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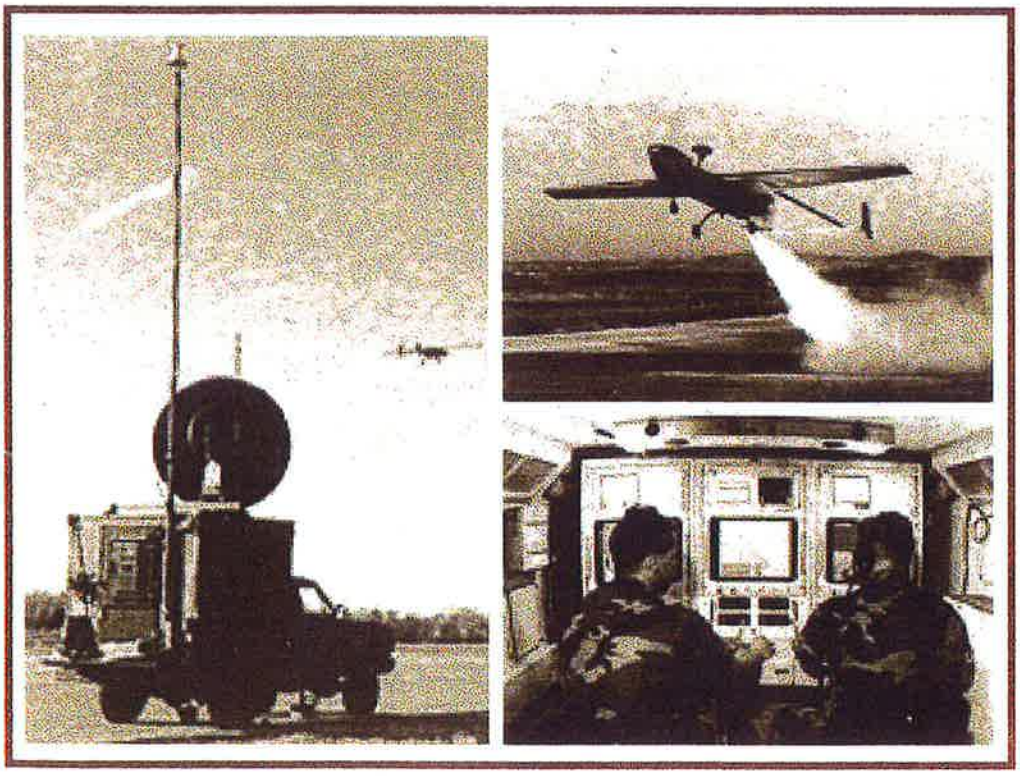
Comprehensive Unmanned Aerial Vehicle Testing and Training at Fort Huachuca, AZ

Environmental Assessment

US Army Garrison
Fort Huachuca

Directorate of
Installation Support

June, 2000



HOW THIS ENVIRONMENTAL ASSESSMENT IS ORGANIZED

The EXECUTIVE SUMMARY briefly describes the Proposed Action and alternatives. Direct and indirect impacts are summarized and compared, and cumulative inputs are briefly described.

SECTION 1 INTRODUCTION discusses the purpose and need for the Proposed Action, the regulatory background surrounding this project, and the scope of this Environmental Assessment.

SECTION 2 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES discusses the Proposed Action and alternatives addressed in this Environmental Assessment.

SECTION 3 AFFECTED ENVIRONMENT describes the existing environment within the Region of Influence.

SECTION 4 ENVIRONMENTAL CONSEQUENCES provides a comparison of environmental consequences associated with the Proposed Action alternatives. Mitigation measures are also addressed in this section.

SECTION 5 CUMULATIVE IMPACT ANALYSIS provides a discussion of anticipated contributions to other past, present and reasonably foreseeable activities in the region.

SECTION 6 FINDINGS AND CONCLUSIONS provides a summary of anticipated environmental impacts.

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EXECUTIVE SUMMARY

INTRODUCTION

One of the most important missions on any battlefield is the accumulation of intelligence data. A system that has been developed for acquiring these data is the unmanned aerial vehicle (UAV). The UAV is a remotely controlled aircraft that can fly over enemy occupied territory and acquire military intelligence data without risk to human operators. Its small size and low noise profile make it hard to detect and difficult to counteract.

Fort Huachuca is a center for Department of Defense (DOD) UAV testing and training programs. The Fort's geography, climate, remote location and facilities provide the DOD with appropriate conditions for these programs. Recently, competition for facilities has increased as the UAV program continues to be an important part of the Army intelligence mission. The proposed UAV action is an expansion of existing mission capability at Fort Huachuca, and will represent a reduction in full-time equivalent (FTE) personnel associated with these programs on the installation. The testing of a wide variety of UAVs, training of UAV operators and maintainers (maintenance technicians), and the development of operational combat units already occurs at Fort Huachuca. In fact, Fort Huachuca has been serving the DOD in this capacity for over 10 years, but existing facilities are inadequate to meet a proposed increase in UAV program activities. In short, Fort Huachuca is proposing to expand its capability to sustain current missions and support future UAV program activities on the installation.

PROPOSED ACTION

Several action scenarios were found to be reasonable for providing Fort Huachuca with increased UAV program capabilities. These were evaluated based on each scenario's ability to provide the required infrastructure and operational capabilities to support an expanded UAV mission, as proposed by the Fort. As a result of this evaluation, a preferred alternative (Full Facilities) was selected as the Proposed Action.

Full Facilities Alternative. The Proposed Action includes an expansion of Fort Huachuca's current UAV program by improving UAV facilities and operational capabilities at Fort Huachuca. Proposed activities related to the Proposed Action include the following:

- Upgrade of existing UAV facilities.
- Construction of new UAV training facilities within existing training complex and new testing facility on East Range.
- Increased testing of existing and new UAV systems from three to approximately five tests per year.
- Increased frequency of UAV flights in local Special Use Restricted Airspace by up to 30 percent.
- Increased use of existing and proposed take off and landing strips at Fort Huachuca.
- Changes in numbers of personnel positions assigned to the UAV training program at Fort Huachuca.
- Shortening of class length for medium UAV testing from 33 to 23 weeks.

Small UAV and Medium UAV testing and training flights will continue to take-off and land at Libby Army Airfield (LAAF), Rugge-Hamilton Runway, Pioneer Runway, and Hubbard Assault Airstrip, with increased use of the Demonstration Hill Airstrip and new use of the East Range Airstrip. Small UAVs could also take-off and land at a number of other locations across Fort Huachuca, in accordance with individual range restrictions and facility or roadway capabilities. Medium UAVs would also be used in conjunction with indirect fire assets (artillery and/or mortars) on the East Range impact area (Area Zulu). Large UAV testing and training flights will continue to take-off and land at LAAF, Rugge-Hamilton Runway, Pioneer Runway, and Hubbard Assault Airstrip.

An increase in both testing and training of UAV systems at Fort Huachuca is part of the Proposed Action. UAVs take off from designated airstrips, perform any number of aerial tasks, and then return to the ground during both testing and training activities. Flights are generally confined within Fort Huachuca Special Use Restricted Airspace and do not occur over the San Pedro Riparian National Conservation Area (NCA) or Miller Peak Wilderness Area at an altitude lower than 2,000 feet above ground level (AGL).

Testing, for the purpose of this document, is the activity of testing, assessing, and evaluating military systems or their components in laboratory and or operationally realistic environments and conditions. Testing at Fort Huachuca does not involve air-worthiness testing. All UAV vehicles used at Fort Huachuca for testing (and training) activities undergo air-worthiness testing (certification that the UAV vehicle is safe to operate in the air under a wide variety of conditions) prior to deployment at Fort Huachuca. In the Proposed Action testing activities involve placing targets for detection (for each category of UAV) and the use of active and passive payloads. During training, UAVs collect data, such as photographs and climatic data, while providing personnel with an opportunity to master operating and maintaining the vehicles. Both testing and training may also involve the use of Rocket Assisted Take-off (RATO).

Targets are set in a natural environment to determine the accuracy of the UAV systems at detecting, recognizing, and locating the targets. These targets may be stationary, moving, or a mixture of both and will be set on Fort Huachuca, as well as at selected sites within the Coronado National Forest and along established roadways throughout Cochise and Santa Cruz counties.

The use of a variety of active and passive sensors and other payloads during in-flight activities is another aspect of UAV testing and training. Active sensors and payloads may include smoke or obscurant delivery; chaff or chaff-like material release; psychological operations material (such as leaflets, pamphlets); humanitarian aid material; electromagnetic emissions; lasers; microwave; telecommunications emissions; conventional weapons delivery; other unmanned air or ground vehicles; and non-conventional weapon delivery (such as tear gas for riot control). The release of active payloads into the environment during training will be extremely limited in type, frequency, and duration. Radar and laser are the primary active systems used in training scenarios.

The continued use of facilities both on- and off-Fort Huachuca, as well as the construction of new facilities on the Fort are part of the Proposed Action. Four specific areas of the West Range are included in the Proposed Action and alternatives as potential sites for increased UAV program activity or facility construction: (1) Black Tower Complex, (2) UAV Training Center and Rugge-

Hamilton Runway, (3) Pioneer Training Facility and Runway, and (4) the Demonstration Hill Airstrip.

Several areas of the East Range are included in the Proposed Action and alternatives as potential sites for increased UAV program activity or facility construction. Tactical use of existing runways and maintained roadways on the East Range for Small UAVs and Medium UAVs could occur. (The only areas that will not be used are the East Range Area Zulu and portions of Training Areas A and E that have been restricted for a variety of activities based on their proximity to the San Pedro River.) New construction on the East Range could include a new Urban Landscape Training Facility and an East Range Test and Evaluation Facility in the general proximity of the existing East Range Airstrip and Hubbard Assault Airstrip.

Although no specific area of the South Range is included in the Proposed Action or alternatives as a potential site for increased UAV program activity or facility construction, the Fort Huachuca UAV Program may, on occasion, use existing facilities (including roadways) on this range in support of testing or training activities.

Areas within the Coronado National Forest are used on occasion for the UAV-target placement testing activities. There will be no new construction related to this project within the Coronado National Forest, and all movement will be along established roads. Proposed locations for target placement and other UAV program-related activity are presented in the document. These areas have already been evaluated for use during testing activities. Realistic estimates of this activity suggest approximately 15 testing events per year at each location, with testing potentially occurring throughout the day and night

UAV testing is typically conducted by dispatching target vehicles and/or electronic equipment to a selection of ASA sites that meet the evaluation requirements for a required test. Off-post sites are generally located within road right-of-way (ROW) shoulders along several highways in Cochise and Santa Cruz Counties. The remaining off-post ASA sites are located in previously disturbed areas.

For UAV testing activities, additional personnel (not currently stationed at Fort Huachuca) will only be required during individual testing events. Testing events will vary in size and complexity and in length of time and personnel requirements. Operational training at Fort Huachuca will require a change in authorized positions corresponding to projected student throughput (or number of students per year), instructors, and UAV program support personnel being stationed at the Fort.

OTHER ALTERNATIVES CONSIDERED

Three other scenarios were considered to be less effective at providing required improvements in mission capabilities at Fort Huachuca, but reflect reasonable scenarios for supporting the mission at lower levels of program funding and also reflect decisions that may be made outside of the Army's span of control.

Full Facilities Plus Navy Alternative. Under the Proposed Action, it is projected that the existing U.S. Navy Pioneer UAV program would relocate to Pensacola Florida in FY01 and an Army UAV program element would assume the use of the existing Pioneer Training Facility and Runway. Alternative A is included in the event that the U.S. Navy keeps their Pioneer UAV program at Fort Huachuca. This will mean that the Pioneer UAV personnel will remain at the

Fort and training of Pioneer-related students annually will need to be included in baseline UAV personnel numbers.

Alternative A is identical to the Proposed Action with the exception of these additional Pioneer program personnel. This difference will only affect the number of baseline UAV personnel already residing on the Fort, and the projected cumulative level of UAV personnel that will eventually be located at Fort Huachuca.

Enhanced Facilities Alternative. Fort Huachuca will continue with the exact same use of existing facilities, UAV operations, support services, and number of personnel requirements as in the Proposed Action and the U.S. Navy Pioneer Program will relocate off the installation. This alternative is identical to the Proposed Action but there will be a reduced level of facility construction under this alternative. Specifically the following construction activities will not occur:

- New runway at the UAV Training Center and Rugge-Hamilton Runway.
- Renovation of the East Range Airstrip.
- Paving of Demonstration Hill Airstrip.

Existing Facilities Alternative. Under this alternative, Fort Huachuca will continue with the exact same use of existing facilities, UAV operations, support services, and number of personnel requirements as the Proposed Action. However, this alternative would not include any new facilities or upgrades to existing facilities at the Fort. New UAV missions may continue to be stationed at Fort Huachuca, but would require double-shifting and close coordination among UAV programs to use the existing facilities to execute the respective developmental/operational testing and operational training missions. An increase in students, permanent party instructors and/or training and testing support personnel would accompany this alternative and be identical in size to the Proposed Action, but will be less than Alternative B because the Navy Pioneer UAV training program will not remain at the Fort. The reduction in the length of operator training would occur under this alternative.

No-Action Alternative. Under CEQ regulations, a proponent must also evaluate the No-Action scenario. Therefore, Alternative D reflects the No-Action scenario and represents a continuation of existing UAV program activities and levels of use of associated facilities at Fort Huachuca..

ENVIRONMENTAL CONSEQUENCES OF THE PROPOSED ACTION AND ALTERNATIVES

The alternatives evaluated in this Environmental Assessment will result in no significant environmental impact, direct, indirect, cumulative or otherwise. No adverse impact to land use is anticipated from the Proposed Action. Impacts to local air quality resulting from construction activities and increased UAV operations were found to be *de minimus*. Noise levels in the local and regional environment will increase but this will be limited to those areas beneath the UAV flight paths and near the take-off and capture facilities on the Fort. Although this noise may be a nuisance to populations in the more remote areas of the Elgin, Sonoita and Patagonia, this increased noise level will not pose a threat to human health or safety and will not create a significant impact on humans or wildlife (including Federally-listed Threatened and Endangered Species).

The proposed changes in training length and student throughput at the Fort will not have a significant impact on economic expenditures in the local area. The amount of this change is negligible in the context of the growing regional economic base and will not be significant at the local or regional level.

Because of changes in the Fort's UAV program composition (to reflect a change in UAV developmental and operational programs) and projected student requirements, the water use projection for the UAV Program will decline from its FY00 estimate by 36.36 ac-ft (11,849,325 gallons) to an estimated 15.21 ac-ft (4,956,772 gallons) in FY01. The relocation of the U.S. Navy Pioneer Program will remove an additional 47.23 ac-ft of water use per year, which further reduces overall UAV Program water consumption. Cumulatively, these water use reductions are estimated at an 83.59 ac-ft (27,241,064 gallons) decline from projected FY00 levels. Because of these estimates and ongoing and planned water conservation, recharge and reuse programs at Fort Huachuca through FY07, the Proposed Action is not anticipated to result in a net increase in annual water use at the Fort.

Impacts to biological resources will not be significant. The loss of vegetation associated with proposed construction activities will be less than 20 acres in total, and no significant impact to existing wildlife (including Federally-listed Threatened and Endangered Species) is anticipated. Activities associated with the 1998/99 level of UAV activities at Fort Huachuca were addressed in the 1999 USFWS Biological Opinion on *Ongoing and Programmed Future Military Operations and Activities at Fort Huachuca, Arizona.* This Biological Opinion concurred with the Army that the 1998/99 level of UAV activity at Fort Huachuca would not jeopardize the existence of any Federally-listed Threatened or Endangered species and would not cause any adverse modification to existing Critical Habitat for the southwestern willow flycatcher and Huachuca water umbel in the San Pedro Riparian NCA. The proposed increase in UAV activity associated with alternatives evaluated in this Environmental Assessment will not cause any additional potential for significant impact to Federally-listed species or Critical Habitat and will incorporate all Reasonable and Prudent Measures and Mitigation Measures (Appendix D) listed in the Biological Opinion.

An increase in air traffic will result from additional UAV flights in the local Special Use Restricted Airspace. This increase has the potential to cause minor scheduling and air-traffic control conflicts with ongoing military, general aviation and air carrier traffic during busier days at LAAF. UAV Program offices will work closely with LAAF to ensure that this conflict is minimized as much as possible. Higher levels of UAV flight activity will also increase the risk of UAV mishap and crash during operational training and developmental/operational testing. Existing contingency plans detail the actions to be taken in the event of a UAV mishap and include the activation of a React Team to minimize any potential for impacts to public health and safety and ensure that damage caused by the crash or other mishap is minimized as best possible.

SUMMARY OF MITIGATION ACTIONS PLANNED

All relevant mitigation measures included in Appendix B of the *1999 USFWS Biological Opinion on Ongoing and Programmed Future Military Operations and Activities at Fort Huachuca, Arizona* (USFWS 1999) will be implemented as a part of the proposed action. A copy of these mitigation measures are provided as Appendix D.

In addition, special considerations for protection of the environment during UAV program activities have already been enacted as a result of previous environmental evaluation. A summary of these mitigation measures is provided in Appendix B, *Summary of Ongoing UAV Program Environmental Mitigation Measures,* and will be implemented in addition to the mitigation measures are identified in Section 4 of the document.

CUMULATIVE IMPACTS

In summary, neither the Proposed Action nor any alternative would be anticipated to result in any significant contribution to past, present, and reasonably foreseeable future actions in the local or regional context for any given resource including water resources and biological resources and ecosystems. The Proposed Action, however, is a more favorable alternative because of projected reductions in program-related water use (see Section 6 for a more thorough discussion of potential impacts related to the various alternatives under analysis).

3.9 FINDINGS AND CONCLUSIONS

It is the conclusion of this analysis that neither the Proposed Action nor any of the alternatives constitute a major federal action with significant impact on the human environment, and a Finding of No Significant Impact should be issued to complete the documentation.

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COMPREHENSIVE UNMANNED AERIAL VEHICLE TESTING AND TRAINING AT FORT HUACHUCA, ARIZONA

ENVIRONMENTAL ASSESSMENT

LEAD AGENCY: Department of the Army

TITLE OF THE PROPOSED ACTION: Comprehensive Unmanned Aerial Vehicle Testing and Training at Fort Huachuca, AZ.

AFFECTED JURISDICTION: Cochise County, Arizona

PREPARED BY: Directorate of Installation Support, U.S. Army Garrison, Fort Huachuca

REVIEWED BY: Commander, U.S. Army Garrison, Fort Huachuca

APPROVED BY: Commander, U.S. Army Intelligence Center & Fort Huachuca

ABSTRACT: Fort Huachuca is a center for Department of Defense (DOD) Unmanned Air Vehicle (UAV) testing and training programs. The Fort's geography, climate, and facilities provide the DOD with appropriate conditions for UAV program activity. The Proposed Action (PA) is to provide the required infrastructure and operational capabilities to support anticipated changes to UAV mission requirements at Fort Huachuca. These changes include upgrade of existing UAV facilities; construction of new UAV testing and training facilities to include an expansion of class room space, a new runway, and a testing facility; increase in training and development testing for existing and new UAV systems; increase use of landing strips; a decrease in the length of UAV operator training classes, and a change in the number of personnel assigned to the UAV programs at Fort Huachuca.

