lanuginosa	Woolly tidestromia	K
	Tidestromia suffruticosa	Shrubby honeysweet	K
ANACARDIACEAE			
	Rhus microphylla	Littleleaf sumac, desert sumac	K
	Rhus trilobata	Skunkbush sumac	K
	Rhus virens	Fragant sumac	K
APIACEAE			
	Aletes filifolius	Trans-Pecos Indian parsley	K
	Cymopterus acaulis	Plains springparsley	E
	Cymopterus montanus	Mountian springparsley	K
	Cymopterus multinervatus	Purplenerve springparsley	E
	Daucus pusillus	American wild carrot	K
	Pseudocymopterus montanus	Alpine false springparsley	K
	Spermolepis echinata	Bristly scaleseed	K
	Spermolepis inermis	Red River scaleseed	E
APOCYNACEAE			
	Amsonia longiflora	Slimpod, blue star	K
	Amsonia tomentosa	Woolly bluestar	K
	Apocynum cannabinum	Indianhemp; dogbane	K
	Haplophyton crooksii	Cockroachplant	K
	Macrosiphonia brachysiphon	Huachuca Mountain rocktrumpet	K
ARISTOLOCHIACEAE			
	Aristolochia wrightii	Wright's dutchman's pipe	K
ASCLEPIADACEAE			
	Asclepias arenaria	Sand milkweed	E
	Asclepias asperula	Milkweed	K
	Asclepias brachystephana	Bract milkweed	K
	Asclepias latifolia	Broadleaf milkweed	E
	Asclepias macrotis	Longhood milkweed	K
	Asclepias oenotheroides	Zizotes milkweed	K
	Asclepias subverticillata	Horsetail milkweed	K
	Matelea producta	Texas milkvine	K
	Sarcostemma crispum	Wavyleaf twinevine	K
	Sarcostemma cynanchoides	Fringed twinevine	K

Table B-1. Nonvascular and Vascular Plants Groups Expected on Fort Bliss (Continued)

Family	*Species*		*Occurrence on Fort Bliss*[b]
	Scientific Name	*Common Name*[a]	
VASCULAR PLANTS (FERNS AND FERN ALLIES, EPHEDRAS, CONIFERS, FLOWERING PLANTS)			
ASPELNIACEAE			
	Asplenium resiliens	Black-stemmed spleenwort	K
	Asplenium trichomanes	Maidenhair spleenwort	K
ASTERACEAE			
	Achillea millefolium	Common yarrow	K
	Acourtia nana	Dwarf desertpeony, desert holly	K
	Acourtia wrightii	Brownfoot, pink perezia	K
	Acroptilon repens	Hardheads	E
	Ageratina herbacea	Fragrant snakeroot, shrubby boneset	K
	Ageratina wrightii	Wright's snakeroot	K
	Ageratina rothrockii	Rothorock's snakeroot	K
	Ambrosia acanthicarpa	Flatspine burr ragweed	K
	Ambrosia confertiflora	Weakleaf burr ragweed	K
	Aphanostephus ramosissimus	Lazy daisy	K
	Arctium minus	Lesser burdock	E
	Artemisia carruthii	Carruth's sagewort	K
	Artemisia dracunculus	Rough sagebrush, tarragon	K
	Artemisia filifolia	Sand sagebrush	E
	Artemisia franserioides	Ragweed sagebrush	K
	Artemisia ludoviciana	White sagebrush	K
	Artemisia neomexicana	White sagebrush	E
	Baccharis brachyphylla	Shortleaf baccharis	K
	Baccharis pteronioides	Yerba del pasmo	K
	Baccharis salicifolia	Mule's fat, seepwillow	K
	Baccharis salicina	Great Plains false willow	K
	Baccharis sarothroides	Desertbroom	K
	Baccharis wrightii	Wright's baccharis	K
	Bahia absinthifolia	Hairyseed bahia	K
	Bahia dissecta	Ragleaf bahia	K
	Bahia pedata	Bluntscale bahia	K
	Baileya multiradiata	Desert marigold	K
	Bebbia juncea	Sweetbush, rush bebbia	K
	Berlandiera lyrata	Lyerleaf greeneyes	K
	Bidens bigelovii	Bigelow's beggarticks	K
	Bidens frondosa	Devil's beggartick	E
	Brickellia baccharidea	Resinleaf brickellbush	K
	Brickellia californica	California brickellbush	K
	Brickellia coulteri	Coulter's brickellbush	K

Table B-1. Nonvascular and Vascular Plants Groups Expected on Fort Bliss (Continued)

Family	*Species*		*Occurrence on Fort Bliss*[b]
	Scientific Name	*Common Name*[a]	
VASCULAR PLANTS (FERNS AND FERN ALLIES, EPHEDRAS, CONIFERS, FLOWERING PLANTS)			
	Brickellia eupatorioides	False boneset	K
	Brickellia fendleri	Fendler's brickellbush	K
	Brickellia grandiflora	Tasselflower brickellbush	K
	Brickellia laciniata	Splitleaf brickellbush	K
	Brickellia lemmonii	Lemmon's brickellbush	K
	Brickellia parvula	Mt. Davis brickellbush	K
	Brickellia rusbyi	Stinking brickellbush	K
	Brickellia venosa	Veiny brickellbush	K
	Calycoseris wrightii	White tackstem, white cup-fruit	K
	Calyptocarpus vialis	Straggler daisy	K
	Carminatia tenuiflora	Plumeweed	K
	Carphochaete bigelovii	Bigelow's bristlehead	K
	Centaurea melitensis	Maltese star-thistle	K
	Chaenactis stevioides	Steve's dustymaiden	K
	Chaetopappa ericoides	Rose heath; baby white aster	K
	Chloracantha spinosa	Spiny chloracantha	E
	Chrysactinia mexicana	Damianita	K
	Chrysothamnus baileyi	Bailey's rabbitbrush	E
	Chrysothamnus pulchellus	Southwestern rabbitbrush	K
	Chrysothamnus spathulatus	Douglas rabbitbrush	E
	Cirsium neomexicanum	Thistle	K
	Cirsium ochrocentrum	Yellowspine thistle	K
	Cirsium undulatum	Wavyleaf thistle	K
	Clappia suaedifolia	Fleshy clapdaisy	E
	Conyza bonariensis	Asthmaweed	E
	Conyza canadensis	Canadian horseweed	K
	Cosmos parviflorus	Southwestern cosmos	K
	Dyssodia papposa	Fetid marigold	K
	Eclipta prostrata	False daisy	E
	Engelmannia peristenia	Engelmann's daisy	K
	Ericameria laricifolia	Turpentine bush	K
	Erigeron bellidiastrum	Western daisy fleabane	K
	Erigeron colomexicanus	Running fleabane	K
	Erigeron divergens	Spreading fleabane	K
	Erigeron modestus	Plains fleabane	K
	Evax verna	Spring pygmycudweed	K
	Filago californica	California cottonrose	K
	Flaveria campestris	Alkali yellowtops	E

Table B-1. Nonvascular and Vascular Plants Groups Expected on Fort Bliss (Continued)

Family	*Species*		*Occurrence on Fort Bliss*[b]
	Scientific Name	*Common Name*[a]	
VASCULAR PLANTS (FERNS AND FERN ALLIES, EPHEDRAS, CONIFERS, FLOWERING PLANTS)			
	Flaveria trinervia	Clustered yellowtops	E
	Flourensia cernua	American tarweed	K
	Gaillardia pinnatifida	Red dome blanketflower	K
	Gaillardia pulchella	Firewheel	K
	Galinsoga parviflora	Gallantsoldier, quickweed	K
	Gnaphalium canescens	Wright's cudweed	K
	Gnaphalium stramineum	Cottonbatting plant	K
	Grindelia nuda	Curly-top gumweed	K
	Grindelia papposa	Spanish gold	K
	Gutierrezia microcephala	Threadleaf snakeweed	K
	Gutierrezia sarothrae	Broom snakeweed	K
	Gutierrezia sphaerocephala	Roundleaf snakeweed	K
	Gymnosperma glutinosum	Gumhead, tatalencho	K
	Haploesthes greggii	False broomweed	E
	Helenium microcephalum	Sneezeweed	K
	Helianthus annuus	Common sunflower	K
	Helianthus ciliaris	Texas blueweed	K
	Helianthus laciniatus	Alkali sunflower	K
	Helianthus niveus	Showy sunflower	K
	Helianthus petiolaris	Plains sunflower	K
	Heliopsis helianthoides	Rough heliopsis	E
	Heterosperma pinnatum	Wingpetal, fineleaf heterosperma	K
	Heterotheca canescens	Hoary false goldenaster	K
	Heterotheca fulcrata	Golden aster, camphor weed	K
	Heterotheca subaxillaris	Camphorweed	E
	Heterotheca vicida	Cliff false goldenstar	K
	Hieracium fendleri	Yellow hawkweed	K
	Hymenoclea monogyra	Burro-brush	K
	Hymenopappus filifolius	Fine-leaf wolly white	K
	Hymenopappus flavescens	Woolly-white	K
	Hymenothrix wislizeni	Trans-Pecos thimblehead	K
	Hymenothrix wrightii	Wright's thimblehead	K
	Hymenoxys odorata	Western bitterweed	K
	Hymenoxys quinquesquamata	Rincon rubberweed	K
	Hymenoxys richardsonii	Pingue	K
	Hymenoxys vaseyi	Vasey's rubberweed	K
	Isocoma pluriflora	Southern goldenbush	K
	Isocoma tenuisecta	Burroweed	E

Table B-1. Nonvascular and Vascular Plants Groups Expected on Fort Bliss (Continued)

Family	*Species*		*Occurrence on Fort Bliss*[b]
	Scientific Name	*Common Name*[a]	
VASCULAR PLANTS (FERNS AND FERN ALLIES, EPHEDRAS, CONIFERS, FLOWERING PLANTS)			
	Iva ambrosiifolia	Ragweed marshelder	K
	Iva dealbata	Woolly marshelder	K
	Lactuca serriola	Prickly lettuce	K
	Laennecia coulteri	Conyza, Coulter laennecia	K
	Laennecia sophiifolia	Leafy marshtail	K
	Machaeranthera asteroides	New Mexico tansyaster	K
	Machaeranthera blephariphylla	Texas tansyaster	K
	Machaeranthera canescens	Sand goldenweed	K
	Machaeranthera gracilis	Slender goldenweed	K
	Machaeranthera parviflora	Smallflower tansyaster	E
	Machaeranthera pinnatifida	Lacy tansyaster	K
	Machaeranthera tanacetifolia	Tansyleaf tansyaster	K
	Malacothrix fendleri	Fendler's desert dandelion	K
	Malacothrix sonorae	Sonoran desert dandelion	K
	Melampodium leucanthum	Plains blackfoot	K
	Microseris lindleyi	Lindley's silverpuffs	K
	Microseris linearifolia	Silver puffs	K
	Palafoxia sphacelata	Othake	K
	Parthenium confertum	Lyreleaf parthenium	K
	Parthenium incanum	Mariola	K
	Pectis angustifolia	Narrowleaf pectis	K
	Pectis cylindrica	Sonoran cinchweed	E
	Pectis filipes	Fivebract cinchweed	K
	Pectis papposa	Many-bristle pectis, chinchweed	K
	Pectis prostrata	Spreading cinchweed	K
	Pericome caudata	Mountain tail-leaf	K
	Perityle cernua	Organ Mountain rockdaisy	K
	Perityle coronopifolia	Crowfoot rockdaisy	K
	Perityle huecoensis	Hueco Mountains rockdaisy	K
	Perityle staurophylla	New Mexico rockdaisy	K
	Pluchea odorata	Sweetscent	E
	Porophyllum gracile	Slender poreleaf	K
	Porophyllum scoparium	Trans-Pecos poreleaf	K
	Prenanthella exigua	Brightwhite	E
	Psathyrotes scaposa	Naked turtleback	E
	Psilactis asteroides	New Mexico tansyaster	E
	Psilostrophe tagetina	Paper-flower	K
	Pyrrhopappus pauciflorus	Smallflower desert-chicory	E

Table B-1. Nonvascular and Vascular Plants Groups Expected on Fort Bliss (Continued)

Family	*Species*		*Occurrence on Fort Bliss*[b]
	Scientific Name	*Common Name*[a]	
VASCULAR PLANTS (FERNS AND FERN ALLIES, EPHEDRAS, CONIFERS, FLOWERING PLANTS)			
	Rafinesquia neomexicana	New Mexico plumeseed	K
	Ratibida columnifera	Upright prairie coneflower	K
	Ratibida tagetes	Green prairie coneflower	E
	Sanvitalia abertii	Albert's creeping zinnia	K
	Sartwellia flaveriae	Threadleaf glowwort	E
	Schkuhria anthemoidea	Wright's false threadleaf	K
	Senecio eremophilus	Desert groundsel	K
	Senecio flaccidus	Thread-leaf ragwort	K
	Senecio multicapitatus	Broomlike ragwort	E
	Senecio neomexicanaus	New Mexico groundsel	K
	Senecio riddellii	Riddell's ragwort	K
	Senecio vulgaris	Old-man-in-the-spring	E
	Solidago canadensis	Shorthair goldenrod	K
	Solidago scabrida	Threenerve goldenrod	E
	Solidago sparsiflora	Goldenrod	E
	Solidago velutina	Threenerve goldenrod	K
	Solidago wrightii	Wright's goldenrod	K
	Sonchus asper	Spiny sowthistle	K
	Sonchus oleraceus	Common sowthistle	K
	Stephanomeria exigua	Annual mitra	K
	Stephanomeria pauciflora	Brownplume wirelettuce	K
	Symphyotrichum subulatum	Eastern annual saltmarsh aster	K
	Tagetes micrantha	Licorice marigold	K
	Taraxacum officinale	Common dandelion	K
	Tetradymia filifolia	Threadleaf horsebrush	E
	Tetraneuris scaposa	Stemmy four-nerve daisy	K
	Thelesperma longipes	Longstalk greenthread	K
	Thelesperma megapotamicum	Hopi tea greenthread	K
	Thymophylla acerosa	Pricklyleaf dogweed	K
	Thymophylla aurea	Manyawn dogweed	K
	Thymophylla pentachaeta	Fiveneedle pricklyleaf	K
	Thymophylla setifolia	Texas pricklyleaf	K
	Townsendia annua	Annual townsend daisy	K
	Townsendia exscapa	Stemless townsend daisy	K
	Tragopogon dubius	Yellow salsify, goats beard	K
	Trixis californica	American threefold	K
	Verbesina encelioides	Golden crownbeard	K
	Viguiera annua	Golden-eye	K

Table B-1. Nonvascular and Vascular Plants Groups Expected on Fort Bliss (Continued)

Family	*Species*		*Occurrence on Fort Bliss*[b]
	Scientific Name	*Common Name*[a]	
VASCULAR PLANTS (FERNS AND FERN ALLIES, EPHEDRAS, CONIFERS, FLOWERING PLANTS)			
	Viguiera cordifolia	Heartleaf goldeneye	K
	Viguiera dentata	Toothleaf goldeneye	K
	Viguiera multiflora	Showy goldeneye	E
	Viguiera stenoloba	Resin-bush	K
	Xanthium spinosum	Spiny cocklebur	K
	Xanthium strumarium	Cocklebur, abrojo	K
	Zinnia acerosa	Desert zinnia, spinyleaf zinnia	K
	Zinnia grandiflora	Rocky Mountain zinnia	K
BERBERIDACEAE			
	Berberis haematocarpa	Red barberry, red hollygrape	K
	Berberis trifoliolata	Algerita	K
BIGNONIACEAE			
	Chilopsis linearis	Desert willow	K
	Tecoma stans	Esperanza, tronadora	K
BORAGINACEAE			
	Cryptantha albida	New Mexico cryptantha	K
	Cryptantha angustifolia	Panamint cryptantha	K
	Cryptantha barbigera	Bearded cryptantha	K
	Cryptantha cinerea	James' cryptantha	K
	Cryptantha crassisepala	Thicksepal cryptantha	K
	Cryptantha mexicana	Mexican cryptantha	K
	Cryptantha micrantha	Redroot cryptantha	K
	Cryptantha oblata	Rough cryptantha	K
	Cryptantha paysonii	Payson's cryptantha	E
	Cryptantha pterocarya	Wingnut cryptantha	K
	Cryptantha pusilla	Low cryptantha	K
	Hackelia besseyi	Bessey's stickseed	E
	Hackelia pinetorum	Stickseed, forget-me-not	K
	Heliotropium convolvulaceum	Phlox heliotrope	K
	Heliotropium curassavicum	Seaside heliotrope	K
	Heliotropium greggii	Fragrant heliotrope	K
	Lappula occidentalis	Flat-spine sheepburr	K
	Lithospermum incisum	Narrowleaf stoneseed	K
	Lithospermum multiflorum	Mayflowered stoneseed	K
	Lithospermum parksii	Park's stoneseed	E
	Pectocarya heterocarpa	Chuckwalla combseed	K
	Pectocarya platycarpa	Broadfruit combseed	K
	Tiquilia canescens	Woody crinklemat	K

Table B-1. Nonvascular and Vascular Plants Groups Expected on Fort Bliss (Continued)

Family	*Species*		*Occurrence on Fort Bliss*[b]
	Scientific Name	*Common Name*[a]	
VASCULAR PLANTS (FERNS AND FERN ALLIES, EPHEDRAS, CONIFERS, FLOWERING PLANTS)			
	Tiquilia gossypina	Texas crinklemat	K
	Tiquilia greggii	Plumed crinklemat, plume coldenia	K
	Tiquilia hispidissima	Hairy crinklemat, rough coldenia	K
BRASSICACEAE			
	Arabidopsis thaliana	Mouseear cress	E
	Arabis fendleri	Fendler's rockeress	K
	Arabis perennans	Perennial rockcress	K
	Brassica rapa	Field mustard	K
	Brassica tournefortii	Asian mustard	E
	Capsella bursa-pastoris	Shepherd's purse	K
	Chorispora tenella	Crossflower	E
	Descurainia incana	Mountain tansymustard	K
	Descurainia pinnata	Western tansymustard	K
	Descurainia sophia	Herb sophia, flixweed	K
	Dimorphocarpa wislizenii	Tansy spectaclepod	K
	Diplotaxis tenuifolia	Perennial wallrocket	E
	Draba cuneifolia	Draba whilow grass	K
	Draba standleyi	Standley's draba	K
	Dryopetalon runcinatum	Rockmustard	K
	Eruca vesicaria	Rocketsalad	K
	Erysimum capitatum	Sanddune wallflower	K
	Halimolobos diffusa	Spreading fissurewort	K
	Lepidium alyssoides	Mountain pepperweed	K
	Lepidium lasiocarpum	Bladder-pod	K
	Lepidium latifolium	Broadleaved pepperweed	E
	Lepidium montanum	Pepperweed	K
	Lepidium oblongum	Veiny pepperweed	E
	Lepidium virginicum	Lentejilla	K
	Lesquerella fendleri	Fendler's bladderpod	K
	Lesquerella gordonii	Gordon's bladderpod	K
	Lesquerella purpurea	Rose bladderpod	K
	Matthiola longipetala	Night scented stock	E
	Nerisyrenia camporum	Mesa greggia, bicolor fan mustard	K
	Nerisyrenia linearifolia	White Sands fanmustard	E
	Pennellia micrantha	Mountain mock thelypody	K
	Rorippa nasturtium-aquaticum	Watercress	E
	Rorippa palustris	Bog yellowcress	E
	Schoenocrambe linearifolia	Slimleaf plainsmustard	K

Table B-1. Nonvascular and Vascular Plants Groups Expected on Fort Bliss (Continued)

Family	*Species*		*Occurrence on Fort Bliss*[b]
	Scientific Name	*Common Name*[a]	
VASCULAR PLANTS (FERNS AND FERN ALLIES, EPHEDRAS, CONIFERS, FLOWERING PLANTS)			
	Selenia disecta	Texas selenia	K
	Sibara grisea	Marble Canyon winged rockcress	E
	Sinapsis arvensis	Charlock mustard	E
	Sisymbrium irio	London rocket	K
	Sisymbrium orientale	Indian hedgemustard	E
	Streptanthus carinatus	Twistflower	K
	Thelypodiopsis purpusii	Purpus' tumblemustard	E
	Thelypodiopsis vaseyi	Las Vegas tumblemustard	E
	Thelypodium wrightii	Wright's thelypody	K
	Thlaspi montanum	Alpine pennycress	K
CACTACEAE			
	Ancistrocactus uncinatus	Chihuahuan fishhook cactus	K
	Cereus greggii	Nightblooming cereus	K
	Coryphantha macromeris	Nipple beehive cactus	K
	Coryphantha organensis	Organ Mountain foxtail cactus	K
	Coryphantha scheeri	Scheer's beehive cactus	K
	Coryphantha sneedii	Sneed pinchushion cactus	K
	Coryphantha strobiliformis	White column foxtail cactus	K
	Coryphantha vivipara	Spinystar	K
	Echinocactus horizonthalonius	Turk's head, manca caballo	K
	Echinocereus chloranthus	Hedgehog cactus	K
	Echinocereus enneacanthus	Pitaya	K
	Echinocereus fendleri	Fendler echinocereus	K
	Echinocereus pectinatus	Yellow pitya	K
	Echinocereus triglochidiatus	Claret-cup	K
	Epithelantha micromeris	Pingpong ball cactus	K
	Ferocactus wislizenii	Candy barrelcactus	K
	Mammillaria grahamii	Graham's nipple cactus	K
	Mammillaria heyderi	Little nipple cactus	K
	Mammillaria lasiacantha	Lacespine nipple cactus	K
	Neolloydia intertexta	White biznagita	K
	Opuntia arenaria	El Paso pricklypear	E
	Opuntia chlorotica	Dollarjoint pricklypear	E
	Opuntia engelmannii	Cactus apple	K
	Opuntia grahamii	Graham's pricklypear	K
	Opuntia imbricata	Tree cholla, coyonostle	K
	Opuntia kleiniae	Candle cholla	K
	Opuntia leptocaulis	Christmas cactus	K

Table B-1. Nonvascular and Vascular Plants Groups Expected on Fort Bliss (Continued)

Family	*Species*		*Occurrence on Fort Bliss*[b]
	Scientific Name	*Common Name*[a]	
VASCULAR PLANTS (FERNS AND FERN ALLIES, EPHEDRAS, CONIFERS, FLOWERING PLANTS)			
	Opuntia phaeacantha	New Mexico or tulip pricklypear	K
	Opuntia polyacantha	Plains pricklypear	K
	Opuntia spinosior	Walkingstick cactus	K
	Opuntia violaceae	Purple pricklypear	K
	Toumeya papyracantha	Grama grass cactus	K
CAMPANULACEAE			
	Triodanis perfoliata	Clasping Venus' looking-glass	K
CAPPARACEAE			
	Koeberlinia spinosa	Crown-of-thorns	K
	Polanisia dodecandra	Red-whisker clammyweed	K
	Polanisia uniglandulosa	Mexican clammyweed	K
CAPRIFOLIACEAE			
	Lonicera albiflora	Western white honeysuckle	K
	Sambucus cerulea	Common elderberry	K
	Symphoricarpos guadalupensis	Duhamel, snowberry	K
	Symphoricarpos longiflorus	Desert snowberry	E
	Symphoricarpos oreophilus	Mountain snowberry	K
	Symphoricarpos palmeri	Palmer's snowberry	E
	Symphoricarpos rotundifolius	Roundleaf snowberry	K
CARYOPHYLLACEAE			
	Alsine jamesiana	Tuber starwort	E
	Arenaria fendleri	Fendler's sandwort	K
	Arenaria lanuginosa	Spreading sandword	K
	Cerastium axillare	Trans-Pecos chickweed	K
	Cerastium glomeratum	Sticky chickweed	K
	Cerastium nutans	Nodding chickweed	K
	Drymaria fendleri	Fendler's drymary	K
	Paronychia jamesii	James' nailwort	K
	Silene antirrhina	Sleepy silene, sleepy catchfly	K
	Silene laciniata	Mexican campion	K
	Silene plankii	Plank campion, Plank's catchfly	K
	Silene scouleri	Scouler's campion	K
	Stellaria cuspidata	Mexican starwort	K
CHENOPODIACEAE			
	Allenrolfea occidentalis	Iodinebush	E
	Atriplex acanthocarpa	Tubercled saltbush	E
	Atriplex canescens	Fourwing saltbush	K
	Atriplex elegans	Wheelscale saltbush	K

Table B-1. Nonvascular and Vascular Plants Groups Expected on Fort Bliss (Continued)

Family	*Species*		*Occurrence on Fort Bliss*[b]
	Scientific Name	*Common Name*[a]	
VASCULAR PLANTS (FERNS AND FERN ALLIES, EPHEDRAS, CONIFERS, FLOWERING PLANTS)			
	Atriplex heterosperma	Twoscale saltbush	E
	Atriplex saccaria	Sack saltbush	E
	Atriplex semibaccata	Australian saltbush	E
	Atriplex wrightii	Wright's saltbush	E
	Chenopodium atrovirens	Pinyon goosefoot	K
	Chenopodium berlandieri	Pitseed goosefoot	K
	Chenopodium cycloides	Sandhill goosefoot	K
	Chenopodium desiccatum	Aridland goosefoot	E
	Chenopodium fremontii	Fermont's goosefoot	K
	Chenopodium graveolens	Ragleaf goosefoot, fetid goosefoot	K
	Chenopodium incanum	Mealy goosefoot	K
	Chenopodium leptophyllum	Narrowleaf goosefoot	K
	Chenopodium neomexicanum	New Mexico goosefoot	E
	Corispermum americanum	American bugseed	E
	Corispermum nitidum	Shiny bugseed	K
	Cycloloma atriplicifolium	Winged pigweed	K
	Kochia scoparia	Mexican fireweed	K
	Krascheninnikovia lanata	Winterfat	K
	Monolepis nuttalliana	Nuttall's povertyweed	E
	Salsola kali	Russian thistle, tumbleweed	K
	Suaeda calceoliformis	Pursh seepweed	E
	Suaeda moquinii	Mojave seablite	E
	Suaeda suffrutescens	Desert seepweed	E
CLADONIACEAE			
	Cladonia pyxidata	Cup lichen	E
COMMELINACEAE			
	Commelina dianthifolia	Birdbill dayflower	K
	Commelina erecta	Whitemouth dayflower	K
	Tradescantia occidentalis	Prairie spiderwort	K
	Tradescantia wrightii	Wright spiderwort	K
CONVOLVULACEAE			
	Convolvulus arvensis	Mallow bindweed	K
	Convolvulus equitans	Texas bindweed	K
	Cressa truxillensis	Spreading alkaliweed	E
	Dichondra argentea	Silver ponysfoot	K
	Dichondra brachypoda	New Mexico ponysfoot	K
	Evolvulus alsinoides	Slender dwarf morning-glory	K
	Evolvulus arizonicus	Wild dwarf morning-glory	K

Table B-1. Nonvascular and Vascular Plants Groups Expected on Fort Bliss (Continued)

Family	*Species*		*Occurrence on Fort Bliss*[b]
	Scientific Name	*Common Name*[a]	
VASCULAR PLANTS (FERNS AND FERN ALLIES, EPHEDRAS, CONIFERS, FLOWERING PLANTS)			
	Evolvulus nuttallianus	Shaggy dwarf morning-glory	K
	Evolvulus sericeus	Silver dwarf morning-glory	K
	Ipomoea barbatisepala	Canyon morning-glory	K
	Ipomoea cardiophylla	Heartleaf morning-glory	K
	Ipomoea costellata	Crestrib morning-glory	K
	Ipomoea cristulata	Trans-Pecos morning-glory	K
	Ipomoea hederacea	Ivyleaf morning-glory	K
	Ipomoea lindheimeri	Lindheimer's morning-glory	K
	Ipomoea pubescens	Silky morning-glory	K
	Ipomoea purpurea	Tall morning-glory	K
CRASSULACEAE			
	Sedum cockerellii	Cockerell's stonecrop	K
	Sedum wrightii	Wright's stonecrop	K
CROSSOSOMATACEAE			
	Apacheria chiricahuensis	Apachebush	E
	Glossopetalon spinescens	Spiny greasebush	K
CUCURBITACEAE			
	Apodanthera undulata	Melon loco	K
	Cucurbita digitata	Fingerleaf gourd	E
	Cucurbita foetidissima	Buffalo gourd, Missouri gourd	K
	Ibervillea tenuisecta	Slimlobe globeberry	K
	Sicyos ampelophyllus	Streamside burr cucumber	K
	Sicyos glaber	Smooth burr cucumber	K
CUPRESSACEAE			
	Juniperus coahuilensis	Roseberry juniper	K
	Juniperus deppeana	Alligator juniper	K
	Juniperus monosperma	One-seeded juniper	K
CUSCUTACEAE			
	Cuscuta applanata	Gila River dodder	E
	Cuscuta decipiens	Trans-Pecos dodder	E
	Cuscuta indecora	Bigseed alfalfa dodder	E
	Cuscuta umbellata	Flatglobe dodder	E
CYPERACEAE			
	Carex emoryi	Emory's sedge	E
	Carex frankii	Frank's sedge	K
	Carex microptera	Smallwing sedge	E
	Carex occidentalis	Western sedge	E
	Carex wootonii	Wooton's sedge	E

Table B-1. Nonvascular and Vascular Plants Groups Expected on Fort Bliss (Continued)

Family	*Species*		*Occurrence on Fort Bliss*[b]
	Scientific Name	*Common Name*[a]	
VASCULAR PLANTS (FERNS AND FERN ALLIES, EPHEDRAS, CONIFERS, FLOWERING PLANTS)			
	Cyperus croceus	Baldwin's flatsedge	K
	Cyperus erythrorhizos	Redroot flatsedge	E
	Cyperus esculentus	Chuffa flatsedge	K
	Cyperus fendlerianus	Fendler's flatsedge	K
	Cyperus odoratus	Fragrant flatsedge	E
	Cyperus retroflexus	Oneflower flatsedge	K
	Cyperus rotundus	Nutgrass	K
	Cyperus squarrosus	Bearded flatsedge	K
	Eleocharis geniculata	Canada spikesedge	K
	Eleocharis palustris	Common spikerush	E
	Eleocharis rostellata	Beaked spikerush	E
	Schoenoplectus acutus	Hardstem bullrush	E
	Schoenoplectus americanus	Chairmaker's bullrush	K
	Schoenoplectus californicus	California bullrush	E
	Schoenoplectus maritimus	Cosmopolitan bullrush	E
DENNSTAEDTIACEAE			
	Pteridium aquilinum	Western brackenfern	K
DRYOPTERIDACEAE			
	Cystopteris reevesiana	Reeve's bladderfern	K
	Dryopteris filix-mas	Male fern	E
	Phanerophlebia auriculata	Mexican holly fern, eared vein fern	K
	Woodsia neomexicana	New Mexico cliff fern	K
	Woodsia plummerae	Plummer's cliff fern	K
EPHEDRACEAE			
	Ephedra aspera	Rough jointfir, boundary ephedra	K
	Ephedra torreyana	Torrey ephedra	K
	Ephedra trifurca	Longleaf jointfir, Mormon tea	K
EQUISETACEAE			
	Equisetum laevigatum	Smooth horsetail	E
EUPHORBIACEAE			
	Acalypha neomexicana	New Mexico copperleaf	K
	Argythamnia neomexicana	New Mexico silverbush	K
	Chamaesyce albomarginata	Whiemargin sandmat	K
	Chamaesyce arizonica	Arizona sandmat, Arizona spurge	K
	Chamaesyce chaeatocalyx	Bristlecup sandmat	K
	Chamaesyce dioica	Royal sandmat	E
	Chamaesyce geyeri	Geyer's sandmat	E
	Chamaesyce glyptosperma	Ribsewed sandmat	K

Table B-1. Nonvascular and Vascular Plants Groups Expected on Fort Bliss (Continued)

Family	*Species*		*Occurrence on Fort Bliss*[b]
	Scientific Name	*Common Name*[a]	
VASCULAR PLANTS (FERNS AND FERN ALLIES, EPHEDRAS, CONIFERS, FLOWERING PLANTS)			
	Chamaesyce hyssopifolia	Hysopleaf sandmat	K
	Chamaesyce lata	Hoary sanadmat	K
	Chamaesyce maculata	Spotted sandmat	E
	Chamaesyce micromera	Sonoran sandmat	K
	Chamaesyce parryi	Parry's sandmat	K
	Chamaesyce prostrata	Prostrate sandmat	E
	Chamaesyce revoluta	Threadstem sandmat	K
	Chamaesyce serpens	Matted sandmat	K
	Chamaesyce serphyllifolia	Thymeleaf sandmat	K
	Chamaesyce serrula	Sawtooth sandmat	K
	Chamaesyce setiloba	Yuma sandwort	K
	Chamaesyce stictospora	Slimseed sandmat	K
	Chamaesyce theriaca	Terlingua sandmat	K
	Chamaesyce villifera	Hairy sandmat	E
	Croton dioicus	Grassland croton	K
	Croton fruticulosus	Bush croton	K
	Croton lindheimerianus	Tharp croton	K
	Croton pottsii	Leather-weed	K
	Croton texensis	Texas croton	K
	Euphorbia bifurcata	Forked spurge	E
	Euphorbia brachycera	Horned spurge	E
	Euphorbia cyanthophora	Fire on the mountain	K
	Euphorbia dentata	Toothed spurge	K
	Euphorbia exstipulata	Squareseed spurge	K
	Euphorbia marginata	Snow on the mountain	K
	Phyllanthus polygonoides	Smartweed leaf-flower	K
	Reverchonia arenaria	Sand reverchonia	K
	Tragia amblyodonta	Dogtooth noseburn	E
	Tragia ramosa	Branched noseburn	K
FABACEAE			
	Acacia anguistissima	Chisos prairie acacia	K
	Acacia constricta	Whitethorn acacia	K
	Acacia greggii	Catclaw acacia	K
	Acacia neovernicosa	Viscid acacia	K
	Alhagi maurorum	Camelthorn	E
	Amorpha fruitcosa	Desert false indigo	K
	Astragalus allochrous	Halfmoon locoweed	K
	Astragalus emoryanus	Emory's milkvetch	E

Table B-1. Nonvascular and Vascular Plants Groups Expected on Fort Bliss (Continued)

Family	*Species*		*Occurrence on Fort Bliss*[b]
	Scientific Name	*Common Name*[a]	
VASCULAR PLANTS (FERNS AND FERN ALLIES, EPHEDRAS, CONIFERS, FLOWERING PLANTS)			
	Astragalus flexuosus	Flexile milkvetch	E
	Astragalus gypsodes	Gypsum milkvetch	K
	Astragalus humistratus	Groundcover milkvetch	K
	Astragalus mollissimus	Crazy weed, Texas locoweed	K
	Astragalus nuttallianus	Smallflowered milkvetch	K
	Astragalus tephrodes	Ashen milkvetch	K
	Astragalus waterfalli	Waterfall's milkvetch	K
	Caesalpinia gillesii	Bird-of-paradise shrub	K
	Caesalpinia jamesii	James' holdback	K
	Chamaecrista nictitans	Partridge pea	K
	Cologania broussonettii	Mexican cologania	E
	Crotalaria pumila	Low rattlebox	E
	Dalea brachystachya	Fort Bowie prairie clover	E
	Dalea candida	White prairie clover	K
	Dalea formosa	Featherplume, feather dalea	K
	Dalea frutescens	Black prairie clover	K
	Dalea jamesii	James' prairie clover	K
	Dalea lanata	Woolly prairie clover	K
	Dalea nana	Dwarf dalea	K
	Dalea neomexicana	New Mexico dalea	K
	Dalea pogonathera	Brearded prairie clover	K
	Dalea polygonoides	Sixweeks prairie clover	K
	Dalea wrightii	Wright's prairie clover	K
	Desmanthus cooleyi	Cooley's bundleflower	E
	Desmanthus glandulosus	Glandular bundleflower	K
	Desmanthus illinoensis	Prairie bundleflower	E
	Desmodium grahamii	Graham's ticktrefoil	K
	Desmodium neomexicanum	New Mexico ticktrefoil	K
	Galactia wrightii	Wright milkpea	K
	Glycyrrhiza lepidota	American licorice	E
	Hoffmannseggia drepanocarpa	Sicklepod rushpea	K
	Hoffmannseggia glauca	Indian rushpea	K
	Lotus greenei	Greene's bird's-foot trefoil	K
	Lotus humistratus	Foothill deervetch	K
	Lotus plebeius	New Mexico bird's-foot trefoil	K
	Lupinus concinnus	Annual lupine	K
	Macroptilium gibbosifolium	Variableleaf bushbean	K
	Medicago lupulina	Black medik	K

Table B-1. Nonvascular and Vascular Plants Groups Expected on Fort Bliss (Continued)