REVIEW COMMENT DEADLINE: Public comments must be received within 30 days from the publishing date of this document. Public comments may be provided to: Commander, USAIC&FH, ATTN: ATZS-ISB (UAVEA), Fort Huachuca, Arizona 85613-6000. Comments may also be faxed to (520)533-3043.

ENVIRONMENTAL ASSESSMENT

COMPREHENSIVE UNMANNED AERIAL VEHICLE (UAV) TESTING AND TRAINING FORT HUACHUCA, ARIZONA

Prepared by:

Environmental and Natural Resources Division
Directorate of Installation Support
U.S. Army Garrison, Fort Huachuca

JOHN A. RUBLE
Director, Installation Support

Reviewed by:

MICHAEL W. BOARDMAN
Colonel, Military Intelligence
Commander, U.S. Army Garrison

Approved by:

JOHN D. THOMAS, JR.
Major General, Commander,
U.S. Army Intelligence Center & Fort Huachuca

JUNE 2000

Comprehensive Unmanned Aerial Vehicle (UAV) Testing and Training at Fort Huachuca, Arizona

ERATA SHEET

Page 1-2, line 16. Sentence should end after the word 'agency'.

Page 3-4, line 39. Sentence should read: "The airstrip is occasionally used for UAV demonstrations at Fort Huachuca.

Page 3-17, Table 3-4.4 should read:

Table 3.4-4. Fort Huachuca Noonday Population*

	September 1997	September 1998	September 1999
Military Assigned	4,455	4,310	4,272
DOD Civilian Employees	2,466	2,442	2,426
Other Civilian Employees**	1,947	2,499	2,836
Students***	1,248	1,111	1,606
Total Employees	**10,116**	**10,362**	**11,140**
Military Family Members Residing On Post	4,734	4,431	4,326
Total Noonday Population	**14,850**	**14,793**	**15,466**

Source: DRM 1998, 1999

* Not corrected for double counts of personnel falling into more than 1 category.

**Represents non-DOD civilian workers on Fort Huachuca. Note: The noonday population includes assigned military, their family members living on post, and all civilians employed on post.

*** Students are temporarily assigned to Fort Huachuca for training and usually are not accompanied by family members.

Page 3-29, Table 3.6-2, 'TOTAL' line, **'531'** should be in the first column.

Page 3-40, line 32. Delete all verbiage on this line.

FINDING OF NO SIGNIFICANT IMPACT (FNSI)

Comprehensive Unmanned Aerial Vehicle (UAV) Testing and Training at Fort Huachuca, Arizona

SEPTEMBER 2000

Title of the Proposed Action: Comprehensive Unmanned Aerial Vehicle Testing and Training at Fort Huachuca, Arizona.

Introduction: Fort Huachuca is a center for Department of Defense UAV testing and training programs. An environmental assessment (EA), dated June 2000, was prepared to support changes to the UAV testing and training capabilities at Fort Huachuca. This EA was prepared in compliance with the National Environmental Policy Act (NEPA) (Public Law 91-190, 42 U.S.C. 4321-4347, as amended), the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 CFR 1500-1508), and AR 200-2, Environmental Effects of Army Actions (USA 1988). The EA is incorporated by reference in this FNSI.

Description of the Proposed Action (PA): The PA is to provide the required infrastructure and operational capabilities to support anticipated changes to UAV mission requirements at Fort Huachuca. These changes include upgrade of existing UAV facilities; construction of new UAV testing and training facilities to include an expansion of class room space, a new runway, and a testing facility; increase in training and development testing for existing and new UAV systems; increase in the use of landing strips; a decrease in the length of UAV operator training classes, and a change in the number of personnel assigned to the UAV programs at Fort Huachuca. Under the PA, the existing U.S. Navy UAV program would relocate to Pensacola, Florida in FY01, and an Army UAV program element would assume the use of the existing Pioneer Training Facility.

Alternatives Considered: Three other scenarios were considered to be less effective at providing required improvements in mission capabilities at Fort Huachuca. These reflect reasonable scenarios for supporting the mission at lower levels of program funding, and also reflect decisions that may be made outside of the Army's span of control. In the Full Facilities Plus Navy alternative, the U.S. Navy Pioneer UAV program would remain at Fort Huachuca. The same activities as under the Proposed Action would occur, but with the additional personnel associated with the U.S. Navy Pioneer UAV Program. In the Enhanced Facilities Alternative, the same level of activities and personnel authorizations as the Proposed Action would occur, but with fewer construction activities. With the Existing Facilities Alternative, the Fort will continue with the same proposed increase in use of existing facilities as the Proposed Action but would not include any new facilities or any upgrades to existing facilities at the Fort. A fourth scenario, The No-Action Alternative, was also analyzed as required by the NEPA. The No-Action Alternative represents a continuation of existing UAV program activities and levels of current UAV facilities use at Fort Huachuca.

Anticipated Environmental Effects: The EA documents that the PA will result in no significant environmental impacts. Only minor impacts to land use; air quality; noise; transportation; public services, utilities, and energy; health, and safety; and cultural resources will occur as a result of the PA or alternatives, and the majority of impacts are limited to on-post resources.

Impacts to local air quality resulting from construction activities and increased UAV operations were found to be *de minimus* and not significant. Noise levels in the local and regional environment will increase, but this will be limited to those areas beneath the UAV flight paths and near the take-off and capture facilities on the Fort. Although this noise may be a nuisance to populations in the more remote areas of Elgin, Sonoita and Patagonia, this increased noise level will not pose a threat to human health or safety and will not create a significant impact on humans or wildlife (including federally-listed threatened and endangered species).

The potential exists for a slight increase or decrease of Full-Time Equivalent (FTE) personnel in any year depending on the actual percentage of fill of projected training slots or permanent party authorizations. However, net FTE positions are not anticipated to increase over the No-Action alternative.

As a result of the PA, regional special-use airspace will become more congested, especially at Libby Army Airfield (LAAF). The PA includes an estimated 30 percent increase in annual UAV flight operations. This

additional air traffic will impact LAAF and Hubbard Assault Airstrip capabilities, but the impact will be localized, not regional. Higher levels of UAV flight activity will also increase the risk of UAV mishap or crash during training and testing. Existing contingency plans detail the required actions if a UAV mishap occurs, and include the activation of a React Team to minimize any potential for impacts to public health and safety, and ensure that damage caused by the crash or other mishap is minimized as best possible.

Projected FY01 water use under the PA is less than the previously projected water use for the FY00 UAV program and represents a declining trend in overall water consumption. This decrease is a result of a smaller UAV Program at Fort Huachuca than was originally projected, and shorter class lengths. The relocation of the U.S. Navy Pioneer program will remove an additional 47.23 ac-ft of water use per year. Because of this level of projected water use, the PA will not result in a net increase in annual water use at Fort Huachuca or in the Sierra Vista Subwatershed.

Impacts to biological resources will not be significant. The loss of vegetation associated with proposed construction activities will be less than 20 acres (8.1 ha) in total, and no significant impact to existing wildlife (including federally-listed threatened and endangered species) is anticipated. Activities associated with the 1998/99 level of UAV activities at Fort Huachuca were addressed in the 1999 US Fish and Wildlife Service (USFWS) Biological Opinion on *Ongoing and Programmed Future Military Operations and Activities at Fort Huachuca, Arizona*. This biological opinion concurred with the Army that the 1998/99 level of UAV activity at Fort Huachuca would not jeopardize the existence of any federally-listed threatened or endangered species. It also stated that UAV activity would not cause any adverse modification to critical habitat for the southwestern willow flycatcher and Huachuca water umbel in the San Pedro Riparian NCA. The proposed increase in UAV activity associated with alternatives evaluated in this EA will not significantly impact any federally-listed species or critical habitat. The USFWS is currently reviewing a biological evaluation for this action that concludes that the PA will not adversely effect any federally listed endangered or threatened species in the region.

The Fort's contribution to cumulative impacts on regional water resources has declined in recent years. While the declining employment at the installation has contributed somewhat to this reduction, better management of water resources and a concerted effort to find additional sources of water savings and artificial aquifer recharge have been a more significant factor. The Proposed Action includes no increase in the level of projected FTE personnel associated with the UAV Program and will not increase the net annual water use. Both independently and together, the various components of the Proposed Action would have little contribution to trends in ecological resources already being experienced in the region.

Findings: Based on the analysis in the EA, and contingent upon concurrence with the biological evaluation by USFWS, I have determined that the implementation of the Proposed Action for Comprehensive Unmanned Aerial Vehicle Testing and Training at Fort Huachuca, Arizona would not constitute a major federal action significantly affecting the quality of the human environment. Thus, an Environmental Impact Statement will not be prepared. Additionally, the action will not be implemented until concurrence from USFWS has been received.

Public Comments: The Army invites interested or affected parties to review and comment on the FNSI within 30 days of publication by writing to Commander, U.S. Army Garrison, ATTN: ATZS-ISB (UAV EA), Fort Huachuca, Arizona 85613-6000. Requests to obtain a copy of the EA may be sent to the above address or faxed to (520) 533-3043, or by contacting Ms. Ledbetter at (520) 533-3120. Other telephone inquiries should be directed to: Public Affairs Office, U.S. Army Garrison, telephone: (520) 533-2922 or 533-1985.

Approved by:

John D. Thomas, Jr.
Major General, U.S. Army
Commanding

18 5600
Date

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1.0 INTRODUCTION

One of the most important missions on any battlefield is the accumulation of intelligence data. A system that has been developed for acquiring these data is the unmanned aerial vehicle (UAV). The UAV is a remotely controlled aircraft that can fly over enemy occupied territory and acquire military intelligence data without risk to human operators. Its small size and low noise profile make it hard to detect and difficult to counteract.

Fort Huachuca is a center for Department of Defense (DOD) UAV testing and training programs. The Fort's geography, climate, remote location, and facilities provide the DOD with excellent conditions for a national UAV testing and training center. UAV activities that currently occur on Fort Huachuca include the testing of a wide variety of UAVs, training of UAV operators and maintainers (maintenance technicians), and the development of operational combat units. Fort Huachuca has been serving the DOD in this capacity for over 10 years, but existing facilities are inadequate to meet the future needs of the program. In short, Fort Huachuca is proposing to expand its capability to support future UAV programs.

1.1 PURPOSE OF THE PROPOSED ACTION

The purpose of the Proposed Action is to provide the required infrastructure and operational capabilities to support anticipated incremental changes to UAV mission requirements at Fort Huachuca. Proposed activities include the following:

- Upgrade of existing UAV facilities.
- Construction of new UAV training facilities within existing training complex and new testing facility on East Range.
- Increased testing of existing and new UAV systems from three to approximately five tests per year.
- Increased frequency of UAV flights in local Special Use Restricted Airspace by up to 30 percent.
- Increased use of existing and proposed takeoff and landing strips at Fort Huachuca.
- Changes in numbers of personnel positions assigned to the UAV training program at Fort Huachuca.
- Shorten class length for medium UAV testing from 33 to 23 weeks.

1.2 NEED FOR THE PROPOSED ACTION

The need for the Proposed Action is a result of the limited capability of existing facilities at Fort Huachuca to sustain current missions and future UAV program activities on the installation. The Proposed Action would provide the required infrastructure improvements and expanded operational capabilities to prevent any impact on mission effectiveness.

Because Fort Huachuca serves as a DOD UAV testing and training platform, several UAV facilities have been built and are maintained on the Fort. These existing facilities (described in Section 3.1, *Land Use)* provide DOD with an opportunity to co-locate a number of UAV programs in an efficient and cost-savings development environment. The facilities differ in use and capability, but have all been an integral part of Fort Huachuca's capability to support various DOD UAV programs and serve as a foundation for expanding the Fort's UAV mission. However, competition for these facilities has increased significantly since testing and training programs were conceived in the early '90s.

It is important that the DOD and the U.S. Army work together with UAV developers and users to ensure that these systems perform when called upon to provide the intelligence edge during conflicts. Proposed improvements to Fort Huachuca's UAV program capabilities reflect DOD's decision to increase the use of UAVs during military actions, and the resulting need for improved UAV program infrastructure at select training installations across the country.

1.3 SCOPE OF THIS ENVIRONMENTAL ASSESSMENT

This Environmental Assessment (EA) identifies, evaluates, and documents the effects of various proposed changes in the UAV program at Fort Huachuca.

This EA was prepared in compliance with the National Environmental Policy Act (NEPA) (Public Law 91-190, 42 U.S.C. 4321-4347, as amended), the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 CFR 1500-1508), and AR 200-2, Environmental Effects of Army Actions (USA 1988). NEPA requires that agencies of the federal government implement an environmental impact analysis program in order to evaluate "...major federal actions significantly affecting the quality of the human environment." A federal action may include projects financed, assisted, conducted, regulated, or approved by a federal agency that have the potential to significantly affect the human environment. AR 200-2 implements the NEPA process for Army commands and installations. The Regulation states that "... all Army decision making that may have an impact on the human environment will use a systematic, interdisciplinary approach that ensures the integrated use of natural and social sciences, planning and the environmental design arts..." (USA 1988, Section 2.1).

In order to assess the full range of the potential impacts, the Army determined that this EA should evaluate the following resources:

- Land Use (Sections 3.1, 4.1)
- Air Quality (3.2, 4.2)
- Noise (3.3, 4.3)
- Socioeconomics (3.4, 4.4)
- Transportation (3.5, 4.5)
- Public Services, Utilities, Energy (3.6, 4.6)
- Public Hazards, Health, and Safety (3.7, 4.7)
- Soil and Water Resources (3.8, 4.8)
- Biological Resources (3.9, 4.9)
- Cultural Resources (3.10, 4.10)

This EA was also prepared in order to meet the requirements of an effective and coordinated environmental planning process. By identifying future construction requirements, the assessment places the activities associated with the Proposed Action and their impacts into a broad geographical, environmental, and developmental context. A wide variety of available data and results of previous studies (see Section 1.4 below), were incorporated and consolidated into this document to serve as a resource and planning baseline for subsequent project-specific environmental analyses. Results from recent consultations with the U.S. Fish and Wildlife Service (USFWS 1999) regarding ongoing and proposed activities at Fort Huachuca, as they apply to facilities or activities associated with the Proposed Action, are also incorporated into this EA. All UAV operations and activities will adhere to the Reasonable and Prudent Measures and Terms and Conditions of the recent 1999 USFWS Biological Opinion.

The study area for this EA includes Fort Huachuca and vicinity (including the City of Sierra Vista, Huachuca City, and Coronado National Forest) as well as local Special Use Restricted Airspace.

1.4 ENVIRONMENTAL ANALYSES RELATED TO THE UAV PROGRAM

A comprehensive review was conducted on previous environmental analyses prepared for similar activities at Fort Huachuca and vicinity. This included the collection of environmental data prepared for previous UAV program impact evaluations at the Fort as well as program-specific planning documents. Data from these documents were incorporated into this EA in general and by specific citation where applicable. For ease of reference, this section provides a list of the documents incorporated by general reference. When a portion of a document is used for detailed reference material, that document is cited within the text, and the specific reference is presented in Section 8, *References*.

U.S. Fish and Wildlife Service. Biological Opinion AESO/SE 2-21-98 for *Ongoing and Proposed Activities at Fort Huachuca, Arizona,* Albuquerque Regional Office, October, 1999.

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Department of the Army, Fort Huachuca Garrison, Test and Experimentation Command (TEXCOM), Final Environmental Assessment. Unmanned Aerial Vehicle – Short Range (UAV-SR), June 1, 1992.

U.S. Army Electronic Proving Ground, Fort Huachuca. *Environmental Assessment for the U.S. Army Electronic Proving Ground Communication-Electronic Testing and Use of Test Sites in Southern Arizona and Fort Huachuca.* May 1992.

Dames & Moore. *Environmental Assessment for the Development of a Forward Operating Base for the Advanced Airlift Tactics Training Center, Joint Operations Training Site, Libby Army Airfield, Fort Huachuca, Arizona.* May 1992.

U.S. Army Electronic Proving Ground, Fort Huachuca. *Electronic Proving Ground Environmental Assessment for Shortrange Unmanned Air Vehicle Tests, Fort Huachuca, Arizona.* February 1991.

U.S. Army Electronic Proving Ground, Fort Huachuca. *Electronic Proving Ground Environmental Assessment for Position Location System, Fort Huachuca, Arizona.* January 1991.

1.5 PUBLIC INVOLVEMENT AND COMMENT

Public Notices and invitations for comment were published in the Sierra Vista Herald during March 2000, in preparation for this environmental analysis. One public comment was received concerning flight safety in residential communities. Recent scoping sessions for other environmental analyses have indicated consistent concerns from groups and individuals. The issues raised included concern from local residents relative to Fort Huachuca as a local economic base. The discussion on the economic impact of the proposed activities in the preceding section (Socioeconomics) concluded that no significant impact on the local economy will result from implementation of the Proposed Action.

CEQ and AR-200-2 regulations that implement NEPA, recommend an early and open process for the preparation of an EA, especially projects that may have potential impacts on communities surrounding military installations. In keeping with an open decision-making process, the Army has made this EA available to agencies and the general public for review and comment. A Notification of Availability (NOA) was published on in the *Sierra Vista Herald, Huachuca Scout, Arizona Daily Star,* and *Sonoita Bulletin* newspapers. Initial distribution of this EA included agencies and individuals that had previously expressed interest in activities at Fort Huachuca. This distribution list is provided in Section 7, *Distribution List.*

For further information contact: Public Affairs Office, U.S. Army Garrison, ATTN: ATZS-PA, Fort Huachuca, Arizona 85613-6000 telephone: (520) 533-2922 or 533-1985. To obtain copies of the EA, contact Ms. Ledbetter at (520) 533-3120 or write to: U.S.A.I.C. & F.H., ATTN: ATZS-ISB (UAVEA), Fort Huachuca, Arizona 85613-6000.

The public is invited to comment on this EA during the 30-day public comment period. Comments postmarked after that date will be considered to the extent practicable. Questions and comments may be addressed to either of the addresses provided above.

1.6 A BRIEF HISTORY OF UAV PROGRAMS

Although the notion of using unmanned aircraft has been around since World War I, the United States did not begin seriously experimenting with unmanned reconnaissance drones until the late 1950s. The Vietnam War and the Cold War spurred a variety of new development programs, which led to several reconnaissance drones, such as the Firefly and Lightning Bug. The Air Force deployed these early drones for a variety of missions, including gathering signal intelligence and collecting high- and low-altitude imagery, both during the day and at night. By the end of the Vietnam War, concern about casualties meant that only two aircraft were allowed to fly reconnaissance missions over North Vietnam: the Lightning Bug UAV and a high-altitude, manned reconnaissance plane (the supersonic SR-71).

After the Vietnam War, the DOD remained interested in exploring the capabilities that unmanned aircraft had to offer. In particular, from 1979 to 1987 the Army developed and tested a tactical UAV called Aquila. In 1982, the Israelis effectively used drones to destroy Syrian air defenses in Lebanon's Bekaa Valley. Their success inspired the Navy to acquire UAVs, primarily to support targeting by, and battle-damage assessment for, U.S. battleships. The Navy and Marine Corps acquired nine Pioneer UAV systems-which have been employed in U.S. operations since the 1980s, including the Gulf War, Bosnia, and Kosovo.

In recent years, the DOD has begun a number of other UAV development programs: the Predator and Shadow 200 currently in production, and the Global Hawk, in development. Advances in technologies such as miniaturization and noise reduction and increasing experience in the integration of all UAV system components (air vehicle, ground support equipment, sensors or other payloads, and communications equipment), have contributed to the optimism of DOD officials about the current group of UAVs

Several major organizations currently participate in UAV-related activities on Fort Huachuca. These organizations represent both testing and training in support of a variety of UAV platforms and include:

- 111th Military Intelligence (MI) Brigade, U.S. Army Intelligence Center (USAIC).
- White Sands Missile Range–Electronic Proving Ground (WSMR-EPG).
- Intelligence Electronic Warfare Test Directorate (IEWTD).
- TRADOC System Manager (TSM), UAVs.
- Naval Air Maintenance Training Group Detachment (NAMTRAGRUDET).

This organizational structure serves for coordinated development and testing, as well as training of operators and other military personnel on UAV systems.

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2.0 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

This EA addresses anticipated changes to the UAV program at Fort Huachuca and associated improvements in facility and operational capabilities. Several action scenarios were found to be reasonable for providing Fort Huachuca with increased UAV program capabilities. These were evaluated based on each scenario's ability to provide the required infrastructure and operational capabilities to support an expanded UAV mission, as proposed by the Fort. As a result of this evaluation, a preferred alternative was selected and is presented as the Proposed Action. The other scenarios were considered to be less effective at providing required improvements in mission capabilities at Fort Huachuca, but reflect reasonable scenarios for supporting the mission at lower levels of program funding and also reflect decisions that may be made outside Fort Huachuca's span of control. The action scenarios are:

- **Proposed Action**—Full Facilities: Expansion of Fort Huachuca's current UAV program capabilities through new construction and upgrades of existing UAV facilities; increase in testing, development, and frequency of UAV flights; and a change in the number personnel assigned to the UAV training programs at the Fort.
- **Alternative A**—Full Facilities Plus Navy: Identical to the Proposed Action but the U.S. Navy Pioneer Program would remain at Fort Huachuca.
- **Alternative B**—Enhanced Facilities. The same operational activities as under the Proposed Action would take place, but there would be a reduced level of construction.
- **Alternative C**—Existing Facilities. The same operational activities as in the Proposed Action would take place, but the activities will be contained within the existing facilities and accommodated to the extent possible through scheduling. No new facilities or upgrades to existing facilities would occur.
- **Alternative D-No Action**—Under CEQ regulations, a proponent must also evaluate the No-Action scenario. Therefore, Alternative D reflects the No-Action scenario and represents a continuation of existing UAV program activities and levels of authorized positions and use of associated facilities at Fort Huachuca.

2.1 PROPOSED ACTION: FULL FACILITIES

The Proposed Action is to improve UAV facilities and operational capabilities at Fort Huachuca. Proposed activities related to the Proposed Action include the following:

- Upgrade of existing UAV facilities.
- Construction of new UAV training facilities within existing training complex and new testing facility on East Range
- Increase testing of existing and new UAV systems from three to approximately five tests per year.
- Increase frequency of UAV flights in local Special Use Restricted Airspace by up to 30 percent.
- Increase use of existing and proposed takeoff and landing strips at Fort Huachuca.
- Changes in numbers of personnel positions assigned to the UAV training program at Fort Huachuca.
- Shorten class length for medium UAV testing from 33 to 23 weeks.

A description of each type of UAV is presented below. Following the descriptions, each component of the Proposed Action is discussed.

2.1.1 Types of Aircraft

Since the names and configurations of individual UAV programs may change over time, this section describes UAVs based on a category of size, followed by the facilities and airspace used by each size of aircraft. A detailed description of representative UAVs is provided as Appendix A. Where applicable, UAV models in each size category are briefly described to help the reader understand what a typical UAV system may include.

2.1.1.1 Small Unmanned Aerial Vehicles

Small UAVs (currently described as micro and mini air vehicles) typically have dimensions less than 10 ft long with wingspans up to 12 ft (Figure 2.1-1). These UAVs have been proposed for use in military surveillance, law enforcement, and civilian rescue efforts.

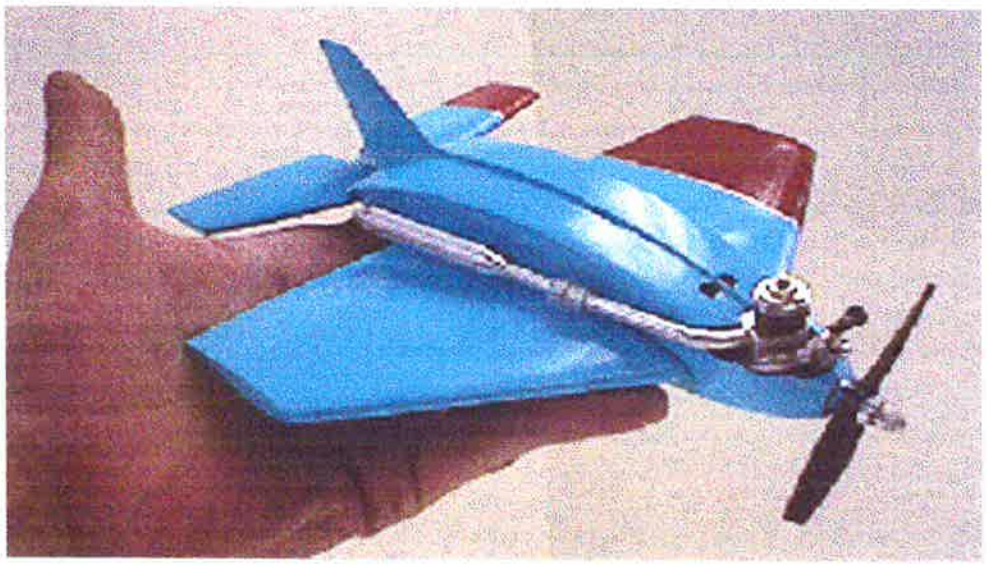


Figure 2.1-1. Small Unmanned Aerial Vehicle

The ground-based portion of a small UAV system typically includes a PC-based machine vision (image processing) system, a joystick for manual flight control, and a RF uplink. The UAV is designed to be able to launch, cruise, dash, loiter (virtual hover about a point or an area), and return to the launch site or another site, where it lands. Small UAV testing and training flights will continue to take-off and land at Libby Army Airfield (LAAF), Rugge-Hamilton Runway, Pioneer Runway, and Hubbard Assault Airstrip, with increased use of the Demonstration Hill Airstrip and new use of East Range Airstrip (see Section 3.1.4 for detailed facility descriptions). Small UAVs could also take-off and land at a number of other locations across Fort Huachuca, in accordance with individual range restrictions and facility or roadway capabilities. Small UAVs will use Special Use Restricted Airspace in the vicinity of Fort Huachuca (see Section 2.1.6 for proposed airspace use).

2.1.1.2 Medium Unmanned Aerial Vehicles

Medium UAVs (Pioneer, Hunter, and Shadow 200) are larger than Small UAVs but less than 25 ft long with a wingspan of less than 30 ft (Figures 2.1-2A and 2.1-2B). These aircraft have been designed to perform accurate surveillance and reconnaissance missions under adverse environments and tactical battlefield conditions.

Figure 2.1-2A. Medium Unmanned Aerial Vehicle

Figure 2.1-2B. Medium Unmanned Aerial Vehicle

Medium UAV testing and training flights will continue to take-off and land at LAAF, Rugge-Hamilton Runway, Pioneer Runway, and Hubbard Assault Airstrip with new use of the East Range Airstrip and Demonstration Hill Airstrip (see Section 3.1.3, for detailed facility descriptions). Medium UAVs will also use Special Use Restricted Airspace in the vicinity of Fort Huachuca (see Section 2.1-6 for proposed airspace use). In addition, the Proposed Action also includes testing activities involving Medium UAVs in conjunction with indirect fire assets (artillery and/or mortars) on the East Range impact area (Area Zulu) (see Section 2.1.4.2 for a discussion on proposed use of the East Range Area Zulu).

2.1.1.3 Large Unmanned Aerial Vehicle

Large UAV systems such as the Predator, are larger than Medium UAVs with wing spans up to 115 ft or larger (Figure 2.1-3). These UAVs can provide long-range, near-real-time reconnaissance, surveillance, target acquisition, and battle-damage assessment day or night and in some difficult weather conditions, as well as work in tandem with other, smaller UAVs.

Large UAV testing and training flights will continue to take-off and land at LAAF, Rugge-Hamilton Runway, Pioneer Runway, and Hubbard Assault Airstrip (see Section 3.1.4 for detailed facility descriptions). Large UAVs would also use Special Use Restricted Airspace in the vicinity of Fort Huachuca (see Section 2.1-6 for proposed airspace use).

The Proposed Action also includes testing activities that involve the Large UAVs in conjunction with other UAV programs and indirect fire assets (artillery and/or mortars) on the East Range impact area (Area Zulu) (see Section 2.1.4.2 for a discussion of proposed use of Area Zulu).

Figure 2.1-3. Large Unmanned Aerial Vehicle

2.1.2 UAV Operations and Ancillary Tasks

An increase in both testing and training of UAV systems at Fort Huachuca is part of the Proposed Action. In general UAVs take off from designated airstrips, perform any number of aerial tasks, and then return to the ground during both testing and training activities. Flights are generally confined within Fort Huachuca Special Use Restricted Airspace and do not occur over the San Pedro Riparian National Conservation Area (NCA) or Miller Peak Wilderness Area at an altitude lower than 2,000 ft (608 m).

There are two kinds of UAV testing that occur at Fort Huachuca: Developmental Testing and Operational Testing. Developmental testing typically involves contractor technical experts and the testing of UAV platforms and prototypes. It involves testing the technical parameters of the system as in confirming it performs per the technical specifications advertised and required. The EPG is the primary developmental testing organization at Fort Huachuca.

Operational testing, on the other hand, typically involves military and government civilian operators and maintainers. Operational testing looks at the system's performance in an environment similar to how we expect the system to perform when fielded to the Army. The IEWTD is the primary operational testing organization at the Fort. There are only negligible differences between developmental and operational testing as they relate to the human environment, and for ease of discussion, both types of testing will be hereafter combined and referred to only as "testing" throughout the remainder of this document. Testing activities generally involve placing targets for detection (for each category of UAV) and the use of active and passive sensors and other payloads.

During training, UAVs collect data, such as photographs and climatic data, while providing personnel with an opportunity to master operating and maintaining the vehicles. Both testing and training may also involve the use of Rocket Assisted Take-off (RATO). A discussion of these three specific activities follows.

2.1.2.1 Target Placement and Identification

One aspect of UAV testing and training involves the setting of targets in a natural environment to determine the accuracy of the system to detect, recognize, and locate the targets. These targets may be stationary, moving, or a mixture of both and will be set on Fort Huachuca, as well as at selected sites within the Coronado National Forest and along established roadways throughout Cochise and Santa Cruz counties.

Stationary targets are static groupings of materials, reflectors, or equipment that can be detected by active or passive sensor systems. Target placement consists of driving wheeled vehicles along established roads and parking them along the roadway under trees and cover. No off-road travel for either vehicles or personnel is proposed outside of previously disturbed areas. Vehicle parking will occur on or immediately adjacent to the established roads.

Moving targets normally consist of small convoys traveling within a defined area on existing roads on Fort Huachuca and the surrounding areas. Convoys may also double as stationary targets once they stop at designated points.

Special considerations for protection of the environment during these activities have already been enacted as a result of previous EAs and are incorporated into this document.

2.1.2.2 UAV Payloads and Applications

The use of a variety of active and passive sensors and other payloads during in-flight activities is another aspect of UAV testing and training activity. Active sensors and payloads may include smoke or obscurant delivery; chaff or chaff-like material release; psychological operations material (such as leaflets, pamphlets); humanitarian aid material; electromagnetic emissions; lasers; microwave; telecommunications emissions; conventional weapons delivery; other unmanned air or ground vehicles; and non-conventional weapon delivery (such as tear gas for riot control). The release of active payloads into the environment during testing will be extremely limited in frequency and duration. There would be no release of active payload materials during training, however, active payloads mounted in the UAV vehicle such as radar or lasers may be used. Passive payloads, during both testing and training, include infrared, thermal and photographic sensors, meteorological sensors, or nuclear, biological, and chemical detection sensors.

The limited use of munitions in support of UAV payload testing and deployment capability research is also part of testing. The use of munitions would occur only in accordance with range capabilities and safety requirements, and in coordination with Range Control. Technical measurements of explosive round performance will occur at other installations and facilities designed for such work. Examples of munitions that may be involved with the UAV program, and used during testing at Fort Huachuca fall under two general categories:

(1) Precision-type munitions, where the UAV is destroyed as part of the weapon.

(2) Munitions dispensed by or fired from a UAV, where the UAV continues its mission and is recovered for rearming and reuse.

Under the Proposed Action, all uses of munitions would be in strict conformance of Fort Huachuca range capabilities and Fort Huachuca Regulation 385-8, Safety—Range and Training Area Operations (19 October 1994). Currently, the Army proposes the use of Area Zulu on the East Range for testing activities involving munitions. While air-burst munitions and air-to-air weapons could be evaluated for UAV development, the use of such munitions are not addressed in this EA and would be subject to future event-specific environmental review, as previously mentioned.

2.1.2.3 Rocket Assisted Takeoffs

RATO involves a rocket that boosts takeoff speed and allows the UAV to lift off in a shorter space of airstrip. After takeoff, the RATO cylinder is detached from the UAV and falls to the ground. Under the Proposed Action, RATO-assisted takeoffs will continue to be used in the UAV program at Fort Huachuca. Due to the expense involved in using RATO, it is anticipated that only four to ten RATO flights would occur annually at Fort Huachuca. Currently only the Hunter and Pioneer UAVs use RATO.

Previous environmental analyses have evaluated the use of RATO for UAV operations on the Pioneer and Rugge-Hamilton runways at Fort Huachuca (see Section 1.4 of this EA). The Proposed Action includes the continued use of RATO at these runways on the West Range and the potential use of RATO at Hubbard Assault Strip on the East Range. Special considerations for the protection of the environment during RATO operations have already been enacted as a result of previous environmental analysis.

2.1.3 Ancillary Systems

Testing and training of UAV systems (of all sizes) requires the integration of additional ground and airborne systems for mission coordination and communication testing. These systems include

unmanned ground vehicles, military-aircraft and/or stationary or mobile-ground monitoring, and tracking platforms. The configuration of these ancillary support systems may vary from exercise-to-exercise and may change over time to support Army requirements. The major components include the combined Common Ground Station/Ground Control Station (CGS/GCS) and the Aerial Common Sensor (ACS) platform. A brief discussion of these components is provided below.

2.1.3.1 Combined Common Ground Station/Ground Control Station

The combined CGS/GCS provides aircraft control functions for UAVs. It serves as the air vehicle operator (pilot) and payload operator workstations for UAVs, and is the manned aircraft equivalent of the cockpit. The CGS/GCS has a variety of configurations, but in general consists of a wheeled vehicle and a lightweight multipurpose shelter with operator workstations and a communications suite. Two to five vehicles with trailer-mounted generators may also be included in the system. This mobile, sophisticated control center can direct the UAV throughout the mission from a highly mobile militarized shelter. The CGS/GCS is the central intelligence information collection station and processing point for analyzing the health of the UAV while airborne.

The CGS/GCS could be set up at a number of locations at Fort Huachuca including the existing Electronic Proving Ground (EPG) test areas throughout Fort Huachuca, Black Tower Complex, LAAF, Rugge-Hamilton Runway, Hubbard Assault Airstrip, and Pioneer Runway. Other locations include existing roads and bivouacking areas on Fort Huachuca, and outside of the Fort at specific sites in the Coronado National Forest and on military, federal, and state lands within Santa Cruz and Cochise Counties that have been leased by the military for such activity. Previous environmental analysis has evaluated the use of these areas for similar activities (Section 1.4 of this EA).

2.1.3.2 Aerial Common Sensor Platform

The ACS platform is the next step in the Aerial Reconnaissance Low-Multifunction (ARL-M) and the Guardrail Common Sensor (GR/CS) system. The ACS is a rapidly self-deployable system designed to conduct multifunction intelligence missions in support of echelons above corps, corps division, and brigade battle management. The aircraft is capable of self-deployment with flights at operational altitudes of 25,000 to 35,000 ft. and can carry a full suite of sensor payloads. It typically consists of a manned aircraft equipped with a suite of modular electronic payloads, and a portable Ground Processing Facility (GPF).

GPF components typically consist of two ground vehicles equipped with remote workstations. The GPF will be cargo aircraft (such as C-5, C-17, C-130, and C-141) drive-on/drive-off capable, with the mobility required to keep pace with the main headquarters of the supported commander.

A typical ACS mission requires the aircraft to orbit behind and parallel to the forward line own troops (FLOT). A proposed ACS mission involving UAV systems could include regional airborne communication with and control of the UAV aircraft.

ACS flights could originate or occur at LAAF or Hubbard Assault Airstrip facilities (see Section 3.1.3 for facility descriptions). The ACS program components will also use Special Use Restricted (see Section 3.5.2 of this EA) in the vicinity of Fort Huachuca.

2.1.4 Facilities on Fort Huachuca

The continued use of facilities both on- and off-Fort Huachuca, as well as the construction of new facilities on the Fort are part of the Proposed Action. This section discusses existing UAV-activity

facilities on Fort Huachuca, as well as proposed new construction projects designed to support future UAV program requirements (facilities off-fort are discussed in Section 2.1.5).

Under the Proposed Action, several existing facilities on the Fort will continue to be used for UAV program activities. These facilities are discussed below along with the proposed activity at each site, including any new construction (Figure 2.1-4).

Special considerations for the protection of the environment at many of these sites have already been enacted as a result of previous environmental review. These mitigation measures are identified throughout Section 4 of this document and Appendix D.

2.1.4.1 West Range Facilities

The West Range covers approximately 16,453 acres (6,663 ha) of land on the West Reservation and is west of the cantonment area (see Figure 2.1-4). Four specific areas of the West Range are included in the Proposed Action and alternatives as potential sites for increased UAV program activity or facility construction: (1) Black Tower Complex, (2) UAV Training Center and Rugge-Hamilton Runway, (3) Pioneer Training Facility and Runway, and (4) the Demonstration Hill Airstrip.

Black Tower Complex—Facilities at the Black Tower Complex would continue to be used for UAV program activities.