Family	*Species*		*Occurrence on Fort Bliss*[b]
	Scientific Name	*Common Name*[a]	
VASCULAR PLANTS (FERNS AND FERN ALLIES, EPHEDRAS, CONIFERS, FLOWERING PLANTS)			
	Medicago polymorpha	Burclover	K
	Medicago sativa	Alfalfa, lucerne	K
	Melilotus albus	White sweetclover	K
	Melilotus indicus	Annual yellow sweetclover	K
	Melilotus officinalis	Yellow sweetclover	K
	Mimosa aculeaticarpa	Catclaw mimosa	K
	Mimosa borealis	Fragant mimosa	E
	Mimosa quadrivalvis	Fourvalve mimosa, sensitive-briar	K
	Mimosa rupertiana	Eastern sensitive plant	E
	Parkinsonia aculeata	Jerusalem thorn	K
	Peteria scoparia	Rush peteria	K
	Phaseolus acutifolius	Tepary bean	K
	Phaseolus angustissimus	Slimleaf bean	K
	Phaseolus filiformis	Slimjim bean	K
	Prosopis glandulosa	Honey mesquite	K
	Prosopis pubescens	Screwbean mesquite	E
	Psorothamnus scoparius	Broom dalea	K
	Rhynchosia senna	Texas snoutbean	K
	Robinia neomexicana	New Mexico locust	K
	Robinia pseudoacacia	Black locust	K
	Senna bauhinioides	Twinleaf senna	K
	Senna lindheimeriana	Velvet leaf senna	K
	Senna roemeriana	Two-leaf wild sensitive plant	K
	Sophora nuttalliana	Silky sophora	E
	Sophora secundiflora	Mescal bean	E
	Spartium junceum	Spanish broom	K
	Sphaerophysa salsula	Alkali swainsonpea	E
	Trifolium repens	White clover	E
	Vicia americana	American vetch	K
	Vicia ludoviciana	Louisiana vetch	K
FAGACEAE			
	Quercus arizonica	Arizona white oak	K
	Quercus gambelii	Gambel oak	K
	Quercus grisea	Gray oak	K
	Quercus havardii	Shin oak, shinnery oak	K
	Quercus pungens	Pungent oak, scrub oak	K
	Quercus rugosa	Netleaf oak	K
	Quercus toumeyi	Tomey oak	K

Table B-1. Nonvascular and Vascular Plants Groups Expected on Fort Bliss (Continued)

Family	*Species*		*Occurrence on Fort Bliss*[b]
	Scientific Name	*Common Name*[a]	
VASCULAR PLANTS (FERNS AND FERN ALLIES, EPHEDRAS, CONIFERS, FLOWERING PLANTS)			
	Quercus turbinella	Sonoran scrub oak	K
	Quercus undulata	Wavyleaf oak	K
FOUQUIERIACEAE			
	Fouquieria splendens	Ocotillo	K
FRANKENIACEAE			
	Frankenia jamesii	James' seaheath	E
FUMARIACEAE			
	Corydalis aurea	Scrambled eggs	K
GARRYACEAE			
	Garrya ovata	Eggleaf silktassel	E
	Garrya wrightii	Wright's silktassel	K
GENTIANACEAE			
	Centaurium arizonicum	Arizona centaury	K
	Centaurium maryannum	Gypsum centaury	E
	Centaurium nudicaule	Santa Catalina Mountain centaury	E
GEOCALYCACEAE			
	Chiloscyphus pallescens	Liverwort	E
GERANIACEAE			
	Erodium cicutarium	Redstem stork's bill	K
	Erodium texanum	Texas stork's bill, Texas filaree	K
	Geranium caespitosum	Carolina geranium	K
	Geranium carolinianum	Carolina geranium	K
GROSSULARIACEAE			
	Ribes leptanthum	Trumpet gooseberry	K
	Ribes montigenum	Gooseberry currant	K
HYDRANGEACEAE			
	Fendlera rupicola	Cliff fendlerbush	K
	Fendlerella utahensis	Utah fendlerbush	K
	Jamesia americana	Fivepetal cliffbush	E
	Philadelphus argenteus	Silver mock orange	K
	Philadelphus mearnsii	Mearns' mock orange	E
	Philadelphus microphyllus	Littleleaf mock orange	K
	Philadelphus occidentalis	Western mock orange	E
HYDROPHYLLACEAE			
	Eucrypta micrantha	Dainty desert hideseed	K
	Nama carnosum	Sand fiddleleaf	E
	Nama dichotomum	Wishbone fiddleleaf	K
	Nama hispidum	Bristly nama, rough nama	K

Table B-1. Nonvascular and Vascular Plants Groups Expected on Fort Bliss (Continued)

Family	*Species*		*Occurrence on Fort Bliss*[b]
	Scientific Name	*Common Name*[a]	
VASCULAR PLANTS (FERNS AND FERN ALLIES, EPHEDRAS, CONIFERS, FLOWERING PLANTS)			
	Nama xylopodum	Yellowseed fiddleleaf	E
	Phacelia coerulea	Skyblue phacelia	K
	Phacelia congesta	Caterpillars, blue curls	K
	Phacelia integrifolia	Crenate leaf phacelia	K
	Phacelia intermedia	Cleftleaf wildheliotrope	K
	Phacelia popei	Pope's phacelia	K
	Phacelia rupestris	Rock phacelia	K
JUNCACEAE			
	Juncus balticus	Baltic rush	E
	Juncus bufonius	Toad rush	K
	Juncus interior	Inland rush	K
	Juncus mexicanus	Mexican rush	K
	Juncus saximontanus	Rocky Mountain rush	K
	Juncus tenuis	Poverty rush	E
	Juncus torreyi	Torrey's rush	K
KRAMERIACEAE			
	Krameria grayi	White ratany	E
	Krameria lanceolata	Trailing krameria	K
	Krameria parvifolia	Ranger ratany	K
	Krameria ramosissima	Manystem ratany	E
LAMIACEAE			
	Agastache breviflora	Trans-Pecos giant hyssop	K
	Agastache cana	Mosquito plant	K
	Agastache micrantha	White giant hyssop	K
	Agastache pallidiflora	Bill Williams Mountain giant hyssop	K
	Dracnocephalum parviflorum	American dragonhead	E
	Hedeoma drummondii	Drummond's false pennyroyal	K
	Hedeoma nanum	Low false pennyroyal	K
	Hedeoma oblongifolium	Oblongleaf false pennyroyal	K
	Hedeoma plicatum	Veiny hedeoma	K
	Lamium amplexicaule	Henbit deadnettle	K
	Marrubium vulgare	Horehound	K
	Monarda citriodora	Lemon beebalm	K
	Monarda pectinata	Plains beebalm	K
	Monarda punctata	Spotted beebalm	K
	Poliomintha incana	Hoary rosemary-mint	K
	Salvia henryi	Crimson sage, henry sage	K
	Salvia lycioides	Canyon sage	K

Table B-1. Nonvascular and Vascular Plants Groups Expected on Fort Bliss (Continued)

Family	*Species*		*Occurrence on Fort Bliss*[b]
	Scientific Name	*Common Name*[a]	
VASCULAR PLANTS (FERNS AND FERN ALLIES, EPHEDRAS, CONIFERS, FLOWERING PLANTS)			
	Salvia pinguifolia	Rock sage	K
	Salvia reflexa	Lanceleaf sage	K
	Salvia subincisa	Sawtooth sage	E
	Salvia summa	Mountain sage, supreme sage	K
	Stachys coccinea	Scarlet hedgenettle, Texas betony	K
	Teucrium cubense	Small coastal germander	K
	Teucrium laciniatum	Cutleaf germander	K
LEMNACEAE			
	Lemna minor	Common duckweed	E
LILIACEAE			
	Allium cernuum	Nodding onion	K
	Allium geyeri	Geyer onion	K
	Allium kunthii	Kunth's onion	K
	Allium macropetalum	Largeflower onion	K
	Cooperia drummondii	Evening rainlily	E
	Maianthemum racemosum	Feathery false lily of the valley	E
	Maianthemum stellatum	Starry false lily of the valley	K
	Schoenocaulon texanum	Texas feathershank	E
	Zephyranthes longifolia	Copper zephyrlily; rainlily	K
LINACEAE			
	Linum aristatum	Bristle flax, awned flax	K
	Linum lewisii	Blue flax	K
	Linum puberulum	Plains flax	K
	Linum rupestre	Rock flax	K
	Linum vernale	Chihuahuan flax, spring flax	K
LOASACEAE			
	Cevallia sinuata	Stinging serpent, stinging cevallia	K
	Mentzelia albicaulis	Whitestem blazingstar	K
	Mentzelia asperula	Organ Mountain blazingstar	K
	Mentzelia montana	Variegated-bract blazingstar	E
	Mentzelia multiflora	Adonis blazingstar, desert blazingstar	K
	Mentzelia oligosperma	Chickenthief	K
	Mentzelia pumila	Stick-leaf	K
LYTHRACEAE			
	Lythrum californicum	California loosestrife	K
MALPIGHIACEAE			
	Janusia gracilis	Slender janusia	K

Table B-1. Nonvascular and Vascular Plants Groups Expected on Fort Bliss (Continued)

Family	*Species*		*Occurrence on Fort Bliss*[b]
	Scientific Name	*Common Name*[a]	
VASCULAR PLANTS (FERNS AND FERN ALLIES, EPHEDRAS, CONIFERS, FLOWERING PLANTS)			
MALVACEAE			
	Abutilon malacum	Yellow Indian mallow	K
	Abutilon parvulum	Dwarf Indian mallow	K
	Abutilon wrightii	Wright's Indian mallow	K
	Anoda cristata	Crested anoda	K
	Herissantia crispa	Bladdermallow	K
	Hibiscus denudatus	Paleface	K
	Malva neglecta	Common mallow	E
	Malva parviflora	Cheeseweed mallow	K
	Malvella lepidota	Scruffymallow	K
	Malvella leprosa	Alkali mallow	K
	Rhynchosida physocalyx	Buffpetal; spearleaf sida	K
	Sida aubtifolia	Common wireweed, spreading sida	K
	Sphaeralcea grossulariaefolia	Globemallow	K
	Sphaeralcea angustifolia	Copper globemallow	K
	Sphaeralcea coccinea	Scarlet globemallow	K
	Sphaeralcea digitata	Juniper globemallow	K
	Sphaeralcea fendleri	Fendler's globemallow	K
	Sphaeralcea hastulata	Globemallow	K
	Sphaeralcea incana	Gray globemallow	K
	Sphaeralcea leptophylla	Scaly globemallow	K
	Sphaeralcea polychroma	Hot springs globemallow	K
	Sphaeralcea subhastata	Wrinkled globemallow	K
MOLLUGINACEAE			
	Mollugo cerviana	Threadstem carpetweed	K
	Mollugo verticillata	Green carpetweed	E
MORACEAE			
	Morus alba	White mulberry	K
	Morus microphylla	Texas mulberry	K
NYCTAGINACEAE			
	Abronia angustifolia	Purple sand verbena	K
	Abronia fragans	Snowball sand verbena	K
	Allionia choisyi	Annual windmills	K
	Allionia incarnata	Umbrella wort	K
	Ammocodon chenopodioides	Goosefoot moonpod	K
	Anulocaulis leiosolenus	Southwestern ringstem	E
	Boerhavia coccinea	Scarlet spiderling	K
	Boerhavia gracillima	Slimstalk spiderling	K

Table B-1. Nonvascular and Vascular Plants Groups Expected on Fort Bliss (Continued)

Family	*Species*		*Occurrence on Fort Bliss*[b]
	Scientific Name	*Common Name*[a]	
VASCULAR PLANTS (FERNS AND FERN ALLIES, EPHEDRAS, CONIFERS, FLOWERING PLANTS)			
	Boerhavia intermedia	Fivewing spiderling	K
	Boerhavia spicata	Creeping spiderling	K
	Boerhavia wrightii	Largebract spiderling	E
	Cyphomeris gypsophiloides	Red cyphomeris	K
	Mirabilis comata	Hairy-tuft four o'clock	K
	Mirabilis glabra	Smooth four o'clock	K
	Mirabilis linearis	Narrowleaf four o'clock	K
	Mirabilis longiflora	Sweet four o'clock	E
	Mirabilis multiflora	Colorado four-o'clock	K
	Mirabilis nyctaginea	Heartleaf four o'clock	E
	Mirabilis oblongifolia	White four o'clock	K
	Mirabilis oxybaphoides	Smooth spreading four o'clock	K
	Selinocarpus diffusus	Spreading moonpod	K
	Selinocarpus lanceolatus	Lanceleaf moonpod	E
	Tripterocalyx carnea	Sand verbena	K
OLEACEAE			
	Forestiera pubescens	Stretchberry	E
	Fraxinus cuspidata	Fragrant ash	K
	Fraxinus velutina	Velvet ash	K
	Menodora longiflora	Showy menodora	E
	Menodora scabra	Rough menodora	K
ONAGRACEAE			
	Calylophus hartwegii	Hartweg's sundrops	K
	Camissonia chamaenerioides	Longcapsule suncup	K
	Epilobium ciliatum	Fringed willowherb	K
	Gaura coccinea	Scarlet bee blossom	K
	Gaura hexandra	Harlequinbush	K
	Gaura parviflora	Lizard-tail, velvet-leaf	K
	Gaura suffulta	Kisses	K
	Gaura villosa	Woolly beeblossom	E
	Ludwigia peploides	Floating primrose-willow	E
	Oenothera albicaulis	White evening-primrose	K
	Oenothera brachycarpa	Shortfruit evening-primrose	K
	Oenothera elata	Hooker's evening-primrose	K
	Oenothera engelmannii	Engelman evening-primrose	K
	Oenothera hookeri	Hooker evening-primrose	E
	Oenothera neomexicana	New Mexico evening-primrose	K
	Oenothera organensis	Organ Mountain evening-primrose	K

Table B-1. Nonvascular and Vascular Plants Groups Expected on Fort Bliss (Continued)

Family	*Species*		*Occurrence on Fort Bliss*[b]
	Scientific Name	*Common Name*[a]	
VASCULAR PLANTS (FERNS AND FERN ALLIES, EPHEDRAS, CONIFERS, FLOWERING PLANTS)			
	Oenothera pallida	Mountain evening-primrose	K
	Oenothera primiveris	Large yellow desert primrose	K
	Oenothera speciosa	Pinkladies	E
ORCHIDACEAE			
	Epipactis gigantea	Stream orchid	E
	Hexalectris spicata	Crested coral-root	K
OROBANCHACEAE			
	Conopholis alpina	Alpine squawroot	K
	Orobanche cooperi	Desert broomrape	K
	Orobanche fasciculata	Clustered broomrape	K
	Orobanche ludoviciana	Louisiana broomrape	K
OXALIDACEAE			
	Oxalis alpina	Alpine woodsorrel	K
	Oxalis corniculata	Creeping woodsorrel	E
	Oxalis drummondii	Drummond's woodsorrel	E
	Oxalis monticola	Mountain woodsorrel	E
PAPAVERACEAE			
	Argemone chisosensis	Chisos mountain pricklypoppy	K
	Argemone polyanthemos	Crested pricklypoppy	K
	Argemone squarrosa	Hedgehog pricklypoppy	K
	Eschscholtzia californica	Mexican gold poppy	K
PEDALIACEAE			
	Proboscidea altheaefolia	Desert unicorn-plant	K
	Proboscidea parviflora	Double claw, devil's claw	K
PINACEAE			
	Abies concolor	White fir	K
	Pinus edulis	Twoneedle pinyon	K
	Pinus ponderosa	Ponderosa pine	K
	Pseudotsuga menziesii	Rocky Mountains douglas-fir	K
PLANTAGINACEAE			
	Plantago hookeriana	California plantain	E
	Plantago major	Common plantain	K
	Plantago patagonica	Woolly plantain	K
	Plantago rhodosperma	Wright's plantain	E
	Plantago virginica	Virginia plantain	E
PLUMBAGINACEAE			
	Limonium limbatum	Trans-Pecos sealavender	E

Table B-1. Nonvascular and Vascular Plants Groups Expected on Fort Bliss (Continued)

Family	*Species*		*Occurrence on Fort Bliss*[b]
	Scientific Name	*Common Name*[a]	
VASCULAR PLANTS (FERNS AND FERN ALLIES, EPHEDRAS, CONIFERS, FLOWERING PLANTS)			
POACEAE			
	Agrostis exarata	Spike bentgrass	E
	Agrostis hyemalis	Winter bentgrass	E
	Andropogon gerardii	Big bluestem	K
	Aristida adscensionis	Sixweeks three-awn	K
	Aristida divaricata	Poverty three-awn	K
	Aristida fendleriana	Fendler's three-awn	K
	Aristida glauca	Red three-awn	K
	Aristida havardii	Havard three-awn	K
	Aristida longiseta	Three-awn	K
	Aristida orcuttiana	Single three-awn	K
	Aristida pansa	Wooton's three-awn	K
	Aristida purpurea	Purple three-awn	K
	Aristida ternipes	Spidergrass	K
	Aristida wrightii	Wright three-awn	K
	Arundo donax	Giant reed	E
	Avena fatua	Wild oat	K
	Blepharoneuron tricholepis	Pine dropseed	E
	Bothriochloa barbinodis	Cane bluestem	K
	Bothriochloa laguroides	Silver beardgrass, silver bluestem	E
	Bothriochloa springfieldii	Springfield's beardgrass	K
	Bouteloua aristidoides	Needle grama	K
	Bouteloua barbata	Sixweeks grama	K
	Bouteloua breviseta	Gypsum grama	E
	Bouteloua curtipendula	Sideoats grama	K
	Bouteloua eriopoda	Black grama	K
	Bouteloua gracilis	Blue grama	K
	Bouteloua hirsuta	Hairy gramma	K
	Bouteloua parryi	Parry's grama	E
	Bouteloua trifida	Red grama	E
	Bouteloua warnockii	Warnock's grama	K
	Brachiaria arizonica	Panic grass	K
	Brachiaria fasciculata	Browntop signalgrass	K
	Bromus anomalus	Nodding brome	K
	Bromus carinatus	California brome, mountain brome	K
	Bromus catharticus	Rescuegrass	K
	Bromus ciliatus	Fringed brome	K
	Bromus frondosus	Weeping brome	K

Table B-1. Nonvascular and Vascular Plants Groups Expected on Fort Bliss (Continued)

Family	*Species*		*Occurrence on Fort Bliss*[b]
	Scientific Name	*Common Name*[a]	
VASCULAR PLANTS (FERNS AND FERN ALLIES, EPHEDRAS, CONIFERS, FLOWERING PLANTS)			
	Bromus japonicus	Japanese brome	K
	Bromus lanatipes	Woolly brome	K
	Bromus rubens	Red brome	K
	Bromus tectorum	Cheatgrass	K
	Cenchrus incertus	Common sandbur	K
	Cenchrus longispinus	Mat sandbur	E
	Cenchrus spinifex	Coastal sandbur	K
	Chloris crinita	False Rhodes grass	K
	Chloris cucullata	Hooded windmill grass	E
	Chloris submutica	Mexican windmill grass	E
	Chloris verticillata	Tumble windmill grass	K
	Chloris virgata	Feather fingergrass	K
	Cynodon dactylon	Bermudagrass	K
	Dactylis glomerata	Orchard grass	K
	Dasyochloa pulchella	Low woollygrass, fluffgrass	K
	Dichanthelium acuminatum	Tapered rosette grass	E
	Digitaria bicornis	Asian crabgrass	E
	Digitaria californica	Arizona cottontop	K
	Digitaria cognata	Carolina crabgrass	K
	Digitaria sanguinalis	Hairy crabgrass	K
	Distichlis spicata	Inland saltgrass	E
	Echinochloa colona	Jungle rice	K
	Echinochloa crus-galli	Barnyardgrass	K
	Elymus arizonicus	Arizona wheatgrass	K
	Elymus canadensis	Canada wildrye	E
	Elymus longifolius	Squirreltail	K
	Enneapogon desvauxii	Nineawn pappusgrass	K
	Eragrostis barrelieri	Bahia lovegrass	K
	Eragrostis cilianensis	Stinkgrass	K
	Eragrostis curvula	Weeping lovegrass	K
	Eragrostis erosa	Chihuahuan lovegrass	K
	Eragrostis intermedia	Plains lovegrass	K
	Eragrostis lehmanniana	Lehmann lovegrass	K
	Eragrostis mexicana	Mexican lovegrass	K
	Eragrostis pectinacea	Lovegrass	K
	Eragrostis pilosa	Indian lovegrass	K
	Eriochloa acuminata	Cupgrass	K
	Eriochloa contracta	Prairie cupgrass	E

Table B-1. Nonvascular and Vascular Plants Groups Expected on Fort Bliss (Continued)

Family	*Species*		*Occurrence on Fort Bliss*[b]
	Scientific Name	*Common Name*[a]	
VASCULAR PLANTS (FERNS AND FERN ALLIES, EPHEDRAS, CONIFERS, FLOWERING PLANTS)			
	Erioneuron avenaceum	Shortleaf woollygrass	K
	Erioneuron pilosum	Hairy woollygrass	K
	Heteropogon contortus	Tanglehead	K
	Hordeum jubatum	Foxtail barley	K
	Hordeum murinum	Mouse barley	K
	Hordeum pusillum	Little barley	K
	Koeleria macrantha	Prairie junegrass	K
	Leptochloa dubia	Green sprangletop	K
	Leptochloa fascicularis	Breaded sprangletop	K
	Lolium perenne	Perennial ruegrass	K
	Lycurus pheloides	Common wolftail	K
	Lycurus setosus	Common wolftail	K
	Melica porteri	Porter's melicgrass	K
	Muhlenbergia arenacea	Ear muhly	K
	Muhlenbergia arenicola	Sand muhly	K
	Muhlenbergia asperifolia	Scratchgrass	K
	Muhlenbergia brevis	Short muhly	E
	Muhlenbergia dubia	Pine muhly	K
	Muhlenbergia emersleyi	Bullgrass	K
	Muhlenbergia fragilis	Delicate muhly	K
	Muhlenbergia glauca	Desert muhly	K
	Muhlenbergia longiligula	Longtonque muhly	K
	Muhlenbergia metcalfei	Metcalfe muhly	K
	Muhlenbergia minutissima	Annual muhly	K
	Muhlenbergia montana	Mountain muhly	K
	Muhlenbergia pauciflora	New Mexico muhly	K
	Muhlenbergia polycaulis	Cliff muhly	E
	Muhlenbergia porteri	Bush muhly	K
	Muhlenbergia pungens	Sandhill muhly	E
	Muhlenbergia repens	Creeping muhly	K
	Muhlenbergia rigens	Deergrass	K
	Muhlenbergia rigida	Purple muhly	K
	Muhlenbergia setifolia	Curlyleaf muhly	K
	Muhlenbergia sinuosa	Marshland muhly	K
	Muhlenbergia tenuifolia	Slim flower muhly	K
	Muhlenbergia torreyi	Ring muhly	K
	Muhlenbergia wrightii	Spike muhly	K
	Munroa squarrosa	False buffalograss	K

Table B-1. Nonvascular and Vascular Plants Groups Expected on Fort Bliss (Continued)

Family	*Species*		*Occurrence on Fort Bliss*[b]
	Scientific Name	*Common Name*[a]	
VASCULAR PLANTS (FERNS AND FERN ALLIES, EPHEDRAS, CONIFERS, FLOWERING PLANTS)			
	Oryzopsis hymenoides	Indian ricegrass	K
	Panicum bulbosum	Bulb panicgrass	K
	Panicum capillare	Witchgrass	E
	Panicum dichotomiflorum	Fall panicgrass	E
	Panicum hallii	Panic grass	K
	Panicum hians	Gaping grass	E
	Panicum hirticaule	Panic grass	K
	Panicum miliaceum	Broomcorn millet	K
	Panicum obtusum	Vine mesquite	K
	Paspalum distichum	Knotgrass	K
	Pennisetum ciliare	Buffelgrass	K
	Pennisetum setaceum	Crimson fountaingrass	E
	Phalaris canariensis	Canary grass	E
	Phalaris caroliniana	Carolina canarygrass	K
	Phleum pratense	Timothy	K
	Phragmites australis	Common reed	E
	Piptochaetium fimbriatum	Pinyon ricegrass	K
	Pleuraphis jamesii	James' galleta	E
	Pleuraphis mutica	Tobosagrass	K
	Poa annua	Annual bluegrass	K
	Poa bigelovii	Bigelow's bluegrass	K
	Poa bulbosa	Bulbous bluegrass	K
	Poa fendleriana	Muttongrass	K
	Polypogon monspeliensis	Annual rabbitfoot grass	K
	Polypogon viridis	Beardless rabbitsfoot grass	K
	Schizachyrium sanguineum	Crimson bluestem	K
	Schizachyrium scoparium	Little blustem	K
	Scleropogon brevifolius	Burrograss	K
	Setaria adhaerens	Burr bristlegrass	K
	Setaria grisebachi	Grisebach's bristlegrass	K
	Setaria leucopila	Streambed bristlegrass	K
	Setaria parviflora	Marsh bristlegrass	K
	Setaria pumila	Yellow bristlegrass	E
	Setaria verticillata	Hooked bristlegrass	E
	Setaria viridis	Green bristlegrass	K
	Sorghum bicolor	Sorghum	E
	Sorghum halepense	Johnsongrass	K
	Sphenopholis obtusata	Prairie wedgescale	K

Table B-1. Nonvascular and Vascular Plants Groups Expected on Fort Bliss (Continued)

Family	*Species*		*Occurrence on Fort Bliss*[b]
	Scientific Name	*Common Name*[a]	
VASCULAR PLANTS (FERNS AND FERN ALLIES, EPHEDRAS, CONIFERS, FLOWERING PLANTS)			
	Sporobolus airoides	Alkali sacaton	K
	Sporobolus contractus	Spike dropseed	K
	Sporobolus cyrptandrus	Sand dropseed	K
	Sporobolus flexuosus	Mesa dropseed	K
	Sporobolus giganteus	Giant dropseed	K
	Sporobolus texanus	Wireleaf dropseed	E
	Sporobolus wrightii	Big sacaton	K
	Stipa curvifolia	Guadalupe needlegrass	K
	Stipa eminens	Southwestern needlegrass	K
	Stipa neomexicana	New Mexico feathergrass	K
	Tragus berteronianus	Spiked burr grass	K
	Tridens albescens	White tridens	K
	Tridens muticus	Slim tridens	E
	Trisetum interruptum	Prairie false oat	E
	Triticum aestivum	Common wheat	E
	Vulpia microstachys	Small fescue	E
	Vulpia octoflora	Sixweeks fescue	K
POLEMONIACEAE			
	Eriastrum diffusum	Miniature woollystar	K
	Gilia flavocincta	Yellow-throat gilia	K
	Gilia mexicana	El Paso gilia	E
	Gilia rigidula	Gilia	K
	Ipomopsis aggregata	Scarlet gilia	K
	Ipomopsis longiflora	Trumpet flower	K
	Ipomopsis multiflora	Manyflowered ipomopsis	E
	Ipomopsis polycladon	Sprawling ipomopsis	K
	Ipomopsis pumila	Dwarf ipomopsis	K
	Ipomopsis wrightii	Leafy skyrocket	E
	Linanthus bigelovii	Bigelow's linanthus	K
	Phlox longifolia	Longleaf phlox	K
	Phlox nana	Santa Fe phlox	K
	Phlox triovulata	Threeseed phlox	K
POLYGALACEAE			
	Polygala alba	White milkwort	K
	Polygala barbeyana	Blue milkwort	K
	Polygala lindheimeri	Shrubby milkwort	K
	Polygala macradenia	Glandleaf milkwort	K
	Polygala obscura	Veiledseed milkwort	K

Table B-1. Nonvascular and Vascular Plants Groups Expected on Fort Bliss (Continued)

Family	*Species*		*Occurrence on Fort Bliss*[b]
	Scientific Name	*Common Name*[a]	
VASCULAR PLANTS (FERNS AND FERN ALLIES, EPHEDRAS, CONIFERS, FLOWERING PLANTS)			
	Polygala reducta	Blue milkwort	K
	Polygala scoparioides	Broom milkwort	K
POLYGONACEAE			
	Eriogonum abertianum	Wild buckwheat	K
	Eriogonum alatum	Winged buckwheat	E
	Eriogonum annuum	Annual buckwheat	K
	Eriogonum havardii	Harvard's buckwheat	K
	Eriogonum hieracifolium	Hawkweed wild buckwheet	K
	Eriogonum jamesii	Antelope sage	K
	Eriogonum polycladon	Sorrel buckwheat	K
	Eriogonum rotundifolium	Roudleaf wild buckwheat	K
	Eriogonum trichopes	Wild buckwheat	K
	Eriogonum wrightii	Bastardsage	K
	Polygonum amphibium	Water knotweed	E
	Polygonum argyrocoleon	Silver-sheath knotweed	K
	Polygonum aviculare	Prostrate knotweed	E
	Polygonum lapathifolium	Curlytop knotweed	K
	Polygonum pensylvanicum	Pensylvania smartweed	E
	Polygonum persicaria	Spotted ladysthumb	E
	Rumex crispus	Curley dock	K
	Rumex hymenosepalus	Canaigre dock	K
	Rumex violascens	Violet dock	E
PORTULACACEAE			
	Portulaca halimoides	Silkcotton purslane	E
	Portulaca oleracea	Little hogweed, common purslane	K
	Portulaca pilosa	Kiss me quick, shaggy portulaca	K
	Portulaca retusa	Purslane	K
	Portulaca suffrutescens	Shrubby purslane	K
	Portulaca umbraticola	Wingpod purslane	K
	Talinopsis frutescens	Arroyo flameflower	K
	Talinum aurantiacum	Orange flameflower	K
	Talinum brevicaule	Dwarf flameflower	K
	Talinum confertiflorum	New Mexico flameflower	K
	Talinum longipes	Pink flameflower	K
	Talinum paniculatum	Jewels of Opar	E
	Talinum parviflorum	Sunbright	K
POTAMOGETONACEAE			
	Potamogeton foliosus	Leafy pondweed	E

Table B-1. Nonvascular and Vascular Plants Groups Expected on Fort Bliss (Continued)

Family	*Species*		*Occurrence on Fort Bliss*[b]
	Scientific Name	*Common Name*[a]	
VASCULAR PLANTS (FERNS AND FERN ALLIES, EPHEDRAS, CONIFERS, FLOWERING PLANTS)			
	Potamogeton illinoensis	Illinois pondweed	E
PRIMULACEAE			
	Androsace occidentalis	Western rockjasmine	K
	Centunculus minimus	Chaffweed	E
	Samolus ebracteatus	Limewater brookweed	E
PTERIDACEAE			
	Adiantum capillus-veneris	Common maidenhair, Venus-hair fern	K
	Argyrochosma limitanea	Southwestern false cloak fern	K
	Argyrochosma microphylla	Small-leaf false cloak fern	K
	Astrolepis cochisensis	Jimmy fern, Cochise scaly cloak fern	K
	Astrolepis integerrima	Wavyleaf cloak fern	K
	Astrolepis sinuata	Bulb lipfern	K
	Bommeria hispida	Copper fern, hairy bommeria	K
	Cheilanthes alabamensis	Alabama lipfern	K
	Cheilanthes bonariensis	Golden lipfern	K
	Cheilanthes eatonii	Eaton's lipfern	K
	Cheilanthes feei	Slender lipfern, fee lipfern	K
	Cheilanthes fendleri	Fendler's lipfern	K
	Cheilanthes integerrima	Wavy cloak fern	E
	Cheilanthes lindheimeri	Lindheimer's lipfern, fairy sords	K
	Cheilanthes parvifolia	Small-leaf false cloak fern	E
	Cheilanthes tomentosa	Woolly lipfern	K
	Cheilanthes villosa	Scaly lipfern, villous lipfern	K
	Cheilanthes wootonii	Beaded lipfern, Wooton's lipfern	K
	Cheilanthes wrightii	Wright's lipfern	K
	Notholaena standleyi	Star cloak fern	K
	Pellaea atropurpurea	Purple cliffbrake	K
	Pellaea intermedia	Intermediate cliffbrake	K
	Pellaea ternifolia	Wright's cliffbrake	K
	Pellaea truncata	Spiny cliffbrake	K
	Pellaea wrightiana	Wright's cliffbrake	K
PUNICACEAE			
	Punica granatum	Pomegranate	K
RAFFLESIACEAE			
	Pilostyles thurberi	Thurber's stemsucker	K
RANUNCULACEAE			
	Anemone tuberosa	Desert windflower	K
	Aquilegia chrysantha	Golden columbine	K

Table B-1. Nonvascular and Vascular Plants Groups Expected on Fort Bliss (Continued)

Family	*Species*		*Occurrence on Fort Bliss*[b]
	Scientific Name	***Common Name***[a]	
VASCULAR PLANTS (FERNS AND FERN ALLIES, EPHEDRAS, CONIFERS, FLOWERING PLANTS)			
	Clematis drummondii	Drummond's clematis	K
	Clematis ligusticifolia	Western white clematis	E
	Delphinium wootonii	Organ Mountain larkspur	K
	Myosurus cupulatus	Arizona mousetail	K
	Myosurus minimus	Tiny mousetail	E
	Thalictrum fendleri	Fendler's meadow-rue	K
RHAMNACEAE			
	Ceanothus greggii	Desert ceanothus	K
	Condalia ericoides	Javelin bush	K
	Condalia warnockii	Condalia	K
	Ziziphus obtusifolia	Lotebush	K
ROSACEAE			
	Cercocarpus montanus	Mountain mahogany	K
	Fallugia paradoxa	Apache plume	K
	Holodiscus dumosus	Rockspirea	K
	Petrophytum caespitosum	Rock-spiraea	K
	Potentilla hippiana	Woolly cinquefoil	E
	Potentilla pennsylvanica	Pennsylvania cinguefoil	K
	Potentilla thurberi	Scarlet cinquefoil	E
	Prunus serotina	Black cherry	K
	Rosa stellata	Desert rose	K
	Rosa woodsii	Wood's rose	K
	Rubus neomexicanus	New Mexico raspberry	K
RUBIACEAE			
	Galium aparine	Stickywilly	K
	Galium microphyllum	Bracted bedstraw	K
	Galium proliferum	Limestone bedstraw	K
	Galium wrightii	Wright's bedstraw	K
	Hedyotis humifusa	Mat bluets	E
	Hedyotis rubra	Red bluet	K
	Houstonia acerosa	Needleleaf bluet	K
	Houstonia fasciculata	Cluster bluet	K
RUTACEAE			
	Choisya dumosa	Mexican orange	K
	Ptelea trifoliata	Common hoptree	K
	Thamnosma texana	Rue of the mountains	K

Table B-1. Nonvascular and Vascular Plants Groups Expected on Fort Bliss (Continued)

Family	*Species*		*Occurrence on Fort Bliss*[b]
	Scientific Name	*Common Name*[a]	
VASCULAR PLANTS (FERNS AND FERN ALLIES, EPHEDRAS, CONIFERS, FLOWERING PLANTS)			
SALICACEAE			
	Populus angustifolia	Narrowleaf cottonwood	K
	Populus deltoides	Plains cottonwood	K
	Populus tremuloides	Quaking aspen	K
	Salix amygdaloides	Peachleaf willow	E
	Salix exigua	Narrowleaf willow	E
	Salix gooddingii	Goodding's willow	K
	Salix lasiolepis	Narrowleaf arroyo willow	K
SANTALACEAE			
	Comandra umbellata	Bastard toadflax	E
SAPINDACEAE			
	Koelreuteria paniculata	Golden rain-tree	K
	Sapindus saponaria	Soap-berry	K
	Ungnadia speciosa	Mexican buckeye	K
SAURURACEAE			
	Anemopsis californica	Yerba mansa	E
SAXIFRAGACEAE			
	Heuchera parvifolia	Littleleaf alumroot	K
	Heuchera rubescens	Red alumroot	K
	Saxifraga eriophora	Redfuzz saxifrage	K
SCROPHULARIACEAE			
	Bacopa rotundifolia	Disk waterhyssop	E
	Castilleja integra	Wholeleaf Indian paintbrush	K
	Castilleja lanata	Sierra woolly Indian paintbrush	K
	Castilleja latebracteata	Broadbract Indian paintbrush	K
	Castilleja organorum	Organ Mountain Indian paintbrush	K
	Castilleja sessiliflora	Downy paintedcup	K
	Cordylanthus wrightii	Wright's bird's beak	K
	Leucophyllum minus	Big Bend barometerbush	E
	Maurandella antirrhiniflora	Blue snapdragon vine	K
	Maurandya wislizenii	Balloonsepal maurandya	K
	Mimulus glabratus	Roundleaf monkeyflower	K
	Mimulus guttatus	Seep monkeyflower	K
	Mimulus rubellus	Little redstem monkeyflower	K
	Penstemon alamosensis	Alamo beardtongue	K
	Penstemon ambiguus	Gilia beardtongue	K
	Penstemon barbatus	Beardlip penstemon	K
	Penstemon fendleri	Fendler's penstemon	K
	Penstemon jamesii	James' beard tongue	K

Table B-1. Nonvascular and Vascular Plants Groups Expected on Fort Bliss (Continued)

Family	*Species*		*Occurrence on Fort Bliss*[b]
	Scientific Name	*Common Name*[a]	
VASCULAR PLANTS (FERNS AND FERN ALLIES, EPHEDRAS, CONIFERS, FLOWERING PLANTS)			
	Penstemon linarioides	Toadflak penstemon	K
	Penstemon palmeri	Palmer's penstemon	E
	Penstemon pseudospectabilis	Desert penstemon	K
	Scrophularia laevis	Organ Mountain figwort	K
	Verbascum thapsus	Flannel mullein	K
	Veronica americana	American brookline	K
	Veronica anagalis-aquatica	Water speedwell	E
	Veronica peregrina	Neckweed	E
	Veronica persica	Birdeye speedwell	K
SELLAGINELLACEAE			
	Selaginella mutica	Bluntleaf spikemoss	K
	Selaginella peruviana	Bluntleaf spikemoss	K
	Selaginella rupincola	Rockloving spikemoss	K
	Selaginella x neomexicana	New Mexico spikemoss	K
SOLANACEAE			
	Chamaesaracha conoides	Gray five eyes	K
	Chamaesaracha coronopus	Greenleaf five eyes	K
	Chamaesaracha sordida	Hairy five eyes	K
	Datura quercifolia	Chinese thorn-apple, oakleaf datura	K
	Datura wrightii	Sacred thorn-apple	K
	Lycium berlandieri	Berlandier wolfberry	K
	Lycium pallidum	Pale wolfberry, desert-thorn	K
	Lycium torreyi	Squawthorn, Torrey wolfberry	E
	Nicotiana glauca	Tree tobacco	E
	Nicotiana trigonophylla	Desert tobacco	K
	Physalis acutifolia	Sharpleaf groundcherry	E
	Physalis cinerascens	Smallflower groundcherry	K
	Physalis hederaefolia	Groundcherry	K
	Physalis solanaceus	Neted globecherry	K
	Physalis subulata	Chihuahuan groundcherry	E
	Quincula lobata	Purple groundcherry	K
	Solanum americanum	American black nightshade	K
	Solanum citrullifolium	Melon-leaf nightshade	K
	Solanum elaeagnifolium	Silverleaf nightshade	K
	Solanum fendleri	Fendler's horsenettle, wild potato	E
	Solanum heterodoxum	Melonleaf nightshade	E
	Solanum jamesii	Wild potato	E
	Solanum rostratum	Buffalobur nightshade	K
	Solanum triflorum	Cutleaf nightshade	K

Table B-1. Nonvascular and Vascular Plants Groups Expected on Fort Bliss (Continued)

Family	*Species*		*Occurrence on Fort Bliss*[b]
	Scientific Name	*Common Name*[a]	
VASCULAR PLANTS (FERNS AND FERN ALLIES, EPHEDRAS, CONIFERS, FLOWERING PLANTS)			
STERCULIACEAE			
	Ayenia filiformis	Trans-Pecos ayenia	K
	Ayenia insulicola	Dwarf ayenia	K
	Ayenia microphylla	Dense ayenia	K
TAMARICACEAE			
	Tamarix ramosissima	Saltcedar	E
TYPHACEAE			
	Typha angustifolia	Narrowleaf cattail	E
	Typha domingensis	Southern cattail	K
	Typha latifolia	Broadleaf cattail	K
ULMACEAE			
	Celtis laevigata	Hetleaf hackberry	K
	Celtis pallida	Spiny hackberry, grenjano	K
	Ulmus pumila	Siberian elm	K
URTICACEAE			
	Parietaria pensylvanica	Pennsylvania pellitory	K
	Urtica gracilenta	Mountain nettle	K
VALERIANACEAE			
	Valeriana arizonica	Arizona valerian	K
VERBENACEAE			
	Aloysia wrightii	Wright's beebrush, oreganillo	K
	Glandularia bipinnatifida	Dakota mock vervain, sweet william	K
	Glandularia pumila	Pink mock vervain	K
	Glandularia racemosa	Pale mock vervain	E
	Glandularia wrightii	Davis Mountain mock vervain	K
	Phyla nodiflora	Turkey tangle fogfruit	K
	Tetraclea coulteri	Coulter's wrinklefruit	K
	Verbena bracteata	Bigbract verbena	K
	Verbena macdougalii	MacDougal vervain	K
	Verbena neomexicana	Hillside vervain	K
	Verbena perennis	Perennial verbena	K
	Verbena plicata	Fan-leaf vervain	K
	Vitex angus-castus	Lilac chastetree	K
VIOLACEAE			
	Hybanthus verticillatus	Green violet	K
VISCACEAE			
	Arceuthobium vaginatum	Pineland dwarf mistletoe	K
	Phoradendron tomentosum	Christmas mistletoe	K

Table B-1. Nonvascular and Vascular Plants Groups Expected on Fort Bliss (Continued)

Family	*Species*		*Occurrence on Fort Bliss*[b]
	Scientific Name	*Common Name*[a]	
VASCULAR PLANTS (FERNS AND FERN ALLIES, EPHEDRAS, CONIFERS, FLOWERING PLANTS)			
	Phoradendron hawksworthii	Hawksworth's mistletoe	K
	Phoradendron villosum	Oak mistletoe	K
VITACEAE			
	Parthenocissus vitacea	Woodbine, thicket creeper	K
	Vitis arizonica	Canyon grape	K
ZYGOPHYLLACEAE			
	Kallstroemia californica	California caltrop	K
	Kallstroemia grandiflora	Orange caltrop	K
	Kallstroemia hirsutissima	Hairy caltrop, carpetweed	K
	Kallstroemia parviflora	Warty caltrop	K
	Larrea tridentata	Creosote bush	K
	Peganum harmala	African Rue	K
	Tribulus terrestris	Punctureviné; goat head	K
	Zygophyllum fabago	Syrian beancaper	E

[a] Primary sources for common and scientific names: USDA; NRCS, 2001; Worthington et al. 1997.