UAV Training Center and Rugge-Hamilton Runway—The UAV Training Center, which includes the Rugge-Hamilton Runway and the Applied Instruction Building (AIB), would continue to be used for UAV activities. New construction at the facility could include an additional runway, with permanent administrative, sanitary, and maintenance structures with impermeable roadways, run-ups and parking facilities. The locations of these proposed construction activities are not known at this time, however, they are estimated to disturb approximately 8 acres (3.2 ha) of land at the site during construction activities and have a post-construction footprint of less than 4 acres (1.6 ha) (including the proposed runway). The Rugge-Hamilton Runway could experience UAV activity on a daily basis. Realistic estimates of this activity would suggest approximately 8 hours of flight per day, with 300 days of flying activity per year. A large (56,000 sq ft) (5,200 sq m) expansion of the AIB is also proposed.

Pioneer Training Facility and Runway—The Pioneer Training Facility will continue to be used for UAV activities. New construction at the site could include permanent administrative, sanitary, and maintenance structures with impermeable roadways, run-ups and parking facilities for training activities conducted at the runway. The locations of these proposed construction activities are not known at this time, however, they are estimated to require the disturbance of approximately 3 acres (1.2 ha) of land at the site during construction, and have a post-construction footprint of less than one acre (0.41 ha).

The Pioneer Runway could experience UAV activity on a daily basis. Realistic estimates of this activity suggest that approximately 8 hours of flight per day, with 300 days of flying activity per year will occur, but could increase substantially based on unknown projections. It is projected that the existing U.S. Navy Pioneer UAV program may relocate to Pensacola Florida in FY01. In the event that this move occurs, a replacement UAV program would likely assume the use of the existing Pioneer Training Facility and runway. The Proposed Action assumes that this U.S. Navy program will relocate.

Demonstration Hill Airstrip—This airstrip would be paved and used for Small UAV and Medium UAV takeoff and landing activities. The site is not capable of supporting the take off or landing of any Large UAV. This airstrip will experience UAV activity on an infrequent basis. Reasonable estimates suggest that there would be approximately 8 hours of flight per day on approximately 30 days per year.

2.1.4.2 East Range Facilities

The East Range is on the East Reservation east of the cantonment area and Highway 90 and covers approximately 27,215 acres (11,022 ha) of land (see Figure 2.1-4). Several areas of this range are included in the Proposed Action and alternatives as potential sites for increased UAV program activity or facility construction. Tactical use of existing runways could occur on East Range roadways for small and medium UAVs. These activities will not occur in Training Areas A and E east of Area Zulu.

New construction on the East Range could include a new Urban Landscape Training Facility and an East Range Test and Evaluation Facility in the general proximity of the existing East Range Airstrip and Hubbard Assault Airstrip. These facilities could include administrative, sanitary, and maintenance facilities for UAV test administration and simulated urban landscape training for UAV testing and training activities by all organizations. The locations of these proposed construction activities are not known at this time; however, they are estimated to disturb approximately 20 acres (10 ha) of land during construction activities, and have a post-construction footprint of less than 10 acres (4 ha).

East Range Airstrip—The existing grass airstrip on the East Range will be cleared of vegetation and will experience new UAV activity on an infrequent basis. Realistic estimates of this activity suggest approximately 8 hours of flight per day, with up to 30 days of flying activity per year.

Hubbard Assault Airstrip—The Hubbard Assault Airstrip could experience an increased level of UAV activity to accommodate expanded UAV program requirements. Realistic estimates of this activity suggest approximately 8 hours of flight per day, with up to 90 days of flying activity per year.

Area Zulu (Impact Area)—Mortars and field artillery could be used during testing of UAV systems to fire rounds into Area Zulu from any number of approved firing points on the East Range. Mortar and artillery fire is necessary in order to test UAV capabilities to detect targets and provide real-time feedback on the accuracy of mortar/artillery and adjustment of fires on targets. The use of Area Zulu for training activities involving live munitions has already been evaluated for the potential affects to natural and human environment (see Section 1.4 of this EA). The Proposed Action does not include the use of any munitions in Area Zulu that are beyond the capability of that area, and will only be used after approval from the Fort Huachuca Range Control Officer.

2.1.4.3 South Range Facilities

The South Range is on the West Reservation south of the cantonment area and covers approximately 24,334 acres (9,855 ha), which includes most of the installation's extent of the Huachuca Mountains (Figure 2.1-6). Although no specific area of the South Range is included in the Proposed Action or alternatives as a potential site for increased UAV program activity or facility construction, the Fort Huachuca UAV Program may, on occasion, use existing facilities (including roadways) on this range in support of testing or training activities.

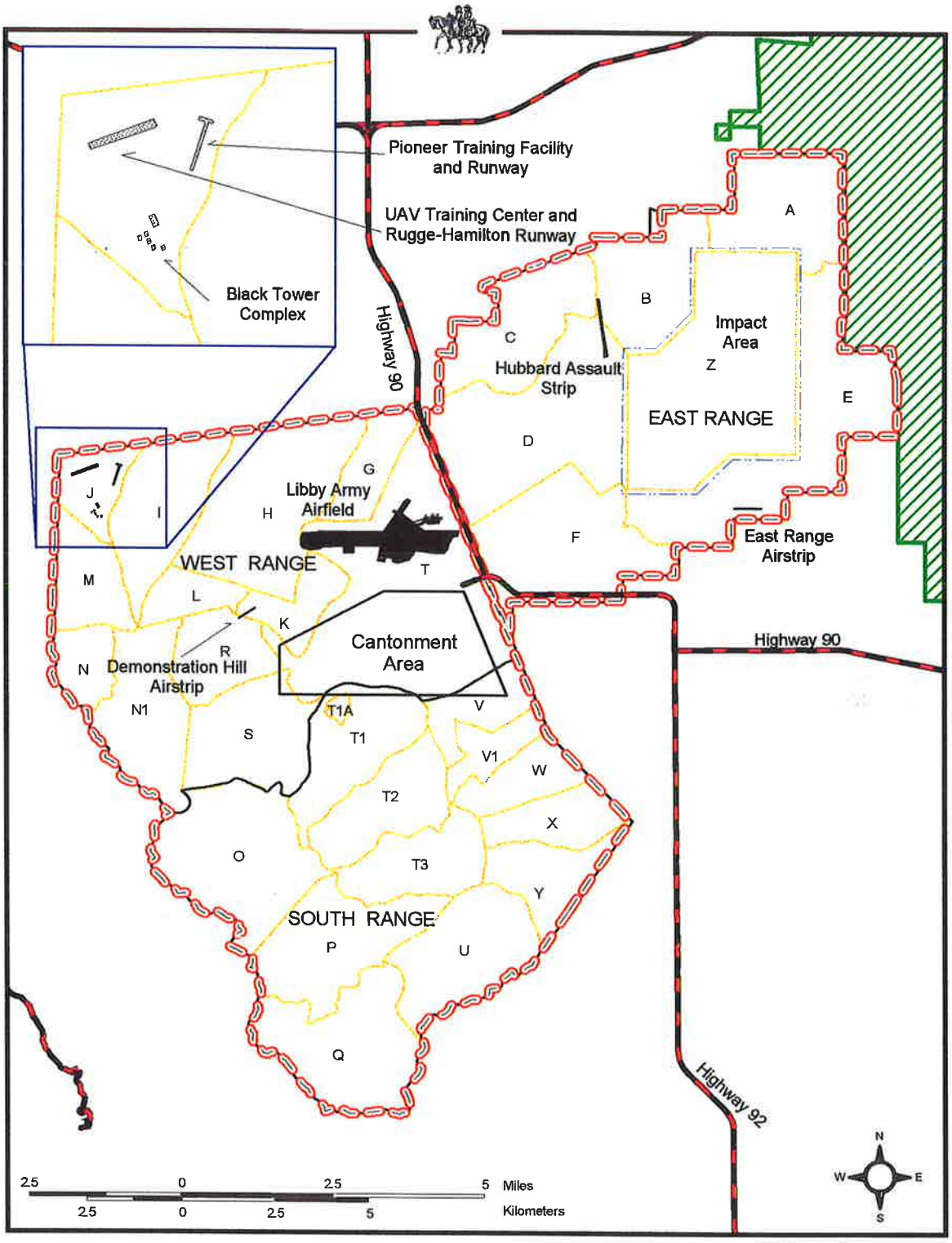


FIGURE 2.1-4

Fort Huachuca
UAV Facilities

Major Roads
Fort Huachuca
Training Areas
San Pedro River NCA

1

2.1.4.4 Libby Army Airfield

LAAF is co-located with the Sierra Vista Municipal Airport (Figure 2.1-4). LAAF will continue to serve as an alternative for UAV activity. New construction at LAAF could include the construction of a new antenna tower and two maintenance buildings to support UAV operations and a 1,500 ft. (457 m) extension to the southeastern-most taxiway to create a UAV-only runway. The locations of these proposed construction activities are not known at this time, however, they are estimated to require the disturbance of approximately 9 acres (3.6 ha) of land at the west end of the site during construction, and have a post-construction footprint of 5 acres (2 ha). LAAF would experience UAV activity on an infrequent basis. Realistic estimates of this activity would suggest that approximately 8 hours of flights per day, with up to 250 days of flying activity per year would occur.

2.1.5 Facilities off Fort Huachuca

Facilities off Fort Huachuca to be used for UAV activities under the Proposed include the Coronado National Forest and off-post Accurate Survey Areas (ASA) sites.

2.1.5.1 Coronado National Forest

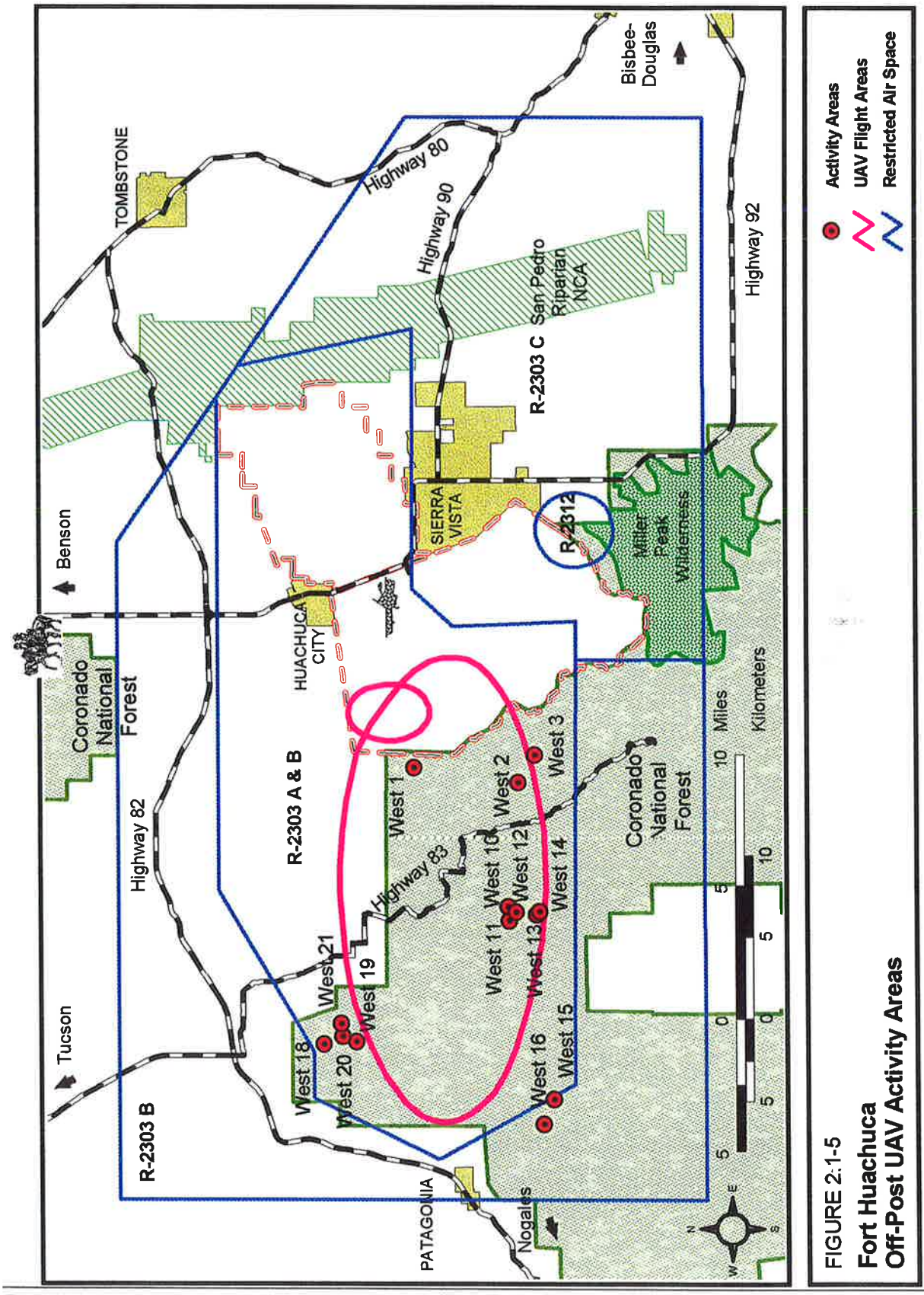
Areas within the Coronado National Forest are used on occasion for the UAV-target placement testing activities. There will be no new construction related to this project within the Coronado National Forest, and all movement will be along established roads. Proposed locations for target placement and other UAV program-related activity are presented in Figure 2.1-5. These areas have already been evaluated for use during testing activities (USFS 1999). Realistic estimates of this activity suggest approximately 15 testing events per year at each location, with testing potentially occurring throughout the day and night. A discussion on testing events and levels of activity (including personnel and equipment) per event is presented in Section 2.1-7 below.

2.1.5.2 Off-Post Accurate Survey Area Sites

A network of approximately 675 off-post Accurate Survey Area (ASA) sites could be used to support the testing and training by various UAV programs. Soldiers will be trained on operating procedures for realistic placement of mobile and stationary targets and intelligence systems over a wide geographic area. Further, the capability of electronic systems to operate under a variety of geographic and atmospheric conditions would be tested.

UAV testing is typically conducted by dispatching target vehicles and/or electronic equipment to a selection of ASA sites that meet the evaluation requirements for a required test. Off-post sites are generally located within road right-of-way (ROW) shoulders along several highways in Cochise and Santa Cruz Counties. The remaining off-post ASA sites are located in previously disturbed areas.

At the time of testing or training, vehicles, and personnel could be deployed to any combination of on-post or off-post ASA sites, but most remain on Fort Huachuca. Deployed units generally consist of one to two vehicles with 4 to 6 support personnel and could include up to approximately 20 personnel. The vehicular components of the intelligence training systems can consist of 5-ton military trucks, heavy-duty 4-wheel drive vehicles, and trailers. No off-road vehicle travel outside of established parking areas or designated sites is authorized. Vehicles must remain on established roads or trails and can park adjacent to the road or trail in a previously disturbed, designated area at each ASA site, if necessary


Activity Areas
UAV Flight Areas
Restricted Air Space
Benson
Tucson
Nogales
Bisbee-Douglas
TOMBSTONE
PATAGONIA
HUACHUCA CITY
SIERRA VISTA
Highway 80
Highway 90
Highway 92
Highway 82
Highway 83
San Pedro Riparian NCA
Coronado National Forest
Miller Peak Wilderness
R-2303 A & B
R-2303 B
R-2303 C
R-2312
West 1
West 2
West 3
West 10
West 11
West 12
West 13
West 14
West 15
West 16
West 18
West 19
West 20
West 21
Miles
Kilometers
FIGURE 2:1-5
Fort Huachuca
Off-Post UAV Activity Areas

1

2.1.6 Airspace

As a part of testing and operator training, all three categories of UAVs will use existing Special Use Restricted Airspace in the vicinity of Fort Huachuca. The following restricted-use airspace will experience increased UAV flight levels as a result of the Proposed Action: R-2303A, R-2303B, and R-2303C (see Figure 2.1-6). These areas are used for the primary purpose of testing UAVs as well as other electronic research and testing, and are under the jurisdiction of the Albuquerque Air Traffic Control Center (AATCC). Realistic estimates of suggest a 30 percent increase in flights per year for each airspace.

2.1.7 Personnel Requirements

UAV systems (of all sizes) require personnel who are trained to test, operate, and maintain these vehicles. However, personnel requirements differ between testing and training associated with the UAV program at Fort Huachuca.

2.1.7.1 Testing Activities

Testing, for the purpose of this document, is the activity of testing, assessing and evaluating military systems or their components in laboratory and or operationally realistic environments and conditions. Testing activities do not include air-worthiness testing of UAV vehicles. For UAV testing activities, additional personnel (not currently stationed at Fort Huachuca) are required during individual testing events. Testing events vary in size and complexity and in length of time and personnel requirements as shown in Table 2.1-1. The Proposed Action is to increase the frequency of testing events from three per year to five per year for each size event.

Table 2.1-1. Testing Event Requirements

	Small Testing Events	Medium Testing Events	Large Testing Events
Number of Events	Up to 5 per year	Up to 5 per year	Up to 5 per year
Length of Events	Up to 5 weeks	Up to 5 weeks	Up to 5 weeks
TDY Personnel Needed [1]	Up to 55 TDY [2]	Up to 90 TDY	Up to 90 TDY
Estimated Length of Stay	Up to 90 days	Up to 90 days	Up to 90 days
FTEs	Up to 26 FTEs	Up to 43 FTEs	Up to 43 FTEs

[1] Not including personnel already stationed at Fort Huachuca or in the immediate vicinity
[2] Temporary duty station

All three testing events require the use of UAVs (any type) and ground support equipment in various configurations to support testing requirements. The additional (not already assigned to Fort Huachuca) personnel required will be assigned to the Fort on temporary duty for up to 90 days at a time. The length of the time for the testing varies from two to five weeks, but depending on the type of testing being performed, these additional personnel could be required before, after, or throughout the different phases of testing. Anticipated activities include the launch of UAVs to locate static and moving targets within the Coronado National Forest, Cochise County, and on Fort Huachuca. Some testing events will include flight operations at night.