[b] Occurrence: K = Known, E = Expected

distinct ordinary high water marks totaling 212 acres were also mapped. In addition, 26 artificial water resources including sewage treatment ponds, storm water retention basins, and stock tanks comprising 16 acres were mapped (U.S. Army, 1998g).

The vast majority of arroyo-riparian drainages on Fort Bliss do not qualify as USACE jurisdictional wetlands but, as indicted above, thousands of miles of these waterways are potential Waters of the U.S. Perennial riparian corridors of the western U.S. have been studied extensively and the density and diversity of flora and fauna in many of these areas have been determined. Similar studies have been conducted in arroyo-riparian drainages of Fort Bliss (U.S. Army, 1991c; Kozma, 1995; Cockman, 1996).

Cockman (1996) studied four arroyo-riparian drainages on McGregor Range in Culp Canyon; two were in the desert shrublands of the Sacramento Mountains foothills, at elevations ranging from 5,900 feet at the head waters to 5,480 feet at the tailwaters. The other two drainages were also in the desert shrublands in the submesa, at elevations ranging from 4,920 feet (headwaters) to 4,500 feet (tailwaters). The dominant shrubs in the foothill drainages were skeletonleaf goldeneye (*Viguiera stenoloba)*, little leaf sumac (*Rhus microphylla)*, largeleaf sumac (*R. trilobata*), and Apache plume (*Fallugia paradoxa*). Cutleaf bricklebush (*Brickella laciniata),* Mexican silktassel *(Garrya ovata)* and desert willow (*Chilopsis linearis*) were found only in the main channel (obligate species). The dominant shrubs in the submesa drainages were desert willow, Apache plume, four-winged saltbush (*Atriplex canescens)*, little and big leaf sumac, and honey mesquite (*Prosopis glandulosa)*. Creosotebush (*Larrea tridentata)*, skeletonleaf goldeneye, and tarbush (*Flourensia cernua)* were also common. Desert willow and Apache plume were obligate in the main channel.

In the desert shrub plant communities at and near the Sacramento Mountains foothills, Cockman (1996) determined that the following vegetation parameters characterize ephemeral drainages on Fort Bliss:

- Shrub, tree, and forb cover are higher on the main channel than the surrounding area.
- Species richness of shrubs, trees, grasses, and forbs are higher in the main channel than all other locations.
- Heights of shrubs along the main channel are nearly twice that of shrubs in the uplands.
- Obligate species such as desert willow tended to be taller than nondrainage species.
- Obligate species at one elevation may occur outside of the drainage at another elevation. For example, Apache plume is obligate in the submesa drainages but occurs outside the drainages in the foothills. Species such as little and big sumac occur at many locations in the foothills and submesa drainages. Little sumac occurs most often in deep sandy soil in arroyo-riparian drainages in the Tularosa Basin on McGregor Range; it also occurs in sandy soil areas not associated with drainages.

Army (1991c) studied the vegetation of the arroyo-riparian drainages and surrounding uplands in eight locations on the Doña Ana Range–North Training Areas. Preliminary results of the study agree with Cockman's work in that there was greater species richness and plant height in the arroyos. Nineteen species of shrubs were obligates to arroyos and soapberry (*Sapindus saponaria)*, little sumac, and desert willow were typically the tallest shrubs along the arroyos. The study also found that the percentage of bare ground tended to be less in arroyos than uplands. For example, the percent of bare ground in some arroyos was 12 percent versus 54 percent in the uplands.

Montane riparian plant communities cover 395 acres in the Organ Mountains and include forested and shrub-dominated types. Forested riparian areas are dominated by trees such as box elder (*Acer negundo)* and velvet ash (*Fraxinus velutina)* in riparian areas along Fillmore and Soledad canyons. A second forested riparian type is dominated by netleaf hackberry (*Celtis reticulata)* and river walnut (*Juglans microcarpa),* and occurs in Long Canyon. Netleaf hackberry is the dominant overstory tree, while river walnut along with New Mexico buckeye (*Ungnadia speciosa)* and Texas mulberry (*Morus microphylla)* dominate the understory. This type occurs among the large boulders in the canyon bottom (U.S. Army, 1994b).

Shrub-dominated montane riparian plant communities in the Organ Mountains include coyote willow (*Salix exigua)* dominated type along the perennial streams in Rucker Canyon. Deer grass (*Muhlenbergia rigens)* forms large tussocks along the stream in this type. The coyote willow/bulb panicgrass (*Panicum bulbosum)* type also occurs along the stream in Rucker Canyon, but at a higher elevation than the previous type. A third riparian shrub plant community is dominated by black cherry (*Prunus serotina)* and mountain leaftail (*Pericome caudata),* and occurs on rock-covered slopes in North Canyon. Arizona Grape (*Vitis arizonica),* netleaf hackberry, and New Mexico locust (*Robinia neomexicana)* are also common in this type (U.S. Army, 1994b).

B.2 WILDLIFE

B.2.1 Amphibians and Reptiles

Surveys for amphibians and reptiles were conducted on Otero Mesa and in the Tularosa Basin in 1996 and 1997 (see Figure B-1). A total of 8 species of amphibians and 39 species of reptiles have been observed on Fort Bliss; an additional 19 species of amphibians and reptiles have the potential to occur (U.S. Army, 1997c, 1997e, 1996f) (Table B-2). Seven of the amphibian species are toads and the eighth species is the barred tiger salamander (*Ambystoma tigrinum mavortium),* which is found in stock tanks on

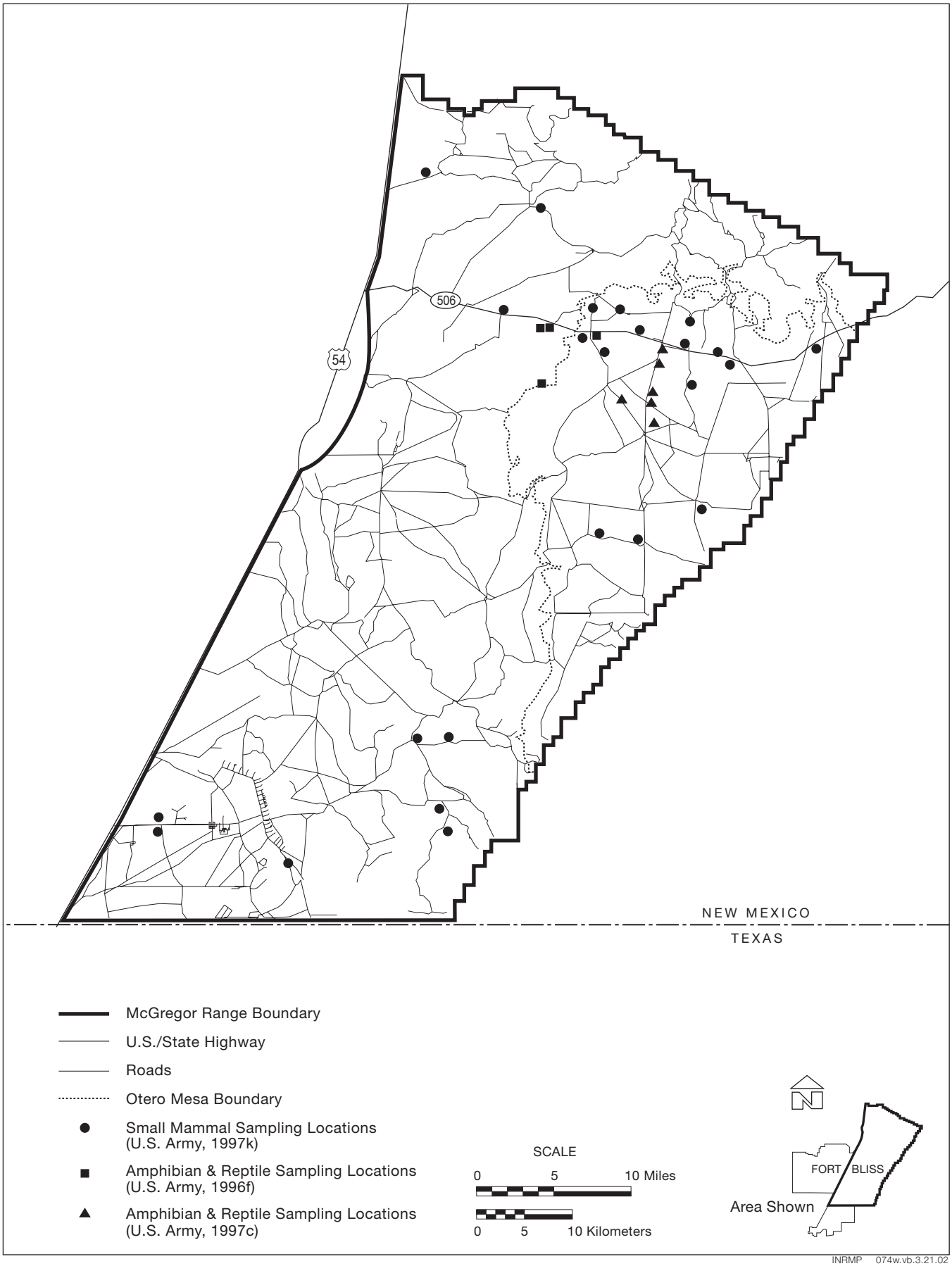

Figure B-1. Amphibian, Reptile and Small Mammal Sampling Locations on McGregor Range.

Table B-2. Amphibians and Reptiles that Occur or Could Occur on Fort Bliss

Species		*Occurrence on Fort Bliss*	
Common Name	*Scientific Name*	*Known*	*Possible*
Tiger salamander	*Ambystoma tigrinum*	●	
Couch's spadefoot	*Scaphiopus couchii*	●	
Plains spadefoot	*Spea bombifrons*	●	
New Mexico spadefoot	*Spea multiplicata*	●	
Great plains toad	*Bufo cognatus*	●	
Green toad	*Bufo debilis*	●	
Red-spotted toad	*Bufo punctatus*	●	
Woodhouse's toad	*Bufo woodhousii*	●	
Canyon tree frog	*Hyla arenicolor*		●
Bullfrog	*Rana catesbeiana*		●
Painted turtle	*Chrysemys picta*		●
Ornate box turtle	*Tarrapene ornata*	●	
Yellow mud turtle	*Kinosternon flavescens*		●
Collared lizard	*Crotaphytus collaris*	●	
Leopard lizard	*Gambelia wislizenii*	●	
Greater earless lizard	*Cophosaurus texanus*	●	
Lesser earless lizard	*Holbrookia maculata*	●	
Texas horned lizard	*Phrynosoma cornutum*	●	
Short-horned lizard	*Phrynosoma douglasii*		
Roundtail horned lizard	*Phrynosoma modestum*	●	
Desert spiny lizard	*Sceloporus magister*	●	
Crevice spiny lizard	*Sceloporus poinsettii*		●
Prairie lizard	*Sceloporus undulatus*	●	
Tree lizard	*Urosaurus ornatus*	●	
Side-blotched lizard	*Uta stansburiana*	●	
Western banded gecko	*Coleonyx brevis*	●	
Mediterranean gecko	*Hemidactylus turcicus*	●	
Chihuahuan spotted whiptail	*Cnemidophorus exanguis*	●	
Checkered whiptail	*Cnemidophorus grahamii*	●	
Little striped whiptail	*Cnemidophorus inornatus*	●	
New Mexico whiptail	*Cnemidophorus neomexicanus*	●	
Western whiptail	*Cnemidophorus tigris*	●	
Desert grassland whiptail	*Cnemidophorus uniparens*	●	
Great Plains skink	*Eumeces obsoletus*	●	
Glossy snake	*Arizona elegans*	●	
Trans-Pecos rat snake	*Bogertophis subocularis*		●
Racer	*Coluber constrictor*		●
Ringneck snake	*Diadophis punctatus*	●	
Corn snake	*Elaphe gutatta*		●
Western hooknose snake	*Gyalopion canum*	●	

Table B-2. Amphibians and Reptiles that Occur or Could Occur on Fort Bliss (Continued)

Species		*Occurrence on Fort Bliss*	
Common Name	*Scientific Name*	*Known*	*Possible*
Western hognose snake	*Heterdon nasicus*		●
Night snake	*Hypsiglena torquata*	●	
Gray-banded kingsnake	*Lampropeltis alterna*		●
Common kingsnake	*Lampropeltis getula*	●	
Milk snake	*Lampropeltis triangulum*		●
Texas blind snake	*Leptotyphlops dulcis*	●	
Western blind snake	*Leptotyphlops humilis*		●
Western coachwhip	*Masticophis flagellum*	●	
Striped whipsnake	*Masticophis taeniatus*	●	
Bullsnake	*Pituophis melanoleucus*	●	
Longnose snake	*Rhinocheilus lecontei*	●	
Big bend patchnose snake	*Salvadora deserticola*		●
Mountain patchnose snake	*Salvadora grahamiae*	●	
Ground snake	*Sonora semiannulata*	●	
Southwestern blackhead snake	*Tantilla hobartsmithi*		●
Plains blackhead snake	*Tantilla nigriceps*	●	
Blackneck garter snake	*Thamnophis cyrtopsis*		●
Checkered garter snake	*Thamnophis marcianus*		●
Common garter snake	*Thamnophis sirtalis*		●
Texas lyre snake	*Trimorphodon biscutatusi*	●	
Western diamondback rattlesnake	*Crotalus atrox*	●	
Rock rattlesnake	*Crotalus lepidus*	●	
Blacktail rattlesnake	*Crotalus molossus*	●	
Mojave rattlesnake	*Crotalus scutulatus*	●	
Prairie rattlesnake	*Crotalus viridis viridis*	●	
Massasauga	*Sistrurus catenatus*		●
Total Species		*47*	*18*

Source: U.S. Army 1996f, 1996g 1997c, 1997e.

Table B-3. Amphibians and Reptiles Observed at Six Sampling Sites, Along Arroyos, Roads, and at Stock Tanks on Otero Mesa in 1997

Species[a]	*Sampling site*						*Arroyo*	*Tanks*	*Roads*	*Total*
	1	*2*	*3*	*4*	*5*	*6*				
New Mexico spadefoot	0	1	0	0	15	7	1	N[b]	0	N(24)[c]
Great Plains toad	0	0	0	0	0	0	0	N	0	N
Couch's spadefoot	0	0	0	0	0	0	0	N	1	N(1)[c]
Prairie lizard	15	1	4	41	0	22	6	0	0	89
Lesser earless lizard	7	33	17	8	14	6	0	0	0	85
Little striped whiptail	8	17	21	12	0	2	3	0	2	65
Short-horned lizard	0	10	3	0	2	1	2	0	2	20
Collared lizard	7	4	0	0	0	1	1	0	1	14
Ornate box turtle	0	0	0	0	1	0	0	2	8	11
Checkered whiptail	3	0	0	0	0	0	4	0	0	7
Western diamondback rattlesnake	1	0	0	0	0	0	4	0	2	7
Western coachwhip	0	0	0	0	0	0	2	0	3	5
Texas horned lizard	0	1	1	0	0	0	0	0	2	4
Bull snake	0	1	0	0	0	0	0	0	2	3
Red-spotted toad	0	0	0	0	0	0	0	0	3	3
Round tailed horned lizard	0	2	0	0	0	0	0	0	0	2
Western hooknose snake	0	0	1	0	1	0	0	0	0	2
Greater earless lizard	0	0	0	0	0	0	0	0	2	2
Chihuahuan spotted whiptail	1	0	0	0	0	0	0	0	0	1
Glossy snake	0	0	0	1	0	0	0	0	0	1
Side-blotched lizard	0	0	0	0	0	0	1	0	0	1
Prairie rattlesnake	0	0	0	0	0	0	0	0	1	1
Garter snake species	0	0	0	0	0	0	0	0	1	1
Totals										
Number of species	*7*	*9*	*6*	*4*	*5*	*6*	*9*	*4*	*13*	*23*
Number of individuals	*42*	*70*	*47*	*62*	*33*	*39*	*24*	*2*[d]	*30*	*349*

[a] See Table B-1 for scientific names.
[b] "N" = numerous.
[c] Number observed at locations other than tanks.
[d] Numerous toads also observed.
Source: U.S. Army, 1997e.

the Otero Mesa and in the Tularosa Basin. Numerous Great Plains toads (*Bufo cognatus),* New Mexico spadefoot (*Spea multiplicata)*, and Couch's spadefoot (*Scaphiopus couchii)* were observed at stock tanks on Otero Mesa (U.S. Army, 1997e). A few red-spotted toads (*Bufo punctatus)* were also observed on Otero Mesa (U.S. Army, 1997e); this species has also been observed in the Organ Mountains and the desert shrub habitat of the Tularosa Basin (U.S. Army, 1997d, 1996f). Sampling at 20 sites in the Chihuahuan Desert in the Tularosa Basin on McGregor Range yielded 428 toad captures and the New Mexico spadefoot was the most common with 278 captures (65 percent of total), followed by Couch's spadefoot with 103 captures (24 percent). All but one of the New Mexico spadefoot were from one sampling location, while the Couch's spadefoot was much more widespread, being captured at all 20 sampling sites. The Great Plains toad and western green toad (*Bufo debilis)* were each captured 18 times

(4 percent) and occurred at over one-half of the sample locations. The red-spotted toad and plains spadefoot (*Spea bombifrons)* were captured infrequently (5 and 2 times, respectively) (U.S. Army, 1996f).

The box turtle (*Terrapene ornata)* is the only species of turtle observed on Fort Bliss and is most common in the grassland plant communities on Otero Mesa, although it has been regularly observed in the desert shrubland communities in the Tularosa Basin (U.S. Army, 1997c, 1997e, 1996f, 1996g). This species was recorded 11 times on Otero Mesa during baseline amphibian and reptile surveys in 1997 (U.S. Army, 1997e) (Table B-3). It was also recorded 11 times at 9 of 20 sample plots in the desert shrublands habitat in the Tularosa Basin (U.S. Army, 1996f).

The most diverse group of reptiles is the lizards; 20 species have been recorded from Fort Bliss, including 6 species of whiptails (Table B-2). The largest number of lizard species occurs in the grassland habitat (17 species), followed by the desert shrublands (13), Sacramento Mountains foothills (10), and Organ Mountains (6) (U.S. Army, 1997c). Some species such as the western marbled whiptail (*Cnemidophorus marmoratus)* and Texas horned lizard (*Phrynosoma cornutum*) are found in essentially all areas on Fort Bliss, while others such as the leopard lizard (*Gambelia wislizenii*) have been reported only from the desert shrubland habitat, and the lined tree lizard (*Urosaurus ornatus)* only in the wooded habitat of the foothills of the Sacramento and Organ mountains (U.S. Army, 1997c). Eleven species of lizards were recorded 290 times in grassland habitat on Otero Mesa; the most common species were the southern prairie lizard (*Sceloporus undulatus),* which was captured 89 times (31 percent of total lizard captures), and the northern earless lizard (*Holbrookia maculata)*, which was captured 85 times (29 percent). The side-blotched lizard (*Uta stansburiana)* and spotted whiptail (*Cnemidophorus exanguis)* were each recorded only once (U.S. Army, 1997e) (Table B-3). The most common lizards captured in the desert shrubland habitat were the striped whiptail (5,500 captures), side-blotched lizard (3,163 captures), and marbled whiptail (845 captures) (U.S. Army, 1996f).

Jorgensen and Demarais (U.S. Army, 1996g) studied amphibians and reptiles in eight arroyos and adjacent upland sites in the Chihuahuan Desert shrubland plant communities on McGregor Range, and found there was no statistical difference in the amphibian and reptile species richness and abundance between arroyo and upland habitats. The most common species captured were the side-blotched lizard (captured 249 times), the marbled whiptail (191 captures), and little striped whiptail (78 captures).

Eighteen species of snakes have been recorded from Fort Bliss (U.S. Army, 1996k, 1997g) (Table B-2). The largest number of species occur in the grassland habitat on Otero Mesa (13 species), followed by the desert shrubland and Sacramento Mountains foothills (11) and the Organ Mountains (6). Species such as the western diamondback rattlesnake (*Crotalus atrox)* and gopher snake (*Pituophis catenifer)* are common and widespread throughout Fort Bliss. Other species such as the Mojave (*C. scutulatus)* and prairie (*C. viridis)* rattlesnakes have been reported only from the grassland habitat on Otero Mesa, and the Texas long-nosed snake (*Rhinocheilus lecontei)* was observed only in the Sacramento Mountains foothills (U.S. Army, 1997c) and the desert shrubland habitat of the Tularosa Basin (U.S. Army 1996f). Surveys on Otero Mesa in 1997, yielded seven species of snakes (Table B-2). The western diamondback rattlesnake and western coachwhip (*Masticophis flagellum)* were the most common species observed. Other species observed include the hooknosed snake (*Gyalopion canum),* Kansas glossy snake (*Arizona elegans)*, and prairie rattlesnake (U.S. Army, 1997e). In the desert shrubland habitat in the Tularosa Basin, the night snake (*Hypsiglena torquata*) (59 captures), plains black-headed snake (*Tantilla nigriceps)* (58 captures), and ground snake (*Sonora semiannulata*) (43 captures) were the most common species captured (U.S. Army, 1996f). Five species were recorded fewer times, including the western hooknosed snake (18 captures), long-nosed snake (8 captures), desert kingsnake (*Lampropeltis gelula)* (3 captures), and gopher snake and western coachwhip (1 capture each) (U.S. Army, 1996f).

B.2.2 Avifauna

A total of 335 species of birds have been recorded from Fort Bliss (Table B-4). Eighty species occur throughout the year, 129 species are seen only during migration, 42 species are spring and summer residents, and the remaining species occur principally during the winter. Thirty-two species are common, 89 fairly common, 72 uncommon, and 142 rare to very rare.

In recent years, detailed studies of the bird life in various habitats on Fort Bliss have been initiated and some of these studies are still in progress. These studies have centered on determining existing conditions, and have concentrated on documenting breeding bird communities in various habitats, the occurrence of neotropical migrants, and the status of sensitive species. This section emphasizes bird life in various habitats on McGregor Range and the Organ Mountains on Doña Ana Range–North Training Areas, because that is where most of the current research has been focused and where the majority of the more diverse bird habitat is located on Fort Bliss. The plant communities in the desert habitat on the South Training Areas and Doña Ana Range–North Training Areas are similar to the Chihuahuan Desert shrublands sampled for breeding birds on McGregor Range (see Figure B-2 for map of sampling locations). Castner Range is dominated by habitats similar to those found in the Organ Mountains.

Table B-4. Birds Observed on Fort Bliss

Species		*Relative Abundance*[a]				
Common Name	*Scientific Name*	*A*	*C*	*FC*	*UC*	*R*
Common loon	*Gavia immer*					●
Pied-billed grebe	*Podilymbus podiceps*			●		
Horned grebe	*Podiceps auritus*					●
Eared grebe	*Podiceps nigricollis*			●		
Western grebe	*Aechmophorus occidentalis*				●	
Clark's grebe	*Aechmophorus clarkii*					●
American white pelican	*Pelecanus erythrorhynchus*					●
Double-crested cormorant	*Phalacrocorax auritus*				●	
Neotropic cormorant	*Phalacrocorax brasilianus*				●	
Least bittern	*Ixobrychus exilis*					●
Great blue heron	*Ardea herodias*			●		
Great egret	*Ardea alba*				●	
Snowy egret	*Egretta thula*				●	
Little blue heron	*Egretta caerulea*					●
Reddish egret	*Egretta rufescens*					●
Cattle egret	*Bubulcus ibis*				●	
Green heron	*Butorides virescens*				●	
Black-crowned night-heron	*Nycticorax nycticorax*				●	
Yellow-crowned night-heron	*Nyctanass violacea*					●
Glossy ibis	*Plegadis falcinellus*					●
White-faced ibis	*Plegadis chihi*			●		
Turkey vulture	*Cathartes aura*		●			
Greater white-fronted goose	*Anser albifrons*					●
Snow goose	*Chen caerulescens*			●		
Ross's goose	*Chen rossii*					●
Canada goose	*Branta canadensis*					●
Wood duck	*Aix sponsa*				●	
Gadwall	*Anas strepera*			●		
Eurasian wigeon	*Anas penelope*					●
American wigeon	*Anas americana*			●		

Table B-4. Birds Observed on Fort Bliss (Continued)

Species		*Relative Abundance*[a]				
Common Name	*Scientific Name*	*A*	*C*	*FC*	*UC*	*R*
Mallard	*Anas platyrhynchos*			●		
Blue-winged teal	*Anas discors*			●		
Cinnamon teal	*Anas cyanoptera*			●		
Northern shoveler	*Anas clypeata*		●			
Northern pintail	*Anas acuta*			●		
Green-winged teal	*Anas crecca*		●			
Canvasback	*Aythya valisineria*			●		
Redhead	*Aythya americana*			●		
Ring-necked duck	*Aythya collaris*			●		
Greater scaup	*Aythya marila*					●
Lesser scaup	*Aythya affinis*			●		
Surf scoter	*Melanitta perspicillata*					●
White-winged scoter	*Melanitta fusca*					●
Bufflehead	*Bucephala albeola*				●	
Common goldeneye	*Bucephala clangula*				●	
Hooded merganser	*Lophodytes cucullatus*					●
Common merganser	*Mergus merganser*				●	
Red-breasted merganser	*Mergus serrator*					●
Masked duck	*Nomonyx dominicus*					●
Ruddy duck	*Oxyura jamaicensis*			●		
Osprey	*Pandion haliaetus*			●		
White-tailed kite	*Elanus leucurus*					●
Mississippi kite	*Ictinia mississippiensis*					●
Bald eagle	*Haliaeetus leucocephalus*				●	
Northern harrier	*Circus cyaneus*			●		
Sharp-shinned hawk	*Accipiter striatus*				●	
Cooper's hawk	*Accipiter cooperii*			●		
Northern goshawk	*Accipiter gentilis*					●
Gray hawk	*Asturina nitidus*					●
Common black-hawk	*Buteogallus anthracinus*					●
Harris's hawk	*Parabuteo unicinctus*					●
Swainson's hawk	*Buteo swainsoni*		●			
Red-tailed hawk	*Buteo jamaicensis*		●			
Ferruginous hawk	*Buteo regalis*			●		
Zone-tailed hawk	*Buteo albonotatus*					●
Rough-legged hawk	*Buteo lagopus*					●
Golden eagle	*Aquila chrysaetos*			●		
American kestrel	*Falco sparverius*		●			
Merlin	*Falco columbarius*					●
Prairie falcon	*Falco mexicanus*				●	
Peregrine falcon	*Falco peregrinus*					●
Wild turkey	*Meleagris gallopavo*				●	
Montezuma quail	*Cyrtonyx montezumae*				●	
Scaled quail	*Callipepla squamata*		●			
Gambel's quail	*Callipepla gambelii*		●			
Virginia rail	*Rallus limicola*					●
Sora	*Porzana carolina*					●
Common moorhen	*Gallinula chloropus*					●
American coot	*Fulica americana*			●		

Table B-4. Birds Observed on Fort Bliss (Continued)

Species		*Relative Abundance*[a]				
Common Name	*Scientific Name*	*A*	*C*	*FC*	*UC*	*R*
Sandhill crane	*Grus canadensis*				●	
Black-bellied plover	*Pluvialis squatarola*					●
American golden-plover	*Pluvialis dominica*					●
Snowy plover	*Charadrius alexandrinus*				●	
Semipalmated plover	*Charadrius semipalmatus*				●	
Piping plover	*Charadrius melodus*					●
Killdeer	*Charadrius vociferus*		●			
Mountain plover	*Charadrius montanus*					●
Black-necked stilt	*Himantopus mexicanus*				●	
American avocet	*Recurvirostra americana*				●	
Greater yellowlegs	*Tringa melanoleuca*				●	
Lesser yellowlegs	*Tringa flavipes*				●	
Solitary sandpiper	*Tringa solitaria*				●	
Willet	*Catoptrophorus semipalmatus*				●	
Spotted sandpiper	*Actitis macularia*				●	
Upland sandpiper	*Bartramia longicauda*					●
Whimbrel	*Numenius phaeopus*					●
Long-billed curlew	*Numenius americanus*					●
Marbled godwit	*Limosa fedoa*					●
Ruddy turnstone	*Arenaria interpres*					●
Red knot	*Calidris canutus*					●
Sanderling	*Calidris alba*					●
Semipalmated sandpiper	*Calidris pusilla*					●
Western sandpiper	*Calidris mauri*			●		
Least sandpiper	*Calidris minutilla*			●		
White-rumped sandpiper	*Calidris fuscicollis*					●
Baird's sandpiper	*Calidris bairdii*			●		
Pectoral sandpiper	*Calidris melanotos*				●	
Dunlin	*Calidris alpina*					●
Stilt sandpiper	*Calidris himantopus*				●	
Ruff	*Philomachus pugnax*					●
Short-billed dowitcher	*Limnodromus griseus*					●
Long-billed dowitcher	*Limnodromus scolopaceus*			●		
Common snipe	*Gallinago gallinago*			●		
Wilson's phalarope	*Phalaropus tricolor*			●		
Red-necked phalarope	*Phalaropus lobatus*			●		
Red phalarope	*Phalaropus fulicarius*					●
Laughing gull	*Larus atricilla*					●
Franklin's gull	*Larus pipixcan*					●
Bonaparte's gull	*Larus philadelphia*				●	
Ring-billed gull	*Larus delawarensis*				●	
California gull	*Larus californicus*					●
Herring gull	*Larus argentatus*					●
Western gull	*Larus occidentalis*					●
Sabine's gull	*Xema sabini*					●
Caspian tern	*Sterna caspia*					●
Common tern	*Sterna hirundo*					●
Forster's tern	*Sterna forsteri*				●	
Black tern	*Chlidonias niger*				●	

Table B-4. Birds Observed on Fort Bliss (Continued)

Species		Relative Abundance[a]				
Common Name	*Scientific Name*	*A*	*C*	*FC*	*UC*	*R*
Rock dove	*Columba livia*		●			
Band-tailed pigeon	*Columba fasciata*					●
White-winged dove	*Zenaida asiatica*			●		
Mourning dove	*Zenaida macroura*		●			
Inca dove	*Columbina inca*					●
Yellow-billed cuckoo	*Coccyzus americanus*				●	
Greater roadrunner	*Geococcyx californicus*			●		
Groove-billed ani	*Crotophaga sulcirostris*					●
Barn owl	*Tyto alba*				●	
Western screech-owl	*Otus kennicotti*				●	
Great horned owl	*Bubo virginianus*			●		
Northern pygmy-owl	*Glaucidium gnoma*					●
Burrowing owl	*Athene cunicularia*			●		
Spotted owl	*Strix occidentalis*					●
Long-eared owl	*Asio otus*				●	
Short-eared owl	*Asio flammeus*					●
Lesser nighthawk	*Chordeiles acutipennis*			●		
Common nighthawk	*Chordeiles minor*				●	
Common poorwill	*Phalaenoptila nuttallii*			●		
Whip-poor-will	*Caprimulgus vociferus*					●
Black swift	*Cypseloides niger*					●
White-throated swift	*Aeronautes saxatilis*			●		
Black-chinned hummingbird	*Archilochus alexandrinus*		●			
Costa's hummingbird	*Calypte costae*					●
Calliope hummingbird	*Stellula calliope*					●
Broad-tailed hummingbird	*Selasphorus platycercus*				●	
Rufous hummingbird	*Selasphorus rufus*				●	
Belted kingfisher	*Ceryle alcyon*					●
Lewis woodpecker	*Melanerpes lewis*					●
Acorn woodpecker	*Melanerpes formicivorus*					●
Yellow-bellied sapsucker	*Sphyrapicus varius*					●
Red-naped sapsucker	*Sphyrapicus nuchalis*				●	
Williamson's sapsucker	*Sphyrapicus thyroideus*					●
Ladder-backed woodpecker	*Picoides scalaris*			●		
Downy woodpecker	*Picoides pubescens*					●
Hairy woodpecker	*Picoides villosus*				●	
Northern flicker	*Colaptes auratus*				●	
Olive-sided flycatcher	*Contopus cooperi*					●
Western wood-pewee	*Contopus sordidulus*				●	
Willow flycatcher	*Empidonax traillii*					●
Least flycatcher	*Empidonax minimus*					●
Hammond's flycatcher	*Empidonax hammondii*					●
Dusky flycatcher	*Empidonax oberholseri*			●		
Gray flycatcher	*Empidonax wrightii*					●
Cordilleran flycatcher	*Empidonax occidentalis*				●	
Black phoebe	*Sayornis nigricans*			●		
Eastern phoebe	*Sayornis phoebe*					●
Say's phoebe	*Sayornis saya*			●		
Ash-throated flycatcher	*Myiarchus cinerascens*			●		

Table B-4. Birds Observed on Fort Bliss (Continued)