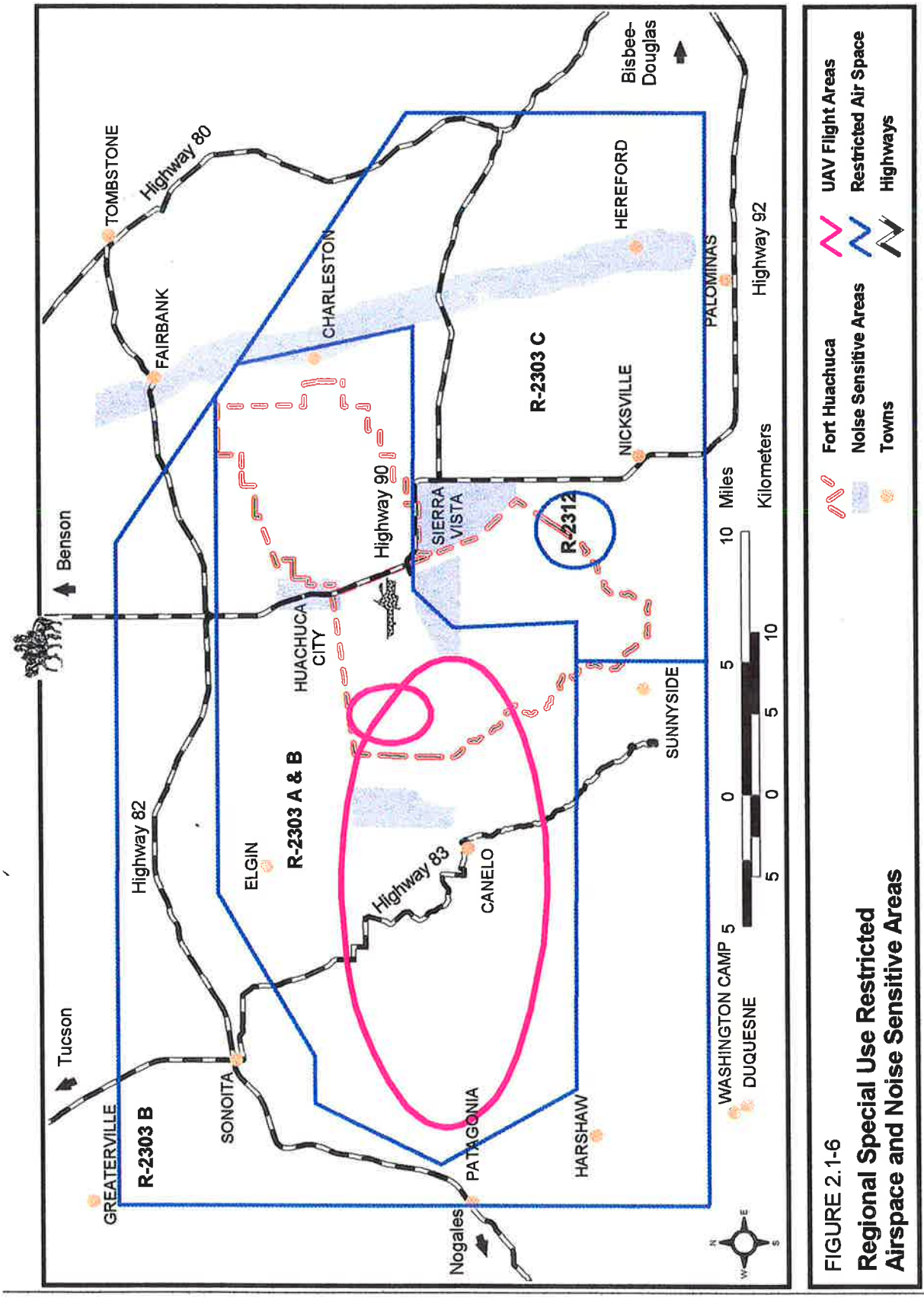


FIGURE 2.1-6
Regional Special Use Restricted Airspace and Noise Sensitive Areas

2.1.7.2 Training Activities

Unlike testing activities, training refers to the training of operators and maintenance personnel required to stand-up or field the various UAV systems. Activities generally include classroom and workshop training, flight simulator training, field instruction (including the operation of different scaled versions of remote-controlled aircraft and UAV platforms), and maintenance activities to support the operation of the vehicle and systems. Training operations will include flight operations at nights. Under the Proposed Action, the level of training at Fort Huachuca may change. This change in personnel will mostly correspond to student throughput (or number of students per year) being trained at the Fort.

The Army estimates that the personnel requirements for future training missions at Fort Huachuca may change year to year based on operational needs of the Army. This change is a decrease in projected student throughput from previous Army projections or forecasts and does not represent an increase in personnel planned for the UAV program at Fort Huachuca. Changes include both students and the shortening of the training course for UAV personnel in the 96U Rating. The 96U Rating (operator) currently requires the completion of a 33-week course which will be reduced to 23 weeks beginning in FY02. The other 52D and 33W Ratings (maintenance technicians) are 10 to 11 week courses.

Table 2.1-2 provides the estimated student throughput for future UAV training at the Fort. This table reflects current Army projections, and depicts the graduated change of UAV-related personnel at the Fort over the next seven years.

Table 2.1-2. Projected UAV Student Throughput at Fort Huachuca: FY01-FY07

Rating	Course Length (weeks)	FY 01	FY 02	FY 03	FY 04	FY 05	FY 06	FY 07
33W[1,2]	Up to 11	43/13	64/19	97/29	118/35	77/23	77/23	77/23
52D	Up to 11	26	40	61	74	48	48	48
96U	23 [3]	56	142	174	268	325	210	210
TOTAL		**125**	**246**	**332**	**460**	**450**	**335**	**335**
FTEs [2]		**49/43**	**85/75**	**110/96**	**159/141**	**169/158**	**119/108**	**119/108**

[1] Approximately 70% of the 33W students will already be stationed at Fort Huachuca.
[2] The first number is the estimated total number of students. The second number represents those students not already stationed at Fort Huachuca and who would be relocating to the FH area.
[3] 33 in FY01

The Army estimates that 70 percent of the 33W Rating students will already be located on Fort Huachuca prior to training. The remaining 30 percent of 33W Rating, and all of the 52D and 96U Ratings, however, will be temporarily stationed at Fort Huachuca without their families for the duration of their training.

UAV program instructors and support positions will be full-time employees (either military or government civilian) and reside in the area. Based on previous experience, the Army estimates that these UAV instructors will likely result from military or civilian personnel already residing in the Fort Huachuca area.

2.2 ALTERNATIVE A: FULL FACILITIES PLUS NAVY

Under the Proposed Action, it is projected that the existing U.S. Navy Pioneer UAV program would relocate to Pensacola Florida in FY01. Alternative A is included in the event that the U.S. Navy keeps their Pioneer UAV program at Fort Huachuca. This will mean that the existing U.S. Navy Pioneer UAV personnel will remain at the Fort and training of Pioneer-related students annually will continue.

Alternative A is identical to the Proposed Action with the exception of these additional Pioneer program personnel. This difference will only affect the number of baseline UAV personnel already residing on the Fort, and the projected cumulative level of UAV personnel that will be trained at Fort Huachuca.

2.3 ALTERNATIVE B – ENHANCED FACILITIES

Alternative B includes the exact same use of existing facilities, UAV operations, support services, and number of personnel requirements as in the Proposed Action and the U.S. Navy Pioneer UAV Program will relocate off the installation. This alternative is identical to the Proposed Action but there will be a reduced level of facility construction under this alternative. Specifically the following construction activities will not occur:

- New runway at the UAV Training Center and Rugge-Hamilton Runway.
- Renovation of the East Range Airstrip.
- Paving of Demonstration Hill Airstrip.

2.4 ALTERNATIVE C – EXISTING FACILITIES

Under Alternative C, Fort Huachuca will continue with the exact same use of existing facilities, UAV operations, support services, and number of personnel requirements as the Proposed Action. However, this alternative will not include any new facilities or any upgrades to existing facilities at the Fort. New UAV missions may continue to be stationed at Fort Huachuca, but would require double-shifting and close coordination among UAV programs to use the existing facilities to execute the respective testing and training missions. Projected changes in student throughput would be identical to the Proposed Action, but will be less than Alternative B because the Navy Pioneer UAV training program will not remain at the Fort.

2.5 ALTERNATIVE D - NO ACTION

Under Alternative D, the existing UAV program at Fort Huachuca will continue as it is, with no further increases in testing or training and no new facilities or upgrades to existing facilities as currently proposed. This alternative resembles the continuation of baseline operational and environmental conditions at Fort Huachuca. It is unknown if the U.S. Navy Pioneer Program will relocate or remain on Fort Huachuca.

3.0 AFFECTED ENVIRONMENT

The affected environment descriptions presented in this section provide the context for understanding the environmental consequences described in Section 4. As such, they serve as a baseline from which any environmental changes that may be brought about by implementation of the Proposed Action and alternatives can be identified and evaluated. These descriptions are provided within the context of overall and specific regions of influence (ROI) that vary by resource area.

These descriptions are based on literature reviews and field observations made by a multi-discipline technical team. In some cases, the discussion has been expanded to provide a better perspective of the regional aspects of such topics as water resources, biological resources, socioeconomic environment, transportation, and public safety as they relate to the Proposed Action and alternatives.

3.1 LAND USE

This section provides information on the existing land uses and controls within the ROI. The section summarizes existing zoning and planned land uses within the Fort Huachuca military installation in its entirety, local cities and towns, and parts of Cochise and Santa Cruz counties.

3.1.1 Setting and Location

Fort Huachuca is located on the western side of the Upper San Pedro River Valley in Cochise County in southeastern Arizona, 75 miles (121 km) southeast of Tucson and approximately 8 miles (13 km) north of the Mexican border (see Figure 3.1-1). Benson, Arizona is approximately 31 miles (50 km) north of the installation on Interstate 10. The Fort encompasses approximately 73,272 acres (29,675 ha) adjacent to the City of Sierra Vista and near Huachuca City in the foothills of the Huachuca Mountains.

Cochise County encompasses approximately 6,219 sq mi (1.6M sq km) in the southeastern-most portion of Arizona. Forty-two percent of the land is privately owned and the remainder is held by the State of Arizona (34 percent), federal agencies (21 percent), and other public entities (3 percent) (ENRD 1999). The major economic sectors in the county are farming, ranching, tourism, and government employment. A large portion of the lands adjacent to the installation fall under the management of the U.S. Forest Service (USFS) and Bureau of Land Management (BLM).

3.1.1.1 Coronado National Forest

The Sierra Vista Ranger District of the Coronado National Forest encompasses 75,000 acres (30,375 ha) of forestland in the Huachuca Mountains immediately to the south and west of the installation. This land is predominately undeveloped and contains very few major access roads, campgrounds, or other high volume recreation facilities. The Forest Management Plans for the Coronado National Forest delineate management areas adjacent to the installation for visual resources, livestock grazing, game habitat, fuel wood harvest, and wilderness (USFS 1986).

3.1.1.2 The San Pedro Riparian National Conservation Area

The San Pedro Riparian NCA was designated in 1988 as part of the Arizona-Idaho Conservation Act. The NCA, which is managed by the BLM, includes roughly 57,000 acres (23,085 ha) in a strip approximately 36 miles (58 km) long and 2.6 miles (4 km) wide. This strip runs from the international boundary north to about 3 miles (5 km) south of St. David (but there is an approximate

2- mile (3 km) gap in the NCA just north of Palominas and a section just north of Lewis Springs). Its purpose, as defined in the legislation, is to conserve, protect, and enhance the riparian area and the aquatic, wildlife, archeological, paleontological, scientific, cultural, educational, and recreational resources of the area. The riparian corridor through the NCA is one of the most extensive, contiguous reaches of cottonwood-willow gallery forests in the southwestern United States (BLM 1998).

3.1.1.3 Local Cities and Towns

There are many small towns and communities in southeastern Arizona. Of the larger population centers, Sierra Vista is the largest, followed by Douglas, Bisbee, Benson, Huachuca City, and finally Tombstone. As was the case with many of the towns in the southwest United States, Bisbee and Tombstone began as mining towns. Benson developed as a transportation hub of the 1800's, and was a stop along the Southern Pacific Railroad, San Pedro River, Pony Express, and Butterfield Overland Stage Coach. Douglas emerged as a copper-processing town with a smelter built in 1901, and was also the annual roundup site for the local ranches. Today Douglas is an important international crossing at the Arizona-Mexico border.

3.1.1.4 Regional Land Use Controls

Cochise County zoning districts maintain land use throughout the county. Approximately 90 percent of the privately-owned unincorporated areas of the county are zoned RU for rural development The lands adjoining the installation at the northern, southern, and portions of the western and eastern borders are zoned RU 4 and require a minimum lot size of 4 acres (1.6 ha). The Transitional Residence (TR) zones along the eastern border of the installation have a minimum lot size of 36,000 sq ft (3,348 sq m). Additional areas around Huachuca City and along State Highway 92 south of Sierra Vista are designated as urban growth areas.

City of Sierra Vista land use categories consist of five major categories that all occur along the city's western border with the installation. They include residential, commercial, public, industrial, and open space (Sierra Vista 2010, City of Sierra Vista General Development Plan).

3.1.2 Fort Huachuca

The Fort Huachuca Military Reservation is divided by Arizona State Highway 90 into a West Reservation of approximately 46,057 acres (18,653 ha) and an East Reservation of approximately 27,215 acres (11,022 ha). The West Reservation includes the West Range, South Range, and cantonment area (including LAAF) with approximately 5,270 acres (2,134 ha) of developed or improved areas. The East Reservation includes the entire East Range and consists mostly of open/operational areas. The Huachuca Mountains form the southern and western boundaries of Fort Huachuca. The northern boundary parallels the Babocomari River, a tributary to the San Pedro River. The City of Sierra Vista lies immediately to the east of the installation, and serves as a regional residential and commercial center. Huachuca City is situated north of the Fort.

The open/operational areas on the West and East Reservations are used as training and test ranges and comprise approximately 93 percent of the installation. Active and Reserve component units of all services use the training areas for mountain/desert training, escape and evasion training, and brigade-size field training exercise. To clarify existing land use patterns and characteristics on Fort Huachuca, the remaining discussion identifies facilities and training ranges affected by the Proposed Action and alternatives.

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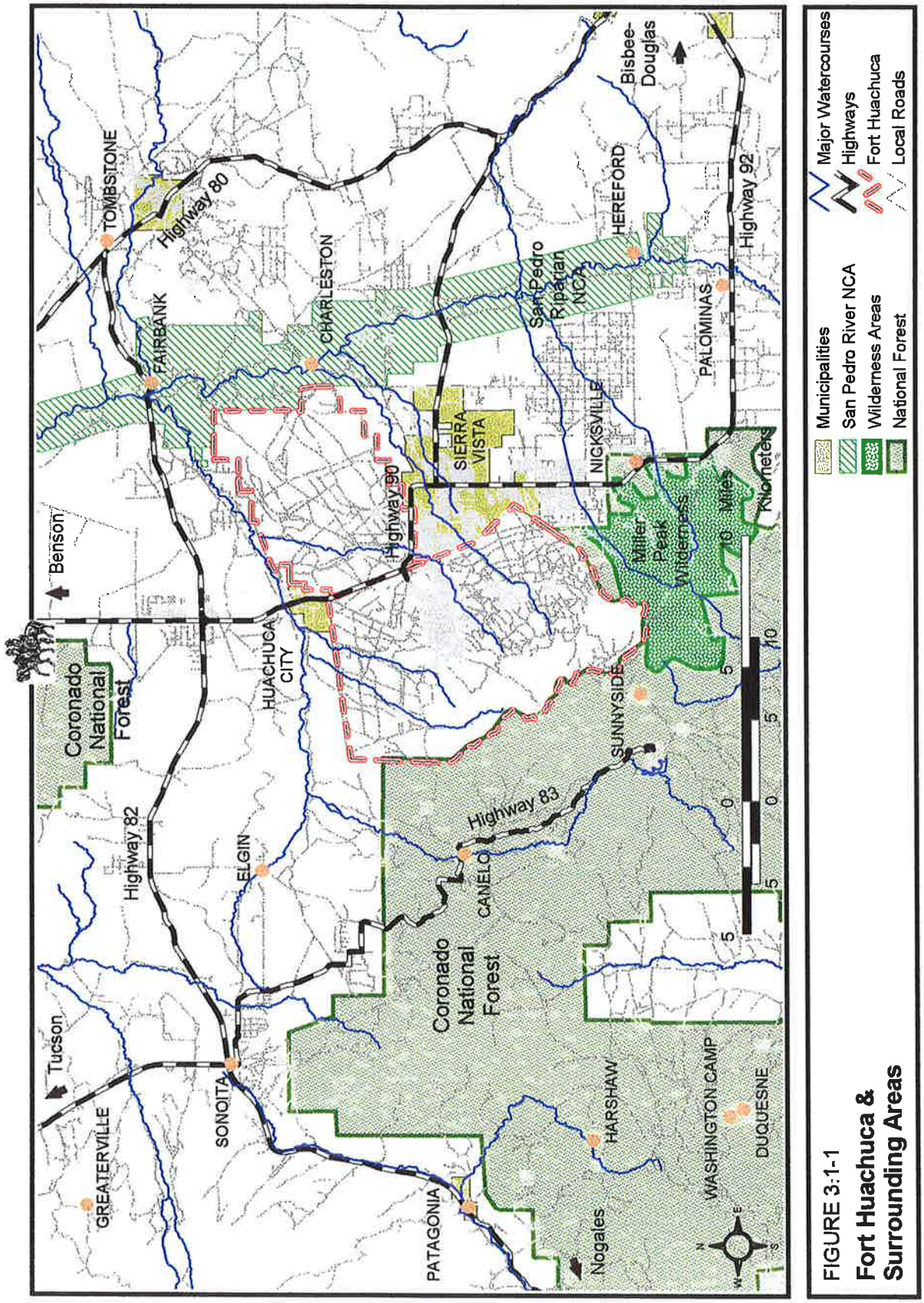

FIGURE 3.1-1
Fort Huachuca & Surrounding Areas

3.1.2.1 West Range

The West Range covers approximately 16,453 acres (6,663 ha) of land on the West Reservation, located west of the cantonment area (see Section 2, Figure 2.1-4). The range is used primarily for field training and UAV testing and training. The UAV program predominantly uses the northwest corner of this range, known as Training Area Juliet. The Army also performs research and development testing in this area, but the frequency of these activities is low. There are no live-fire training areas on this range.

Four specific areas of the West Range are included in the Proposed Action and alternatives as potential sites for increased UAV program activity or facility construction. Land use conditions on these sites are described below.

Black Tower Complex—Located in Training Area Juliet (see Section 2, Figure 2.1-4), the facility is accessed via Black Tower Road, a paved secondary road. The complex includes several permanent block structures and trailers, equipment storage yards, and other structures that house portions of the current UAV program.

UAV Training Center and Rugge-Hamilton Runway—Located in Training Area Juliet (see Section 2, Figure 2.1-4) approximately one-quarter mile (0.4 km) north of the Black Tower Complex, these facilities are accessed via Black Tower Road. The training center includes the Rugge-Hamilton Runway, the AIB building 11640, a metal building, several trailers, and several concrete equipment pads. The runway is approximately 75 ft wide by 2,200 ft long (23 m x 670 m), on an east-west axis. The training center and airstrip are currently used by the Fort Huachuca UAV program for maintenance and technician training and for operator training involving the remote control of UAVs taking off and landing at the runway.

Pioneer Training Facility and Runway—Located in Training Area Juliet (see Section 2, Figure 2.1-4), approximately one-half mile (0.8 km) northeast of the Black Tower Complex, these facilities are accessed from Black Tower Road and an unnamed tertiary access road. The training facility consists of a multi-unit compound that encloses a metal maintenance building, and several temporary trailers. The Pioneer Runway is paved and is approximately 60 ft wide by 2,500 ft long (18 m x 762 m) on a north-south axis.