Species		*Relative Abundance*[a]				
Common Name	*Scientific Name*	*A*	*C*	*FC*	*UC*	*R*
Cassin's kingbird	*Tyrannus vociferans*					●
Western kingbird	*Tyrannus verticalis*		●			
Eastern kingbird	*Tyrannus tyrannus*					●
Northern shrike	*Lanius excubitor*					●
Loggerhead shrike	*Lanius ludovicianus*		●			
Bell's vireo	*Vireo bellii*					●
Gray vireo	*Vireo vicinior*				●	
Hutton's vireo	*Vireo huttoni*					●
Warbling vireo	*Vireo gilvus*					●
Philadelphia vireo	*Vireo philadelphicus*					●
Red-eyed vireo	*Vireo olivaceus*					●
Cassin's vireo	*Vireo cassinii*			●		
Plumbeous vireo	*Vireo plumbeus*					●
Steller's jay	*Cyanocitta stelleri*					●
Western scrub-jay	*Aphelocoma californica*				●	
Pinyon jay	*Gymnorhinus cyanocephalus*				●	
American crow	*Corvus brachyrhynchos*					●
Chihuahuan raven	*Corvus cryptoleucus*			●		
Common raven	*Corvus corax*				●	
Horned lark	*Eremophila alpestris*		●			
Purple martin	*Progne subis*					●
Tree swallow	*Tachycineta bicolor*					●
Violet-green swallow	*Tachycineta thalassina*				●	
Northern rough-winged swallow	*Stelgidopteryx serripennis*			●		
Bank swallow	*Riparia riparia*			●		
Barn swallow	*Hirundo rustica*		●			
Cliff swallow	*Petrochelidon pyrrhonota*			●		
Cave swallow	*Petrochelidon fulva*					●
Mountain chickadee	*Poecile gambeli*				●	
Juniper titmouse	*Baeolophus ridgwayi*				●	
Verdin	*Auriparus flaviceps*			●		
Bushtit	*Psaltriparus minimus*				●	
Red-breasted nuthatch	*Sitta canadensis*			●		
White-breasted nuthatch	*Sitta carolinensis*			●		
Pygmy nuthatch	*Sitta pygmaea*					●
Brown creeper	*Certhia americana*					●
Cactus wren	*Campylorhynchus brunneicapillus*			●		
Rock wren	*Salpinctes obsoletus*		●			
Canyon wren	*Catherpes mexicanus*			●		
Bewick's wren	*Thryomanes bewickii*		●			
House wren	*Troglodytes aedon*				●	
Marsh wren	*Cistothorus palustris*					●
American dipper	*Cinclus mexicanus*					●
Golden-crowned kinglet	*Regulus satrapa*				●	
Ruby-crowned kinglet	*Regulus calendula*			●		
Black-tailed gnatcatcher	*Polioptila melanura*		●			
Blue-gray gnatcatcher	*Polioptila caerulea*			●		
Eastern bluebird	*Sialia sialis*					●
Western bluebird	*Sialia mexicana*			●		

Table B-4. Birds Observed on Fort Bliss (Continued)

Species		*Relative Abundance*[a]				
Common Name	*Scientific Name*	*A*	*C*	*FC*	*UC*	*R*
Mountain bluebird	*Sialia currucoides*		●			
Townsend's solitaire	*Myadestes townsendi*			●		
Swainson's thrush	*Catharus ustulatus*					●
Hermit thrush	*Catharus guttatus*			●		
American robin	*Turdus migratorius*			●		
Northern mockingbird	*Mimus polyglottos*		●			
Sage thrasher	*Oreoscoptes montanus*				●	
Brown thrasher	*Toxostoma rufum*					●
Curve-billed thrasher	*Toxostoma curvirostre*				●	
Crissal thrasher	*Toxostoma dorsalis*			●		
European starling	*Sturnus vulgaris*			●		
American pipit	*Anthus rubescens*			●		
Sprague's pipit	*Anthus spraguei*				●	
Cedar waxwing	*Bombycilla cedrorum*			●		
Phainopepla	*Phainopepla nitens*				●	
Golden-winged warbler	*Vermivora chrysoptera*					●
Tennessee warbler	*Vermivora peregrina*					●
Orange-crowned warbler	*Vermivora celata*			●		
Nashville warbler	*Vermivora ruficapilla*					●
Virginia's warbler	*Vermivora virginiae*				●	
Lucy's warbler	*Vermivora luciae*					●
Northern parula	*Parula americana*					●
Yellow warbler	*Dendroica petechia*				●	
Chestnut-sided warbler	*Dendroica pensylvanica*					●
Yellow-rumped warbler	*Dendroica coronata*			●		
Black-throated gray warbler	*Dendroica nigrescens*				●	
Townsend's warbler	*Dendroica townsendi*				●	
Hermit warbler	*Dendroica occidentalis*					●
Black-throated green warbler	*Dendroica virens*					●
Blackburnian warbler	*Dendroica fusca*					●
Grace's warbler	*Dendroica graciae*					●
Palm warbler	*Dendroica palmarum*					●
Red-faced warbler	*Cardellina rubrifrons*					●
Blackpoll warbler	*Dendroica striata*					●
Black-and-white warbler	*Mniotilta varia*					●
Painted redstart	*Myioborus pictus*					●
American redstart	*Setophaga ruticilla*					●
Prothonotary warbler	*Protonotaria citrea*					●
Northern waterthrush	*Seiurus noveboracensis*			●		
MacGillivray's warbler	*Oporornis tolmei*			●		
Common yellowthroat	*Geothlypis trichas*			●		
Hooded warbler	*Wilsonia citrina*					●
Wilson's warbler	*Wilsonia pusilla*		●			
Yellow-breasted chat	*Icteria virens*					●
Hepatic tanager	*Piranga flava*				●	
Summer tanager	*Piranga rubra*					●
Western tanager	*Piranga ludoviciana*				●	
Green-tailed towhee	*Pipilo chlorurus*			●		

Table B-4. Birds Observed on Fort Bliss (Continued)

Species		*Relative Abundance*[a]				
Common Name	*Scientific Name*	*A*	*C*	*FC*	*UC*	*R*
Eastern towhee	*Pipilo erythrophthalmus*					●
Spotted towhee	*Pipilo maculatus*			●		
Canyon towhee	*Pipilo fuscus*		●			
Cassin's sparrow	*Aimophila cassinii*				●	
Rufous-crowned sparrow	*Aimophila ruficeps*		●			
Chipping sparrow	*Spizella passerina*			●		
Clay-colored sparrow	*Spizella pallida*			●		
Brewer's sparrow	*Spizella breweri*			●		
Black-chinned sparrow	*Spizella atrogularis*				●	
Vesper sparrow	*Pooecetes gramineus*			●		
Lark sparrow	*Chondestes grammacus*			●		
Black-throated sparrow	*Amphispiza bilineata*		●			
Sage sparrow	*Amphispiza belli*				●	
Lark bunting	*Calamospiza melanocorys*			●		
Savannah sparrow	*Passerculus sandwichensis*			●		
Baird's sparrow	*Ammodramus bairdii*				●	
Grasshopper sparrow	*Ammodramus savannarum*				●	
Le Conte's sparrow	*Ammodramus leconteii*					●
Fox sparrow	*Passerella iliaca*					●
Song sparrow	*Melospiza melodia*			●		
Lincoln's sparrow	*Melospiza lincolnii*			●		
Swamp sparrow	*Melospiza georgiana*				●	
White-throated sparrow	*Zonotrichia albicollis*					●
Harris's sparrow	*Zonotrichia querula*					●
White-crowned sparrow	*Zonotrichia leucophrys*		●			
Dark-eyed junco	*Junco hyemalis*		●			
McCown's longspur	*Calcarius mccownii*					●
Lapland longspur	*Calcarius lapponicus*					●
Chestnut-collared longspur	*Calcarius ornatus*		●			
Pyrrhuloxia	*Cardinalis sinuatus*			●		
Rose-breasted grosbeak	*Pheucticus ludovicianus*					●
Black-headed grosbeak	*Pheucticus melanocephalus*			●		
Blue grosbeak	*Guiraca caerulea*			●		
Lazuli bunting	*Passerina amoena*			●		
Indigo bunting	*Passerina cyanea*					●
Varied bunting	*Passerina versicolor*					●
Painted bunting	*Passerina ciris*					●
Dickcissel	*Spiza americana*				●	
Bobolink	*Dolichonyx oryzivorus*					●
Red-winged blackbird	*Agelaius phoeniceus*			●		
Eastern meadowlark	*Sturnella magna*		●			
Western meadowlark	*Sturnella neglecta*			●		
Yellow-headed blackbird	*Xanthocephalus xanthocephalus*			●		
Rusty blackbird	*Euphagus carolinus*					●
Brewer's blackbird	*Euphagus cyanocephalus*			●		
Great-tailed grackle	*Quiscalus mexicanus*			●		
Evening grosbeak	*Coccothraustes vespertinus*					●
Bronzed cowbird	*Molothus aeneus*					●

Table B-4. Birds Observed on Fort Bliss (Continued)

Species		*Relative Abundance*[a]				
Common Name	*Scientific Name*	*A*	*C*	*FC*	*UC*	*R*
Brown-headed cowbird	*Molothrus ater*			●		
Hooded oriole	*Icterus cucullatus*					●
Baltimore oriole	*Icterus galbula*					●
Bullock's oriole	*Icterus bullockii*			●		
Scott's oriole	*Icterus parisorum*		●			
Purple finch	*Carpodacus purpureus*					●
House finch	*Carpodacus mexicanus*		●			
Cassin's finch	*Carpodacus cassini*					●
Pine siskin	*Carduelis pinus*			●		
Red crossbill	*Loxia curvirostra*					●
Lawrence's goldfinch	*Carduelis lawrencei*					●
American goldfinch	*Carduelis tristis*					●
Lesser goldfinch	*Carduelis psaltria*				●	
House sparrow	*Passer domesticus*		●			
Total		*0*	*32*	*89*	*72*	*142*

[a] A = abundant, C = common, FC = fairly common, UC = uncommon, R = rare.
The most abundant category is chosen for each species. For example, if a species is common in the summer but rare in the winter, it is given a "C" delineation on this table.
Source: U.S. Army, 1994b, 1996h, 1996i, 1997g.

Therefore, it is assumed that the breeding birds in the desert portions of the South Training Areas and Doña Ana Range–North Training Areas are similar to breeding birds recorded in shrubland habitat on McGregor Range, and the breeding birds on Castner Range are similar to those recorded in the Organ Mountains. Bird life in the built-up cantonment area is typical for such areas, and species such as the house sparrow (*Passer domesticus)*, great-tailed grackle (*Quiscalus mexicanus)*, rock dove, (*Columba livia*), and house finch (*Carpodacus mexicanus*) are common.

The El Paso Oxidation Ponds occur near the cantonment area and many of the 101 species of diving birds, wading birds, waterfowl, shorebirds, gulls, and terns observed on Fort Bliss have been observed at these ponds, as well as on playa lakes and stock tanks on McGregor Range and Doña Ana Range–North Training Areas, and the South Training Areas.

Data regarding migrant and breeding birds in desert habitats on McGregor Range are available in studies of neotropical migrant and nesting birds in arroyo-riparian and upland habitats on McGregor Range (Kozma and Mathews, 1997; U.S. Army, 1997g; Kozma 1995), and in studies of avian productivity and diversity in seven habitats within the Chihuahuan Desert on McGregor Range (U.S. Army, 1996h, 1997f). Migratory and breeding bird data for the pinyon pine-juniper habitat on the Sacramento Mountains foothills and the woodlands and conifer forests of the Organ Mountains appear in Pidgeon and Mathews (U.S. Army, 1996h, 1997f) and New Mexico Natural Heritage Program (NMNHP) (U.S. Army, 1994b), respectively.

Tularosa Basin

Breeding Birds. In 1996 and 1997, 24 sites were sampled for breeding birds in the Tularosa Basin in desert shrub habitats dominated by sandsage (*Artemisia filifolia)*, mesquite, creosote, and viscid acacia (*Acacia noevernicosa*) (see Figure B-2 for map of survey locations) (U.S. Army, 1996h, 1997f). The total number of birds recorded at these four habitats increased 1.7 times from 6,092 in 1996 to 10,077 in 1997 (Table B-5). The number of species decreased from 75 in 1996 to 70 in 1997. Overall, 83 species have

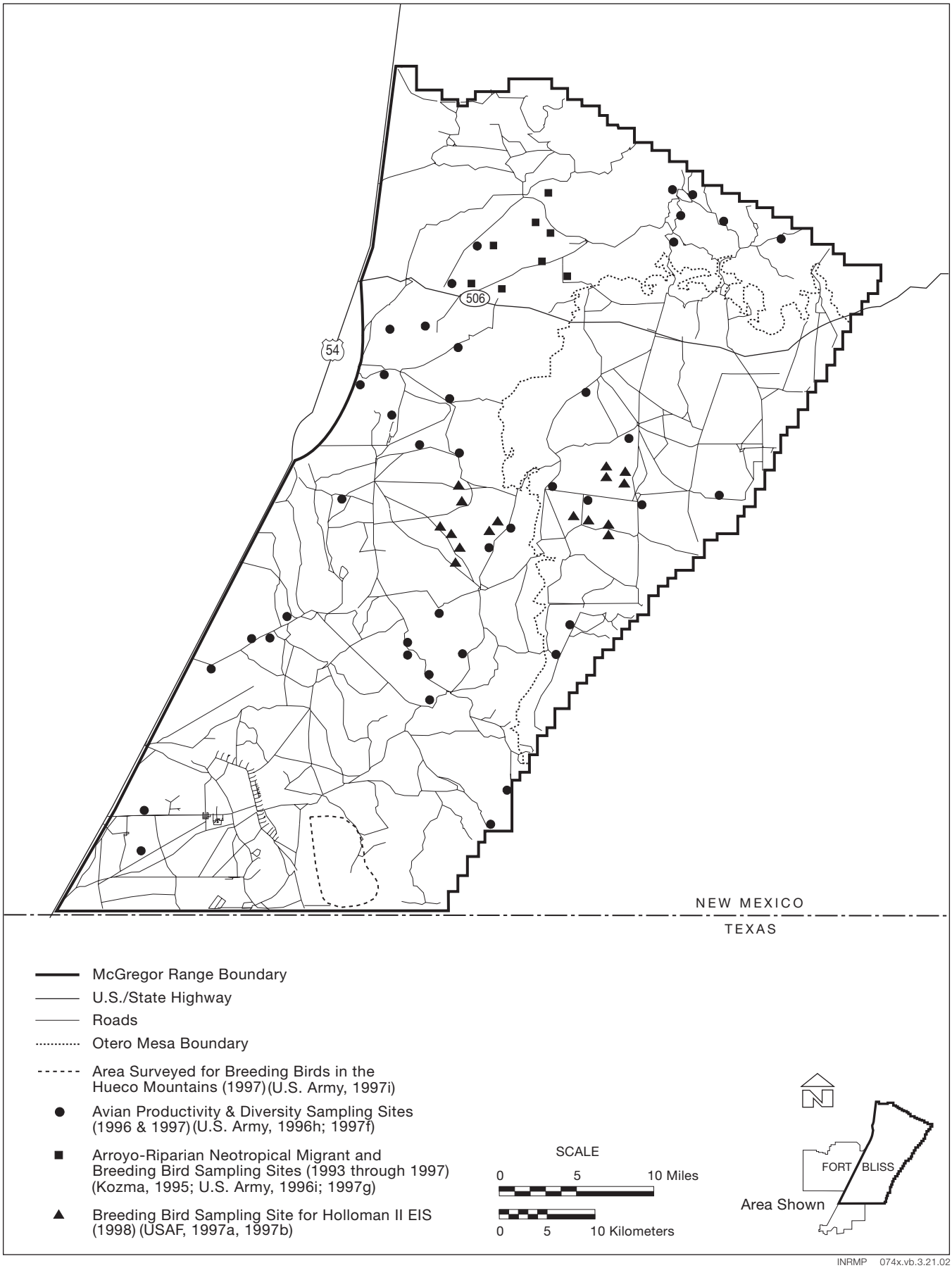

Figure B-2. Breeding Bird Survey Locations on McGregor Range.

been recorded from these four habitats over the 2-year period. In 1996, the mesquite habitat had the largest number of species (53) and individuals (1,943) and the creosotebush habitat of the least number of species (46) and individuals (1,337). In 1997, the viscid acacia habitat had the largest number of species (47) and individuals (2,743), while the creosotebush habitat had the least number of species (44) and the sandsage habitat the least number of individuals (2,315). The black-throated sparrow (*Amphispiza bilineata*) was by far the most common species recorded in all four habitats both years (2,372 in 1996 and 3,213 in 1997). In 1996, it ranged from 29 percent of the birds in the viscid acacia habitat to 44 percent of the birds in the sandsage habitat and 28 percent of the birds in the creosote and acacia habitat to 39 percent of the birds in the sandsage habitat in 1997. Other common species were Scott's oriole (*Icterus parisorum*), western kingbird (*Tyrannus verticalis*), ash-throated flycatcher (*Myiarchus cinerascens*), mouring dove (*Zenaida macroura*), northern mockingbird (*Mimus polyglottes*), pyrrhuloxia (*Cardinalis sinuatus*), cactus wren (*Campylorhynchus brunneicapillus*), house finch (*Carpodacus mexicanus*), and verdin (*Auriparus flaviceps*). All these species showed substantial increases ranging from 1.3 to 2,4 times more birds in 1997 then 1996. Cassin's sparrow showed the greatest increase from 23 birds in 1996 to 380 in 1997 or 16.5 times more birds in 1997; most of this increase took place in the creosote habitat (Table B-5).

In 1997, 718 nests of 43 species were observed compared to 453 nests of 34 species in 1996 (U.S. Army 1996h, 1997f). In the desert shrublands habitats, the largest number of nests found were for the black-throated sparrow followed by the western kingbird, cactus wren, and crissal thrasher (*Toxostoma dorsalis*). During both years, the greatest number of nests were found in the mesquite habitat which had almost twice as many nests as the next most abundant habitat in 1996, and 1.5 times more in 1997.

Table B-5. Number of Birds Observed in 24 Study Plots in the Tularosa Basin of McGregor Range

Species	*Plant community type*							
	Sandsage		*Mesquite*		*Creosote*		*Viscid acacia*	
	1996	*1997*	*1996*	*1997*	*1996*	*1997*	*1996*	*1997*
Black-throated sparrow	599	900	827	832	529	708	417	773
Western kingbird	106	215	159	206	47	81	48	56
Scott's oriole	84	185	118	142	91	152	128	157
Mourning dove	72	128	83	65	34	203	69	223
Northern mockingbird	45	29	64	40	43	48	102	388
Pyrrhuloxia	44	129	108	264	25	40	1	4
Cactus wren	40	139	74	169	62	171	61	87
Ash-throated flycatcher	33	125	85	100	82	118	126	146
Crissal thrasher	31	61	37	77	2	19	9	18
Brewers sparrow	28	26	9	52	3	53	6	7
House finch	27	18	39	34	45	48	91	163
Loggerhead shrike	21	51	7	8	17	17	9	7
Chihuahuan raven	17	57	9	26	28	38	0	2
Verdin	16	46	41	95	48	62	78	155
Scaled quail	14	61	15	51	8	79	14	133
Swainson's hawk	10	9	6	9	6	3	1	0
Green-tailed towhee	9	3	13	2	3	3	2	36
Black-tailed gnatcatcher	7	23	38	97	9	6	16	35
Brown-headed cowbird	7	16	41	108	13	30	36	86
Turkey vulture	7	11	1	6	2	6	9	13
Barn swallow	6	0	2	0	5	0	0	0

Table B-5. Number of Birds Observed in 24 Study Plots in the Tularosa Basin of McGregor Range (Continued)

Species	*Plant community type*							
	Sandsage		*Mesquite*		*Creosote*		*Viscid acacia*	
	1996	*1997*	*1996*	*1997*	*1996*	*1997*	*1996*	*1997*
Cliff swallow	6	2	0	0	4	0	1	0
Eastern meadowlark	5	7	0	1	26	81	18	20
Bullock's oriole	5	5	4	2	0	5	0	0
Gambel's quail	5	9	15	13	4	11	4	7
Blue grosbeak	4	9	7	14	22	39	13	11
Lark bunting	4	0	0	0	0	0	0	3
Blue-gray gnatcatcher	3	0	3	5	0	1	0	0
Cassin's sparrow	3	3	0	0	20	353	0	24
Northern rough-winged swallow	3	2	0	0	0	0	0	0
Common nighthawk	2	3	4	6	36	64	63	81
Greater roadrunner	2	2	6	0	1	8	0	9
Lesser nighthawk	2	3	9	13	13	32	8	5
Pine siskin	2	0	2	2	0	1	0	0
Audubon's warbler	2	2	6	9	0	2	0	0
Black-chinned hummingbird	1	0	1	0	0	1	1	0
Burrowing owl	1	0	0	0	0	0	0	0
Cassin's' kingbird	1	0	0	0	2	0	1	0
Common poorwill	1	0	2	2	0	1	0	0
Curved billed thrasher	1	1	3	21	2	2	3	12
House wren	1	0	0	0	0	0	0	3
MacGillivray's warbler	1	0	3	3	0	0	0	0
Northern flicker	1	0	1	4	0	0	0	0
Northern harrier	1	1	1	0	0	1	0	0
Red-tailed hawk	1	1	5	3	0	2	1	1
Say's phoebe	1	4	3	1	1	1	1	2
Cassin's vireo	1	1	0	0	0	1	0	0
Song sparrow	1	0	2	0	0	0	0	0
Spotted towhee	1	0	3	0	1	0	1	1
Western flycatcher	1	0	3	0	0	0	0	0
Ladder-backed woodpecker	0	6	10	14	0	1	5	1
Brewer's blackbird	0	0	8	1	3	0	13	0
Vesper sparrow	0	0	4	0	0	0	0	0
Chipping sparrow	0	7	2	1	0	0	2	6
Western tanager	0	0	2	2	1	0	0	0
Lark sparrow	0	0	2	0	0	0	2	6
Bewick's wren	0	1	1	0	0	0	0	10
Wilson's warbler	0	2	2	3	0	0	2	1
Black-throated gray warbler	0	0	1	0	0	0	0	0
Orange crowned warbler	0	0	1	0	0	0	1	0
Western bluebird	0	0	1	0	0	0	2	0
Prairie falcon	0	0	1	0	0	0	0	0
White-crowned sparrow	0	0	0	2	8	0	0	0
American kestrel	0	0	0	1	1	0	5	4
White-throated swift	0	0	0	0	2	0	0	0
Hermit thrush	0	0	0	0	1	0	0	1
Horned lark	0	1	0	0	1	4	1	0

Table B-5. Number of Birds Observed in 24 Study Plots in the Tularosa Basin of McGregor Range (Continued)

Species	*Plant community type*							
	Sandsage		*Mesquite*		*Creosote*		*Viscid acacia*	
	1996	*1997*	*1996*	*1997*	*1996*	*1997*	*1996*	*1997*
Virginia's warbler	0	0	0	0	1	0	0	0
Canyon towhee	0	0	0	0	0	1	8	11
Rufous-crowned sparrow	0	0	0	0	0	0	2	14
White-winged dove	0	0	0	0	0	0	2	2
Black-headed grosbeak	0	0	0	0	0	0	1	0
Great horned owl	0	1	0	0	0	0	1	0
Rock wren	0	0	0	0	0	0	1	5
Western meadowlark	0	0	0	0	0	0	1	2
Common raven	0	3	0	0	0	0	0	0
Western wood-pewee	0	0	0	0	0	0	0	10
Golden eagle	0	0	0	0	0	1	0	0
Sharp-shinned hawk	0	0	0	0	0	0	0	1
Broad-tailed hummingbird	0	7	0	5	0	3	0	1
Common yellow-throat	0	0	0	2	0	1	0	0
Ruby-crowned kinglet	0	0	0	1	0	0	0	0
Lesser goldfinch	0	0	0	3	0	0	0	0
Unidentified bird	77	0	49	0	85	0	62	0
Locations sampled	*6*	*6*	*6*	*6*	*6*	*6*	*6*	*6*
Number of species	*50*	*44*	*53*	*46*	*46*	*44*	*47*	*47*
Number of individuals	*1,363*	*2,315*	*1,943*	*2,517*	*1,337*	*2,502*	*1,449*	*2,743*

Source: U.S. Army, 1996h, 1997f.

Breeding bird studies at eight sample locations in arroyo-riparian habitat and surrounding uplands in the Chihuahuan Desert biome have shown that black-throated sparrow, northern mockingbird, verdin, brown-headed cowbird (*Molothrus ater)*, mourning dove, and ash-throated flycatcher are the most common species. During the first 3 years of this study (1993 through 1995), more species were detected in arroyos than uplands. The black-throated sparrow and Scott's oriole were detected more frequently in the uplands, while the remaining species were detected more frequently in the arroyos. Data collected in 1996 showed that slightly more species were detected in the uplands than in the arroyos (U.S. Army, 1996i, 1997g; Kozma, 1995). In 1997, more birds and species were detected in the arroyo-riparian habitat (U.S. Army, 1997g). A total of 1,214 nests of 32 species were detected from 1993 through 1997 (U.S. Army, 1997g). Northern mockingbirds, rock wrens (*Salpinctes obsoletus)*, and verdins nested more in arroyos, and black-throated sparrows and Scott's oriole nested more frequently in uplands. Nest density was about twice as high in arroyo habitat, and Torrey yucca, javelina bush (*Condalia warnockii)*, and little-leaf sumac were most frequently used for nesting, even though these shrubs were among the lowest in density (Kozma and Mathews, 1997).

Neotropical Migrants. Many bird species breed in North America then winter in Central and South America (called neotropical migrants). Breeding bird survey data for a 26 -year period from 1966 through 1991indicate that the population levels of the majority of neotropical migrants have remained stable or increased; some have declined throughout this period, and many other species started to decline in the early 1980s (Robbins et al., 1993). Fragmentation of the forest on the breeding grounds and the elimination of optimum tropical wintering habitat are likely the two major reasons for these declines (Flather and Saure, 1996; Sheery and Holmes, 1996). In addition, the loss of important stop-over habitat used during migration may affect the survival of neotropical migrants (Moore et al., 1993).

In the west, over 60 percent of the neotropical migrants use riparian areas for stop-over habitat during migration or for breeding (Krueper, 1993), and the importance of riparian habitat for breeding birds has been well documented (Brown and Johnson, 1985; Knopf, 1985; Knopf et al., 1988; Krueper, 1993; Szaro and Jakle, 1985). Most of these and other studies have taken place in mesic riparian areas dominated by species such as willow and cottonwoods. This type of habitat is very limited on Fort Bliss; 395 acres of montane riparian plant communities occur in the Organ Mountains. Most riparian areas consist of arroyo-riparian habitat along dry washes. Previous to recent studies currently under way at Fort Bliss, little was known about the importance of arroyo-riparian habitat for neotropical migrants and breeding birds in the Chihuahuan Desert (Kozma, 1995).

A recent study of neotropical migrants in the Chihuahuan Desert on Fort Bliss has shown that the number of individuals and species using the arroyo-riparian habitat is substantially greater than in the surrounding upland habitats (Kozma, 1995; U.S. Army, 1996i, 1997g) (Table B-6). During this 5-year study birds were mist netted in arroyo and upland habitats in the northern part of McGregor Range. A total of 26 species of neotropical migrants were captured 341 times; 290 or 85 percent of these captures were in the arroyos; all species recorded more than once were captured more frequently in arroyos than uplands. Neotropical migrants captured all 5 years included the Virginia's (*Vermivora virginiae)*, orange-crowned (*Vermivora celata)*, and Wilson's (*Wilsonia pusilla)* warblers along with the, green-tailed towhee (*Pipilo chlorurus)*, Brewer's sparrow (*Spizella breweri*), hermit thrush (*Catharus guttatus)*, and blue-gray gnatcatcher (*Polioptila caerulea*). The most frequently captured neotropical migrants were the green-tailed towhee (58 captures in arroyos and 3 in upland), Brewer's sparrow (27 and 21), Wilson's warbler (41 and 1), Virginia's warbler (22 and 5), ruby-crowned kinglet (*Regulus calendula*) (25 and 1), black-chinned hummingbird (*Archilochus alexandri*) (15 and 5), and MacGillivray's warbler (*Oporonis tolmei*) (12 and 1) (Table B-6).

During this 5-year study, 403 short-distance migrants and winter and permanent residents consisting of 25 species were captured in mist nets in arroyo and upland habitats (Table B-6). A total of 285 or 71 percent of these birds were captured in arroyos, which is 14 percent less than for neotropical migrants. Except for the sage sparrow (*Amphispiza belli*), all species were captured more frequently in arroyos than uplands. The black-throated sparrow was the most frequently netted species (100 captures) in this group and its captures were almost equally divided between arroyos (54 percent) and uplands (46 percent). Overall, 745 birds were mist netted during this 5-year study and 575 (77 percent) were captured in arroyos and 170 (23 percent) in uplands (Table B-6) (U.S. Army, 1995c, 1996g, 1997f).

These studies of nesting and migratory birds at Fort Bliss have demonstrated that arroyo-riparian areas are consistently used more than upland habitats for nesting and stop-over areas for neotropical migrants passing through the Chihuahuan Desert. As indicated in Section 6.6, approximately 3,000 miles of arroyos with well-developed channels and sides occur in the training lands of Fort Bliss.

Table B-6. Neotropical Migrant and Short Distance Migrants, Wintering, and Permanent Resident Birds Captured in Arroyos (A) and Adjacent Uplands (U) in the Tularosa Basin of McGregor Range

Species	*1993*		*1994*		*1995*		*1996*		*1997*		*Total*	
	A	*U*	*A*	*U*	*A*	*U*	*A*	*U*	*A*	*U*	*A*	*U*
Neotropical Migrants[a]												
Green-tailed towhee	11	0	8	0	6	1	19	1	14	1	*58*	*3*
Wilson's warbler	10	0	5	0	9	0	6	1	11	0	*41*	*1*
Brewer's sparrow	4	1	0	1	2	1	6	0	15	18	*27*	*21*
Ruby-crowned kinglet	4	0	4	1	0	0	14	0	3	0	*25*	*1*

Table B-6. Neotropical Migrant and Short Distance Migrants, Wintering, and Permanent Resident Birds Captured in Arroyos (A) and Adjacent Uplands (U) in the Tularosa Basin of McGregor Range (Continued)

Species	*1993*		*1994*		*1995*		*1996*		*1997*		*Total*	
	A	*U*	*A*	*U*	*A*	*U*	*A*	*U*	*A*	*U*	*A*	*U*
Neotropical Migrants[a]												
Virginia's warbler	2	0	7	5	1	0	6	0	6	0	*22*	*5*
Black-chinned hummingbird	4	1	1	0	0	0	1	0	9	4	*15*	*5*
MacGillivray's warbler	1	0	7	1	2	0	3	0	0	0	*13*	*1*
Orange-crowned warbler	5	0	2	0	1	0	1	0	4	0	*13*	*0*
Hermit thrush	2	0	3	0	1	0	2	0	3	0	*11*	*0*
Gray flycatcher	4	0	0	0	0	0	2	0	4	1	*10*	*1*
Blue-gray gnatcatcher	1	0	2	10	0	2	2	1	3	0	*8*	*4*
House wren	1	0	3	0	0	0	2	0	1	0	*7*	*0*
Dusky flycatcher	1	0	4	0	1	0	1	0	0	0	*7*	*0*
Lincoln's sparrow	0	0	0	0	0	0	1	0	5	0	*6*	*0*
Ash-throated flycatcher	2	2	0	0	0	1	3	0	0	1	*5*	*4*
Chipping sparrow	0	0	1	0	0	0	0	1	4	2	*5*	*3*
Western kingbird	2	0	0	0	0	0	1	0	1	0	*4*	*0*
Cordilleran flycatcher	1	0	0	0	1	0	1	0	0	0	*3*	*0*
Broad-tailed hummingbird	0	0	0	0	0	0	0	0	3	0	*3*	*0*
Hammond's flycatcher	1	0	0	0	1	0	0	0	0	0	*2*	*0*
Say's phoebe	0	0	1	0	0	0	1	0	0	0	*2*	*0*
Solitary vireo	0	0	0	0	0	0	1	0	0	0	*1*	*0*
Black-throated gray warbler	1	0	0	0	0	0	0	0	0	0	*1*	*0*
Warbling vireo	0	0	1	0	0	0	0	0	0	0	*1*	*0*
Audubon's warbler	0	0	0	0	0	0	0	1	0	0	*0*	*1*
Vesper sparrow	0	0	0	0	0	0	0	0	0	1	*0*	*1*
Lark bunting	0	1	0	0	0	0	0	0	0	0	*0*	*1*
Total	*57*	*4*	*49*	*9*	*25*	*5*	*73*	*5*	*86*	*28*	*290*	*52*
Short Distance Migrants and Winter and Permanent Residents												
Black-throated sparrow	9	7	9	13	2	2	14	18	20	6	*54*	*46*
White-crowned sparrow	9	1	10	9	7	0	4	0	22	3	*52*	*13*
Bewick's wren	7	1	10	1	1	0	22	7	8	1	*48*	*10*
Rufous-crowned sparrow	2	0	7	0	2	0	2	0	6	0	*19*	*0*
Canyon towhee	3	0	4	0	1	0	6	0	5	0	*19*	*0*
Verdin	3	0	4	0	0	1	11	2	0	0	*18*	*3*
Sage sparrow	0	1	0	1	0	0	2	5	11	12	*13*	*19*
Spotted towhee	0	0	0	0	1	0	3	0	8	0	*12*	*0*
Crissal thrasher	3	1	1	1	0	1	4	0	2	2	*10*	*5*
Cactus wren	2	0	1	2	0	0	1	1	4	2	*8*	*5*
Northern mockingbird	5	0	0	3	0	0	0	0	3	0	*8*	*3*
Black-tailed gnatcatcher	2	0	1	0	0	0	0	0	1	1	*4*	*1*
Pyrrhuloxia	0	0	1	0	0	0	0	0	2	0	*3*	*0*
Sage thrasher	2	0	0	1	0	0	0	0	1	1	*3*	*2*
House finch	0	1	0	0	2	0	0	1	0	0	*2*	*2*
Song sparrow	0	0	0	0	0	0	1	0	1	0	*2*	*0*
Rock wren	0	2	2	0	0	0	0	1	0	1	*2*	*4*
Short Distance Migrants and Winter and Permanent Residents (Continued)												
Loggerhead shrike	0	1	1	1	0	0	0	0	1	0	*2*	*2*
Northern flicker	0	0	0	0	0	0	1	0	0	0	*1*	*0*

Table B-6. Neotropical Migrant and Short Distance Migrants, Wintering, and Permanent Resident Birds Captured in Arroyos (A) and Adjacent Uplands (U) in the Tularosa Basin of McGregor Range (Continued)

Species	*1993*		*1994*		*1995*		*1996*		*1997*		*Total*	
	A	*U*	*A*	*U*	*A*	*U*	*A*	*U*	*A*	*U*	*A*	*U*
Neotropical Migrants[a]												
Dark-eyed junco	0	0	0	0	0	0	1	0	0	0	*1*	*0*
Gambel's quail	0	0	0	2	0	0	0	0	1	0	*1*	*2*
Mountain chickadee	0	0	0	0	0	0	0	0	1	0	*1*	*0*
Sparrow	0	0	0	0	0	0	0	0	1	0	*1*	*0*
Mourning dove	0	0	1	0	0	0	0	0	0	0	*1*	*0*
Scaled quail	0	0	0	0	0	0	0	0	0	1	*0*	*1*
Total	*47*	*15*	*52*	*34*	*16*	*4*	*72*	*35*	*98*	*30*	*285*	*118*
Grand total	*104*	*19*	*101*	*43*	*41*	*9*	*145*	*40*	*184*	*58*	*575*	*170*

[a] From Finch, 1992.
Source: Kozma, 1995; U.S. Army 1996h, 1997g.

Raptors. Data collected at 24 breeding bird sample locations in 1996 showed that the Swainson's hawk (*Buteo swainsonii)* and turkey vulture (*Cathartes aura)* were the most common raptors observed in the desert shrublands during the spring and summer of 1996 (Table B-7) (U.S. Army, 1996h). Other species observed were the red-tailed hawk (*Buteo jamaicensis)*, American kestrel (*Falco sparverius)*, northern harrier (*Circus cyaneus)*, and prairie falcon (*Falco mexicanus)*. During surveys of the Otero Mesa escarpment in March and May 1997, one breeding pair of falcons consisting of a prairie falcon and a possible prairie/peregrine falcon (*Falco peregrinus)* hybrid was reported along the escarpment in the area of Rough Canyon (USAF, 1997c, 1997d). Observations of this pair in May 1997 indicated that the nesting attempt was apparently unsuccessful. In 1997, numerous stick nests and a number of golden eagles (*Aquila chrysaetos)* were also observed, but nesting was not confirmed. However, raptor surveys in 1998 along additional segments of the Otero Mesa escarpment, as well as in the Hueco Mountains, resulted in the observation of an active golden eagle nest along the Otero Mesa escarpment just north of Pendejo Wash, and eagles but no nest along the Hueco Mountains escarpment (U.S. Army, 1999b). In 1997, the red-railed hawk, American kestrel, great horned owl (*Bubo virginianus),* and barn owl (*Tyto alba)* nested in the area of the escarpment (USAF, 1997g, 1997h). During the raptor surveys, one ferruginous hawk (*Buteo regalis)* was reported soaring over Otero Mesa above the escarpment south of Martin Canyon on March 28, 1997 (USAF, 1997c), and one immature northern aplomado falcon (*Falco femoralis)* was reported in the basin and foothill grassland habitat, also south of Martin Canyon on May 23, 1997 (USAF, 1997d); these species are discussed in more detail in Section 4.8.4 of the EIS. The northern aplomado falcon was not seen in the area during subsequent surveys (USAF, 1997b) and it is assumed that the bird was no longer in the area. Data from 9 surveys during the winter of 1994 to 1995 and 18 surveys during the winter of 1995 to 1996, along a 14.9-mile route in the desert shrubland habitat, showed that the golden eagle and red-tailed hawk were the most common wintering species in the Tularosa Basin (Table B-8).

Otero Mesa

Breeding birds. In 1996 and 1997, two sites were sampled for breeding birds in the black grama grasslands and six sites in the mesa grasslands (dominated by blue grama grass) on Otero Mesa (U.S. Army, 1996h, 1997f). An additional four sites were sampled in the black grama grasslands in the Tularosa Basin below the Otero Mesa. Results from these four sites are included in this section. In 1996, 36 species totaling 1,361 birds were tallied in the black grama grasslands and 40 species totaling

Table B-7. Raptors Observed during Breeding Bird Surveys on McGregor Range in 1996

Species	*Location*			*Total*
	Tularosa Basin (24 sampling sites)	*Sacramento Mountain Foothills (6 sampling sites)*	*Otero Mesa (12 sampling sites)*	
Turkey vulture	19 (0.8)[a]	103 (17.2)	21(1.8)	*143 (3.40)*
Swainson's hawk	23 (1.0)	0 (0.0)	4 (0.3)	*27 (0.60)*
Red-tailed hawk	7 (0.3)	6 (1.0)	8 (0.7)	*21 (0.50)*
American kestrel	6 (0.3)	0 (0.0)	2 (0.2)	*8 (0.20)*
Northern harrier	2 (0.1)	0 (0.0)	1 (0.1)	*3 (0.10)*
Prairie falcon	1 (0.04)	0 (0.0)	1 (0.1)	*2 (0.10)*
Golden eagle	0 (0.0)	1 (0.2)	0 (0.0)	*1 (0.02)*
Sharp-shinned hawk	0 (0.0)	1 (0.2)	0 (0.0)	*1 (0.02)*

[a] Number observed per sampling site.
Source: U.S. Army, 1996h.

Table B-8. Raptors Observed during Wintering Bald Eagle Surveys along Four Routes on McGregor Range during the Winters of 1994-95 and 1995-96

Species	*Winter*					
	1994-95 (9 surveys along each route)			*1995-96 (18 surveys along each route)*[a]		
	Tularosa Basin (14.9 mi)[b]	*Sacramento Mountains Foothills (29.8 mi)*[c]	*Otero Mesa (34.8 mi)*[d]	*Tularosa Basin (14.9 mi)*[b]	*Sacramento Mountain Foothills (28.9 mi)*[c]	*Otero Mesa (34.8 mi)*[d]
Golden eagle	35 (2.3)[e]	134 (4.5)	25 (0.7)	28 (1.9)	108 (3.7)	33 (0.9)
Red-tailed hawk	25 (1.7)	26 (0.9)	48 (1.4)	23 (1.5)	71 (2.5)	101 (2.9)
American kestrel	12 (0.8)	16 (0.5)	20 (0.6)	7 (0.5)	14 (0.5)	8 (0.2)
Bald eagle	1 (0.1)	26 (0.9)	1 (0.02)	0 (0.0)	13 (0.4)	1 (0.03)
Northern harrier	2 (0.1)	9 (0.3)	5 (0.1)	2 (0.1)	4 (0.1)	4 (0.1)
Prairie falcon	0 (0.0)	4 (0.1)	0 (0.0)	0 (0.0)	1 (0.03)	3 (0.1)
Sharp shinned hawk	0 (0.0)	4 (0.1)	0 (0.0)	1 (0.1)	5 (0.2)	0 (0.0)
Merlin	0 (0.0)	2 (0.1)	1(0.02)	0 (0.0)	0 (0.0)	0 (0.0)
Cooper's hawk	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.1)	0 (0.0)	0 (0.0)

[a] 17 surveys along the El Paso Route, 18 along the remainder.
[b] Grapevine Canyon route.
[c] El Paso and Culp Canyon routes.
[d] Mesa grassland route.
[e] Number seen per mile.
Source: U.S. Army, 1995b, 1996j.

1,658 individuals were recorded from the mesa grasslands (Table B-9). As in the desert shrublands habitat, there was a substantial increase in the number of birds tallied in 1997 but a reduction in the number of species; approximately twice as many birds were recorded in 1997 than 1996. In 1996, the horned lark (*Eremophila alpestris)* was the most abundant species in the mesa grassland while the eastern meadowlark (*Sturnella magna)* was the most common species observed in the black grama grasslands (Table B-9). In 1997, the eastern meadowlark was the most common species in both grassland habitats. Other common breeding bird species were the black-throated sparrow, mourning dove, and northern mockingbird. Cassin's sparrow exhibited a large increase in numbers in 1997 as it did in the desert shrubland habitat. It more than doubled in the mesa grasslands and increased from 3 to 289 in the black grama grasslands.

Table B-9. Number of Birds Observed in 12 Study Plots in Two Grassland Habitat Types on Otero Mesa, McGregor Range

Species	*Plant Communities*			
	Mesa grassland		*Black grama grassland*[a]	
	1996	*1997*	*1996*	*1997*
Horned lark	277	347	173	365
Eastern meadowlark	216	660	404	844
Black-throated sparrow	193	305	178	322
Mourning dove	191	487	41	201
Northern mockingbird	140	283	105	267
Ash-throated flycatcher	69	76	38	44
Scott's oriole	66	75	48	38
Lark sparrow	60	77	16	41
Common nighthawk	55	67	60	71
Cactus wren	45	105	25	56
Western meadowlark	45	9	2	12
Cassin's sparrow	43	112	3	289
Western kingbird	38	55	40	60
Loggerhead shrike	27	39	26	22
Brewers sparrow	15	17	8	1
Turkey vulture	15	3	6	1
Chihuahuan raven	14	10	2	6
House finch	11	26	10	11
Lark bunting	9	18	44	4
Barn swallow	7	4	1	0
Curved billed thrasher	6	11	0	7
Cliff swallow	5	2	2	0
Red-tailed hawk	5	9	3	1
Swainson's hawk	3	4	1	1
Audubon's warbler	3	0	0	0
Crissal thrasher	2	4	0	1
Bullock's oriole	2	0	0	0
Northern rough-winged swallow	2	0	1	0
Violet-green swallow	2	0	0	0
Pyrrhuloxia	1	0	1	0
Green-tailed towhee	1	0	1	0
Brown-headed cowbird	1	16	0	10
Cassin's' kingbird	1	1	1	0
Northern harrier	1	0	0	0
Say's phoebe	1	6	0	0
Spotted towhee	1	0	0	0
Prairie falcon	1	0	0	0
American kestrel	1	2	1	1
Common raven	1	6	0	0
Coopers hawk	1	0	0	0
Scaled quail	0	8	2	41
Black-tailed gnatcatcher	0	1	1	0
Gambel's quail	0	1	1	6
Lesser nighthawk	0	0	2	0
Song sparrow	0	0	1	0
Ladder-backed woodpecker	0	4	4	2

Table B-9. Number of Birds Observed in 12 Study Plots in Two Grassland Habitat Types on Otero Mesa, McGregor Range (Continued)

Species	*Plant Communities*			
	Mesa grassland		*Black grama grassland*[a]	
	1996	*1997*	*1996*	*1997*
Vesper sparrow	0	3	3	0
Chipping sparrow	0	0	7	1
Wilson's warbler	0	0	0	1
Canyon towhee	0	0	0	1
Common bushtit	0	0	0	0
Broad-tailed hummingbird	0	9	0	1
Killdeer	0	2	0	0
Unidentified bird	81	0	99	0
Locations sampled	*6*	*6*	*6*	*6*
Number of species	*40*	*37*	*36*	*32*
Number of individuals	*1,658*	*2,864*	*1,361*	*2,729*

[a] Two sampling sites on Otero Mesa and four below Otero Mesa in the Tularosa Basin.
Source: U.S. Army, 1996h, 1997f.

Breeding bird surveys were conducted twice along transects at 4 swale/upland sites (total of eight transects) in the grassland habitat of Otero Mesa in 1997 (USAF, 1997a, 1997b). Forty-five species comprising 720 individuals were recorded (Table B-10). To compare total birds recorded, only three swale/upland transect sets were used; the East Swale was excluded because the upland transect was surveyed only once. A total of 345 and 262 birds were recorded on the swales and uplands respectively; there were 32 percent more birds in the swales. For the combined results of all 8 transects, the eastern meadowlark was the most abundant species (17 percent of the total), followed by the northern mockingbird (13 percent), mourning dove (13 percent), black-throated sparrow (10 percent), horned lark (7 percent), lark sparrow (5 percent), and the cactus wren (5 percent). The eastern meadowlark, northern mockingbird, mourning dove, and cactus wren were more abundant in the swales, while the black-throated sparrow, horned lark and lark sparrow were more abundant in the uplands (Table B-10).

Table B-10. Birds Recorded during Breeding Bird Surveys in Swale and Upland Habitats in the Otero Mesa Grassland Plant Communities on Fort Bliss

Species	*South Swale*		*North Swale*		*East Swale*		*Lower South Swale*		*Total*	
	S[a]	*U*[b]	*S*	*U*	*S*	*U*	*S*	*U*	*S*	*U*
Mourning dove	11	10	18	14	16	4	7	4	*52*	*38*
Black-throated sparrow	5	15	7	28	5	2	3	4	*20*	*49*
Turkey vulture	0	0	0	0	2	0	0	1	*2*	*1*
Ash-throated flycatcher	2	5	3	3	4	1	5	0	*14*	*9*
Spotted towhee	0	0	1	0	0	0	0	0	*1*	*0*
Cactus wren	7	0	8	5	4	1	7	5	*26*	*11*
Western kingbird	4	1	6	0	4	1	6	1	*20*	*3*
Scaled quail	0	0	11	4	0	0	0	0	*11*	*4*
Brown-headed cowbird	0	0	11	1	6	0	1	0	*18*	*1*
Northern mockingbird	29	4	18	10	14	5	7	5	*68*	*24*
Eastern meadowlark	33	19	26	13	4	4	12	14	*75*	*50*
Western meadowlark	0	0	0	0	0	0	0	1	*0*	*1*

Table B-10. Birds Recorded during Breeding Bird Surveys in Swale and Upland Habitats in the Otero Mesa Grassland Plant Communities on Fort Bliss (Continued)

Species	*South Swale*		*North Swale*		*East Swale*		*Lower South Swale*		*Total*	
	S[a]	*U*[b]	*S*	*U*	*S*	*U*	*S*	*U*	*S*	*U*
Brewer's sparrow	0	0	6	0	6	0	0	1	*12*	*1*
Scott's oriole	0	1	0	2	1	0	2	1	*3*	*4*
House finch	0	0	6	0	6	0	0	0	*12*	*0*
Crissal thrasher	1	0	1	0	0	0	1	1	*3*	*1*
Pyrrhuloxia	0	0	0	0	0	1	0	0	*0*	*1*
Rock wren	0	0	1	0	0	0	0	0	*1*	*0*
Say's phoebe	0	0	1	0	1	0	2	1	*4*	*1*
Rufous-crowned sparrow	0	0	0	0	1	0	0	0	*1*	*0*
Canyon towhee	0	0	0	0	2	0	0	0	*2*	*0*
Green-tailed towhee	0	0	0	0	1	0	0	0	*1*	*0*
Dusky flycatcher	1	0	0	0	0	0	0	0	*1*	*0*
Killdeer	1	0	0	0	0	0	0	0	*1*	*0*
Hermit thrush	1	0	0	0	0	0	0	0	*1*	*0*
Lark sparrow	6	16	3	0	0	0	8	5	*17*	*21*
Western wood pewee	2	0	1	0	3	0	0	0	*6*	*0*
Sage thrasher	1	0	0	0	0	0	0	0	*1*	*0*
Curve-billed thrasher	0	0	2	0	0	0	3	0	*5*	*0*
Loggerhead shrike	2	0	4	0	2	0	0	2	*8*	*2*
Ladderback woodpecker	2	0	0	1	0	0	0	0	*2*	*1*
Lark bunting	2	0	0	0	0	0	0	0	*2*	*0*
Horned lark	2	38	0	0	0	0	4	9	*6*	*47*
Broad-tailed hummingbird	0	1	0	0	0	0	0	0	*0*	*1*
White-crowned sparrow	0	0	1	0	0	0	0	0	*1*	*0*
Red-tailed hawk	0	0	2	0	0	1	0	0	*2*	*1*
Swainson's hawk	0	0	1	0	0	0	0	0	*1*	*0*
Cassin's sparrow	4	1	5	1	0	0	0	0	*9*	*2*
Common nighthawk	6	1	5	9	2	3	1	0	*14*	*13*
Eastern kingbird	1	0	0	0	0	0	0	0	*1*	*0*
Brewers' blackbird	0	0	0	0	0	0	2	0	*2*	*0*
American kestrel	0	0	0	0	0	0	1	0	*1*	*0*
Meadowlark sp.	0	0	0	0	0	2	2	0	*2*	*2*
Black-headed grosbeak	0	0	0	0	1	0	0	0	*1*	*0*
Violet-green swallow	0	0	0	0	1	0	0	0	*1*	*0*
Cassin's kingbird	0	0	0	0	1	0	0	0	*1*	*0*
Unknown species	0	4	0	0	1	0	0	0	*1*	*4*
Number of species	*21*	*11*	*24*	*12*	*22*	*10*	*17*	*14*	*42*	*23*
Number of individuals	*123*	*116*	*148*	*91*	*88*	*25*	*74*	*55*	*433*	*287*

[a] S = Swale
[b] U = Upland.
Source: USAF, 1997a, 1997b.

Raptors. Data collected at 12 breeding bird sampling sites in 1996 on the Otero Mesa indicate that the turkey vulture was the most common species of raptor observed. Other species observed include the red-tailed hawk, Swainson's hawk, American kestrel, northern harrier, and prairie falcon (see Table B-7) (U.S. Army, 1996h). Additional species observed on Otero Mesa during the spring and summer were the golden eagle, merlin (*Falco columbarius)*, burrowing owl (*Speotyto cunicularia)*, and great horned owl. Two active red-tailed hawk nests were observed in 1997 (USAF, 1997g, 1997h). The ferruginous hawk has been observed on the mesa in the winter and spring (U.S. Army, 1994a). During surveys for wintering bald eagles (*Haliaeetus leucocephalus*), along a 34.8-mile route on Otero Mesa, the red-tailed hawk was the most common of the raptors observed (U.S. Army, 1995b, 1996j) (see Table B-8). The golden eagle and American kestrel were also fairly common wintering species.

Hueco Mountains

Breeding birds. Reconnaissance surveys for breeding birds were conducted in the Hueco Mountains on McGregor Range in June 1997 (U.S. Army, 1997i). Six routes totaling about 28 miles were traversed along arroyos and in uplands within an approximate 6,700-acre area. The habitat traversed consisted primarily of foothill desert shrub dominated by viscid acacia, creosotebush, agave (*Agave lechuguilla)*, and grama grass (U.S. Army, 1996c). Desert willow was common along the larger washes, while little sumac, tarbush, mesquite, creosotebush, prickly pear, yucca, viscid acacia, and Apache plume were frequently observed along narrower drainages. No pinyon pine/juniper habitat or other tree dominated areas were in the areas surveyed.

A total of 40 species comprising 737 individuals were recorded during 6 surveys on June 10 and 12, 1997 (Table B-11). Almost 200 black-throated sparrows (27 percent of total) were recorded, and this was the most common species encountered. Other common species were the northern mockingbird (10 percent), cactus wren (7 percent), canyon towhee (6 percent), house finch (6 percent), mourning dove (6 percent), scaled quail (*Callipepla squamata)* (5 percent), Scott's oriole (4 percent), and ash-throated flycatcher (4 percent). Scaled and Gambel's quail (*Callipepla gambelli)* were fairly common and were most frequently associated with the larger washes (U.S. Army, 1997i).

The turkey vulture and red-tailed hawk were the most frequently observed raptors in the Hueco Mountains in June 1997, while the Swainson's hawk and American kestrel were infrequently detected.

Table B-11. Birds Recorded during Breeding Bird Surveys in the Hueco Mountains, on McGregor Range, June 1977

Species	*June 10*				*June 12*				*Grand Total*
	S-1[a]	*S-2*	*S-3*	*Total*	*S-1*	*S-2*	*S-3*	*Total*	
Black-throated sparrow	31	48	22	*101*	34	51	13	*98*	*199*
Northern mockingbird	18	16	18	*52*	8	4	7	*19*	*71*
Cactus wren	12	1	7	*20*	17	3	10	*30*	*50*
Canyon towhee	7	10	11	*28*	5	6	4	*15*	*43*
House finch	17	7	2	*26*	10	6	0	*16*	*42*
Mourning dove	6	5	6	*17*	10	4	10	*24*	*41*
Scaled quail	5	10	15	*30*	1	3	5	*9*	*39*
Scott's oriole	6	3	4	*13*	9	6	1	*16*	*29*
Ash-throated flycatcher	3	5	7	*15*	8	5	0	*13*	*28*
Rock wren	1	0	11	*12*	2	7	1	*10*	*22*
Ladderback woodpecker	8	5	0	*13*	4	3	0	*7*	*20*
Rufous crowned sparrow	2	0	8	*10*	0	9	1	*10*	*20*

Table B-11. Birds Recorded during Breeding Bird Surveys in the Hueco Mountains, on McGregor Range, June 1997

Species	*June 10*				*June 12*				*Grand Total*
	S-1[a]	*S-2*	*S-3*	*Total*	*S-1*	*S-2*	*S-3*	*Total*	
Gambel's quail	3	1	6	*10*	0	4	3	*7*	*17*
Pyrrhuloxia	4	3	3	*10*	2	1	0	*3*	*13*
Blue grosbeak	0	4	1	*5*	2	2	2	*6*	*11*
Turkey vulture	1	5	2	*8*	0	2	0	*2*	*10*
Loggerhead shrike	0	2	1	*3*	1	0	4	*5*	*8*
Red-tailed hawk	3	1	1	*5*	0	2	0	*2*	*7*
Crissal thrasher	3	1	1	*5*	0	1	0	*1*	*6*
Verdin	0	5	0	*5*	0	0	1	*1*	*6*
Say's phoebe	0	2	0	*2*	0	4	0	*4*	*6*
Hummingbird sp.[b]	1	0	4	*5*	0	0	0	*0*	*5*
Western kingbird	0	1	0	*1*	3	1	0	*4*	*5*
Black-tailed gnatcatcher	0	4	0	*4*	0	0	0	*0*	*4*
Common nighthawk	0	1	1	*2*	0	2	0	*2*	*4*
Broad-tailed hummingbird	0	3	0	*3*	0	0	0	*0*	*3*
Lesser goldfinch	0	3	0	*3*	0	0	0	*0*	*3*
Brown-headed cowbird	2	0	0	*2*	1	0	0	*1*	*3*
Greater roadrunner	0	0	1	*1*	0	1	1	*2*	*3*
Lesser nighthawk	0	0	0	*0*	0	1	2	*3*	*3*
Common poorwill	1	0	1	*2*	0	0	0	*0*	*2*
White-winged dove	0	0	2	*2*	0	0	0	*0*	*2*
Swift sp.	0	0	1	*1*	0	1	0	*1*	*2*
Empidonax sp.	0	0	0	*0*	0	0	2	*2*	*2*
Thrasher sp.[b]	1	0	0	*1*	0	0	0	*0*	*1*
Black-chinned sparrow	1	0	0	*1*	0	0	0	*0*	*1*
Curve-billed thrasher	0	1	0	*1*	0	0	0	*0*	*1*
American kestrel	0	1	0	*1*	0	0	0	*0*	*1*
Black-chinned hummingbird	0	0	1	*1*	0	0	0	*0*	*1*
Eastern meadowlark	0	0	0	*0*	0	0	1	*1*	*1*
Swainson's hawk	0	0	0	*0*	0	0	1	*1*	*1*
Bunting species[c]									*1*
Number of species	*22*	*26*	*24*	*35*	*16*	*24*	*18*	*30*	*40*
Number of individuals	*136*	*148*	*137*	*421*	*117*	*129*	*69*	*315*	*737*

[a] "S-1" refers to survey number.
[b] Not counted as separate species.
[c] Suspected hybrid bunting observed at New Tank in the Hueco Mountains on June 9, 1997.
Source: U.S. Army, 1997i.

Raptor surveys were conducted along the east facing Hueco Mountain escarpment, as well as in the interior of these mountains. The red-tailed hawk, American kestrel, and golden eagle were observed along the escarpment. However, the surveys indicated that the golden eagle probably does not nest along the escarpment, although the red-tailed hawk and American kestrel may. Observations in the interior of the Hueco Mountains on McGregor Range showed that there were few cliffs that would support cliff-nesting raptors such as the golden eagle or prairie falcon, and these two species were not observed in this area. The turkey vulture, red-tailed hawk, and American kestrel were observed and these species likely nest in the Hueco Mountains (U.S. Army, 1999b). There are no data regarding wintering raptors in the Hueco Mountains, but the same species that winter elsewhere in the desert shrubland and grassland habitats on McGregor range likely occur in these mountains.

Sacramento Mountains

Breeding birds. The Sacramento Mountains foothills occur on McGregor Range, and breeding birds were sampled in the pinyon pine/juniper woods. In 1996 and 1997, six locations were sampled for nesting birds in this habitat; 2,240 birds comprised of 65 species were recorded in 1996 and 2,986 birds from 62 species were recorded in 1997 (Table B-12). Although more birds were observed in 1997, the increase was less than observed in the desert shrublands and grasslands in 1997. The most common birds recorded in 1996 were the northern mockingbird, common bushtit (*Psaltriparus minimus)*, spotted towhee (*Pipilo maculatus)*, black-chinned sparrow (*Spizella atrogularis)*, black-headed grosbeak (*Pheucticus melanocephalus)*, mourning dove, and western scrub jay (*Aphelocoma californica).* In 1997, the spotted towhee was clearly the most common species followed by the common nighthawk (*Chordeiles minor),* and the other species listed above for 1996 (U.S. Army, 1996h, 1997f) (Table B-12).

Raptors. Data collected from six breeding bird sampling locations in 1996, in the pinyon pine-juniper dominated Sacramento Mountains foothills, indicated the turkey vulture was by far the most common species of raptor observed. The red-tailed hawk was observed occasionally, while the golden eagle and sharp-shinned hawk (*Accipiter striatus)* were seen once (see Table B-7) (U.S. Army, 1996h). The bald eagle winters in small numbers in the foothills (Table B-8) (U.S. Army, 1995b, 1996j) (see Section 6.7.3 for more details on the bald eagle). During the wintering bald eagle surveys, the golden eagle was the most common species observed both winters. The red-tailed hawk was also commonly observed, especially during the winter of 1995 to 1996; the American kestrel was also a fairly common wintering species (see Table B-8) (U.S. Army, 1996j). The northern harrier, sharp-shinned hawk, prairie falcon, merlin, and Cooper's hawk (*Accipiter cooperii)*, were also observed. The great horned owl and western screech owl (*Otus kennicotti)* were detected during spotted owl (*Strix occidentalis)* surveys during the winter of 1995 to 1996; no spotted owls were observed (U.S. Army, 1996n).

Table B-12. Number of Birds Observed in Six Study Plots in the Sacramento Mountains on McGregor Range

Species	*Pinyon pine/juniper plant community*	
	1996	*1997*
Northern mockingbird	250	220
Common bushtit	222	203
Spotted towhee	209	431
Black-chinned sparrow	185	166
Black-headed grosbeak	156	275
Mourning dove	111	58
Scrub jay	107	115
Turkey vulture	103	32
House finch	94	69
Ash-throated flycatcher	78	91
Bewick's wren	78	183
Pinyon jay	77	169
Common nighthawk	50	300
Cassin's' kingbird	40	122
Juniper titmouse	39	36
Rufous-crowned sparrow	30	103
Scott's oriole	22	25
Black-chinned hummingbird	22	6
Brown-headed cowbird	20	51

Table B-12. Number of Birds Observed in Six Study Plots in the Sacramento Mountains on McGregor Range (Continued)

Species	*Pinyon pine/juniper plant community*	
	1996	*1997*
Green-tailed towhee	17	3
Western tanager	16	43
Common raven	12	22
Townsend's solitaire	12	0
Black-throated gray warbler	11	0
Audubon's warbler	10	5
Canyon towhee	10	20
Gray-headed junco	10	1
Western wood-pewee	10	10
Western kingbird	8	4
Cliff swallow	8	3
Red-tailed hawk	6	1
Plumbeous vireo	6	15
Hermit thrush	6	0
Chihuahuan raven	5	33
Wilson's warbler	5	2
Mountain chickadee	5	18
Gambel's quail	4	1
Northern flicker	4	2
White-crowned sparrow	4	0
American robin	4	3
Eastern meadowlark	3	10
Pine siskin	3	3
Virginia's warbler	3	3
Violet-green swallow	3	5
Cedar waxwing	3	0
Golden-crowned kinglet	3	0
Gray flycatcher	3	2
MacGillivray's warbler	2	1
Western bluebird	2	3
Brewers sparrow	1	0
Loggerhead shrike	1	0
Barn swallow	1	0
Blue-gray gnatcatcher	1	1
Curved billed thrasher	1	5
Say's phoebe	1	12
Rose-breasted grosbeak	1	0
Olive-sided flycatcher	1	0
Sharp-shinned hawk	1	0
Black-throated sparrow	0	4
Ruby-crowned kinglet	0	8
Crissal thrasher	0	1
Black-tailed gnatcatcher	0	7
Cassin's sparrow	0	1
Orange crowned warbler	1	1
White-throated swift	1	0
Rock wren	1	10

Table B-12. Number of Birds Observed in Six Study Plots in the Sacramento Mountains on McGregor Range (Continued)

Species	*Pinyon pine/juniper plant community*	
	1996	*1997*
Coopers hawk	1	0
Golden eagle	1	0
Hairy woodpecker	1	0
Hepatic tanager	1	3
Greater roadrunner	0	1
House wren	0	8
Ladder-backed woodpecker	0	19
Brewer's blackbird	0	1
Chipping sparrow	0	8
Lark sparrow	0	2
White-winged dove	0	3
Warbling vireo	0	4
Broad-tailed hummingbird	0	17
Summer tanager	0	1
Lesser goldfinch	0	1
Unidentified bird	133	0
Locations sampled	*6*	*6*
Number of species	*65*	*62*
Number of individuals	*2,240*	*2,986*

Source: U.S. Army, 1996h; 1997f.

Organ Mountains

Breeding Birds. Detailed studies of breeding birds in various wooded habitat types were conducted in the Organ Mountains in 1991 and 1992 (U.S. Army, 1994b). Breeding birds were counted along transects, and in most cases multiple surveys were conducted. The maximum number of individuals encountered for each species in six habitat types appears in Table B-13. A total of 53 species were recorded from the 6 habitat types and, based on Finch's analysis (Finch, 1991), 23 of these are neotropical migrants. The oak/juniper woods were sampled in 1991 and 1992 and the mourning dove was the most common species in 1991. Other commonly encountered species were the house finch, bushtit, Bewick's wren, canyon wren (*Catherpes mexicanus)*, canyon towhee (*Pipilo fuscus)*, spotted towhee, Virginia's warbler, and western wood-pewee (*Contopus sordidulus)*. In 1992, the common species in the oak/juniper habitat were the house finch, Scott's oriole, rufous-crowned sparrow (*Aimophila ruficeps)*, Gambel's quail, canyon wren, and brown-headed cowbird. The gray vireo (*Vireo vicinior)*, a State of New Mexico threatened species, was also observed in this habitat type (see Section 6.7.3 for more details).

The mixed conifer forest is dominated by Douglas fir and ponderosa pine, and the spotted towhee, Virginia's warbler, and plumbeous vireo (*Vireo plumbeus*) were the most common species. Within the ponderosa pine forest, the house finch and bushtit were common. Other common species were the canyon wren, spotted towhee, Bewick's wren, western wood-pewee, rock wren, and plumbeous vireo.

Raptors. A survey of all potential peregrine falcon habitats in the Organ Mountains resulted in the identification of 4 prairie falcon and 3 golden eagle eyries; no peregrine falcon nest sites were observed (U.S. Army, 1980a). Other raptor species observed included the American kestrel, red-tailed hawk, and

Table B-13. Birds Recorded during Breeding Bird Surveys in 1991 and 1992 in Wooded Habitat in the Organ Mountains, Fort Bliss

Species	*Habitat Types*						
	Oak/juniper		*Riparian Shrub*	*Riparian Forest*	*Mixed Conifer*	*Ponderosa Pine*	*Oak, Box Elder, Aspen*
	1991	*1992*	*1992*	*1992*	*1992*	*1991*	*1991*
Mourning dove	26	4	4	2	0	3	1
House finch	16	8	6	2	1	11	8
Bushtit	12	3	0	1	0	11	10
Bewick's wren	10	5	3	3	1	5	5
Canyon wren	10	6	10	1	0	9	7
Canyon towhee	8	2	4	0	1	4	3
Spotted towhee	8	4	0	1	5	6	7
Virginia's warbler	7	4	1	3	5	2	13
Western wood pewee	7	4	2	4	3	5	5
Rock wren	6	3	6	0	1	5	2
Black-chinned sparrow	5	4	4	4	1	2	5
Rufous-crowned sparrow	5	7	5	2	1	3	2
Black-chinned hummingbird	4	3	3	4	0	1	0
Hepatic tanager	4	3	1	2	2	4	2
Ladder-backed woodpecker	4	5	1	2	0	0	3
Scott's oriole	4	8	3	3	0	2	3
Plumbeous vireo	4	2	0	5	5	5	5
Black-headed grosbeak	3	5	1	5	3	3	4
Broad-tailed hummingbird	3	2	0	1	2	2	3
Brown-headed cowbird	3	6	1	1	0	0	0
Grace's warbler	3	0	0	0	0	1	2
Mountain chickadee	3	0	0	0	0	0	5
Violet-green swallow	3	1	0	0	2	3	4
Warbling vireo	3	0	1	0	0	4	1
Yellow-rumped warbler	3	2	0	0	2	2	1
American kestrel	2	0	1	0	0	1	0
Ash-throated flycatcher	2	3	1	1	2	1	0
Cordilleran flycatcher	2	2	0	1	1	1	5
Golden eagle	2	1	0	0	0	2	1
Lesser goldfinch	2	1	2	0	0	0	0
Phainopepla	2	1	0	0	0	0	0
Prairie falcon	2	0	0	0	0	0	0
Red-tailed hawk	2	0	0	0	0	2	1
Say's phoebe	2	1	3	0	0	1	0
Western tanager	2	4	1	1	0	1	2
White-breasted nuthatch	2	1	0	1	0	1	5
Acorn woodpecker	1	0	0	0	1	0	1
Hairy woodpecker	1	0	0	0	0	1	2
Northern flicker	1	0	0	0	1	0	0
Band-tailed pigeon	0	0	0	0	0	2	2
Black-throated sparrow	0	0	2	0	0	0	0
Cooper's hawk	0	0	0	0	0	1	0
Curve-billed thrasher	0	0	1	0	0	0	0
Gambel's quail	0	7	0	0	0	0	0
Gray vireo	0	1	0	0	0	0	0
House wren	0	1	0	0	0	0	0

Table B-13. Birds Recorded during Breeding Bird Surveys in 1991 and 1992 in Wooded Habitat in the Organ Mountains, Fort Bliss (Continued)

Species	*Habitat Types*						
	Oak/juniper		*Riparian Shrub*	*Riparian Forest*	*Mixed Conifer*	*Ponderosa Pine*	*Oak, Box Elder, Aspen*
	1991	*1992*	*1992*	*1992*	*1992*	*1991*	*1991*
Hutton's vireo	0	3	0	1	0	0	0
Northern mockingbird	0	2	0	0	0	0	0
Juniper titmouse	0	2	0	1	0	3	2
Scaled quail	0	0	1	0	0	0	0
Scrub jay	0	1	0	0	0	0	0
Sharp-shinned hawk	0	0	0	0	0	1	2
White-winged dove	0	1	0	1	0	0	0
Number of species	*39*	*38*	*25*	*25*	*19*	*35*	*33*
Number of individuals	*189*	*123*	*68*	*53*	*40*	*111*	*124*

Source: U.S. Army, 1994b.

Cooper's hawk. All these species, as well as the turkey vulture and sharp-shinned hawk were observed during breeding bird surveys in 1991 and 1992 (U.S. Army, 1994b). Skaggs (U.S. Army, 1991b) documented the occurrence of territorial great-horned owls and western screech owls in the Organ Mountains, and also observed the turkey vulture, red-tailed hawk, golden eagle, and prairie falcon.

B.2.3 Mammals

A total of 58 mammal species are known to occur, and an additional 20 species have the potential to occur on Fort Bliss (Table B-14). Seventeen species of bats occur or have the potential to occur on Fort Bliss. However, there have been few studies of bats on Fort Bliss. A maternity colony of pallid bats (*Antrozous pallidus)* currently resides at the Orogrande Range Camp, and two maternity colonies of the fringed myotis (*Myotis thysanodes)* were observed in the pinyon-juniper habitat in the Sacramento Mountains foothills on McGregor Range in 1979 (Howell, 1997; Smartt, 1980). The California myotis (*Myotis californicus)* was observed in the pinyon/juniper habitat in the Sacramento Mountains foothills and the creosotebush and the grassland habitats on Otero Mesa; this species was most common in the grassland habitat (Smartt, 1980). Surveys for bats were conducted along the Otero Mesa escarpment and nearby stock tanks that contained water in May and August 1997 (USAF, 1997f, 1997h) (see Figure B-3). During the May 1997 survey, numerous cracks, crevices, and caves were searched for bats with negative results. However, during August, surveys of selected cliff areas along the escarpment yielded small numbers of bats exiting the cliff face in numerous areas. The bats along the escarpment appear to roost in small, scattered groups and no large roost sites were observed. Western pipistrelles (*Pipistrellus hesperus)*, *Myotis*, and free-tailed bats (*Tadarida*) were observed emerging from the escarpment. Observation at four tanks in the area of the escarpment showed relatively high bat activity at Mack and Double tanks, and low activity at Martin and West Mesa Rim tanks. Various species were noted, including pipistrells, *Myotis,* and free-tail bats.

Fort Bliss conducted rodent surveys at 24 sampling sites in 12 habitat types on McGregor Range in 1997 and 1998. In 1997, trapping took place from May 12 through June 8, and 19 species comprising 941 animals were trapped during 3,600 census line trapnights (26 percent trap success) (U.S. Army, 1997k) (Table B-15). The number trapped at the two census locations for each habitat were combined in Table B-15. The most abundant species were the silky pocket mouse (*Perognathus flavus),* which was captured 189 times (20 percent of total), and Merriam's kangaroo rat (*Dipodomys merriami),* 138 times

Table B-14. Mammals Known to Occur or Could Possibly Occur on Fort Bliss

Species		*Occurrence on Fort Bliss*	
Common Name	*Scientific Name*	*Known*	*Possible*
Virginia opossum	*Didelphis virginianus*		●
Desert shrew	*Notiosorex crawfordi*	●	
Yuma myotis	*Myotis yumanensis*		●
Cave myotis	*Myotis velifera*		●
Little brown myotis	*Myotis lucifugus*		●
Long-legged myotis	*Myotis volans*		●
Fringed myotis	*Myotis thysanodes*	●	
California myotis	*Myotis californicus*	●	
Small-footed myotis	*Myotis leibii*		●
Spotted bat	*Euderma maculatum*		●
Silver-haired bat	*Lasionycteris noctivagans*	●	
Hoary bat	*Lasiurus cinereus*	●	
Western pipistrelle	*Pipistrellus hesperus*	●	
Big brown bat	*Eptesicus fuscus*	●	
Townsend's big-eared bat	*Corynorhinus townsendii*		●
Pallid bat	*Antrozous pallidus*	●	
Brazilian free-tailed bat	*Tadarida brasiliensis*	●	
Pocketed free-tailed bat	*Tadarida femorosacca*		●
Big free-tailed bat	*Nyctinomops macrotis*		●
Desert cottontail	*Sylvilagus audubonii*	●	
Eastern cottontail	*Sylvilagus floridanus*		●
Black-tailed jack rabbit	*Lepus californicus*	●	
Least chipmunk	*Tamias minimus*		●
Gray-footed chipmunk	*Tamias canipes*	●	
Gray-collared chipmunk	*Tamias cinereicollis*	●	
Organ Mountain Colorado chipmunk	*Tamias quadrivittatus australis*	●	
Texas antelope squirrel	*Ammospermophilus interpres*	●	
Spotted ground squirrel	*Spermophilus spilosoma*	●	
Thirteen-lined ground squirrel	*Spermophilus tridecimlineatus*		●
Rock squirrel	*Spermophilus variegatus*	●	
Mexican ground squirrel	*Spermophilus mexicanus*		●
Black-tailed prairie dog	*Cynomys ludovicianus*	●	
Yellow-faced pocket gopher	*Cratogeomys castanops*	●	
Botta's pocket gopher	*Thomomys bottae*	●	
Plains pocket gopher	*Geomys bursarius aernarius*		●
Silky pocket mouse	*Perognathus flavus*	●	
Plains pocket mouse	*Perognathus flavescens*	●	
Apache pocket mouse	*Perognathus apache*		●
Chihuahuan pocket mouse	*Chaetodipus eremicus*	●	
Hispid pocket mouse	*Chaetodipus hispidus*	●	

Table B-14. Mammals Known to Occur or Could Possibly Occur on Fort Bliss (Continued)

Species		*Occurrence on Fort Bliss*	
Common Name	*Scientific Name*	*Known*	*Possible*
Desert pocket mouse	*Chaetodipus penicillatus*	●	
Rock pocket mouse	*Chaetodipus intermedius*	●	
Banner-tailed kangaroo rat	*Dipodomys spectabilis*	●	
Ord's kangaroo rat	*Dipodomys ordii*	●	
Merriam's kangaroo rat	*Dipodomys merriami*	●	
Plains harvest mouse	*Reithrodontomys montanus*	●	
Western harvest mouse	*Reithrodontomys megalotis*	●	
Cactus mouse	*Peromyscus eremicus*	●	
Deer mouse	*Peromyscus maniculatus*	●	
White-footed mouse	*Peromyscus leucopus*	●	
Brush mouse	*Peromyscus boylii*	●	
Northern rock mouse	*Peromyscus nasutus*		●
Mearn's grasshopper mouse	*Onychomys arenicola*	●	
Northern short-tailed grasshopper mouse	*Onychomys leucogaster*	●	
Hispid cotton rat	*Sigmodon hispidus*	●	
Gray wood rat	*Neotoma micropus*	●	
White-throated wood rat	*Neotoma albigula*	●	
Mexican meadow mouse	*Microtus mexicanus*	●	
House mouse	*Mus musculus*	●	
Porcupine	*Erethizon dorsatum*	●	
Coyote	*Canis latrans*	●	
Kit fox	*Vulpes macrotis*	●	
Red fox	*Vulpes vulpes*		●
Gray fox	*Urocyon cinereoargenteus*	●	
Black bear	*Ursus americanus*	●	
Ringtail	*Bassariscus astutus*	●	
Raccoon	*Procyon lotor*		●
Long-tailed weasel	*Mustela frenata*	●	
Badger	*Taxidea taxus*	●	
Western spotted skunk	*Spilogale gracilis*	●	
Striped skunk	*Mephitis mephitis*	●	
Mountain lion	*Puma concolor*	●	
Bobcat	*Lynx rufus*	●	
Javelina or Collared peccary	*Dicotyles tajacu*	●	
Mule deer	*Odocoileus hemionus*	●	
Pronghorn	*Antilocapra americana*	●	
Oryx	*Oryx gazella*	●	
Desert bighorn sheep	Ovis canadensis mexicana		●
Total		*58*	*20*

Sources: U.S. Army, 1997l; Smartt, 1980.