The training facility and runway are currently used by the U.S. Navy Pioneer UAV Program for maintenance and technician training and for operator training involving the remote control of Pioneer UAVs taking off and landing at the runway. It is currently anticipated that the U.S. Navy Pioneer program will relocate to another military installation in FY01. In any event, this training facility will likely continue to be used for Fort Huachuca UAV program activities.

Demonstration Hill Airstrip—Located in Training Area Kilo in the west-central portion of the installation (see Section 2, Figure 2.1-4), approximately one-quarter mile (400 m) northwest of the Wren Arena. Access to this airstrip is off Canelo Road. The dirt airstrip is approximately 60 ft wide by 2000 ft long (18 m x 609 m), on northeast-southwest axis. There are no permanent facilities at the airstrip, with the exception of bleachers located approximately 300 yards (275 m) to the west. The airstrip is occasionally used by the Fort Huachuca UAV demonstrations.

3.1.2.2 East Range

The East Range, located east of the cantonment area and Highway 90 on the East Reservation, covers approximately 27,215 acres (11,022 ha) of land (see Section 2, Figure 2.1-4) This area includes approximately 13,463 acres (5,452 ha) of public domain land withdrawn from public use

for military purposes pursuant to the Order of the Secretary of Interior (Public Land Order 1471, 8/22/57). These lands are managed primarily for military training purposes consistent with the stated purpose of the secretarial withdrawal. The Resource Management Plan of the Safford District of the BLM identifies these lands as being managed for military purposes and provides for resource management coordination with Fort Huachuca consistent with the requirements of the Federal Land Protection and Management Act (FLPMA). Aside from hunting, outdoor recreation is not permitted on the East Range (ENRD 1997a).

The East Range contains six training areas, a demolition range, a UAV landing strip, an impact area, and three dropzones. Several areas of the East Range are included in the Proposed Action and alternatives as potential sites for increased UAV program activity or facility construction. Land use conditions at these sites are described below.

East Range Airstrip—Located in Training Area Echo in the southeast portion of the East Range (see Section 2, Figure 2.1-4), this grass airstrip is approximately 100 ft wide by 2,000 ft long (30 m x 610 m) on an east-west axis. There are no permanent facilities at the airstrip.

Hubbard Assault Airstrip—Located within Training Areas Charlie and Delta in the northwest portion of the East Range (see Section 2, Figure 2.1-4), this dirt runway is 100 ft wide by 5,300 ft long (30 m x 1,615 m) on a northwest-southeast axis. Access to and from the airstrip is via a series of dirt roads on the East Range. The Hubbard Assault Airstrip has no permanent facilities and is bordered by 40 ft (12 m) of cleared lands to the west and approximately 300 to 400 ft (90-120 m) of cleared lands to the east. Small and medium UAV activities occur on this airstrip.

Area Zulu (Impact Area)—Consists of 6,954 acres (2,816 ha) and is used for various types of self propelled, towed, or man-packed artillery and mortars. When live fire exercises occur in Area Zulu, the entire East Range is closed for all other training activities. Some portions of Area Zulu may contain unexploded ordnance (UXO). The Fort Huachuca Range Control Officer dictates strict adherence to the 'off-limits' policy of this impact area and warning signs are posted in the area to alert personnel of the potential danger.

Several surveyed firing points—These firing points are used to receive mortar and artillery firing into Area Zulu. They support 60mm and 80mm mortar, 4.2-in mortars, and the use of high explosive, illumination, smoke, and weapons piercing rounds for training. Use of areas outside of the preexisting firing points, must be surveyed to the 5th Order (1/1000) of accuracy with accompanying environmental analysis prior to submission to the Fort Huachuca Range Control Officer for approval. Training activities, including the use of the East Range for mortar firing, are subject to Fort Huachuca Regulation 385-5 and must carry sufficient fire suppression equipment to respond to any inadvertent fires. Range Control regulations also require observation personnel to maintain a constant watch for accidental fires resulting from mortar use during training activities.

3.1.2.3 South Range

The South Range is located south of the cantonment area on the West Reservation and covers approximately 24,334 acres (9,855 ha) and most of the installation's extent of the Huachuca Mountains (see Section 2, Figure 2.1-4). The southern portion of the mountains' eastern slopes are used in part as impact areas from the firing positions located in the flat terrain of the eastern portion of the range. Training and some testing occur in the northern portion of the range. The South Range is divided into 12 training areas, 17 firing ranges, and several impact areas.

Although no specific area of the South Range is included in the Proposed Action or alternatives as a potential site for increased UAV program activity or facility construction, the Fort Huachuca UAV Program may on occasion use existing facilities (including roadways) on the South Range in support of developmental testing or training activities. Training activities that use the South Range are subject to Fort Huachuca Regulation 385-5 and must carry sufficient fire suppression equipment to respond to any inadvertent fire. Range Control regulations also require observation personnel to maintain constant watch for accidental fires resulting from training activities.

3.1.2.4 Libby Army Airfield

LAAF is co-located with the Sierra Vista Municipal Airport (see Section 2, Figure 2.1-4) and supports military aircraft involved in testing and training programs, as well as troop movements. Three runways, several taxiways, aprons, and parking areas for fixed and rotary-wing aircraft cover the largest portion of the airfield area. The three runways include a 12,000 ft (3,600 m) Class 'B' main runway on an east-west axis, a 5,365 ft (1,610 m) secondary runway on a southeast-northwest axis, and a 4,300 ft (1,290 m) tertiary runway parallel to the main runway. Support facilities include a flight control tower, navigational aids building, airfield operations building, and an airfield fire and rescue station. Storage buildings are located along the southern side of the main runway, within the operational land use zone. Maintenance facilities and the City of Sierra Vista air terminal are on the north side of LAAF.

3.1.2.5 Fort Huachuca Land Use Controls

Within the cantonment area and other developed areas on Fort Huachuca, land use control, management activities, and maintenance fall under the direction of the Fort Huachuca Master Planner and Directorate of Installation Support (DIS). Future activities in the cantonment area are guided by the Fort Huachuca Real Property Master Plan (Nakata, 1997).

Outside of the cantonment area and other developed areas on Fort Huachuca, land use control and range management activities fall under the direction of the Fort Huachuca Range Control Officer. Fort Huachuca Regulation 385-5 and other Fort Huachuca Range Control Policies guide training and range use activities in these areas.

3.2 AIR QUALITY

An air pollutant is any contaminant present in the atmosphere in sufficient quantities to be detrimental to the public's well being, human health, plant or animal life, or property. Criteria air pollutants are defined as those pollutants for which the federal government has established air quality standards or criteria for outdoor concentrations to protect public health. The air quality of a region is evaluated on the basis of Ambient Air Quality Standards (AAQS) for five criteria air pollutants: particulate matter smaller than 10 microns (μm) in diameter (PM_{10}). sulfur dioxide (SO_x), ozone (O3), carbon monoxide (CO), and nitrogen dioxide (NO_x). The directly emitted criteria air pollutants are CO, NO_x, SO_x and suspended particulate matter (PM_{10}). Ozone is a secondary air pollutant resulting from photochemical reactions involving nitrogen oxides (NO_x) and reactive organic gases (ROG).

In 1990, the Arizona Department of Environmental Quality (ADEQ) adopted the National AAQS as the Arizona AAQS. The Arizona State Implementation Plan (SIP), a detailed description of the programs Arizona uses to carry out its responsibilities under the Clean Air Act, includes the Arizona Air Pollution Control Laws and the Arizona Air Pollution Control Regulations under the Arizona Administrative Rules and Regulations. The State of Arizona has adopted both National Primary and

Secondary Standards for criteria air pollutants (Table 3.2-1). Air quality standards and regulations are expressed either as pollutant concentration or as the annual emission rate. Concentrations are expressed either in micrograms per cubic meter ($\mu g/m^3$) or parts per million (ppm) by volume. National Primary Standards define the levels of air quality necessary to protect the public health and welfare from known or anticipated adverse effects of a pollutant with an adequate margin of safety.

This section identifies current ambient air quality conditions, and policies affecting the Fort Huachuca area, which is located in the Southwest Arizona Air Quality Control region. This region also encompasses the counties of Cochise, Graham, and Santa Cruz. Local air quality standards fall under the jurisdiction of the U.S. Environmental Protection Agency (EPA) and are regulated under the National AAQS as directed by the Clean Air Act of 1971 and the ADEQ.

Table 3.2-1. National Primary and Secondary Ambient Air Quality Standards

		Standards	
Pollutant	**Averaging Time**	**Primary**	**Secondary**
Ozone	1 Hour	0.12 ppm; (235 $\mu g/m^3$)	Same as primary standard
Carbon Monoxide	8 Hours	9.5 ppm; (10 $\mu g/m^3$)	-
	1 Hour	35 ppm; (40 $\mu g/m^{3)}$	-
Nitrogen Dioxide	Annual	0.053 ppm; (100 $\mu g/m^3$)	Same as primary standard
Sulfur Dioxide	Annual	0.03 ppm; (80 $\mu g/m^3$)	-
	24 Hours	0.14 ppm; (365 $\mu g/m^3$)	-
	3 Hours	-	1,300 $\mu g/m^3$; (0.5 ppm)
Particulate Suspended Matter (PM_{10})	24 Hours	150 $\mu g/m^3$	Same as primary standard
	Annual Arithmetic Mean	50 $\mu g/m^3$	
Lead	Calendar Quarter	1.5 $\mu g/m^3$	Same as primary standard

Source: 40 CFR Part 50

3.2.1 Ambient Air Quality

Pollutants emitted at a site, as well as those emitted upwind and carried by wind and air currents into the site area affect general ambient air quality conditions. The air quality for the ROI, which includes Fort Huachuca and the general vicinity, is of primary concern in this EA. Given the remote location of the Fort, upwind emissions play a minimal roll in the air quality of the region. Therefore, the ROI for air quality is limited to the Fort, with considerations made to how the activities evaluated would influence downwind air quality.

The superior air quality in the vicinity of Fort Huachuca is related to favorable wind patterns and a lack of typical major sources of air pollution, such as heavy industry and fossil fuel power plants. Sources of air pollutants in the area include aircraft (military and private), private and military vehicles, and gas heating emissions. Because of these favorable conditions, Fort Huachuca is within an area of air quality attainment for all criteria air pollutants.

Recorded air quality in the area is inferred from data obtained from Pima County's Department of Environmental Quality for Tucson monitoring stations. These stations were used since they are the closest air quality monitoring stations to Fort Huachuca. Air quality data from the Tucson station from 1993 to 1998 is presented in Table 3.2-2.

Table 3.2-2. Air Quality-Monitoring Summary for Tucson Station

Pollutant/Standard	1993	1994	1995	1996	1997	1998
Ozone 1 hour >0.12 ppm	0	0	0	0	0	0
Ozone Max. 1 hour conc. (ppm)	0.09	0.08	0.118	0.093	0.106	0.104
Carbon monoxide 8 hour[2] 9.5 ppm	0	0	0	0	0	0
Carbon monoxide 1 hour >35 ppm	0	0	0	0	0	0
Carbon monoxide Max. 1 hour conc. (ppm	14.3	10.8	11.9	10.0	9.0	7.8
Carbon monoxide Max. 8 hour conc. (ppm)	6.5	6.0	6.0	5.2	5.3	4.3
Nitrogen dioxide Annual average >100 ppm	No	No	No	No	No	No
Nitrogen dioxide Max. 1 hour conc. Ppm	0.081	0.095	0.078	0.075	0.068	0.059
Total suspended particulates 24 hour >260 $\mu g/m^3$	NR	NR	NR	NR	NR	NR
Total suspended particulates 24 hour >150 $\mu g/m^3$	NR	NR	NR	NR	NR	NR
Total suspended particulates Max. 24 hour conc. ($\mu g/m^3$)	NR	NR	NR	NR	NR	NR
Particulate lead Highest quarter [2] 1.5 $\mu g/m^3$	0	0	0.02	0.05	0.02	NR[4]
Inhalable particulates (PM_{10}) 24 hour >150 ($\mu g/m^3$)	0	0	0	0	0	0
Inhalable particulates (PM_{10}) Max. 24 hour conc. ($\mu g/m^3$)	88	71	132	123	72	90

Source: ADEQ 1993, 1994, 1995, 1996, 1997, 1998, and 1999.
[1]All data are for the Tucson area but the placement of the stations recorded in the table varies across the city from year to year. This is because the pollutants each station monitored did not necessarily remain the same from year to year.
[2]No = No violations of the quarterly standard for any of the four quarters.
[3]NR = Not reported.
[4]This value is no longer recorded due to the EPA's revision of air quality requirements. The Tucson area has been in compliance for 8 calendar years so is no longer required to monitor lead emissions.

The air quality at Fort Huachuca is expected to be much better than the air quality of the Tucson area represented in the table because the area is less urbanized with less traffic volume and industrial facilities that emit air pollutants.

Other available monitoring data also indicates that air quality in the immediate Fort Huachuca area meets AAQS for criteria air pollutants, and has met the standards since the inception of monitoring programs. Since Sierra Vista monitoring stations are close to Fort Huachuca, these data provide applicable characterization of Fort Huachuca air quality. This data is supplemented by the Tucson data above since the information from Sierra Vista is dated; monitoring programs for CO and O_3 were conducted in Sierra Vista between 1977 and 1983 by the ADEQ. The routine CO and O_3 monitoring program in Sierra Vista ended in 1984 and with the justification that CO and O_3 concentrations would continue to decrease through year 2000. CO results primarily from automobile emissions and O_3 from photochemical reactions involving hydrocarbons.

ADEQ also monitored total suspended particulate (TSP) in Sierra Vista between 1974 and 1988. The TSP measurements include particles in the PM_{10} size range and PM_{10} levels can be calculated from TSP values. The Arizona Office of Air Quality Control monitors PM_{10} because particles in the PM_{10} size range are respirable, thus influencing human health. Calculated PM_{10} levels for the Sierra Vista area were well below 50 μm, the compliance standard.

No data are available on sulfur and nitrogen oxides, but these pollutants are less likely to exceed standards than the others are. Vehicle engines and industrial processes are the major sources of these two pollutants. Potential industrial sources of sulfur dioxides in the region are mainly copper smelters. At Fort Huachuca, the sources of these pollutants are vehicle and aircraft engines, diesel generators, boilers, military ordnance and other heating equipment. Fuels and ordnance at Fort Huachuca are typically low in sulfur and would not contribute measurable amounts of sulfur and nitrogen dioxides to the region.

3.2.2 Climate

The climate at Fort Huachuca is as varied as its topography, ranging from hot, dry valley bottoms to cool, moist mountain peaks. The principal meteorological station is located at LAAF, elevation 4,664 ft (1422 m) above mean sea level (MSL), and the EPG maintains other stations on Fort Huachuca. Average minimum and maximum daily air temperatures at the LAAF station are 35°F (2°C) in January and 90°F (32°C) in June (ENRD 1995). Average annual precipitation at Fort Huachuca is 15 inches (38 cm). The intensity and frequency of storms varies greatly from one year to the next, so that the seasonal precipitation is normally much below or above the long-term average value. Roughly one tenth of the winter precipitation falls as snow, but rarely stays on the ground for more than a day or two.

The Huachuca Mountains receive an average annual precipitation that exceeds 30 inches (76 cm) per year (ENRD 1988). Precipitation has a bimodal distribution, with approximately 60 percent of the total falling during the summer "monsoon" season, and roughly 30 percent occurring during winter months. Spring and fall are typically dry (Sellers and Hill 1974). Maximum "monsoonal" precipitation falls on the southeast (windward) side of the Huachuca Mountains (ENRD 1988).

3.3 NOISE

The degree to which noise will disrupt an area is dependent on the perception of the people living in the affected area. By definition, noise is unwanted sound; when sound interrupts daily activities such as sleeping or conversation, it becomes noise. Typically, noise is measured as a nuisance; the more the noise interferes with daily activities, the greater the level of nuisance. If noise levels cause physical damage to hearing or psychological harm, noise is considered a health hazard.

A decibel (dB) is a unit for expressing the relative intensity of sound on a scale from zero for the average least perceptible sound to about 130 for the average pain level. Because the human ear is more sensitive to certain ranges of the sound spectrum, a weighted scale has been developed to more accurately measure human perception of sound. This measurement is called A-weighted decibels (dBA). For the purposes of measuring annoyance, noise measurements are frequently taken over a period of time (for example, every minute for an hour) and the values are averaged. This value is called an equivalent noise value, or L_{eq} and allows the steady source of noise (such as a busy road) to be compared to established state and federal noise criteria. Humans are also more sensitive to noise at different times of the day. To reflect this sensitivity, a day-night decibel measurement, or L_{dn}, similar to an L_{eq} value, measures the average ambient noise and adds 10 dB to

all readings taken between 10 p.m. and 7 a.m. A maximum noise reading, or L_{max}, is typically used to describe noises that occur infrequently. Figure 3.3-1 shows a comparison of different noise sources and associated magnitudes.