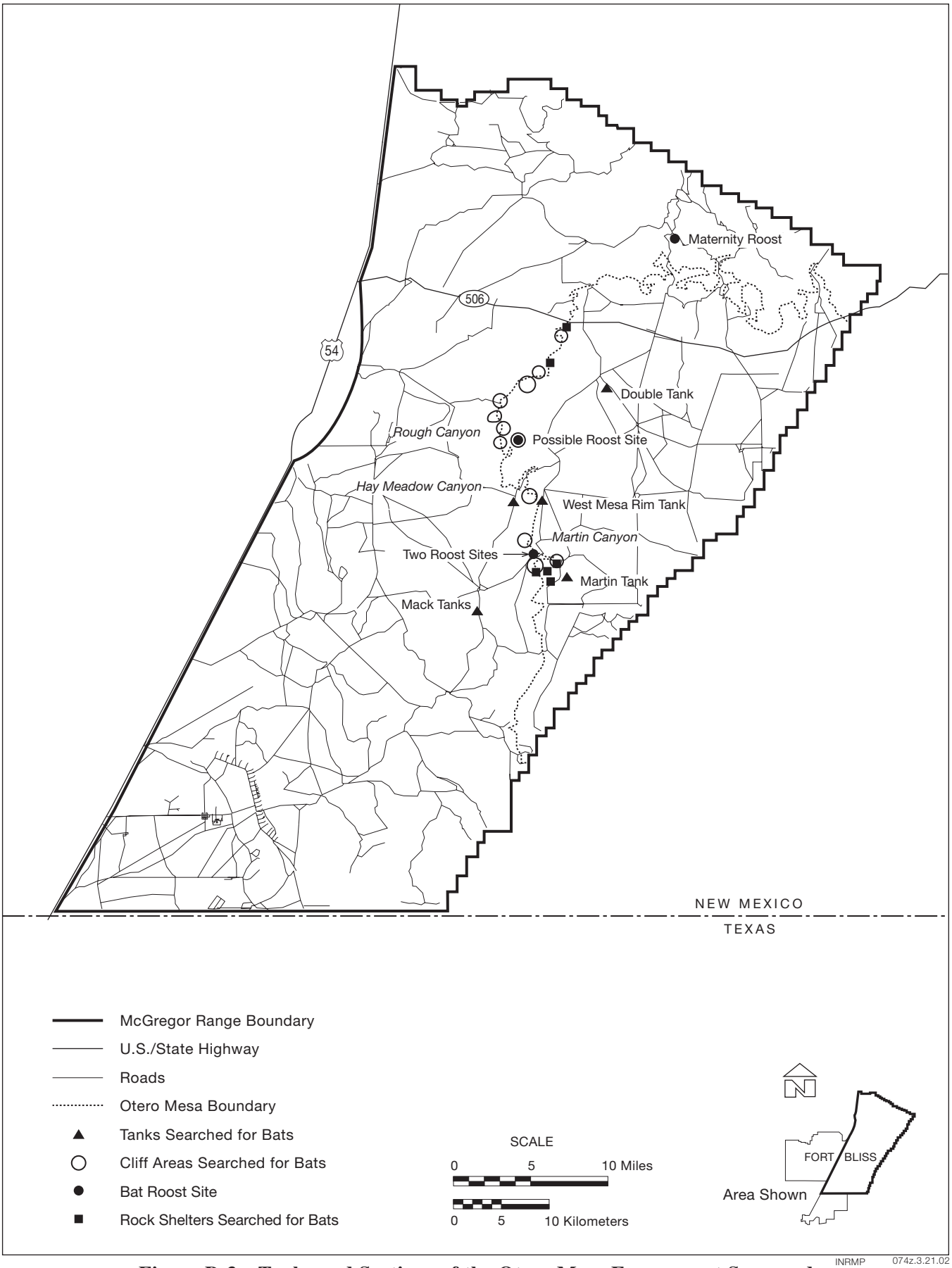

Figure B-3. Tanks and Sections of the Otero Mesa Escarpment Surveyed for Bat Fauna in 1997 and 1998.

(15 percent of total). Both these species were recorded from all but one habitat type and the silky pocket mouse was most common in the grassland habitats, while Merriam's kangaroo rat was more common in the desert scrub and arroyo habitats. Other common species were the deer mouse (*Peromyscus maniculatus)*, hispid cotton rat (*Sigmodon hispidus)*, white-footed mouse (*Peromyscus leucopus)*, cactus mouse (*Peromyscus eremicus),* western harvest mouse (*Reithrodontomys megalotis),* and Ord's kangaroo rat (*Dipodomys ordii)*. The deer mouse and white-footed mouse were found in 10 of the 12 habitats; the deer mouse was most common in the acacia scrub habitat, while the white-footed mouse was most common in the swale. The hispid cotton rat and western harvest mouse were also common in the swale, where 57 of 75 and 34 of 61 of the animals captured were in this area, respectively. Like deer mouse, the cactus mouse was most common in the acacia scrub (27 of 62 captured in this area).

The largest number of animals were captured in the swale (151) and the acacia scrub (123). The largest number of species were in the sandy arroyo scrub (14), *Chilopsis* arroyo (14), mixed desert scrub (13), acacia scrub (13), and creosote grassland (13). The lowest number of individuals (15) and species (7) were recorded in the mesquite coppice dunes. A relatively small number of individuals (41) and species (8) were also recorded in the grama grasslands (Table B-15) (U.S. Army, 1997k).

Table B-15. Mammals Recorded from 12 Habitat Types on McGregor Range

Species	*Habitat Type*												*Total*
	Desert Shrub					*Grassland*				*Arroyo/Swale*			
	DS1	*DS2*	*DS3*	*DS4*	*DS5*	*G1*	*G2*	*G3*	*G4*	*A1*	*A2*	*A3*	
Spotted ground squirrel	0	0	0[a]	0	0	1	1	0	0	0	0	0	*2*
Plains pocket mouse	0	0[a]	0[a]	0	0	0	0	0	0	1	0	0	*1*
Silky pocket mouse	16	10	0[a]	3	3	32	38	45	20	1	8	13	*189*
Chihuahuan pocket mouse	0	9	0[a]	5	13	0	0	0	2	7	0	2	*38*
Hispid pocket mouse	0	0	0	0	0[a]	2	2	7	0	0	0	0	*11*
Rock pocket mouse	0	1	0	1	24	0	0	0	19	11	3	0	*59*
Merriam's kangaroo rat	19	29	11	8	16	0	14	0	5	10	21	5	*138*
Ord's kangaroo rat	0	0[a]	3	42	0	0[a]	3	4	0	1	3	1	*57*
Banner-tailed kangaroo rat	0	0	0	0	0	0	2	0[a]	0	0	0	0	*2*
Western harvest mouse	7	0[a]	0	0[a]	1	0	2	7	0	1	9	34	*61*
Plains harvest mouse	0	0	0	0	0	0[a]	0	0[a]	0	0	12	3	*15*
Cactus mouse	1	7	0	6	27	0	0	0	10	9	2	0	*62*
White-footed mouse	7	0[a]	0	2	2	0	9	7	3	4	8	21	*63*
Deer mouse	8	10	0	9	27	0	4	2	4	9	5	13	*91*
Mearn's grasshopper mouse	3	0	0	0	1	3	5	0[a]	0	0	2	2	*16*
Short-tailed grasshopper mouse	0	2	0	9	0	3	1	0	2	1	1	0	*19*
Hispid cotton rat	11	0	0	0	1	0[a]	1	3	0	0[a]	2	57	*75*

Table B-15. Mammals Recorded from 12 Habitat Types on McGregor Range (Continued)

Species	*Habitat Type*												*Total*
	Desert Shrub					*Grassland*				*Arroyo/Swale*			
	DS1	*DS2*	*DS3*	*DS4*	*DS5*	*G1*	*G2*	*G3*	*G4*	*A1*	*A2*	*A3*	
White-throated wood rat	0	0[a]	1	4	7	0	0	0[a]	3	13	3	0	*31*
Gray wood rat	3	1	0	0	1	0	2	0	0	3	1	0	*11*
Total species	*9*	*13*	*7*	*11*	*13*	*8*	*13*	*11*	*9*	*14*	*14*	*10*	*19*
Total individuals	*75*	*69*	*15*	*89*	*123*	*41*	*84*	*75*	*68*	*71*	*80*	*151*	*941*

Notes: See Table **B-14** for scientific names. Habitat types are as follows: DS1 = creosote-tarbush scrub, DS2 = mixed desert scrub, DS3 = coppice dunes, DS4 = non-stabilized sand dune, DS5 = acacia scrub, G1 = grama grassland, G2 = creosote grassland, G3 = yucca grassland, G4 = yucca-nolina-sotol, A1 = sandy arroyo scrub, A2 = *chilopsis* arroyo, A3 = swale.
[a] Species not taken along census line but observed in habitat and, therefore, are part total species.
Source: U.S. Army, 1997k.

Other rodents observed were the Texas antelope squirrel (*Ammospermophilus interpres)*, rock squirrel (*Spermophilus variegatus)*, Botta's pocket gopher (*Thomomys bottae)*, and yellow-faced pocket gopher (*Cratogeomys castanops)*. The porcupine (*Erethizon dorsatum)*, coyote (*Canis latrans)*, badger (*Taxidea taxus),* and bobcat *(Felis rufus)* were observed (U.S. Army, 1997k). Jorgensen and Demarais (U.S. Army, 1996g) studied rodents in eight locations in arroyos and associated upland habitats in the Chihuahuan Desert for 2 years on McGregor Range. Sampling took place along an elevation gradient in the upper, middle, and lower zones of the arroyos. A total of 5,127 individuals representing 18 species of nocturnal rodents were captured during the 69,120 trap nights.

The relative abundance of rodents was greater in the arroyos than in the uplands, and at the lower elevation sites than the upper elevation sites. The white-footed mouse, deer mouse, western harvest mouse, white-throated woodrat (*Neotoma albigula),* hispid cotton rat, rock pocket mouse (*Chaetodipus intermedius),* and desert pocket mouse (*C. penicillatus)* had higher relative abundance in the arroyos than in the uplands. Merriam's kangaroo rat and the desert plains pocket mouse (*Perognathus flavescens)* were more abundant in the uplands than the arroyos. The relative abundance of rodents was over six times greater in the lower elevation arroyos than in the uplands. The pattern of higher rodent species richness and abundance was consistent for both study years, even though the number of rodents captured was 34 percent less in 1994 than 1993 (U.S. Army, 1996g).

Small mammals trapping took place at 27 sampling locations on TA 9 on the Doña Ana Range–North Training Areas, and 21 species were recorded (U.S. Army, 1992a). Ten sampling sites were in upland grassland habitat and the remaining were in arroyo/upland habitats. The banner-tailed kangaroo rat (*Dipodomys spectabilis)*, Merriam's kangaroo rat, plains pocket mouse, silky pocket mouse, and spotted ground squirrel (*Spermophilis spilosoma)* showed a strong preference for grasslands and uplands. The white-throated woodrat, cactus mouse, white-footed mouse, and hispid cotton rat were more common in arroyos (U.S. Army, 1992a).

Two lagomorphs, the desert cottontail (*Sylvilagus audubonii)* and black-tailed jackrabbit (*Lepus californicus)* are common on post. Smartt (1980) found these species to be more common in the desert shrubland habitat than the grassland habitat on Otero Mesa. The density of lagomorphs was estimated on McGregor Range from 85 transect lines totaling 141 miles in 1994, and 88 transect lines totaling 148 miles in 1995. Estimated density in 1994 was 22 lagomorphs per square mile, and 13 per square mile in 1995. The reduction from 1994 to 1995 was not statistically significant (U.S. Army, 1996k).

The coyote, kit fox (*Vulpes macrotis*), badger, and bobcat are predators in the desert shrubland and grassland habitats. The mountain lion (*Puma concolor*) was observed in the Sacramento Mountains foothills and along the Otero Mesa escarpment in 1979 (Smartt, 1980), and in Rough Canyon along the Otero Mesa escarpment in 1996 (U.S. Army, 1997k).

The kit fox on Fort Bliss is morphologically indistinguishable from its close relative the swift fox (*Vulpes velox)*; Fort Bliss is within the area where the ranges of these two species overlap. Genetic studies are currently underway to determine which species or hybrid species occurs on Fort Bliss (U.S. Army, 1996k). In 1994 and 1995, 20 kit foxes were captured and the average home range size based on radio telemetry was 795 acres in 1994 and 1,390 acres in 1995. During the study, 10 animals died and the cause of death for 3 of these was a mammalian predator (probably coyote); the remaining cause(s) were unknown. Coyote tracks were observed around all carcasses. Coyotes have been reported as a major predator on the swift fox (USFWS, 1990). The largest number of kit fox dens were in the creosotebush habitat followed by grassland/tarbush and mesquite. Arthropods comprised the largest percent of the diet followed by mammals. The highest density of arthropods was sampled in the mesquite and sandsage/saltbush dune plant communities (U.S. Army, 1996l). Although the population densities of the coyote and kit fox on McGregor Range are not known, the coyote appears to be more common, based on the collections of 1,812 canid scats during surveys of 1,525 miles of roads. Coyote scats were 2.2 and 3.6 times more common then foxes during 1994 and 1995, respectively (U.S. Army, 1996k).

The mule deer (*Odocoileus hemionus*) occurs throughout Fort Bliss and is most common in the mountainous portions, including the foothills of the Sacramento and Organ mountains. Surveys in the Sacramento Mountains foothills on McGregor Range have occurred almost annually, and from 1983 through 1995, the number of deer ranged from a high of 587 in 1984 to a low of 206 in 1995 (Table B-16) (NMDGF, 1997). During this period, there was a general decline in the mule deer population. The average number from 1983 through 1987 was 458, while the average number between 1989 and 1995 was 276. During the 1987 and 1992 surveys, the number observed north and south of New Mexico Highway 506 was determined; 79 and 90 percent of the deer recorded were north and south of New Mexico Highway 506, respectively. This indicates that the mule deer is more common in the Sacramento Mountains foothills than in the grasslands and shrublands to the south. Data from aerial surveys of the Hueco Mountains in Texas, from 1985 through 1990, indicate that the number of mule deer ranged from 1.2 to 6.1 per 1,000 acres, except for 1986 when there were an estimated 23.1 per 1,000 acres (Cantu, 1990).

The pronghorn (*Antilocapra americana*) occurs mostly in the grassland communities of the Otero Mesa and adjoining grasslands below the mesa. Pronghorns occasionally use the desert shrubland habitat in the Tularosa Basin. An estimated 500 to 700 pronghorn inhabit Otero Mesa on Fort Bliss. The oryx (*Oryx gazella)* is fairly common in the desert shrubland communities and was observed in the area of Mack Tanks in the Tularosa Basin, while sign was common at New Tank in the Hueco Mountains (USAF, 1997g; U.S. Army, 1997l). The javelina (*Dicotyles tajacu*) is uncommon on Fort Bliss and observations include one animal in an arroyo about 3 miles east of Hay Meadow Tank, and sign about 1 mile east of Martin Canyon (USAF, 1997g, 1997h).

Table B-16. Mule Deer Census Data from the Sacramento Mountains Foothills (North of New Mexico Highway 506) and the Otero Mesa Grasslands and Desert Shrublands (South of New Mexico Highway 506) on McGregor Range, Otero County, New Mexico

Year	*Number of Mule Deer*		
	North of New Mexico Highway 506	*South of New Mexico Highway 506*	*Total*
1983	544	-	*544*
1984	587	-	*587*
1985	308	-	*308*
1986	442	-	*442*
1987	323	87	*410*
1988	226	-	*226*
1989	222	-	*222*
1990	350	-	*350*
1991	319	33	*352*
1992	249	-	*249*
1993	No Survey	No Survey	*No Survey*
1994	No Survey	No Survey	*No Survey*
1995	206	-	*206*

Note: "-" = Survey data not provided for below New Mexico Highway 506.
Source: NMDGF, 1997.

APPENDIX C

FORT BLISS FORM 88

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Attachment 3: Fort Bliss Form 88

RANGE AND MANEUVER AREA REQUEST								
TO: Cdr, USAADACENFB ATTN: ATZC-B-C Range Scheduling		THRU:		FROM:		DATE: RCVD:		
ARMY ____ USAF ____ USMC ____ USN ____ RESERVE ____ NG ____ OTHER								
DATE	OCCUPATION TIMES	RANGE AREAS	WEAPON	PURPOSE	FIRING TIMES	ILLUM	MAX ORD FOR ART	# OF PERS
REMARKS: (Aerial Targets, Special Target Requirements, Area & Time of Target Presentation, etc.)								
PYROTECHNICS:(Grid/Date/Time)				BLACKOUT MARCH: (Grid/Date/Time)				
POC: (Rank/Name/Date)				SIGNATURE:		DATE:		
CO-USE INFORMATION								
POC: (PRINT/NAME/PHONE) (SIGNATURE)			UNIT		# PERS	DATE	AREA	VEHICLES

FB Form 88

Attachment 3: Fort Bliss Form 88 (Continued)

Environmental and Archaeological Assessment

TO: Cdr USAADACENFB ATTN: ATZC-B-C Range Scheduling	THRU: Cdr, USAADACENFB ATTN: ATZC-DOE Fort Bliss, TX 79916	FROM:

Request the location for action described below be evaluated for environmental and archaeological impact. Request approvals, changes, and restrictions be noted as appropriate.

Signature Date

Type of Operation:

Start Date:_____ End Date: _____ Number of Personnel:
Number of Vehicles: Total: _____ Track: _____ Wheel: _____

MANEUVER AREA	ACTIVITY	GRID COORDINATES	CHANGE/ RESTRICTION

REMARKS:	LOCATION FOR OPERATION/ACTION IS: _____ Recommend approval _____ Recommend approval w/changes DPTMS Representative DATE
Requesting unit agrees with and will implement the evaluation action with noted restrictions/changes Signature of Unit Representative	LOCATION FOR OPERATION/ACTION IS: _____ Recommend approval _____ Recommend approval w/changes DOE Representative DATE

FB Form 88

APPENDIX D

MANAGEMENT PLANS

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APPENDIX D

MANAGEMENT PLANS

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U. S. Army Air Defense Artillery Center
Fort Bliss, Texas and New Mexico

ENDANGERED SPECIES MANAGEMENT PLANS

2001 - 2006

U. S. Army Air Defense Artillery Center Fort Bliss, Texas and New Mexico
Endangered Species Management Plans
2001 - 2006

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PREFACE

U. S. Army Air Defense Artillery Center Fort Bliss, Texas and New Mexico
Endangered Species Management Plans
2001 - 2006

Army Regulation AR 200-3 requires the preparation of Endangered Species Management Plans (ESMPs) for listed and proposed threatened and endangered species and critical habitat on installations. These plans are the primary means for compliance with the Endangered Species Act. Failure to implement these ESMPs can result in costly disruptions of military operations.

AR 200-3 also encourages installations to develop ESMPs for Candidate species (currently designated as species of special concern) and to participate in conservation agreements with the Fish and Wildlife Service. Conserving species of special concern can preclude the need to list such species.

The species considered here are: one federally endangered bird [northern Aplomado falcon (falco femoralis septentrionalis)], one federally threatened bird [bald eagle (Halideetus leviocephalus)], one federally endangered plant [Sneed pincushion cactus (*Coryphantha sneedii* var. *sneedii*)], two federally endangered birds [American peregrine falcon (*Falco peregrinus anatum*) and northern aplomado falcon (*Falco femoralis septentrionalis*)], and four species of special concern, [Organ Mountain sevening primrose (*Oenothera organensis*), Hueco rock daisy (*Perityle huecoensis*), Alamo beardtongue (*Penstemon alamosensis*), and night-blooming cereus (*Peniocereus greggii* var. *greggii*)].

These ESMPs will be a component of the installation's Integrated Natural Resources Management Plan. The National Environmental Policy Act compliance requirements for implementing these plans will be covered under the Installation's Mission and Master PEIS.

Point of contact for the coordination of these plans is Keith Landreth, Chief of Conservation Division, Directorate of Environment, Fort Bliss, Texas at (915) 568-3782.

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ENDANGERED SPECIES MANAGEMENT PLAN FOR THE NORTHERN APLOMADO FALCON (*FALCO FEMORALIS SEPTENTRIONALIS*)

Fort Bliss, Texas

Prepared by

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October 2001 – September 2006

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ACRONYMS/ABBREVIATIONS

AR	Army Regulation
DOE	Directorate of Environment
ESA	Endangered Species Act of 1973
ESMP	Endangered Species Management Plan
USFWS	U.S. Fish and Wildlife Service
MACOM	Major Army Command
PF	The Peregrine Fund
T&E	Threatened and Endangered
USFS	U.S. Forest Service

EXECUTIVE SUMMARY

Background: Army regulation (AR 200-3) requires the preparation of Endangered Species Management Plans (ESMP) for listed and proposed species and critical habitat present on the installation. All Army lands are subject to this regulation. Compliance with Chapter 11 of AR 200-3 involves coordination with other Federal agencies responsible for the protection of these species. Failure to implement this management plan can lead to violation of the ESA and result in the costly disruption of military operations. This plan was developed following guidelines set in the "Manual for the preparation of installation Endangered species management plans" (Science Applications International Corporation 1995).

Current Species Status: The northern aplomado falcon (*Falco femoralis septentrionalis*) was considered extirpated from the U.S. by the mid 1950's. In 1986 the species was listed as endangered by the U.S. Fish and Wildlife Service (USFWS) under authority of the ESA (Federal Register 1986, 51:6686-6690). The species is currently state-listed as endangered in Texas and New Mexico. Due to the species' failure to recolonize its former range, the USFWS has decided to move into the reintroduction phase of the recovery plan in southern Texas (Cade et al. 1991). In recent years, there has been only one confirmed observation of an Aplomado falcon on Fort Bliss. The installation contains areas of potentially suitable Aplomado falcon habitat (Meyer 1997; U. S. Army 1998) and has been mentioned as a possible location for future reintroduction (Montoya and Tafanelli 1994).

Habitat Requirements and Limiting Factors: The northern aplomado falcon inhabits open, grassland areas with low herbaceous ground cover and relatively few scattered, tall plants that serve as perch and nest sites (USFWS 1990). Soaptree yuccas (*Yucca elata*) and Mesquite (*Prosopis glandulosa*) shrubs are commonly used as a nesting substrate by aplomados. This species is not known to construct its own nest, but instead occupies abandoned stick nests constructed by other raptor or corvid species. Aplomado falcons feed primarily on small- and medium-sized birds (Hector 1985). Currently, biologists do not have a full understanding of the critical components that make up suitable Aplomado falcon breeding habitat. However, the availability of suitable nests and a high abundance of avian prey are probably important components.

Hector (1981) reported Fort Bliss as an area having potentially suitable habitat for the Aplomado falcon. Montoya and Tafanelli (1994) visually assessed the installation and reported that a large portion of Otero Mesa appears to have the necessary structural characteristics of Aplomado falcon habitat. Meyer (1997) measured vegetation and avian prey at different sites on Fort Bliss and compared results with occupied Aplomado habitat in northern Chihuahua. Comparisons revealed that a large portion of Otero Mesa possesses vegetation physiognomy similar to that in northern Chihuahua where a population of Aplomado falcons exists.

Reasons for the decline of the Aplomado falcon in the U.S. are unknown. However, it is believed that it was related to the loss and degradation of former grassland habitat. It is believed that grazing practices and climatic factors have contributed to this degradation. (Hector 1987 and 1998).

Management Objectives: Management actions will be coordinated with land users, the Bureau of Land Management (BLM), and the USFWS to maintain areas of suitable habitat on Fort Bliss in their existing condition to allow for the natural expansion of the species breeding range. The installation will cooperate with the USFWS and other agencies to meet recovery goals set forth in the Recovery Plan (USFWS 1990). Management actions will be implemented for as long as the species remains listed.

Conservation Goals:

1) The installation's goal is to maintain its grassland / yucca habitat as a functional ecosystem. This will allow for the natural expansion of the species range.

2) Monitor the species status and monitor habitat suitability on the installation.

3) Cooperate with the USFWS and other agencies to develop a detailed model for Aplomado falcon habitat and to achieve the recovery goals set forth in the USFWS Recovery Plan (USFWS 1990).

Actions Needed: The major steps needed to satisfy the management objectives and achieve conservation goals are:

1) Conduct annual surveys to monitor the species status and document any nesting attempts. Surveys should also be carried out in conjunction with major training activities.

2) Coordinate access (hunting, training, etc.) in areas of potentially suitable habitat.

3) Stay abreast of current research on the species.

4) Participate in educating land users about the need to protect T&E species and their habitat on Fort Bliss.

1.0 INTRODUCTION

The purposes of this ESMP are: 1) to present information on the northern aplomado falcon (*Falco femoralis septentrionalis*), a federally listed endangered species; 2) to discuss the threats it would face on the installation; 3) to define conservation goals; 4) and to outline a plan for management of the species and potential habitat that will enable achievement of conservation goals. The cost of the conservation effort and impacts to other installation activities will also be discussed.

The northern aplomado falcon is a medium-sized falcon that inhabits open grassland areas and feeds primarily on small and medium-sized birds. The species was once considered a fairly common raptor within its range in the U.S. (Ligon 1961, Hector 1987) but by the mid 1950's the species had been extirpated from the U.S. However, as a result of reintroduction efforts and management practices in southern Texas, the species can once again be seen in the U.S. Despite the occurrence of potentially suitable aplomado habitat on Fort Bliss, in recent years there has been only one unconfirmed observation of the species on the installation (New Mexico Ornithological Society 1997). The species was known to have existed on lands that are now Fort Bliss.

Population declines during the first half of this century were the reason for listing this species as endangered. The exact cause of these declines is unknown. However, habitat loss and degradation of grasslands through overgrazing and drought are believed to be likely causes (Hector 1987). Persecution and specimen and egg collection may have also contributed to these declines (Meyer 1997). Without appropriate management of the species and its habitat and more reintroductions, the species may never recolonize many parts of its historic range.

This ESMP is based on and is consistent with the following law, regulation, and guidelines: ESA, Army Regulation (AR) 200-3, and USFWS northern aplomado falcon recovery plan (USFWS 1990). This plan was developed following guidelines set in the "Manual for the preparation of installation Endangered species management plans" (Science Applications International Corporation 1995).

2.0 SPECIES INFORMATION

Description - The northern aplomado falcon is a colorful, medium-sized falcon with a wingspan of approximately 3.5 feet. Aplomados are smaller than Peregrine (*Falco peregrinus*) and Prairie falcons (*Falco mexicanus*) but larger than American kestrels (*Falco sparverius*) and Merlins (*Falco columbarius*). Adults exhibit a blue-gray color on the backside and crown, a long banded tail, and a narrow pale band on the trailing edge of the wing. The underparts are light colored with a distinctive black cummerbund across the abdomen. Facial markings include broad, pale superciliary lines that join at the back of the head and a distinctive white line below the black cape. Immatures have streaking on underside and more cinnamon coloring in the breast than adults. The species was listed as endangered in accordance with the ESA by the USFWS in 1986 (Federal Register 1986, 51:6686-6690). More detailed descriptions of the species are provided by Hector (1988) and Johnsgard (1990).

Distribution - The northern aplomado falcon formerly bred in the U.S. from southern Texas westward through southern New Mexico and southeast Arizona (Ligon 1961, AOU 1983, USFWS 1990). In New Mexico, Ligon (1961) described the range as the southern portion of the state extending northwest from the Guadalupe Mountains to the base of the Sacramento Mountains, San Antonio, and Silver City. Specimen records and documented sightings indicate that the species was fairly common throughout its range until 1940, but has rarely been seen thereafter (Hector 1987). The last documented nesting of the species in the Chihuahuan Desert portions of U.S. occurred in 1952 near Deming, New Mexico (Ligon 1961) and the species was considered extirpated from the U.S. by the mid 1950's. Since then, only

occasional sightings of the species have been documented in Texas, New Mexico, and Arizona (USFWS 1990, Cade et al. 1991, Williams and Hubbard 1991, Williams 1993, Henry and Cathey 1995). However, a reintroduction effort is underway in southern Texas with captive-bred individuals being released in the Laguna Atascosa National Wildlife Refuge (Cade et al. 1991).

Reports indicate that the historical range of the Aplomado falcon included the area that is now Fort Bliss (Ligon 1961). There was an unconfirmed sighting of a juvenile aplomado falcon in the Tularosa Basin of McGregor Range in May 1997. There have been several confirmed sightings of aplomado falcons on White Sands Missile Range (WSMR), which borders Fort Bliss to the north, between 1991 and 1993 (Williams 1993). The most recent local sighting occurred northeast of Las Cruces in 1996. Currently, the closest known breeding populations of the species occur in Mexico less than 200 km south of Fort Bliss.

Habitat / Ecosystem - The northern aplomado falcon inhabits open grassland areas in the southwestern United States. Suitable habitat has low herbaceous ground cover and relatively few scattered, tall, woody plants (particularly yucca and mesquite) that serve as perch and nest sites (Hector 1981). Aplomados are not known to construct their own nests but instead occupy abandoned stick nests built by other raptor and corvid species. They commonly use nests built in tall forked yuccas. The former range of the northern aplomado falcon apparently closely overlapped that of the soaptree yucca (*Yucca elata*).

Aplomados prey primarily on small- and medium-sized birds and supplement their diet with insects, small snakes, lizards, and rodents. Montoya et al. (1997) analyzed pellets from Aplomado falcons in northern Chihuahua, Mexico. They found that avian prey made up 94% of the diet while insects accounted for the other 6%. They did not find rodents or reptiles in pellets or at pluck sites. Hector (1981, 1985) analyzed prey remains from Aplomado falcons in eastern Mexico and reported that 94% of the prey items were birds, comprising 97% of prey biomass. Insects appear to be an important component of the diet of juvenile aplomados (Montoya 1995). Quality habitat must provide a suitable nest substrate and an abundance of avian prey.

Hector (1981) reported Fort Bliss as an area having potentially suitable habitat for the Aplomado falcon. Montoya and Tafanelli (1994) visually assessed the installation and reported that a large portion of Otero Mesa appears to have the necessary structural characteristics of Aplomado falcon habitat.

Meyer (1997) and U. S. Army (1998) measured vegetation and avian prey at different sites on Fort Bliss and compared results with occupied Aplomado falcon habitat in northern Chihuahua, Mexico. Comparisons revealed that a large portion of Otero Mesa possesses vegetation physiognomy similar to that in northern Chihuahua. However, basal grass cover on the Mesa was significantly less than in occupied areas in Chihuahua, Mexico. There were also differences in the biomass and composition of potential avian prey found in the two areas (Meyer 1997). There was a significantly greater amount of biomass available in the occupied areas in Chihuahua. Numbers of birds were not significantly different. Montoya et al. (1997) found that the most common birds in both prey remains and bird counts in northern Chihuahua were meadowlarks (*Sturnella sp.)*, but the most common species in grasslands of McGregor Range were horned larks (*Eremophila alpestris*) (Meyer 1997).

Life History / Ecology - Little is known about the migratory status of this species. In eastern Mexico pairs remain on their nesting territories year-round. Historically, they apparently overwintered in the U.S. because numerous specimens were collected here during the winter months (Hector 1981, 1987). In eastern Mexico, northern aplomado falcons nest during the dry season (January-June), with most clutches being laid from March to May. Average clutch size in eastern Mexico is 2.6 eggs and incubation lasts for 31-32 days (Hector 1988). Nestlings fledge when they are 32-40 days of age and have approximately a 30 day post-fledging dependency period (Hector 1988).

Reasons for Listing - Reasons for the decline of the Aplomado falcon in the U.S. are unknown. However, it is believed that it was related to the loss and degradation of former grassland habitat (Hector 1987, Keddy Hector 1988). Persecution and specimen and egg collection may also have contributed to the decline of this species (Meyer 1997). The continued use of pesticides in eastern Mexico may be limiting the potential of this species to recolonize its former range (Hector 1987, USFWS 1990).

Conservation Measures - The USFWS has placed the northern aplomado falcon on the Endangered Species list and has developed and is implementing a recovery plan for the species (USFWS 1990). Due to failure of the species to recolonize its former range, the USFWS has decided to move into the reintroduction phase of the recovery plan in southern Texas. This region was chosen for releases because it appears to be the area where aplomado falcons last occurred in high breeding densities in the U.S. (Hector 1987, USFWS 1990) and because it is near remnant populations in Mexico. From 1986-89, Peregrine Fund, Inc. personnel released 22 aplomado falcons on or near Laguna Atascosa National Wildlife Refuge (Cade et al. 1991).

3.0 CONSERVATION GOALS

1) The installation's goal is to maintain its grassland / yucca habitat as a functional ecosystem. This will allow for the natural expansion of the species range.

2) Fort Bliss will monitor the population status and monitor habitat suitability on the installation.

3) Develop an understanding of what components make up suitable breeding habitat for Aplomado falcons by staying abreast of current research that is taking place in areas occupied by the species.

4) Fort Bliss will cooperate with the USFWS and other agencies to develop a detailed model for Aplomado falcon habitat and to achieve the recovery goals set forth in the USFWS Recovery Plan (USFWS 1990).

4.0 MANAGEMENT PRESCRIPTIONS AND ACTIONS

1) The installation will conduct annual surveys to monitor the species status and document any nesting attempts. These monitoring surveys will follow the protocol established during the baseline study (Leal et al., 1996, Meyer 1997). If aplomados are detected during these monitoring surveys, the U.S. Fish and Wildlife Service and the New Mexico Game and Fish Department will be notified and consultation will follow. Both of these agencies consider Fort Bliss to be potential habitat. These surveys will support continued training.

2) The installation will also conduct habitat evaluations every five years to assess any changes in habitat suitability, in terms of vegetation structure and prey availability.

3) As more information is gathered on habitat requirements and habitat use in areas occupied by aplomados, Fort Bliss will refine its habitat suitability map and update its management plan.

4) The potential impacts to grassland habitats due to any changes in Fort Bliss' mission will be evaluated and results from these assessments will be incorporated into this ESMP.

5) Consultation under the ESA will occur on any specific action that may affect aplomado falcons.

5.0 MONITORING

Monitoring actions are described above. These actions are focused on monitoring habitat conditions. As more is learned about the habitat requirements of aplomado falcons, Fort Bliss habitat evaluations and other monitoring actions will be revised.

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ENDANGERED SPECIES MANAGEMENT PLAN FOR THE BALD EAGLE (*HALIAEETUS LEUCOCEPHALUS*)

Fort Bliss, Texas

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ACRONYMS/ABBREVIATIONS

AR	Army Regulation
DDT	Dichloro-diphenyltrichloroethane
DOE	Directorate of Environment
ESA	Endangered Species Act of 1973
ESMG	Endangered Species Management Guidelines
ESMP	Endangered Species Management Plan
USFWS	U.S. Fish and Wildlife Service
HQDA	Headquarters, Department of the Army
MACOM	Major Army Command
NF	National Forest
NGPC	Nebraska Game and Parks Commission
NMDGF	New Mexico Department of Game and Fish
T&E	Threatened and Endangered

EXECUTIVE SUMMARY

Background: Army regulation (AR 200-3) requires the preparation of Endangered Species Management Plans for listed and proposed listed T&E species and critical habitat present on the installation. All Army lands are subject to this regulation. Compliance with Chapter 11 of AR 200-3 involves coordination with other Federal agencies responsible for the protection of these species. Failure to implement this management plan can lead to violation of the ESA and result in the costly disruption of military operations. This plan was developed following guidelines set in the "Manual for the preparation of installation Endangered species management plans" (Science Applications International Corporation 1995).