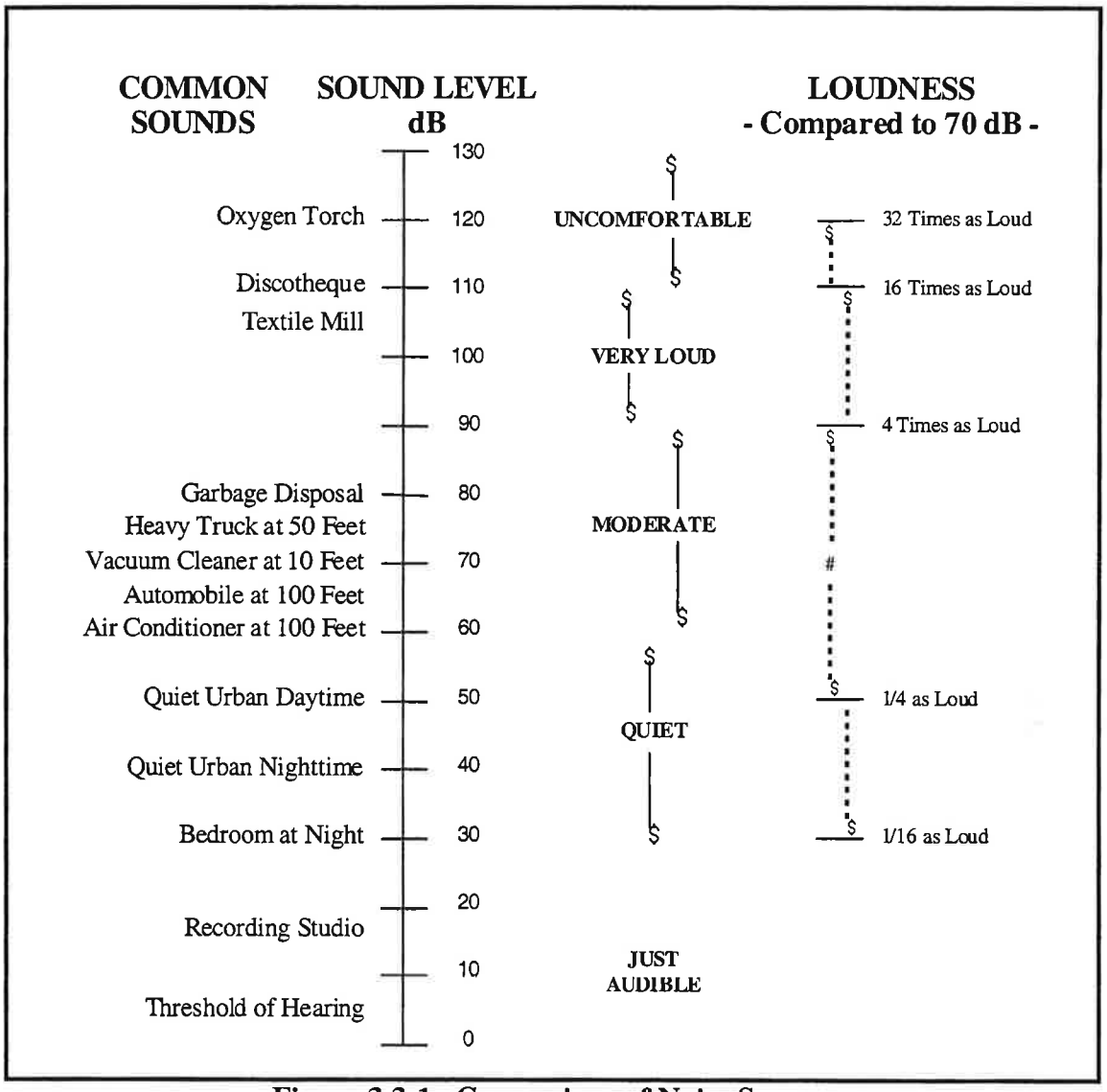

Figure 3.3-1. Comparison of Noise Sources

The Noise Control Act of 1972 was created to ensure that programs are developed to promote an environment that is free from noise that jeopardizes public health or welfare. The EPA is responsible for administrating and implementing this act and has set a goal of achieving noise levels of 55 dB L_{dn} or less for residential areas; however, the 55 dB L_{dn} goal does not consider the costs of attainment. The Federal Interagency Committee on Noise (FICUN) has taken economic feasibility into consideration in recommending a threshold for residential land use compatibility of 65 dB L_{dn} (FICUN 1980). The ROI for noise includes areas that could potentially be subject to noise levels in excess of 65 dB L_{dn} related to the Proposed Action and alternatives.

3.3.1 Regional

Areas to the west of the installation in the Coronado National Forest and Canelo Hills are located over landscape that is characterized as wildland, where ambient noise is predominantly natural sounds made by wind, rain, thunder, and wildlife. In rural areas, noise levels average 30 dBA to 50 dBA, with occasional peaks of 90 dBA (BLM 1989). Towns, settlements, highways, roads, railroads, farm machinery, mining machinery, blasting, and rural-based construction or industry, such as power plants, cause human-generated noise within the area.

Aviation noise within the ROI is generated by commercial, general, and military activities. There are no major general aviation airports within the region, and noise generated by either commercial or general aviation traffic is low. Maintained airports within the area include the Sierra Vista/LAAF joint facility, Cochise College, Douglas Municipal, Bisbee-Douglas International, and Sells. None of these airports is served by a major airline; however, regional air service is available to Sierra Vista. General aviation and civil use account for the majority of aircraft using these airports.

Military Operating Areas (MOAs) have been specifically designated over regions with little to no population to minimize human exposure to noise and limit safety risks. Noise associated with training activities within regional MOAs has resulted in complaints from rural residents in southern Arizona in the past, particularly in the Tohono O'Odham Indian Reservation. As a result, flights over the reservation were addressed in a 1988 Environmental Impact Statement (EIS), and flights in the vicinity of settlements on the reservation are now restricted.

3.3.2 Fort Huachuca

Army policy is to comply with all federal, state, and local requirements on noise control, unless doing so would conflict with the Army's mission. AR 200-1 implements all federal laws concerning environmental noise for Department of the Army activities. These include the Quiet Communities Act of 1978, the Noise Control Act of 1972, and federal regulations, such as EPA's Procedures for Reporting Proposed Pollution Abatement Projects for Federal Facilities. The primary strategy of the Department of the Army is to protect humans and animals from environmental noise impacts through land use planning. Three noise zones are identified in AR 200-1: Zone I (Acceptable), Zone II (Normally Unacceptable), and Zone III (Unacceptable). Housing, schools, and medical facilities are considered noise-sensitive land uses under this regulation. Table 3.3-1 presents an assessment of land use planning for Army environs prepared by the Army.

Table 3.3-1. Land Use Planning Guidelines

Noise Zone	Population Highly Annoyed	Noise Limits in L_{dn}
I	<15%	<65 dBA
II	15-39%	65-75 dBA
III	>39%	>75 dBA

Source: U.S. Army Center for Health, and Preventive Medicine, 1994

Major noise sources on Fort Huachuca include weapons blasts, vehicle traffic, and airfield operations (DEHE 1997). Weapons blasts involving the use of small arms, artillery, and explosives occur during training exercises. Aircraft that regularly operate out of LAAF include C-130, A-10, F-16, UH-60, RC-12, OH-58, AH-64, and UH-1. The noise generated by both weapons use and aircraft operations only exceeds 65 dB L_{dn} over undeveloped areas within Fort (DEHE 1997).

Noise contours for LAAF were determined in the Airport Master Plan for Sierra Vista, developed in 1989 by Coffman Associates Airport Consultants (Coffman 1989). The noise contours are shown in Figure 3.3-2. The unacceptable (Zone III) and normally unacceptable (Zone II) noise zones are compatible with the land uses on Fort Huachuca, and do not extend beyond the Fort's boundary. Noise contours for the Hubbard Assault Airstrip and UAV activities are not shown in Figure 3.3-2. Because of the small number of annual operations and the wide spacing of operations, respectively, noise within Zones II and III does not occur beyond LAAF (ENRD 1999).

The noise element of the master plan calculated 65 dB L_{dn}, 70 dB L_{dn}, and 75 dB L_{dn} noise contours for 1989. It was noted that approximately 3,281 acres (1,328 ha) within the installation, but no surrounding communities, were affected by aviation noise levels exceeding 65 dB L_{dn}. Additionally, it was found that existing and planned land uses within this ROI are compatible with the estimated noise levels.

3.4 SOCIOECONOMIC

The assessment of socioeconomic effects resulting from proposed Army operations, maintenance, and training activities at an installation or civilian facility can be one of the more controversial issues related to Army actions. The economic and social well-being of a local community can be dependent upon the activities of the installation, and disruptions to the *status quo* can become politically charged and emotion-laden. The objectives of socioeconomic analysis in an EA are twofold. First, an open and realistic assessment of the potential effects must be performed, evaluated, and documented. Second, this process should be communicated to the general public in a manner that removes or reduces the emotion and politics and focuses on actual effects and mitigation actions.

Fort Huachuca is an integral part of the local community, both as a major consumer of goods and services and as a major employer. Population and economic activity on the Fort are important influencing factors on the surrounding region. The socioeconomic resources of the potentially affected regions are characterized in terms of population, housing, economic activity, and environmental justice.

Because these resources are interrelated in their response to some components of the Proposed Action and alternatives, the current condition of each is assessed to provide a basis for analyzing potential socioeconomic impacts. A change in employment, for example, may lead to population movements into or out of a region and, in turn, lead to changes in demand for housing and public services. The baseline conditions established in this section were compiled from federal, state, county, and installation sources.

The primary socioeconomic ROI that could be potentially affected by the Proposed Action and alternatives of this EA includes Fort Huachuca, Sierra Vista and Huachuca City. These three communities are the most likely to experience population and economic changes as a result of personnel being stationed at the Fort or living off-post. While consideration is given to the entire region, detailed analysis focuses on these three areas.

3.4.1 Regional

There are many communities within the ROI. Of the larger population centers, Sierra Vista is the largest followed by Douglas, Bisbee, Benson, Huachuca City, and finally Tombstone.

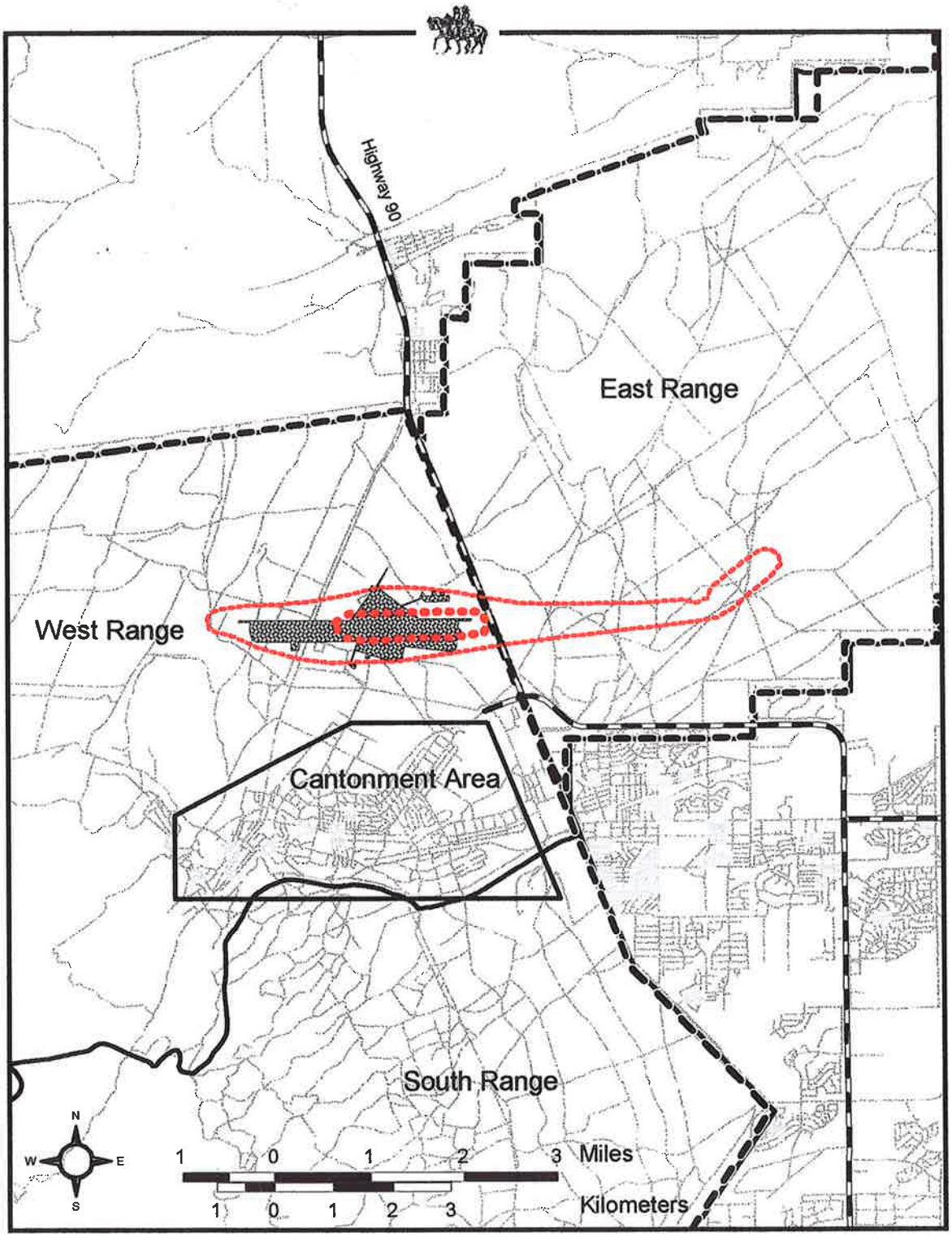

FIGURE 3.3-2

Fort Huachuca Noise Contours and Incompatible Zones

1

3.4.1.1 Population

The Arizona Department of Economic Security (ADES), Population Statistics Unit, conducted a mid-year 1999 population estimate. The findings indicate that between 1998 and 1999 Cochise County grew by 0.7 percent, reaching a total population of 124,575 (Cochise College Center for Economic Research 2000a). Arizona's population in 1999 is estimated at 4,924,350 (ADES 2000). Based on this information, Cochise County accounts for approximately 2.5 percent of Arizona's population. All the major population centers in the ROI have experienced growth since 1990 (see Table 3.4-1).

Table 3.4-1. Population and Growth Rates for Populations Centers in Cochise County

City	Growth 1998-1999	Growth 1990-1999	Population
Sierra Vista*	+1.7 %	+23.3 %	40,680
Douglas	-1.3 %	+13.8 %	14,955
Bisbee	0.0 %	+3.8 %	6,525
Benson	+1.4 %	+20.4 %	4,605
Huachuca City	+1.5 %	+15.6 %	2,060
Tombstone	+0.3 %	+36.1 %	1,660
Cochise County	+0.7 %	+27.6 %	124,575

*Includes Fort Huachuca residents

Source: Cochise College Center for Economic Research, February 2000; Arizona Department of Economic Security, Population Statistics Unit, 1999a; Department of Economic Security, Population Statistics Unit, 1999b.

3.4.1.2 Housing

During the summer of 1999, the Center for Economic Research conducted its annual apartment vacancy survey. The study takes into account 2,300 apartments in complexes around the city. The overall apartment vacancy rate for Sierra Vista was 6.4 percent, down from the 7.0 percent vacancy in 1998 and the 8.3 percent vacancy in 1997. Home rentals at the end of 1999 as reported by the Sierra Vista Multiple listing service had 90 active rental units available in the Sierra Vista area. They consist of single-family homes, condos, townhouses, manufactured homes, and mobile homes (Sanders, Branden, personal communication 7 September 2000).

3.4.1.3 Economic Activity

Tourism is an important part of Cochise County's economy with an estimated 3.5 million visitors per year (Young Nicholas Gilstrap 1997). This figure has increased considerably since the opening of Kartchner Caverns State Park. National parks and forests, including Fort Bowie, the Coronado Memorial and Chiricahua National Monument, Tombstone Courthouse State Historical Park, and other state parks attract numerous visitors each year (Table 3.4-2). It is estimated that a typical visitor spends an average of $127.00 per day during a multiple-day stay in Cochise County and approximately $57.00 per day if not staying overnight (Cochise County Center for Economic Research, 2000b). The peak tourist season within the county is from Christmas until Easter. There are 2,372 hotel, motel, and bed & breakfast (B&B) rooms within the County, as well as 2,229 RV spaces located in private parks. In addition to these spaces, there are 253 campsites located in state and federal park lands and forests within the county that allow RV camping with certain restrictions on vehicle size (Cochise County 1997).

Table 3.4-2. Number of Park Visitors from 1985-1999

Year	Coronado National Monument	Fort Bowie National Historic Site	Tombstone Courthouse State Historic Park	Chiricahua National Monument
1985	44,026	5,635	58,576	61,680
1986	53,832	7,364	66,960	61,472
1987	55,793	6,772	75,277	61,895
1988	69,730	7,209	72,954	63,126
1989	56,734	7,564	71,976	70,342
1990	56,993	7,592	65,649	78,191
1991	61,893	7,859	69,828	88,710
1992	69,179	9,237	57,902	96,692
1993	81,685	9,192	68,761	125,641
1994	86,668	11,022	89,898	88,544
1995	92,100	10,574	99,321	100,916
1996	93,656	10,666	99,016	102,605
1997	88,624	9,623	71,036	82,856
1998	90,565	9,168	69,308	73,746
1999	87,183	9,390	68,153	102,541

Source: National Park Service; Arizona State Parks Board; University of Arizona EBR

As many as 350,000 visitors per year are anticipated at the Kartchner Caverns State Park (Cochise County Center for Economic Research 2000b). In the first six months, approximately 68,500 visitors toured the caves and over 15,000 visitors toured the park each month (Bilbrey 2000). Currently, individual adults comprise the majority of visitors, but the trend is towards school groups. Group bookings are full six months in advance and individual bookings for five months in advance (Bilbrey 2000). Benson, Arizona, just north of the Caverns, has 388 rooms in 11 motels and approximately 1700 spaces in 12 RV parks (City of Benson 2000).

Ramsey Canyon and the San Pedro Riparian NCA attract many visitors to the Sierra Vista region. Approximately 25,000 to 30,000 people visit Ramsey Canyon each year, with the slowest times occurring during the months of January and February (Lambert 2000). It is estimated that nature-based tourism contributes nearly $3 million to the Sierra Vista economy each year. According to the Sierra Vista Chamber of Commerce, Sierra Vista has six hotels, nine motels, and eight RV parks (2000). While there are no B&B rooms in Sierra Vista, six are in the neighboring communities of Hereford and Tombstone.

3.4.1.4 Employment

Employment in the region has experienced a moderate increase relative to other small urban communities in Arizona. Based on information from the Bureau of Economic Analysis (BEA), the total number of jobs in Cochise County increased about 23 percent during the last 13 years (ENRD 1999). In 1999, the County's labor force increased by 3,600 individuals (Cochise County Center for Economic Research 2000b). The unemployment rate has been declining in Cochise County since 1998. In January 1998, the unemployment rate for the County was approximately 8.1 percent and dropped to 4.8 percent as of December 1999. While the majority of the county is rural, an

additional 3,000 local area jobs have increased the number of non-farm employees by 10.1 percent. The service and trade sectors showed increases in 1999, growing by 875 and 850 jobs respectively in 1999 (Cochise County Center for Economic Research 2000b). Cochise County employment information is presented below in Table 3.4-3.

Table 3.4-3. Cochise County Non-Agricultural Employment by Industry, 1999

Industry	Number Employed
Construction	2,300
Manufacturing	1,350
Transportation and Public Utilities	1,425
Trade	7,850
Finance, Insurance and Real Estate	775
Services	8,575
Government	10,550
TOTAL	**32,825**

Source: Arizona Department of Economic Security 2000.
Note: Employment is reported by place of work and does not necessarily coincide with the number of workers residing in a specific county.

Government and government enterprises are the largest employers (32 percent of total non-agricultural positions). The service industry employs about 26 percent and the retail and wholesale trade industries represent 24 percent of the total employment for the County.

3.4.1.5 Income and Expenditures

Earnings in Cochise County totaled approximately $1.1 billion in 1997, an increase of 4.5 percent over 1996 earnings (BEA 1999). The distribution of earnings across industries is essentially the same as the distribution of employment, with government and government enterprises, services, and retail trade representing the largest income producers (BEA 1995).

The average wage per job for 1997 was $24,119, reflecting a 2.2 percent increase over 1996 and a 5.7 percent higher than the average non-metropolitan wage of $22,810 for Arizona (Cochise County Center for Economic Research 2000b). Per capita income in the county was $10,716, which is 20 percent lower than the state average of $13,461.

Annual retail and service revenues are expected to rise, reflecting the increase in the number of visitors to the County. Kartchner Caverns alone, is expected to have a direct economic impact of $12.2 to $17.1 million per year and a total impact of $19.5 to $27.4 million in Cochise County (Cochise County Center for Economic Research 2000b). In addition, the growth of the population in the region will contribute to the revenue of virtually all sectors of Cochise County's economy.