Current Species Status: The bald eagle (*Haliaeetus leucocephalus*) was recently downlisted from endangered to threatened by the U.S. Fish and Wildlife Service (USFWS) (Federal Register, 12 July 1995) under the authority of the ESA. Currently, the species is also listed as threatened in the states of Texas and New Mexico. Surveys have confirmed the presence of bald eagles on Fort Bliss from the last week in November through the first week in March with the highest number of observations occurring during January and February (Tafanelli et al. 1996).

Habitat Requirements and Limiting Factors: Bald eagles usually breed in undisturbed coastal regions, near inland lake shores, or rivers where there are large, tall trees for nesting and roosting (AOU 1983). Breeding bald eagles usually require nearby wetland areas with clean water for foraging and prefer to nest in quiet, isolated areas. Fish are the bald eagles' primary food (NGPC 1997).

Bald eagles are not so habitat specific on their wintering grounds. In some areas they winter near open water (Southern 1963, Steenhof et al. 1980) and in other wintering areas they have no association with water (Platt 1976, Grubb and Kennedy 1982). Eagles use communal roost sites on their wintering grounds and may use the same roost for several years (Steenhof 1978). Bald eagles are sensitive to disturbance in their roosting and foraging areas (Stalmaster and Newman 1978, Steenhof 1978).

Bald eagles utilize the northeastern portions of McGregor Range during the winter months (Tafanelli et al. 1996). These eagles are not associated with bodies of water. Deer and cattle carrion appear to be their primary food source. There are no documented bald eagle roost sites on Fort Bliss. However, there is a bald eagle roost site in the Lincoln National Forest (NF) less than 8 km north of Fort Bliss.

Management Objectives: Management actions will be coordinated with land users the Lincoln NF, the Bureau of Land Management (BLM), and the USFWS to maintain bald eagle foraging areas and limit disturbance in those areas, especially during the winter months. Management will be implemented for as long as the species remains listed.

Conservation Goals:

1) Maintain wintering habitat. This will proceed from maintenance of ecosystem integrity, which will result in maintenance of a diverse prey base.

2) Insure that military training impacts remain minimal in the Sacramento foothills.

3) Cooperate with the USFWS, and other agencies to achieve recovery goals set forth in the USFWS bald eagle Recovery Plan (USFWS 1982).

4) Coordinate with the BLM and the Lincoln NF in habitat management actions which would benefit eagles.

Actions Needed: The major steps needed to satisfy management objectives and achieve conservation goals are:

1) Monitor the presence of eagles at the roost the site on a monthly basis during the cold season.

2). Fort Bliss will monitor training plans in the Sacramento foothills to ensure impacts remain minimal. Current training there is limited to foot traffic, on-road travel, and these lands are safety buffer zones for other training activities.

3) Configure potential firewood cutting areas to improve foraging habitat and minimize eagle disturbance.

4) Participate in educating land users about the need to protect T&E species and their habitat on Fort Bliss.

1.0 INTRODUCTION

The purposes of ESMP for the bald eagle (*Haliaeetus leucocephalus*) are: 1) to present information on the bald eagle, a federally listed species present on Fort Bliss; 2) to discuss the threats it faces on the installation; 3) to define conservation goals; 4) and to outline a plan for the management of the species and its habitat that will enable the achievement of conservation goals. Costs of the conservation effort and impacts to other installation activities will also be discussed.

The bald eagles are a large, soaring raptor that feed primarily on fish but are opportunistic and will eat a variety of live prey and carrion. Eagles build large stick nests, usually in tall trees located near open water. The species was once common throughout the U.S. but began experiencing noticeable declines by the 1940's due primarily to pesticide-induced reproductive failure and the loss and degradation of riparian habitat. Human disturbance including shooting, poisoning, and trapping also contributed to the decline of this species.

Drastic population declines were the reason for listing the species as endangered. However, restrictions on the use of DDT, restrictions on the use of lead shot for waterfowl hunting, legal protection of individuals and their habitat, and intensive management have resulted in increasing numbers of breeding bald eagles throughout most of the U.S. (NMDGF 1997). In fact, numbers increased enough that in July 1995, under authority of the ESA, the USFWS reclassified the bald eagle from endangered to threatened (Federal Register, 12 July 1995). Despite this recent population growth, bald eagle populations could suffer declines again in the future without continued management of the species and its habitat.

This ESMP is based on and is consistent with the following law, regulation, and guidelines: ESA; Army Regulation (AR) 200-3; Headquarters, Department of the Army Endangered Species Management Guidelines (HQDA ESMG's) for the bald eagle; and the USFWS southwestern bald eagle Recovery Plan (USFWS 1982). This plan was developed following guidelines set in the "Manual for the preparation of installation Endangered species management plans" (Science Applications International Corporation 1995).

2.0 SPECIES INFORMATION

Description - The bald eagle is a large soaring bird with a 6.5 to 8.0 foot wingspan. The white head, neck, and tail make adults unmistakable. The bill of the adult is yellow and much heavier than that of the Golden eagle (*Aquila chrysaetos*). Legs of adult bald eagles are feathered halfway down the tarsus while Golden eagles have feathers covering the entire leg. Bald eagles fly with deep strokes and soar with wings flattened. Immatures are dark, mottled irregularly with white until their fourth or fifth year. Immature bald eagles have some white wing linning feathers whereas immature golden eagles have white patches at the base of inner primary flight feathers.

The bald eagle was listed as endangered by the USFWS in 1978 (Federal Register, 14 February 1978). However, as a result of increasing numbers of eagles in recent years, the USFWS downlisted the species from endangered to threatened in 1995 (Federal Register, 12 July 1995). In the spring of 1998 Secretary of Interior Babbitt included the bald eagle as one of several species to be downlisted or delisted (U. S. Interior 1998). More detailed descriptions of the species are provided by Palmer (1988) and Johnsgard (1990).

Distribution - Bald eagles are found throughout North America from the Gulf of Mexico to the Arctic. They are usually found in coastal areas, or near inland lakes, and rivers. The largest breeding populations of bald eagles are found in southern Alaska, along the western coast of Canada and Washington, around the Great Lakes, and in Florida (USFWS 1982). Nests are usually constructed in dominant or codominant

trees located 3 km or less from open water. Bald eagles winter along major rivers, reservoirs, or in areas where carrion is available. At the present time, there are no known bald eagle nests on Fort Bliss. The closest known nests are located near reservoirs along the Rio Grande river in southern New Mexico, approximately 60 miles away.

Habitat / Ecosystem - Bald eagles usually breed in undisturbed coastal regions, or near inland lake shores, or rivers where there are large, tall trees for nesting and roosting (AOU 1983). Breeding bald eagles usually require nearby wetland areas for foraging and prefer to nest in quiet, isolated areas where the water is clean. Quality breeding habitat must provide an abundant supply of fish, the primary food for nesting bald eagles.

Bald eagles are not so habitat specific on their wintering grounds. In some areas they winter near open water (Southern 1963, Steenhof et al. 1980) and in other wintering areas they have no association with water (Platt 1976, Grubb and Kennedy 1982). Eagles use communal roost sites on their wintering grounds and may use the same roost for several years (Steenhof 1978). Steenhof (1978) found that roost sites provided protection from the wind and were located in close proximity to their food source. However, eagles that winter away from open water are highly mobile and will travel long distances to locate food (Griffin and Baskett 1985). Fish are the major component of the winter diet in many areas but wintering bald eagles are very opportunistic and will feed on available waterfowl, rabbits, rodents, snakes, and carrion (Steenhof 1978, Grubb and Kennedy 1982).

Surveys were conducted on Fort Bliss during the winters of 1994-1995, 1995-1996, and 1996-1997 to confirm the presence and locations of bald eagles on the installation (Tafanelli et al. 1996, U. S. Army 1998). Another objective of the surveys was to obtain information regarding how frequently they were using the installation. These surveys confirmed the presence of bald eagles in the foothills of the Sacramento Mountains on the northeastern portion of McGregor Range. Eagles were observed using the installation from late November through early March with the highest number of observations occurring in January and February (Tafanelli et al. 1996, U. S. Army 1998). However, there are no known bald eagle roost sites on Fort Bliss. The closest known roost sites are located in the Lincoln NF, approximately 8 km north of the Fort Bliss boundary. The eagles that have been observed on Fort Bliss lands are apparently from the Lincoln NF roost. Bald eagles wintering in the Lincoln NF are not associated with bodies of water, deer and cattle carrion apparently make up an important portion of the species diet. Jackrabbits, cottontails, and other small mammals may also be components of the diet (Tafanelli et al. 1996).

Life History / Ecology - Adult bald eagles are territorial breeders that mate for life. Females lay one clutch of two to three eggs per year in a large stick nest constructed on a cliff or in a tall tree near open water. Adults incubate for 35 days before eggs hatch. After spending up to 90 days in the nest, two young usually fledge and then may have a 30-45 day post-fledging dependency period before dispersal (USFWS 1982). Young eagles do not reach sexual maturity until their fourth or fifth year. Individuals are migratory throughout much of the species' range, moving south during the winter months to find open water.

Reasons for Listing - Population declines of the bald eagle resulted primarily from pesticide induced reproductive failure and the loss and degradation of riparian habitat that the species relies on for breeding. Human disturbance, including shooting, poisoning, and trapping, have also contributed to the decline of this species. Habitat alteration, including logging, nest disturbance and destruction, and environmental contaminants seem to be the most significant threats to the species at the present time (USFWS 1995).

Conservation Measures - A major obstacle to the recovery of this species was removed when the U.S. Government placed restrictions on the use of DDT in the early 1970's. In addition, the USFWS placed

the bald eagle on its Endangered Species list and has developed and is implementing a Recovery Plan for the species (USFWS 1982). The plan calls for the protection the species as well as protection of areas used by bald eagles. Together these actions and regulations have played a major role in the recovery efforts.

3.0 CONSERVATION GOALS

1) Maintain wintering habitat. This will proceed from maintenance of ecosystem integrity, which will result in maintenance of a diverse prey base.

2) Insure that military training impacts remain minimal in the Sacramento foothills, particularly during the winter.

3) Cooperate with the USFWS and other agencies to achieve recovery goals set forth in the USFWS bald eagle Recovery Plan (USFWS 1982).

4) Coordinate with the Lincoln NF and the BLM in habitat management actions which would benefit eagles.

4.0 MANAGEMENT PRESCRIPTIONS AND ACTIONS

The major steps needed to satisfy management objectives and achieve conservation goals are:

1) Annually monitor the presence or absence of eagles on the installation by monitoring use of the roost site. This activity will be coordinated with the Lincoln NF.

2) Current training is limited to foot traffic, on-road travel, and as safety zone for missiles. Ft. Bliss will monitor training plans for the Sacramento foothills, to ensure impacts remains minimal, and try to re-locate any activities, which may degrade the habitat.

3) Configure potential firewood cutting areas to improve foraging habitat and minimize eagle disturbance.

4) Participate in educating land users about the need to protect T&E species and their habitat on Fort Bliss.

5) Consultation under the ESA will occur on any specific action that may affect bald eagles.

5.0 MONITORING PLAN

Fort Bliss DOE staff will cooperate with the US Forest Service to monitor eagle occupancy of the roost site in the Lincoln NF as a reflection of eagles foraging on Army lands.

All data from surveys and monitoring efforts will be maintained permanently by the DOE, Conservation Division personnel at Fort Bliss. Maps depicting survey routes and the location of bald eagle observations will be developed from survey data and made available to land users on a need to know basis. These maps will be incorporated into the installations GIS databases.

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ENDANGERED SPECIES MANAGEMENT PLAN FOR THE SNEED PINCUSHION CACTUS (*CORYPHANTHA SNEEDII* VAR. *SNEEDII*)

Fort Bliss, Texas and New Mexico

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October 2001 – September 2006

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ACRONYMS/ABBREVIATIONS

AR	Army regulation
BLM	U.S. Bureau of Land Management
ESA	Endangered Species Act of 1973
ESMP	Endangered Species Management Plan
FR	Federal Register
GIS	Geographic Information System
GPS	Global Positioning System
HMP	Habitat Management Plan
SPC	Sneed Pincushion Cactus
USFWS	U.S. Fish and Wildlife Service

EXECUTIVE SUMMARY

Background: Army regulation, (AR) 200-3 requires the preparation of an Endangered Species Management Plan (ESMP) for listed and proposed threatened and endangered species and critical habitat on installations. All Army land uses are subject to this regulation (AR 200-3). Compliance with Chapter 11 of AR 200-3 involves coordination with the US Department of the Interior Fish and Wildlife Service (USFWS). Failure to implement this management plan can lead to violation of the Endangered Species Act of 1973 (ESA) and result in the costly disruption of military operations. This plan was developed following guidelines set in "Manual for the Preparation of Installation Endangered Species Management Plans" (Science Applications International Corporation 1995).

Current Species Status: The Sneed pincushion cactus (SPC) [*Coryphantha sneedii* (Britt. and Rose) Berger var. *sneedii*] is listed as endangered by the USFWS as well as by Texas and New Mexico. Three populations of SPC are known from rocky outcrops on the west portion of Dona Ana Range. One of these populations is in an area designated off limits to all military actions. The other two populations are in areas where vehicle traffic is limited to roads and the plants are located in rocky areas inaccessible to vehicles. The species occurs in similar habitat in nearby mountains outside the installation. Throughout its range, SPC may be under collection pressure, but it is unknown to what extent. On Fort Bliss there is low potential for impacts from natural or ordnance caused fire, since cactus grows on rocky substrates with fuel loads too low to sustain a ground fire. Potential habitat has been identified and most of it was censused in 1997.

Habitat Requirements and Limiting Factors: The primary limiting factor for SPC is that it seems to require outcrops of fusselman dolomite, however the habitat requirements of the cactus are not fully known.

Management Objectives: SPC management objectives are for protection and maintenance of the installation's populations.

Conservation Goals:
1) Maintain and protect the three populations (with appropriate age structure) found on the installation.
2) Determine the extent of the potential habitat on the installation and protect additional populations found.

Actions Needed: The lack of military impacts to SPC populations suggests that the only actions needed are monitoring the populations and responding where possible to any declines. The major steps needed to satisfy management objectives and achieve conservation goals are as follows:
1) Finish censusing the remaining identified habitat.
2) Support the protective measures currently in place for known populations.
3) Conduct yearly monitoring according to recently developed protocol including aspects of demography and habitat.
4) If a substantial population decline is detected, Fort Bliss will investigate possible causes including collection, pests, pathogens, or pollinator unavailability.
5) DOE will request assistance from appropriate experts.

1.0 INTRODUCTION

The purposes of this Endangered Species Management Plan (ESMP) are (1) to present information on the Sneed pincushion cactus (SPC) [*Coryphantha sneedii* (Britt. and Rose) Berger var. *sneedii*], a federally listed endangered species, present on Fort Bliss; (2) to discuss the threats that SPC faces on Fort Bliss; (3) to define the installation's conservation goals for SPC; and (4) to outline a plan for management of SPC and its habitat that will enable the conservation goals. These purposes are consistent with the U. S. Fish and Wildlife Service (USFWS) SPC Recovery Plan. Cost of the conservation action and impacts to other installation activities will also be discussed.

The SPC is a small multiple stemmed cactus that grows on dolomite outcrops at elevations from 1300 to 2380 meters. The species is found in the Bishop's Cap Hills of Doña Ana County, New Mexico and Franklin Mountains of Doña Ana County, New Mexico and El Paso County, Texas. It was listed as endangered in 1979 for reasons of over-exploitation by collectors and habitat destruction due to urban expansion and road construction.

This ESMP is based on and is consistent with the ESA; AR 200-3; and the USFWS SPC Recovery Plan. This ESMP was developed following guidelines set in "Manual for the Preparation of Installation Endangered Species Management Plans" (Science Applications International Corporation 1995).

2.0 SPECIES INFORMATION

Description - Mature plants of SPC are tight clumps of up to a 100 or more stems. The mature clumps measure 30 cm or more in diameter. Often juvenile individuals are encountered and have considerably fewer stems per individual and smaller clump size. Individual stems range from 2.5 cm to 7.5 cm long and are 1 to 3 cm in diameter. Spines are white when mature and pinkish when growing (Benson 1982). Spine tips are often red or brown. Flowers are 1 cm tall and of equal diameter and are pale rose in color with pink filaments and bright orange anthers. The fruits are grayish-green or green tinged with brown or pinkish when ripe. The fruits are club-shaped up to 1.5 cm long and 6 mm in diameter (Benson 1982). The appearance has been compared to that of a pile of brussel sprouts and peas covered in white cactus spines.

SPC is sympatric with the cob cactus (*Coryphantha strobiformis* var. *strobiformis* which is also known as *C. tuberculosa* or *Mammillaria tuberculosa*), with which it shares more than a superficial resemblance. Several characters may be used to determine the species of an individual. Older stems of the cob cactus have a "corn-cob" appearance at the base, whereas, SPC stems does not acquire this effect. In general, the spines of SPC are whiter than those of the cob cactus, whose spines are generally darker and have a red under-tone. The mature stems of SPC are smaller and a mature individual of SPC contains more stems than a mature cob cactus (Benson 1982). The radial spines on cob cactus are approximately the same length, whereas on SPC the radial spines are longer on the upper side of the areole. SPC mature fruits are green and cob cactus mature fruits are red (Benson 1982).

Another sympatric species that shares a resemblance to SPC is the New Mexico coryphantha (*Coryphantha vivipara*). Stems of the New Mexico coryphantha are usually solitary and don't form clumps like SPC, although several individuals of New Mexico coryphantha may sprout nearby to each other and appear as a clump, but none of the smaller stems that are characteristic of SPC will be found in a "clump" of New Mexico coryphantha.

A more technical description of SPC is provided by Zimmerman (1985).

SPC was listed as endangered in accordance with the ESA by the USFWS November 7, 1979 [44 Federal Register (FR) 61558]. It is listed as endangered in Texas (Texas Parks and Wildlife 1996) and as a L1A (meaning endangered in New Mexico as well as listed federally) species in New Mexico (Sivinski and Lightfoot 1995).

Distribution - SPC is currently distributed throughout what it is believed to be its historic range. The species is only found in the Franklin Mountains of El Paso County, Texas and Doña Ana County, New Mexico and the Bishop Cap Hills of Doña Ana County, New Mexico (USFWS 1986, USFWS 1993). There are three known populations of SPC found on Fort Bliss. The first population found was found on a NNW-SSE trending ridge, 3.8 km east of the top of Bishop Cap, at an approximate elevation of 1450 meters (Worthington 1980). This hill is referred to as the "south hill site". The "north hill site" is on the western border of Fort Bliss approximately 2 km northwest of the south hill site. The "Webb Gap site" is located on the east slope of the northernmost extension of the Franklin Mountains and approximately 3 km north of Webb Gap proper (U. S. Army, 1998).

Habitat/Ecosystem - Sneed Pincushion Cactus occurs on calcareous outcrops on steep mountain sides, at elevations from 1300 to 2380 meters. The populations in Doña Ana County on BLM owned land are all found on Paleozoic Fusselman dolomite outcrops (BLM 1987, Seager 1981). The three populations on the installation are also found on a Fusselman dolomite outcrops (U. S. Army, 1998, Seager 1981, Worthington and Freeman 1980). SPC grows in cracks and on vertical cliffs and ledges as well as on horizontal benches of loose rock. The species is found in association with lechuguilla (*Agave lechuguilla*), cob cactus, New Mexico coryphantha, sotol (*Dasylirion wheeleri*), ocotillo (*Fouquieria splendens*), and mariola (*Parthenium incanun*) (Van Devender et. al 1993, BLM 1987, Zimmerman 1985).

Life History/Ecology - Plants of SPC have stems of two distinct types. One stem type remains small and probably serves to start new plants when broken off by animals or shifting rocks. The other stem type is larger, more rigidly attached to the substrate, and produces flowers, fruits, and seeds (USFWS 1986).

Individuals of SPC bloom 3 or 4 years after germination (USFWS 1986). Flowers close at night. Blooming period lasts for 3 to 14 days and occur in April and May (Worthington 1986). SPC are obligate outcrossers and pollination vectors are believed to be bees (Van Devender et. al 1993). Fruits are produced from three to four weeks after flowering (Zimmerman 1985). Seed dispersal agents are rodents (fruits have a prune-like odor when ripe and are green, a color not attractive to birds). Because this cactus grows on slopes, rain may distribute seeds as well (USFWS 1986).

Reasons for Listing - When SPC was first listed as endangered in 1979, the reasons for listing were given as: 1) Exploitation by individual and commercial cactus collectors; 2) Destruction of a significant population by the construction of NM 404 through Anthony Gap; 3) Urban growth of El Paso, TX; and 5) and the use of the Organ Mountains by Fort Bliss as an artillery impact area (44 FR 61558).

Worthington and Freeman (1980) reported that the Anthony Gap populations of SPC were not impacted by the construction of NM 404 through Anthony Gap. They surveyed three areas in Doña Ana Range. They found that the Fort Bliss military training mission was not impacting the known population. They hypothesized that the installation's use of Rattlesnake Ridge as a artillery range would not have extirpated a population of SPC, because Rattlesnake Ridge contained a healthy population of cob cactus, which has a similar growth form to SPC (Worthington and Freeman 1980).

The recovery plan prepared by USFWS (1986) found it difficult to determine the impact that collecting has had on SPC, since the cactus is not popular with general cactus collectors, only with specialists in rare species. The urban expansion of El Paso, Texas is viewed as a threat in the recovery plan. Fort Bliss use

of potential habitat (Rattlesnake Ridge) as an artillery range was also viewed as a potential threat to SPC. The recovery plan also states that there are large areas of apparently suitable habitat that are unoccupied by SPC, the reasons behind this are unknown, because the biology and ecology are poorly understood (USFWS 1986).

In 1987, the BLM prepared a Habitat Management Plan (HMP) for SPC. In this HMP they found that collection of SPC is still occurring. The BLM also reiterated that the construction of NM 404 and Army's use of Doña Range had no impact on populations of SPC. The BLM notes that the most significant threat to SPC on public lands is mining operations (BLM 1987).

The Van Devender et al. (1993) Status Report discounts road widening as a threat to SPC because none of the known SPC populations are adjacent to roads, but road re-routing could affect populations. The possibility of urban development affecting SPC also is discounted by Van Devender et al (1993) because populations of SPC are most often found in precarious, vertical, and unstable bedrock situations that are unlikely to be developed for urban, industrial, or recreational purposes.

Currently it is believed that collection is not a major threat to SPC. There are a number of sources of seeds and nursery grown plants. The majority of the populations of SPC are found on public land so the threat of development is minimal. However, SPC populations on BLM land have declined between 31% and 40% since 1987. A third population at Anthony Gap has made a 1% population gain in the same time period. No cause for the decline was discovered (Davis and Atchley in press). SPC populations could be in decline for reasons unrelated to collecting, urban development, or road construction.

On Fort Bliss the populations of SPC are not threatened by collection or development. The military use of the flat lands at the bottom of all three sites does not effect the populations of SPC. It is not known to what extent ordnance initiated or natural fires could harm on SPC, however, it is unlikely that fire would readily spread to the slopes where SPC is found due to the low fuel levels, steep slopes, and rockiness of the area. It is not known if the Fort Bliss populations are in a state of decline, as are the populations on BLM land in the Bishop Cap hills area (Davis and Atchley in press).

Conservation Measures - After SPC was listed as endangered in 1979, the USFWS developed and is implementing a recovery plan (USFWS 1986). The plan included the development and implementation of habitat management to alleviate the threats to SPC due to collecting and habitat modification, the enforcement of existing regulations on collecting and trade; the study of SPC population biology, and the development of public awareness, appreciation, and support for the preservation of SPC (USFWS 1986).

The BLM Habitat Management Plan (HMP) calls for informing miners of liabilities under the ESA, monitoring for illegal collecting, inventorying the public lands for other populations of SPC, establishment of permanent monitoring plots and monitoring at a minimum of three years intervals, acquisition of private and State of New Mexico lands, completion of mineral withdrawals in the range of SPC populations, removal of fusselman dolomite from the list of salable minerals, and closing the HMP area to off road vehicle use (BLM 1987).

SPC conservation activities at Fort Bliss began in 1980 with a survey was of the limestone substrate habitats of Doña Ana range. A population was found here. No SPC were found on Rattlesnake Ridge or the north end of the Franklin Mountains. (Worthington and Freeman 1980). A survey in 1991 of the portions of the Hueco Mountains found no occurrences of the SPC (Worthington 1991). A survey of suitable habitat areas on Fort Bliss was completed in 1997. Two additional populations were discovered on rocky outcrops of the area. In 1981 Seager determined that Fusselman dolomite appears to be appropriate habitat for this cactus. A preliminary survey of Rattlesnake Ridge revealed no SPC. This area will be surveyed in more detailed during CY98. Potential habitat for this species is approximately 238

hectares on Fort Bliss. The area of occupied habitat is approximately 110 hectares. One of the three populations found on the installation is off limits to training and the other two are located on rocky outcrops away from roads (National Imaging and Mapping Agency 1996).

3.0 CONSERVATION GOALS

1) Maintain and protect the three populations (with appropriate age structure) found on the installation.
2) Determine the extent of the potential habitat on the installation and protect additional populations found.

4.0 MANAGEMENT PRESCRIPTIONS AND ACTIONS

1) Continue to monitor all three populations yearly.
2) Continue to systematically survey potential habitat (fusselman dolomite outcrops).
3) Continue to monitor military training activities and avoid impacts to populations.
4) Consult under the ESA on any action that may affect SPC.

5.0 MONITORING PLAN

For the length of this ESMP, 5 years, the health of the SPC populations found on Fort Bliss will be monitored yearly. In 1997 a total of twenty-two permanent monitoring plots were established on the three sites with populations of SPC. Monitoring sites were located in areas with a variety of topographic and microhabitat features. Plots were located in concentrations of the cactus so that reproductive success and growth characteristics could be monitored more efficiently. The plots are 16m by 16m square. A rock cairn painted bright red and flagging marks each plot. The cairn was plotted on 7.5" quad sheets as well as being recorded with a Trimble GPS unit. The location information will be input into the Fort Bliss GIS files.

Individual SPC plants in the plot were marked with an aluminum tag with an unique number for the plot. For each individual a distance and bearing to the rock cairn were recorded. Plant characteristics were noted for each individual. The data recorded for each cactus were basal area, maximum stem height, stem numbers, stem maturity, dried flower presence, and amount of dead material. The microsite characteristics where each individual was found was also recorded. This information collected over a period of time will create a clear picture of major trends in the structure of the SPC populations found on post (U. S. Army, 1998).

Additionally surveys of potential SPC habitat will be made every five years, to investigate if any recruitment has occurred in those areas.

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SPECIES OF SPECIAL CONCERN MANAGEMENT PLAN FOR THE ORGAN MOUNTAIN EVENING PRIMROSE (*OENOTHERA ORGANENSIS*)

Fort Bliss, Texas and New Mexico

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October 2001 – September 2006

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ACRONYMS/ABBREVIATIONS

AR	Army regulation
BLM	U.S. Bureau of Land Management
DOE	Fort Bliss Directorate of Environment
ESA	Endangered Species Act of 1973
GIS	Geographic Information System
NMNHP	New Mexico Natural Heritage Program
OMEP	Organ Mountain Evening Primrose
SSCMP	Species of Special Concern Management Plan
WSMR	White Sands Missile Range
USFWS	United States Fish and Wildlife Service

EXECUTIVE SUMMARY

Background: Army Regulation (AR) 200-3 encourage installations to develop management plans for species of special concern. Compliance with Chapter 11 of AR 200-3 involves coordination with U.S. Department of Interior Fish and Wildlife Service (USFWS). Implementation of this management plan can avoid potential listing of the species under the Endangered Species Act of 1973 (ESA), which could result in the costly disruption of military operations. This Species of Special Concern Management Plan (SSCMP) was developed following guidelines set in "Manual for the Preparation of Installation Endangered Species Management Plans" (Science Applications International Corporation 1995).

Current Species Status: The Organ Mountain evening primrose (OMEP) (*Oenothera organensis* Munz) was previously listed as C2 species and is now considered a species of special concern for Fort Bliss. It is also a state species of concern in New Mexico. The species is restricted to the Organ Mountains in Doña Ana County, New Mexico. Its range extends from Soledad Canyon in the south to the Needles in the North. Global abundance of the species is estimated at 2,300 individuals and approximately 1380 of those individuals are found on Fort Bliss. Other individuals are found on U.S. Department of Interior Bureau of Land Management (BLM) land, White Sands Missile Range (WSMR), and private land. OEMP is susceptible to damage caused by trespass hikers and cattle. Development of the springs of the Organ Mountains could cause the disappearance of surface water that the OEMP depends on, resulting in the extirpation of various populations.

Habitat Requirements and Limiting Factors: Because OMEP requires very moist conditions (preferably associated with surface water), it is limited to the spring areas in the Organ Mountains.

Management Objectives: Management will be focused on the maintenance of the populations on the installation. Fort Bliss should coordinate with the BLM to avoid the trespass of cattle and people from the BLM lands onto the military areas in the Organ Mountains.

Conservation Goals:
1) Maintain the habitat of OMEP in the wet canyon bottoms of the Organ Mountains.
2) Maintain the populations of OMEP that are currently found on the installation.

Actions Needed: The major steps needed to satisfy management objectives and achieve conservation goals are as follows:
1) Continue monitoring permanent plots at intense enough levels to detect major shifts in the population size of OMEP.
2) Coordinate with the Las Cruces office of the BLM to prevent trespass livestock from entering the installation at Fillmore and Soledad Canyons.
3) Develop a fire management plan for the Organ Mountains that will consider the ecological requirements of the rare and endemic species of the mountains.
4) Restrict the development of the spring areas of the Organ Mountains.

1.0 INTRODUCTION

The purposes of this SSCMP are (1) to present information on the OMEP, a New Mexico listed sensitive species and species of special concern for Fort Bliss; (2) to discuss the threats that OMEP faces on Fort Bliss; (3) to define the conservation goals; and (4) to outline a plan for management of OMEP and its habitat that will enable the conservation goals.

The OMEP is an herbaceous half-shrub (to 60 cm tall) that lives in the areas around seeps, creeks, or pools in canyons of the Organ Mountains. The species is narrowly endemic to the Organ Mountains. Land owners of OMEP habitat include the BLM, private citizens, WSMR and Fort Bliss. Approximately sixty percent of the global population of OMEP is found on Fort Bliss. The population is small due to the very specific habitat needs of OMEP, which are a consequence of the historical climate changes in southern New Mexico. It is the small sized nature of the population that warrants the attention of Fort Bliss for special concern that the species not to be listed by the USFWS.

This document is consistent with AR 200-3. This SSCMP was developed following guidelines set in "Manual for the Preparation of Installation Endangered Species Management Plans" (Science Applications International Corporation 1995).

2.0 SPECIES INFORMATION

Description - The OMEP is a perennial herbaceous multi-stemmed plant that forms clumps that are 100 to 150 cm in diameter and up to 60 cm tall. Stems are rather woody, mostly greenish, hairy, spreading, and branched. Old stems are characterized by an exfoliating epidermis. Basal leaves are up to 15 cm long, arranged in a rosette, elliptic to lanceolate in shape, and toothed on the far edge of the leaf. The cauline (attached to the stem) leaves are lanceolate with crisped margins. Flowers are yellow and consist of four petals (3.5 to 5 cm long) attached to a tube 10 to 19 cm long. Fruit is a cylindrical capsule that is slightly enlarged at the tip, obtusely four angled, 3 to 4 cm long, and about 4 mm thick (Worthington 1981). A more technical description of the species can be found in Munz (1965).

The OMEP is suitably different from other evening primroses and other plants found in the area.

OMEP is not currently a federal listed species but is listed in New Mexico as L2, meaning that the plant is considered rare because of restricted distribution or low numerical density (Sivinski and Lightfoot 1995).

Distribution - OMEP is currently distributed throughout its historic range. This range is the area of the Organ Mountains (Doña Ana County, New Mexico) between Soledad Canyon and the Organ Needles. Currently the entire range of OMEP is covered by land owned by Fort Bliss, WSMR, BLM, and private citizens. OMEP has been found at Ice, Arroyo Salado, Rock Springs, Rucker, Texas, Beasley, Fillmore, Maple, North, Bar, Pete Johnson, and Soledad canyons as well as at the Narrows, Indian Hollow, and Sugarloaf Peak (DeBruin et al 1994

As a note Spellenberg (1978) suggests that OMEP has differentiated from a wider-ranging species of a time when the southwest had a wetter climate. So the distribution of OMEP is very restricted. This restriction is considered to be natural, caused by the change in the climate of the area.

Habitat/Ecosystem - OMEP is restricted to mesic canyon bottoms at elevations of 1700 to 2280 meters. It is found growing in the gravel and rocks that surround the edge of streams, pools, and seeps (Skaggs 1992).
Life History/Ecology - OMEP is a perennial half-shrub with the above ground growth dying back each winter to a perennial root stock. It can be found in bloom from July to September. Plants are self-

incompatible and are pollinated by strong-flying hawk-moths (*Hyles lineata, Manduca quinquemaculata, and Sphinx chersis*) (Levin et al 1979). Deer are thought to play an important part in the dispersal of the species. OMEP provides browse for deer, and inadvertently seeds get ingested along with leaves and shoots. Approximately 25% of seeds survive passage through the digestive track of a deer. Thus deer act as a dispersal mechanism between topographically separated colonies. Bird dispersal is unlikely because the OMEP seed is small and did not survive experimental treatments through the digestive tracks of birds. Small mammal dispersal is unlikely due to the small home ranges of animals (Ritter personal communication). However, clonal growth is probably more responsible for the majority of ramets (individuals) (Ladyman personal communication).

Reasons for Listing - OMEP is not a federally listed species; it was considered a candidate species (C2) for listing under previous laws and is now a species of special concern for Fort Bliss. OMEP is L2 species in New Mexico, meaning that its is a rare plant and has a very restricted distribution and low population numbers. A R-E-D code of 2-1-3 was assigned to the plant. This code means that the occurrence is confined to one extended population, is not endangered, and is endemic to New Mexico (Sivinski and Lightfoot 1995). OMEP is a species of special concern at Fort Bliss due to the fact that it is a very narrow endemic and the majority of the range of OMEP is situated on Fort Bliss land.

The canyons inhabited by OMEP can be impacted by a number of disturbances. They are susceptible to catastrophic floods that could wipe out an entire stand as has been documented by Skaggs (1992). Droughts also could have an effect on the species by eliminating the marginal populations (Worthington 1981). Recreational use of the Organs has been historically high and is increasing, both authorized (on BLM land) and unauthorized (through "social trails" on Fort Bliss land). This recreational use of the Organs is concentrated in the riparian areas where OMEP is found. It is unknown what effect increased usage will have (Skaggs 1992). Trespass livestock in Soledad and Fillmore Canyons cause damage in those areas by compacting the soil and trampling plants. Soil compaction affects OMEP by changing the hydrological regime, which is a major threat to the species (The Nature Conservancy of New Mexico 1996). Other changes in the hydrologic regime by new wells or diversion of the springs or runoff water would endanger the plants due to its dependence on surface water (DeBruin et al 1994).

Conservation Measures - A review in 1978 done for the BLM (Spellenberg 1978) suggested that even though there are several eminent threats to OMEP, the species is not in any serious danger of decline. A review in 1981 for the USFWS (Worthington 1981) suggested not listing the plant because it is not threatened or endangered.

A baseline dataset of locations for Fort Bliss stands of OMEP was created between 1990 and 1994 for Fort Bliss by the New Mexico Natural Heritage Program (NMNHP). After this baseline dataset was constructed, permanent monitoring plots were installed in Fillmore, North, Soledad, Rucker, Glendale, Salado, and Beasley Canyons. These plots have been monitored through the summer of the 1997. The plots were marked permanently so they can be revisited in the future (Mehlhop et al 1997).

3.0 CONSERVATION GOALS

1. The installation goal for the OMEP is to maintain the current population. To meet this goal Fort Bliss needs to continue monitoring the species to detect any changes in the size of the population.

2. Maintain the habitat of OMEP in the wet canyon bottoms of the Organ Mountains.

4.0 MANAGEMENT PRESCRIPTIONS AND ACTIONS

The management actions to preserve the OMEP will also benefit the other species of special concern in the Organ Mountains, including Standley's whitlowgrass (*Draba standleyi*), Organ Mountains pincushion cactus (*Coryphantha organensis*), Organ Mountains figwort (*Scrophularia laevis*), nodding cliff daisy (*Perityle cernua*), Organ Mountains chipmunk (*Eutamias quadrivittatus australis*), and several land snails (*Ashmunella organensis, A. auriculata, A. todseni*, and the new species *A. beasleyi*). The Organ Mountains also contain potential habitat suitable for the peregrine falcon (*Falco peregrinus*), a recently delisted raptor. There are historical records of the federally threatened Mexican spotted owl (*Strix occidentalis lucida*) in these mountains. The habitat of these species are not the same as OMEP, but the protection of the important canyon systems and associated water sources in the Organ Mountains will have benefits for all species. An ecosystem-based approach to the protection of the Organ Mountains is biologically appropriate given the great number of species of special concern found there. The military use of the Organ Mountains as a secondary impact area should be easily incorporated in to such an ecosystem based approach.

The border between Fort Bliss and the BLM lands (most importantly Dripping Springs Natural Area and Aguirre Springs Recreational Area) to the west and the north is subject to livestock and recreational trespass. Most livestock trespass occurs in Fillmore and Soledad Canyons, and recreational trespass most often occurs in Fillmore Canyon. Fillmore Canyon and its watershed contain populations of OMEP as well as most of the other species of special concern and is one of the most outstanding natural botanical areas in New Mexico (DeBruin et al 1994). To protect the Fillmore Canyon area, Fort Bliss will take active steps to exclude the trespass cattle from the area. On two occasions (October 1996 and March 1997), salt licks were found at Fillmore Spring (Ladyman personal communication). The construction and maintenance of a fence on the boundary between the BLM property and Fort Bliss should be considered with the possibility of placing turnstiles to prevent the cutting of the fence by recreational trespassers. Also Fort Bliss will take legal actions to prevent the illegal trespass of cattle.

The relatively wet microhabitat where OMEP occurs was relatively unaffected by the large fire of 1994 (U. S. Army 1998). However, the changes in rates of sedimentation and erosion after the fire could have an effect on populations. Development of a fire plan in the Organ Mountains is far from complete and not necessarily important to the OMEP; however, a fire plan would contribute greatly to the ecosystem management of the Organ Mountains. A let-burn policy for areas inhabited by OMEP for natural fires would be appropriate as a fire should not harm populations.

Monitoring populations and protocols for OMEP have been setup for Fort Bliss by the NMNHP (Melhop et al. 1997). Monitoring of the major populations of OEMP as well as the outlying populations of the species should be continued to determine population changes. If a population decline of 25% is detected in three consecutive years, Fort Bliss should actively investigate the cause of the decline and attempt to protect the population from further decline.

Restrictions upon spring development in the Organs should also be implemented. OMEP is dependent on the surface water that is provided by the springs and any changes in the springs will result in changes in the populations of the OMEP as well.

5.0 MONITORING PLAN

In 1996, twenty-seven permanent monitoring plots for OMEP were installed in Fillmore (10 plots), North (8), Soledad (4), Rucker (3), Glendale (1), Salado (1), and Beasley Canyons (1). Plots were placed in areas of high plant density or in areas at the edge of the range. NMNHP also selected permanent plot locations in areas where data had been taken previous to 1994. The large number of plots found in Fillmore and North Canyons is due to the fact that those canyons are also used in a study of fire effects (U. S. Army 1998).

Permanent plots are marked by a 61cm x 1 cm white rebar post being anchored on the side of the drainage in a location secure from being washed away. The plot is the width of the channel ten meters up- and ten meters down- from the rebar. Number of plants are therefore described as "density per 20m of channel length." Size class of plants was also recorded. The size classes were: rosette, less than 0.5m across, 0.5 to 1.0m across, and greater than 1.0m across (U. S. Army 1998)

In addition to the permanent monitoring plots, distances between plants were measured in Fillmore, North, Glendale, and Salado Canyons as a second monitoring method that will indicate changes in the status of the population of each canyon. This study has also supplied information on the spatial distribution of the plants. A description (and diagram) of this secondary monitoring scheme can be found in U. S. Army (1998).

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SPECIES OF SPECIAL CONCERN MANAGEMENT PLAN FOR THE HUECO ROCK DAISY (*PERITYLE HUECOENSIS*)

Fort Bliss, Texas and New Mexico

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ACRONYMS/ABBREVIATIONS

AR	Army regulation
DOE-C	Directorate of Environment - Cultural and Natural Resources Division
ESA	Endangered Species Act of 1973
GIS	Geographic Information System
GPS	Global Positioning System
HRD	Hueco Rock Daisy
SSCMP	Species of Special Concern Management Plan
USFWS	U.S. Fish and Wildlife Service

EXECUTIVE SUMMARY

Background: Army regulation (AR) 200-3 encourages installations to develop management plans for species of special concern. Compliance with Chapter 11 of AR 200-3 involves coordination with U.S. Fish and Wildlife Service (USFWS). Implementation of this management plan can avoid potential listing of the species under the Endangered Species Act of 1973 (ESA) which could result in the costly disruption of military operations. This Species of Special Concern Management Plan (SSCMP) was developed following guidelines set in "Manual for the Preparation of Installation Endangered Species Management Plans" (Science Applications International Corporation 1995).

Current Species Status: The Hueco rock daisy (HRD) (*Perityle huecoensis* Powell) is a species of special concern for Fort Bliss. The only known populations of the plant are found in the installation's South Training Areas.
There are no known populations of HRD found outside Fort Bliss. This species may be vulnerable to damage during exercises that utilize the cliff faces (rappelling or rock climbing for example) of the canyon systems where the populations are located.

Habitat Requirements and Limiting Factors: The HRD grows on limestone cliff sides and bases (1300 to 1500 meters in elevation) in narrow mesic canyons with high north-facing walls.

Management Objectives: The installation's management objectives for the HRD is to maintain the populations that are found in the South Training Areas.

Conservation Goals:
1) The installation goal is to maintain the two known populations at the current population levels.

Actions Needed: The installation training mission has few conflicts with the conservation of HRD. Canyon systems where the plant is found are sensitive to maneuvers that utilize the cliff face. The major steps needed to satisfy management objectives and achieve conservation goals for HRD are:

1) Monitoring of the known populations of HRD should be performed to determine basic population demographic status for the species. Permanently established monitoring plots need to be sampled yearly to investigate population trends.
2) Legal status of the species will be monitored.

1.0 INTRODUCTION

The purposes of this SSCMP are (1) to present information on the Hueco rock daisy (HRD) (*Perityle huecoensis* Powell), a narrow endemic to the Hueco Mountains of El Paso County, Texas. It is unlisted in Texas but, the only known populations of HRD are found on Fort Bliss; (2) to discuss the threats that HRD faces on Fort Bliss; (3) to define the conservation goals; and (4) to outline a plan for management of HRD and its habitat that will enable the conservation goals.

HRD is a small tufted perennial plant that lives on cliff faces and the base of cliffs in the Hueco Mountains. The only know populations of the species are found in El Paso County, Texas. These populations are found on Fort Bliss in two relatively mesic canyon systems. HRD is found in association with another species of special concern, the alamo beardtongue (*Penstemon alamosensis*). The specific habitat needs of HRD contribute to the small population size; it is this small population size that warrants the attention of Fort Bliss, as well as the fact that the only known populations in the world are found on the installation. To prevent the listing of HRD, Fort Bliss is implementing a management plan for the species.

This document is consistent with AR 200-3. This SSCMP was developed following guidelines set in "Manual for the Preparation of Installation Endangered Species Management Plans" (Science Applications International Corporation 1995).

2.0 SPECIES INFORMATION

Description - HRD is a low tufted perennial plant that sprouts from a woody base. The stems are woody and ten to twenty cm long. Old stems are persistent and co-occurring with the new growth which begins to appear in mid-March to mid-April. The leaves are bright green and 0.7 to 1.2 cm long and 0.7 to 1 cm wide. The flowers are yellow and arranged in heads that are five to six mm across. A more technical description of HRD can be found in Powell (1983).

This rock daisy occurs on cliff sides with rocky goldstar (*Heterotheca fulcrata*). The two species can be distinguished from each other by the fact that the rocky goldstar leaves are densely pubescent (covered with short hairs) and are lanceolate in shape where the HRD leaves are smoother, triangular, deeply dentate, and bright green. The internode distance (space between leaves) is much longer in rocky goldstar than HRD. Both HRD and rocky goldstar have yellow flowers but they can be told apart by flower size, the HRD have much smaller flowers than do the rocky goldstar.

Distribution - HRD is found in two canyon systems of a group of limestone hills that are part of the Hueco Mountains of El Paso County, Texas. The current distribution of the HRD is the same as its Late Holocene distribution. Although in cooler and wetter times (Middle Pleistocene to Middle Holocene) the HRD (or an evolutionary predecessor) could have had a larger range than it does now (Worthington 1991). Canyon systems serve as a refugium for HRD (Worthington 1991) and other species, including the alamo beardtongue, that require more mesic conditions than are usually found in Chihuahuan Desert Scrub.

Habitat/Ecosystem - The Hueco rock daisy grows on limestone cliff sides and bases (1300 to 1500 meters in elevation) in canyons systems with narrow high walls and/or northern exposures. HRD does not grow in areas receiving direct sunlight for a long period of time; it is absent from areas of east exposure (morning sunlight) and west exposure (afternoon sunlight), however in narrow canyons where one cliff shades the other HRD can survive regardless of the exposure. Rocky goldstar, alamo beardtongue, henry sage (*Salvia henryi*) and other species inhabit the cliff faces with HRD, and the species that occur in the

canyon bottoms include scrub oak (*Quercus pungens*), skunk bush (*Ptelea trifoliata*), cliff fendlerbush (*Fendlera rupicola*), silk-tassel (*Garrya wrightii*), and sotol (*Dasylirion wheeleri*).

Life History/Ecology - Very little is known about the life history of the HRD. It is a perennial that has a woody base, with new stems beginning to emerge from mid-March to mid-April. Time of flowering is from June to September. It is believed that the seeds of another member of the genus, nodding cliff daisy (*P. cernua*), are distributed down the cliff by falling stem fragments since the stems of the plant are quite brittle (DeBruin et al 1994). It is possible that the HRD could also distribute its seeds in this fashion.

Reasons for Special Concern - The reason for the special concern over the HRD is its small population size. The range of HRD is limited to two canyon systems in the limestone hills of the Hueco Mountains. Of special concern is the fact that Fort Bliss land contains the entire global population of the HRD. A 1991 census found 652 individuals, with the possibility 100 to 200 more plants that could not be located due to the season of the census (Worthington 1991). So any reduction in the size of the population of the HRD could result in the listing of this species as threatened or endangered.

Current survey reports indicate than the entire global population of HRD is found in South Maneuver Area 2D of Fort Bliss, all the possible threats to HRD are from military actions or from trespass onto military land. The cliff habitat of HRD protects the plant from damage from fires and from grazing by wild animals. The plant is not showy and does not face endangerment from collection. However, "pothunters" visiting nearby caves and archaeological sites could cause damage to the plants if they scale the cliffs in search of artifacts. Graffiti has been found on the cliffs in other canyon systems in the hills where HRD grows (Von Finger personal communication). Military exercises, such as rappelling, that use the cliff face could also pose a threat to HRD populations.

Conservation Measures -. In January of 1995 a memorandum from the Directorate of Environment - Cultural and Natural Resources Division (DOE-C), was submitted to the 1st Combined Arms Support Battalion requesting restriction of access to critical areas in the Hueco Mountains in order to protect the cultural resources and sensitive plant species that occur there (Landreth 1995). DOE-C personnel will coordinate conservation efforts with the USFWS during 1998.

The limestone hills west of Hueco Tanks State Historical Park and east of Nations East Well, were surveyed in May, June, and July of 1991 for HRD. In the 1991 survey, 652 individuals were counted. Additionally it was estimated that approximately 100 to 200 plants were missed in that survey (Worthington 1991). Field portions of another survey were completed in 1997 and 1998; the report is under review.

3.0 CONSERVATION GOALS

1. Protect and maintain the current population.

2. Locate and protect any other populations of HRD found on the installation.

4.0 MANAGEMENT PRESCRIPTIONS AND ACTIONS

The actions prescribed below that provide stewardship for HRD population, will also help protect the alamo beardtongue and archaeological resources also present in the area. Also, it will be recommended to increase signage and fence repairs along the installation boundary where these resources are found and vandalism has been documented.

1. Follow up memorandum, referred to in Conservation Measures above, requesting restriction of access to critical areas in the Hueco Mountains. Such action will reduce the potential for impacts to the HRD population by the military.

2. Conduct yearly monitoring following protocol being developed at DOE in coordination with the U. S. Army Corps of Engineers, Fort Worth (U. S. Army 1998)

3. If a substantial population decline is detected, Fort Bliss will investigate possible causes including collection, predators, pathogens, and pollinator unavailability. DOE will request assistance from appropriate experts.

5.0 MONITORING PLAN

Permanent plots established in 1997 and 1998 will be monitored yearly to determine population trends. Species occurrence locations (Global-positioning system generated) and other species data will be incorporated into the DOE-C's databases. The species taxonomic and legal status will also be monitored during this time and Fort Bliss DOE-C personnel will coordinate conservation efforts with the USFWS.

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SPECIES OF SPECIAL CONCERN MANAGEMENT PLAN FOR THE ALAMO BEARDTONGUE (*PENSTEMON ALAMOSENSIS*)

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ACRONYMS/ABBREVIATIONS

ABT	Alamo beardtongue
AR	Army regulation
DOD	Department of Defense
DOE	Directorate of Environment
ESA	Endangered Species Act of 1973
GIS	Geographic Information System
SSCMP	Species of Special Concern Management Plan
USFS	U. S. Forest Service
USFWS	U.S. Fish and Wildlife Service

EXECUTIVE SUMMARY

Background: Army regulation (AR) 200-3 encourages installations to develop management plans for species of special concern. Compliance with Chapter 11 of AR 200-3 involves coordination with U.S. Fish and Wildlife Service (USFWS). Implementation of this management plan can avoid potential listing of the species under the Endangered Species Act of 1973 (ESA) which could result in the costly disruption of military operations. This SSCMP was developed following guidelines set in "Manual for the Preparation of Installation Endangered Species Management Plans" (Science Applications International Corporation 1995).

Current Species Status: The alamo beardtongue (ABT) (*Penstemon alamosensis* Penn and Nisbet) is a species of special concern for Fort Bliss. It is listed in the state of New Mexico as a species of concern. Two populations exist in the Hueco Mountains in the South Training Areas of Fort Bliss. Other populations are found outside the installation in the Sacramento Mountains (Otero County, New Mexico), the Alamo Hueco Mountains (Hidalgo County, New Mexico), the San Andres Mountains (Doña Ana County, New Mexico), and in northern Chihuahua, Mexico.

Habitat Requirements and Limiting Factors: Habitat requirements for the ABT include a limestone substrate and relatively mesic conditions. These requirements are provided by north facing or narrow canyon systems of limestone hills or mountains. Threats to the species include exercises that utilize the cliff face (repelling or rock climbing) and the arroyos (vehicular traffic in an arroyo bed) as well as damage from unauthorized trespass.

Management Objectives: The installation's objective for ABT is to monitor and protect the known populations in the South Training Areas.

Conservation Goals:
1) The installation's goal is to maintain the known population at the current level.
2) Locate and protect any additional populations in potential habitat in canyon systems of the Otero Mesa escarpment and in the foothills of the Sacramento Mountains.

Actions Needed: The major steps needed to satisfy management objectives to achieve population goals for ABT are :

1) Canyon systems where the plant is found are sensitive to maneuvers that utilize the cliff face. Also individuals found in arroyo bottoms are sensitive to vehicle maneuvers through the arroyos where they are found.
2) Exclusion of recreation from these sensitive areas is advisable. The canyon systems from which the ABT is known, also contain populations of the Hueco rock daisy (*Perityle huecoensis*), a rare endemic species of special concern for Fort Bliss, as well as many important archeological sites.
3) Monitoring of the known population of ABT should be performed yearly to determine population demographic trends.
4) Other areas of potential ABT habitat should be surveyed for populations of ABT.

1.0 INTRODUCTION

The purposes of this SSCMP are (1) to present information on the alamo beardtongue (ABT) (*Penstemon alamosensis* Penn and Nisbet), a sensitive species in New Mexico, and a species of special concern for Fort Bliss; (2) to discuss the threats that ABT faces on Fort Bliss; (3) to define ABT conservation goals; and (4) to outline a plan for management of ABT and its habitat that will enable the conservation goals.

ABT is a perennial plant that lives in canyons and the associated arroyos. Populations of ABT are found on the installation in two mesic canyon systems of the Hueco Mountains. It is found in association with another species of special concern, Hueco rock daisy (*Perityle huecoensis*). The specific habitat needs of ABT contributes to the small population size and it is this small population size that warrants the attention of Fort Bliss.

This document is consistent with AR 200-3. This SSCMP was developed following guidelines set in "Manual for the Preparation of Installation Endangered Species Management Plans" (Science Applications International Corporation 1995).

2.0 SPECIES INFORMATION

Description - ABT is a grey-green to green perennial herb. Leaves are green before most other species in the spring. Stems are solitary or few and 30 to 100 cm tall. Basal leaves are elliptic or broadly lance shaped, stem leaves are smaller and lance shaped. Flowers are bright red and all borne on a long narrow inflorescence in clusters of one to four flowers (usually two), corollas are to 25 mm long and funnel shaped (New Mexico Native Plant Protection Advisory Group 1983). A more formal definition of the species can be found in (Nisbet and Jackson 1960).

There are two other species of the *Penstemon* genus that co-occur with ABT. *Penstemon cardinalis* is distinguished by a slight constriction around the mouth of the corolla; the tube is broadest just behind the mouth, where the corolla of the ABT is broadest at the mouth. *P. barbatus* has longer corollas, and the upper-lip is extended forward like a visor, and the lower lip sharply bent downward (New Mexico Native Plant Protection Advisory Group 1983). From a distance ABT also resembles the henry sage (*Salvia henryi*), both species bloom at approximately the same time. Both species inflorescence is a spike of red tubular flowers. The leaves of the henry sage, however, are dentate and usually lobed, whereas the ABT has leaves that are neither dentate nor lobed.

Both Worthington (1991) and New Mexico Native Plant Protection Advisory Committee (1983) note that it is likely that ABT will be synonymized with *Penstemon havardii*, a species with broader distribution, when the Flora of the Chihuahuan Desert is published. This work is in the manuscript stage.

Distribution - ABT is found in four mountain ranges in the United States. These ranges are the Sacramento Mountains (Otero County, New Mexico), Alamo Hueco Mountains (Hidalgo County, New Mexico), San Andres Mountains (Doña County, New Mexico), and the Hueco Mountains of Fort Bliss (El Paso County, Texas). The species also occurs in northern Chihuahua, Mexico. The current distribution of the ABT is the same as its historic distribution.

ABT is part of a canyon flora, in the mountains of the northern Chihuahuan Desert that possibly had broader and more continuous distribution when the climate in the area was cooler and wetter. There are many examples of plants that are endemic to certain mountain ranges in the area, because of the hotter and drier conditions present in the Holocene. The canyon systems provide a refugium for these species from the more extreme climatic conditions (Worthington 1991, Van Devender and Riskind 1979).

Habitat/Ecosystem - ABT is found in gravely arroyos at the bottoms of canyon systems, as well as at the bases of cliffs and on the cliff faces themselves. In the cliff face and cliff bases areas they co-occur with rock daisy (*P. huecoensis*), goldstar (*Heterotheca fulcrata*.), prickly pear (*Opuntia* spp.), wright silktassel (*Garraya wrightii*), mormon tea (*Ephedra trifurca*), lechugilla (*Agave lechugilla*), sotol (*Dasylirion wheeleri*), and banana yucca (*Yucca baccata*). In the arroyo and canyon bottoms habitat they are found along with apache plume (*Fallugia paradoxa*).

Life History/Ecology - ABT is a perennial herb that is one of the first species to put on new leaves in the spring. ABT is known to bloom from April to June (New Mexico Native Plant Advisory Committee 1983). Pollinators are believed to be hummingbirds.

Reasons for Special Concern - ABT is of special concern to Fort Bliss due to its limited distribution and small population. Threats to the population in the Hueco Mountains include utilization of the canyons, where ABT is found, by wheeled and tracked vehicles.

Conservation Measures - ABT is L2 species in New Mexico, meaning that its is a rare plant, and has a very restricted distribution and low population numbers. A R-E-D code of 2-1-2 was assigned to the plant. This code means that the occurrence is confined to several populations, is not endangered, and is rare outside of New Mexico. ABT has also been listed as United States Forest Service (USFS) Sensitive meaning that the USFS considers the species rare and sensitive to land use practices within National Forests (Sivinski and Lightfoot 1995).

In January of 1995 a memorandum from the Directorate of Environment - Cultural and Natural Resources Division (DOE-C), was submitted to the 1st Combined Arms Support Battalion requesting to restrict access to critical areas in the Hueco Mountains in order to protect the cultural resources and sensitive plant species that occur there (Landreth 1995). DOE-C personnel will coordinate conservation efforts with the USFWS during 1998.

In 1991 a survey for ABT (as well as the Hueco rock daisy) was conducted in the limestone hills that are an extension of the Hueco Mountains on Fort Bliss. Two canyons were found to hold populations of ABT (Worthington 1991). A more extensive survey for ABT was completed in 1997 abd 1998 (U. S. Army 1998)

3.0 CONSERVATION GOALS

1. The installation goal is to maintain the populations found in the two canyons in the Hueco Mountains that ABT is currently known from.

2. Locate and protect any additional populations in potential habitat in canyon systems of the Otero Mesa escarpment and in the foothills of the Sacramento Mountains.

4.0 MANAGEMENT PRESCRIPTIONS AND ACTIONS

The lack of impacts to HRD populations caused by Fort Bliss's missions make the suggestions for management for HRD of two types: 1) monitoring the known populations and 2) coordinating conservation efforts with USFWS to reduce the potential for the listing of the HRD.

5.0 MONITORING PLAN

Permanent plots established in 1997 and 1998 (U. S. Army 1998) will be monitored yearly to determine population trends. Species occurrence locations (Global-positioning system generated) and other species data will be incorporated into the DOE-C's databases. The species taxonomic and legal status will also be monitored during this time and Fort Bliss DOE-C personnel will coordinate conservation efforts with the USFWS. Projected activities for this plan are outlined in Tables 2 and 3 below.

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SPECIES OF SPECIAL CONCERN MANAGEMENT PLAN FOR THEDESERT NIGHT-BLOOMING CEREUS (*PENIOCEREUS GREGGII* VAR. *GREGGII*)

Fort Bliss, Texas and New Mexico

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ACRONYMS/ABBREVIATIONS

AR	Army regulation
BLM	U.S. Bureau of Land Management
DNBC	Desert night-blooming cereus
DOE	Directorate of Environment
ESA	Endangered Species Act of 1973
GIS	Geographic Information System
GPS	Global Positioning System
SSCMP	Species of Special Concern Management Plan
USDA	United States Department of Agriculture
USFWS	U.S. Fish and Wildlife Service

EXECUTIVE SUMMARY

Background: Army regulation (AR) 200-3 encourages installations to develop management plans for species of special concern. Compliance with Chapter 11 of AR 200-3 involves coordination with U.S. Department of Interior Fish and Wildlife Service (USFWS). Implementation of this management plan can avoid potential listing of the species under the Endangered Species Act of 1973 (ESA), which could result in the costly disruption of military operations. This Species of Special Concern Management Plan (SSCMP) was developed following guidelines set in "Manual for the Preparation of Installation Endangered Species Management Plans" (Science Applications International Corporation 1995).

Current Species Status: The desert night-blooming cereus (DNBC) [*Peniocereus greggii* (Engelm.) Britt. & Rose var. *greggii*; =*Cereus greggii* in some literature] is a New Mexico L1B species, meaning endangered in the state, but not federally listed as endangered. Outside the installation, DNBC is found from southern Arizona to the Big Bend Area of Texas and in Northern Mexico. A single DNBC population (seven individuals) was located on Fort Bliss in June of 1989 on Doña Ana Range on the slopes of the Organ Mountains. On Fort Bliss the DNBC population is still vulnerable to range upgrades and may be vulnerable to fire caused by ordnance.

Habitat Requirements and Limiting Factors: DNBC is found in high gravel content soils at elevations between 600 and 1400 meters, however the habitat requirements are not fully known. Collection pressure is the most important threat to the species globally. On Fort Bliss the species may be impacted by military actions.

Management Objectives: Management objectives are for protection and maintenance of the population of DNBC on the installation.

Conservation Goals:
1) Maintain (with appropriate age structure) and protect the populations found on the installation.
2) Determine the extent of the potential habitat on the installation and protect additional populations found.

Actions Needed: The low potential for military impacts to SPC populations suggests that the only actions needed are monitoring the populations and responding where possible to any declines. The major steps needed to satisfy management objectives and achieve conservation goals are as follows:
1) Census more of Fort Bliss lands to identify other potential habitat and/or DNBC populations.
2) Support the protective measures currently in place for known populations.
3) The known individuals of this species will be properly marked in such a way that military training can avoid them.
4) Debries in the area of the cactus will be reduced to minimize the risk of fire damage.
5) Conduct yearly monitoring according to recently proposed recommendations including aspects of demography and habitat.
6) If a substantial population decline is detected, Fort Bliss will investigate possible causes, including collection, pests, pathogens, and pollinator unavailability. DOE will request assistance from appropriate experts.

1.0 INTRODUCTION

The purposes of this SSCMP are (1) to present information on the desert night-blooming cereus (DNBC) [*Peniocereus greggii* (Engelm.) Britt. & Rose var. greggii], a state of New Mexico listed endangered species, present on Fort Bliss; (2) to discuss the threats that DNBC faces on Fort Bliss; (3) to define the conservation goals; and (4) to outline a plan for management of DNBC and its habitat that will accomplish the conservation goals.

The DNBC is an inconspicuous cactus with a large showy flower. It grows inside of shrubs such as creosotebush (*Larrea tridentata*) which provide support to its slender branches. The species grows on alluvial fans and terraces composed of sloping high gravel content soils. Populations occur in Texas west of the Pecos River, Southern New Mexico, Southern Arizona, and into the states of Chihuahua and Zacatecas in Mexico.

This document is consistent with AR 200-3. This SSCMP was developed following guidelines set in "Manual for the Preparation of Installation Endangered Species Management Plans" (Science Applications International Corporation 1995).

2.0 SPECIES INFORMATION

Description - DNBC is a cactus that grows within the branches of small shrubs. Its stems are erect or sprawling and are up to 2 m. The mature branches of DNBC are strongly ribbed (4-, 5- or 6- ribs). Spines number 11 to 13 per areole and are 3 mm long. The root is turnip-like. The DNBC flowers nocturnally, the flower is white and is approximately 6 cm in diameter with a 10 to 15 cm floral tube. The fruits are bright reds (Correll and Johnston 1970). A more technical definition can be found in (1982).

Distribution - Desert Night-Blooming Cereus is found in New Mexico in Hidalgo, Doña Ana, Luna, and Grant Counties (Sivinski and Lightfoot 1995); in Texas it is found in Brewster, El Paso, Hudspeth, Jeff Davis, Pecos, Presidio, and Terrell counties (TOES 1994). It has also been found in Chihuahua and Zacatecas in Mexico (Correll and Johnson 1970) and in Southern Arizona (Weniger 1984). DNBC densities are usually quite low with large distances between the different populations. DNBC is distributed throughout the extent of its historic range, it however, appears that its density within the historic range maybe decreasing. Populations may also be more fragmented within its historic range because of extirpation by collectors (Sivinski and Lightfoot 1995).

On Fort Bliss land, seven individuals of DNBC were located in June of 1989. All of the original seven individuals were located on a high gravel content wash on the east slope of the Organ Mountains. Six of these individuals were relocated in January of 1990 (Scarbrough 1990). Soil types known to support populations of DNBC in Doña Ana County, New Mexico were identified as potential habitat (Scarbrough 1990, BLM 1995, USDA 1980). This potential habitat is quite large on the installation, but surveys to locate the cactus in other areas during 1996 and 1997 have not produced more records (U. S. Army 1998)

Habitat/Ecosystem - The DNBC is found growing on slopes at elevations of 600 meters to 1400 meters in shallow or deep soils that are well drained. These soils also have a high gravel content and are formed from alluvium, on fans or terraces [Bureau of Land Management (BLM) 1995, United States Department of Agriculture (USDA) 1980]. Common associated species in the region are black grama grass (*Bouteloua eriopoda*), bush muhly (*Muhlenbergia porteri*), and creosotebush (USDA 1980).

DNBC is often found growing inside of a creosotebush or mesquite (*Prosopis glandulosa*) along with a grass (usually bush muhly) clump, which provide support to its rather spindly stems.

Life History/Ecology - Desert night-blooming cereus have flowers that open at night in the months of May and June (BLM 1995). It is believed that DNBC is pollinated by hawkmoths (Buchman and Nabhan, 1996). Fruits are produced between June and July (BLM 1995).

Reasons for Special Concern - The desert night-blooming cereus has never been a common species and its distribution has always been rather widespread. The continuing urbanization of the areas around DNBC habitat poses some danger to the species (BLM 1995). However the most important threat to the DNBC is from collectors. The unique growth form, rather striking flowers, relatively fast growth rates for a cactus, and the ease of growth inside a house make the DNBC a desirable nursery plant. There are several nurseries easily found through mail order and internet sources that feature DNBC seeds and plants grown in cultivation (Digital 1997). However larger specimens available at nurseries are most likely poached from the wild. It is also commonly found in botanical gardens, however these management methods (botanical gardens and garden cultivation) do not maintain the gene frequencies of distinct natural populations (Nabhan, Hodgson, and Hernadez 1987). Buchman and Nabhan, 1996, expressed concern that hawkmoths pollinators are succumbing to pesticides. They observed few pollinator visits and examination of fruits indicated that seed set was indeed low.

The unique growth form and rather spectacular flowering habit are not the only reason why DNBC has been collected. Essences derived from DNBC parts are being used in herbal tinctures for relief from stress, and for use in treating palpitations, arrhythmias, and tachycardias from excessive coffee, tobacco, or recreational drugs. These tinctures can be purchased over the internet as well (Digital 1997).

The O'odham people used the root of the Arizona queen of the night (*Peniocereus greggii* var. *transmontanus*), a variety of the DNBC found in the states of Arizona and Sonora, as a food product and a medicine for a variety of uses including headaches, respiratory ailments, digestion, and most importantly diabetes. Supposedly after this folk medical knowledge became better known this cactus was overexploited up to 1930. (Nabhan, Hodgson, and Hernadez 1987). It seems reasonable that DNBC could have been overexploited, as well.

Growing within bushes or grass clumps is beneficial for the DNBC in that they provide support and protection. However, when cattle are in the area, they may attempt to graze these protective plants and damage the cactus. Continued breakage would eventually exhaust the plant's food reserves and prevent reproduction (BLM 1995).

Because the known population on Fort Bliss is located within a restricted access zone, the cactus is protected from both collecting and cattle grazing. However, the population is within a live fire range. Threats to the species in this area are natural and training-caused fires, road construction and off-road military traffic. Some marked individuals were destroyed by road building activities (U. S. Army 1998); remaining individuals will be marked more conspicuously in CY98.

Conservation Measures - The State of New Mexico lists DNBC as a L1B species, meaning endangered because unregulated collection could jeopardize the survival of the species in New Mexico due to restricted distribution and low density across the state. The R-E-D code assigned is 1-3-1 meaning that the occurrence of the species is confined to several populations, that the species is endangered in a portion of its range, and the species is rare outside New Mexico (Sivinski and Lightfoot 1995).

The known individuals of this species will be properly marked in such a way that military training and road building activity on Doña Range can avoid them. Debris from around the shrubs that support the

DNBC will be removed to reduce the risk of damage from potential fires in the area. These actions will be coordinated with the units using the Range.

3.0 CONSERVATION GOALS

1) The installation conservation goals for the DNBC should be to maintain the known population, and attempt to locate new populations on base.

4.0 MANAGEMENT PRESCRIPTIONS AND ACTIONS

The population of DNBC needs to be protected from damage caused by vehicle cross-country maneuvers. A potential protection that would not interfere with the installation's training mission could include, marking the areas around each plant (or group of plants) with signs similar to what the Directorate of Environment (DOE) uses to mark their archeological sites or with engineers' cloth tape. DOE will coordinate with Range users to inform them of DNBC areas and the meaning markers.

A census of all suitable DNBC habitat would be difficult to complete, given the relatively cryptic nature of the cactus and the large amount of potential habitat found on the installation. Instead of a total census, a more thorough survey of individual maneuver areas or ranges could be completed for each range or maneuver area (that contains potential DNBC habitat) when an assessment for the area is required.

5.0 MONITORING PLAN

Annual monitoring of simple demographic parameters (death, recruitment into the population, or human removal of plants) of the known population of DNBC would be a simple and not very time consuming. Taxonomic and legal listing status of the species will also be monitored yearly.

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APPENDIX E

ACRONYMS

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LIST OF ACRONYMS

AAF	Army Air Field
ACC	Air Combat Command
ACEC	Areas of Critical Concern
AQCA	Air Quality Control Act
ADA	Air Defense Artillery
AEC	Army Environmental Center
Af	acre feet
AFB	Air Force Base
Afy	acre feet per year
AHPA	Archeological and Historic Preservation Act
AIRFA	American Indian Religious Freedom Act
AR	Army Regulation
ARPA	Archeological Resources Protection Act
ASIP	Army Stationing and Installation Plan
ATTACC	Army Training and Testing Area Carrying Capacity
AUM	Animal units per month
AVHRR	Advance Very High Resolution Sensor
BLM	Bureau of Land Management
BRAC	Base Realignment and Closure
CAA	Clean Air Act
CATS	Combined Arms Training Strategy
CCC	Civilian Conservation Corps
CDR	Commander
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CWA	Clean Water Act
CX	Categorical exclusions
DA	Department of Army
DDT	Dichlorodiphenyltrichloroethane
DoD	Department of Defense
DOE	Directorate of Environment
DPTMS	Directorate of Plan, Training, Mobilization, and Security
DPWL	Directorate of Public Works and Logistics
EA	Environmental Assessment
EC	Environmental Compliance
ECO	Environmental Compliance Officer
EIS	Environmental Impact Statement
EMU	Ecosystem management units
ENV	Environmental Conservation
EO	Executive Order
EPCWID	El Paso County Water Improvement District #1
EPIA	El Paso International Airport
EPWU	El Paso Water Utilities
EQCC	Environmental Quality Control Committee
ESA	Endangered Species Act
ESMP	Endangered Species Management Plan
EWRA	Emergency Wetlands Conservation Act
FAARP	Forward Area Arming and Refuel Point
FB	Fort Bliss
FLPMA	Federal Land Policy and Management Act
FONSI	Finding of No Significant Impact
FORSCOM	U.S. Army Forces Command

LIST OF ACRONYMS (Continued)

FTX	field training exercise
FWPCA	Federal Water Pollution Control Act
fy	fiscal year
GAF	German Air Force Command
GIS	Geographic Information System
GPS	Global Positioning System
GSA	General Services Administration
HIMAD	High- and Medium-Altitude Air Defense
HPO	Historic Preservation Officer
I-10	Interstate 10
ICRMP	Integrated Cultural Resources Management Plan
INRMP	Integrated Natural Resources Management Plan
IPA	Intergovernmental Personnel Act
IR	Installation Restoration
ITAM	Integrated Training Area Management
JTF	Joint Task Force Six
LCTA	Land Condition-Trend Analysis
LRAM	Land Rehabilitation and Maintenance
LRMP	Legacy Resource Management Program
MACOM	major command
MCL	Maximum containment level
METL	Mission essential task list
mg/L	milligrams per liter
Mgd	million gallons per day
MIBN(LI)	Military Intelligence Battalion (Low Intensity)
MLWA	Military Lands Withdrawal Act
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
mph	miles per hour
MSL	mean sea level
MWR	Morale, Welfare, and Recreation
MYBP	million years before present
NAGPRA	Native American Graves Protection and Repatriation Act
NASA	National Aeronautics and Space Administration
NCO	Noncommissioned Officer
NDDEMNR	New Mexico Department of Energy, Mineral and Natural Resources
NEPA	National Environmental Policy Act
NGO	Nongovernmental conservation organizations
NHPA	National Historic Preservation Act
NMDEMNR	New Mexico Department of Energy, Mineral and Natural Resources
NMDGF	New Mexico Department of Game and Fish
NMED	New Mexico Environmental Department
NMNHP	New Mexico Natural Heritage Program
NMSA	New Mexico Statutes Annotated
NMWQCC	New Mexico Water Quality Control Commission
NRCS	Natural Resources Conservation Service
O&M	operation and maintenance
ORV	Off-road vehicle
PA	Public Access
PL	Public Law
PLANTS	Plant List of Accepted Nomenclature, Taxonomy, and Symbols
PLO	Public Land Order
PLS	Planning level surveys

LIST OF ACRONYMS (Continued)

POL	Petroleum, oil, and lubricant
POM	Program Objective Memorandum
POV	Privately owned vehicles
PRIA	Public Rangelands Improvement Act
RAB	Restoration Advisory Board
RCRA	Resource Conservation and Recovery Act
RFMSS	Range Facility Management Support System
RHA	River and Harbor Act
ROI	Region of Influence
RPMP	Real Property Master Plan
RTLP	Range and Training Land Program
SDWA	Safe Drinking Water Act
SDZ	Surface Danger Zone
SHORAD	Short-range Air Defense
SiteRep	Site Rehabilitation Prioritization System
SOP	Standard Operating Procedure
SOW	Statement of Work
TA	Training Areas
TADC	Training Area Development Concept
TCPs	Traditional Cultural Properties
TDA	Table of Distribution and Allowances
TDS	total dissolved solids
TEXCOM	Test and Experimentation Command
TM	Thematic Mapper
TNRCC	Texas Natural Resources Conservation Committee
TOE	Table of Organization and Equipment
TPWD	Texas Parks and Wildlife Division
TRADOC	U.S. Army Training and Doctrine Command
TRI	Training Requirements Integration
TWDB	Texas Water Development Board
UAV	Unmanned Aerial Vehicle
UCMJ	Uniform Code of Military Justice
USA CAS BN	U.S. Army Combined Arms Support Battalion
USAADACE NFB	U.S. Army Air Defense Artillery Center and Fort Bliss
USAADASCH	U.S. Army Air Defense Artillery School
USACE	U.S. Army Corps of Engineers
USAF	United States Air Force
USBR	U.S. Bureau of Reclamation
USC	United States Code
USDA	U.S. Department of Agriculture
USDI	U.S. Department of Interior
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
USTs	Underground storage tanks
UTEP	University of Texas, El Paso
WBAMC	William Beaumont Army Medical Center
WQA	Water Quality Act
WSA	Wilderness Study Area
WSMR	White Sands Missile Range