3.4.2 Fort Huachuca

3.4.2.1 Population

A special survey was conducted in 1999 to develop correction factors to improve the overall accuracy of Fort Huachuca population and employment numbers. Population numbers are calculated by the Fort Huachuca Directorate of Resource Management (DRM) and derived from a

number of sources, including SIDPERS, DCPDS, and other reports. Unfortunately, these data sources are not cross-referenced, nor do they contain the necessary information to cross-reference to reduce or eliminate double or triple counting of personnel who might fall into multiple categories. Proper sampling of personnel at Fort Huachuca provided an estimation of overcounting. This number was used to establish correcting factors for noonday population estimates and overall employment projections.

The total noonday population includes assigned military personnel, civilian employees, and contractors working on the Fort, together with on-Fort family members who have not been counted in any of the employed categories (see Table 3.4-4). The survey did not discover any statistically significant proportion of employees in any one of the three categories (military, civilian, government contractor) who hold second or third jobs. However, when combined across all employment types, a significant 4.9 percent rate of second employment emerges. In other words, although the percentage of employees who have second jobs cannot be determined for each primary employment category with any level of certainty, when all employees are lumped together, a significant proportion (4.9 percent) of them appear to hold second jobs.

Table 3.4-4. Fort Huachuca Noonday Population

	September 1997	September 1998	September 1999
Military Assigned	4,455	4,310	4,272
DOD Civilian Employees	2,466	2,442	2,426
Other Civilian Employees*	1,947	2,499	2,836
Students	1,248	1,111	1,606
Total Permanent Parties	**10,116**	**10,362**	**11,140**
Military Family Members Residing On Post	4,734	4,431	4,326
Total Noonday Population	**14,850**	**14,793**	**15,466**

Source: DRM 1998, 1999
*Represents non-DOD civilian workers on Fort Huachuca. Note: The noonday population includes assigned military, their family members living on post, and all civilians employed on post.

Among the military households on the Fort, 14 percent of military dependents (household members other than the respondent) also hold employment at the Fort. For off-fort military households, the proportion of household members holding jobs at the Fort is 18 percent. In the calculation of noonday population, the military family members residing on the Fort need to be adjusted downward by 14 percent to eliminate double counting. On average, military personnel have approximately 3.1 members in the household. However, after accounting for household members also employed on the Fort, the average number of dependents (non-employed on Fort) per military personnel stationed at Fort Huachuca is only 1.4. The total Fort Huachuca employee population represents about 12 percent of Cochise County total population (ENRD 1999).

The current UAV activities at the Fort include students, instructors, and personnel from both the Army and the Navy. When students are stationed at the Fort for less than a year while UAV program-related classes are in session, instructors and personnel reside on-post or in surrounding communities throughout the year. An estimate can be made that takes into consideration the fact that the students are not present all year. This number is called a full time equivalent (FTE) position. FTE is calculated by taking the number of people who will only be at the Fort for a portion of the

year and multiplying that number by the days they will be present. Then the total is divided by 365 days/year. Table 3.4-5 illustrates the number of authorized positions at the Fort that are involved with the UAV program, how many days of the year they reside in the area, and the FTE positions for the program. These numbers establish the baseline authorization levels for UAV activities, which will be used in determining impacts to socioeconomics and potable water supplies in Section 4.

Table 3.4-5. Projected FY00 Student, Personnel, and Instructor Positions (days/year on Fort)

	Students	Personnel	Instructors
Pioneer	300 (100)	90 (365)	10 (365)
Short Range	689 (238)	--	60 (365)
VTOL	--	8 (365)	--
FTE	531	98	70

USAIC 1993

3.4.2.2 Housing

Approximately 74 percent of the military-personnel assigned to Fort Huachuca reside on post; there are 1,934 family housing units located on post (DRM 1999). In addition to these quarters, there are 208 transient quarters and 3,330 troop billeting spaces. Army Guard and Reserve members, who typically train at Fort Huachuca one weekend per month and for a two-week period in the summer, are housed in existing barracks on post during their training. Some troop and transient billeting housing is being reduced, as World War II wooden buildings are being demolished.

Of the military personnel assigned to Fort Huachuca who reside off post, approximately 9 percent own a home or mobile home, another 43 percent rent a home or mobile home, and the remaining 48 percent rent an apartment. Military personnel own 15 percent and rent 14 percent of the single-family homes in Sierra Vista, own 5 percent and rent 3 percent of the mobile homes, and rent 58 percent of the apartments (ENRD 1999).

3.4.2.3 Economic Activity

As a major employer and consumer, Fort Huachuca plays a large role in the economic well being of the local economy in Arizona. Through the years, the dynamic relationship between the Fort and communities of Cochise County has changed from one of dependence of the communities on the Fort to one of interdependence. The economies of the communities that surround the Fort experience fluctuations in revenue as DOD budgets and personnel numbers change. Goods purchased by Fort Huachuca in FY99 increased from FY98 by 23.2 percent, totaling $229.8 million in Arizona. Approximately $208.9 million of these purchases were made in Sierra Vista. The extended economic impact of the Fort on Cochise County, including military pay, loans, purchases/contracts, claims, civilian pay, and schools, is estimated to be $818.1 million (DNR 1999).

3.4.2.4 Employment

In FY97 there was a 5.3 percent decrease from FY96 to 10,116 students, contractor personnel, and military/civilian personnel at the Fort. In FY98, approximately 10,362 workers, both civilian and military were employed at the Fort, which accounted for almost one-third of all employment in the County (Cochise College Center for Economic Research 2000b). This is an increase in employment of approximately 2.4 percent over FY97.

In FY99, there was a 7.5 percent increase from FY98, bringing the total workforce (including students, contractor personnel, and military/civilian personnel) to 11,140. Most of this increase is due to a temporary increase in the Fort's student population, by approximately 500 FTE positions (44.6 percent). This is a temporary increase to meet world-wide needs for military intelligence (MI) specialties and is anticipated to be reduced by mid-year 2002.

Based on economic multipliers from the Economic Impact Forecast System (EIFS) developed by the U.S. Army Corps of Engineers' Construction Engineering Research Laboratory (CERL), it is estimated that the Fort supports approximately 40,000 job equivalents in Arizona and approximately 18,000 job equivalents in Cochise County. Both the 40,000 and 18,000 job equivalents estimates include the employees at the Fort as well as indirect jobs generated by Fort personnel and expenditures.

The projected authorized strength at Fort Huachuca changes semi-annually with the issuing of the Army Stationing and Installation Plan (ASIP). The five-year trend indicates that employment is anticipated to level off, except for fluctuations in student numbers. As a result of dynamics that include civilian personnel hiring practices, needs of the Army in priority missions, downsizing, and budget constraints, not all authorized positions are filled at a given time. Historically at Fort Huachuca, the actual number of employees has been less than the authorized strength. The recent historical employment is approximately 20 percent less than the authorized strength.

3.4.2.5 Income and Expenditure

Table 3.4-6 shows the decrease in expenditures by Fort Huachuca in Arizona for FY97, FY98, and FY99. Total expenditures under the Fort's control decreased by $60.5 million from FY97 to FY98 and increased by $44.7 million between FY98 and FY99. While FY99 demonstrated an increase in spending, the total was still approximately $15.8 million less than the funds spent in FY97. This total is the spending, minus the retiree and reserve pay, as the Fort has no control over these disbursements.

Table 3.4-6. Fort Huachuca Expenditures in Arizona

Expenditures	FY97 Dollars (in millions)	FY98 Dollars (in millions)	FY99 Dollars (in millions)
Military Payrolls	147.0	155.7	$156.4
Civilian Payrolls	129.9	116.3	117.6
Purchases	243.5	186.6	229.7
Other	4.4	5.7	5.3
TOTAL	**$524.8**	**464.3**	**$509.0**

Source: DRM 1997, 1998, 1999

The "Other" expenditures include impact funds to Arizona school districts for military and DOD civilian children attending schools in the area; damage claims processed through the Office of the Staff Judge Advocate; and Army Emergency Relief grants and loans. From FY98 to FY99, funds to Arizona school districts decreased by $0.14 million, damage claims decreased by $0.15 million; and Army Emergency grants and loans increased by $0.11 million.

3.4.3 Environmental Justice

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations, directs federal agencies to identify and address, as appropriate, disproportionately high and adverse human health or environmental impacts of their program, policies, and activities on minority or low income populations in the surrounding community.

Cochise County population consists of 81.7 percent unspecified white/Caucasian, 29.1 percent Hispanic, 10 percent Other, 5.2 percent African American, 2.3 percent Asian, and the remaining 0.8 percent are Native American. City of Sierra Vista population consists of 71 percent as unspecified white/Caucasian, 11.8 percent Hispanic, 11.5 percent African American, 4.9 percent Asian, 0.6 percent Native American, and 0.2 percent Other (U.S. Bureau of the Census 1994).

3.5 TRANSPORTATION

Two areas of transportation are considered in this section: ground resources and aviation resources. The ROI for ground transportation includes Fort Huachuca in its entirety, portions of the Coronado National Forest, and other roadways in Cochise and Santa Cruz Counties. The ROI for aviation includes four restricted areas in the vicinity of the Fort: R-2303A, R-2303B, R-2303C, and R-2312 (see Figure 2.1-4). This baseline information will be used as a point of comparison when evaluating traffic (both ground and aviation) impacts that may be caused by the Proposed Action and alternatives discussed in this EA.

3.5.1 Ground Transportation

This section describes transportation infrastructure within the regional context and on Fort Huachuca. It also describes ground vehicle maneuvering and training restrictions on Fort Huachuca and provides a listing of individual training areas and the type of traffic (both on-road and off-road) permitted in each area.

3.5.1.1 Regional

The principal highway access to the City of Sierra Vista and Fort Huachuca is Arizona State Route 90. This route provides access to Interstate 10, approximately 25 miles (40 km) north of Fort Huachuca. State Routes 90 and 92 (Fry Boulevard) are the principal arterial streets in Sierra Vista. Fry Boulevard, which begins immediately east of the main gate, is the main commercial/retail strip of Sierra Vista. The City of Sierra Vista bus service linking Sierra Vista and Fort Huachuca runs three times daily.

Public transportation is provided by the Sierra Vista Public Transit System, operated by Catholic Services of Cochise County. Transportation is available to the general public with special attention provided for the physically challenged, developmentally impaired, and senior citizens. Residents of the region have access to the Sierra Vista Municipal Airport, which provides commuters with airline services and ground transportation. Taxi rental is also available.

3.5.1.2 Fort Huachuca

Access to Fort Huachuca is provided through three gates; Main Gate, East Gate, and West Gate. The West Gate serves a low volume of traffic. A paved road travels from the West Gate to the intersection with State Route 83. State Route 83 is paved where it travels north to Sonoita; to the south the pavement eventually ends with dirt roads leading further south to the Mexican border. The East and Main Gates are located on State Route 90 and handle the remainder of base traffic. Peak

traffic within the cantonment area of Fort Huachuca occurs during the commute hours of 0600 to 0800 (6 to 8 AM) and 1530 to 1730 (3:30 to 5:30 PM).

The roadway network inside Fort Huachuca consists of primary and secondary collector streets, and local or residential streets. Roadways that carry large volumes of traffic (6,000 to 10,000 vehicles per day) are classified as primary collector streets. These roadways have cross-sections of up to 4 lanes with a median, shoulders, and sidewalks. Primary collector streets on post include Hatfield Street, Irwin Street, Allison Road, Whitside Road, Brainard Road, Winrow Road between the Main Gate and Allison Road, and Smith Avenue between Hatfield Street and Whitside Road.

Roadways that connect residential or commercial areas to primary collector streets are classified as secondary collector streets. Secondary collector streets carry less traffic (between 2,000 to 8,000 vehicles per day) and are built to lesser design standards than primary collectors. Secondary collector streets have cross-sections of up to four lanes with a median and sidewalks. Roadways on post classified as secondary collectors include Cushing Street, Arizona Street, Squire Avenue, Smith Avenue east of Hatfield Street, Hines Road, Windrow Road west of Allison Street, and Carter Street south of Hatfield Street. All other roads on post are classified as residential or local streets.

There are no railways operating on Fort Huachuca. The nearest railhead is at Benson, Arizona, approximately 25 miles (40 km) north of Fort Huachuca. Another railhead used by Fort Huachuca is located at Davis-Monthan Air Force Base in Tucson, Arizona, 70 miles (112 km) to the north.

Several ground-based activities occur across the Fort and are included within the standard UAV program testing and training activities. These activities have all been previously evaluated for environmental impacts and are subject to several use restrictions and mitigation requirements for activities that occur in areas of sensitive cultural or environmental resources or that include the use of vehicles (both moving and stationary) across the installation. Because the Proposed Action includes the use of these existing roadways and bivouacking areas, a summary-level discussion of applicable use restrictions and authorized training area activities is provided below.

Ground vehicle maneuvering and driver training activities occur across the installation on various existing roads and trails. The majority of all vehicle maneuver training consists of wheeled-vehicles with occasional tracked-vehicle training. Wheeled-vehicle training maneuvers can include attaching and detaching trailers, loading and unloading equipment, and driver training across the installation. All maneuvering activities are confined to the existing roads and trails.

Oversized vehicles are restricted to roads, whereas light vehicles can use roads and trails. No cross country maneuvering or other use of existing off-road maneuvering lanes occurs or is planned during the timeline of this document. All existing and planned operations adhere to the following regulations:

- Fort Huachuca Regulation 385-8, Safety - Range and Training Area Operations (19 October 1994).
- Guidelines set forth in the Installation Spill Contingency Plan - Fort Huachuca, Arizona (20 December 1996).
- Submission of Fort Huachuca Form 1155 (REV), 1 Aug 93, or other official request, through appropriate channels for approval prior to commencement of maneuvers which require access to the East Range.

Table 3.5-1 lists individual training areas and the type of traffic (both on-road and off-road) permitted in each area.

Table 3.5-1. Terrain Type and Traffic Permitted by Training Area

Training Area	Location By Range	Total Acres	Terrain Type	Traffic Permitted On Existing Road And Trails	Traffic Permitted Off Existing Road And Trails
Alpha	East	2471	High Desert	Foot/Wheel	Foot
Bravo	East	2471	High Desert	Foot/Wheel/Tracked	Foot
Charlie	East	2100	High Desert	Foot/Wheel/Tracked	Foot/Wheel/Tracked[1]
Delta	East	4694	High Desert	Foot/Wheel/Tracked	Foot/Wheel/Tracked[1]
Echo	East	4942	High Desert	Foot/Wheel	Foot
Foxtrot	East	3583	High Desert	Foot/Wheel/Tracked	Foot
Golf	West	1087	High Desert	Foot/Wheel	Foot
Hotel	West	4200	High Desert	Foot/Wheel	Foot
India	West	2223	High Desert	Foot/Wheel	Foot
Juliet	West	1111	High Desert	Foot/Wheel	Foot
Kilo	West	1136	High Desert	Foot/Wheel	Foot
Lima	West	840	High Desert	Foot/Wheel	Foot
Mike	West	1087	High Desert	Foot/Wheel	Foot
November	West	3410	Mountain	Foot/Wheel	Foot
Oscar	South	2619	Mountain	Foot/Wheel	Foot
Papa	South	3459	Mountain	Foot/Wheel	Foot
Quebec	South	2347	Mountain	Foot/Wheel	Foot
Romeo	West	1359	Mountain	Foot/Wheel	Foot
Sierra	South	2322	Mountain	Foot/Wheel	Foot
Tango	South	5312	Mountain	Foot/Wheel	Foot
Uniform	South	2347	Mountain	Foot/Wheel	Foot
Victor	South	1729	High Desert	Foot/Wheel	Foot
Whiskey	South	1482	High Desert	Foot/Wheel	Foot
X-Ray	South	1235	High Desert	Foot/Wheel	Foot
Yankee	South	1482	High Desert	Foot/Wheel	Foot
Zulu	East	6954	High Desert	Foot/Wheel	Foot

[1] Off-road wheeled and tracked-vehicle traffic is restricted to existing off-road maneuvering lanes, which are currently inactive and have no programmed use. Any such use of these lanes is subject to further consideration under NEPA and AR 200-2 prior to use. As of this time, there is no authorized off-road activity in these lanes.

3.5.2 Aviation and Airspace Management

Airspace management within the 48 contiguous United States falls under the jurisdiction and oversight responsibility of the Federal Aviation Administration (FAA). In general, there are two categories of airspace or airspace areas that are most likely to be used during airborne UAV activities: Controlled and Special Use. Descriptions of all applicable controlled and special use airspace categories; regulations pertaining to flights over charted U.S. wildlife refuges, parks, and U.S. Forest Service areas; and aviation-related infrastructure within the ROI that could be affected by the Proposed Action and alternatives are provided below.

3.5.2.1 Controlled Airspace

Controlled airspace is a generic term that covers five different classifications of airspace and defines the dimensions within which air traffic control services are provided to instrument flight rules (IFR) traffic and to visual flight rules (VFR) traffic. A brief description of each class is below.

Class A Airspace—18,000 to 60,000 ft MSL. Includes airspace overlying the waters within 12 NM of the coast of the 48 contiguous states and Alaska. Class A airspace is also designated international airspace beyond 12 NM of the coast of the 48 contiguous states and Alaska within areas of domestic

radio navigational signal or air traffic control (ATC) radar coverage, and within which domestic procedures are applied.

Class B Airspace—Surface to 10,000 ft MSL surrounding the nation's busiest airports in terms of IFR operations or passenger enplanements. Each Class B airspace area is individually tailored and consists of a surface area and two or more layers (some Class B airspace areas resemble upside-down wedding cakes), and is designed to contain all published instrument procedures once an aircraft enters the airspace. Aircraft require an ATC clearance to operate in the area, and cleared aircraft receive separation services within the airspace.

Class C Airspace—Surface to 4,000 ft above airport elevation (charted in MSL) surrounding airports that have an operational control tower, are serviced by a radar approach control, have a certain number of IFR operations or passenger enplanement. Each Class C airspace area is individually tailored but usually consists of a 5 NM radius core surface area that extends from the surface up to 4,000 ft above the airport elevation, and a 10 NM radius shelf area that extends from 1,200 ft to 4,000 ft above airport elevation.

Class D Airspace—Surface to 2,500 ft above airport elevation (charted in MSL) surrounding airports that have an operational control tower. Each Class D airspace area is individually tailored, and when instrument procedures are published, the airspace will normally be designed to contain the procedures.

Class E Airspace—Controlled airspace that is not considered Class A, Class B, Class C, or Class D.

Class GB Airspace (Uncontrolled)—Portion of airspace that has not been designated as Class A, Class B, Class C, Class D, or Class E

3.5.2.2 Special Use Airspace

Special use airspace consists of airspace where activities must be confined because of their nature, military operations areas or where limitations are imposed upon aircraft operations that are not a part of those activities (restricted areas), or both. Except for controlled firing areas, special use airspace areas are depicted on aeronautical charts. This special use airspace is described below.

Military Operations Areas—MOAs have airspace of defined vertical and lateral limits, established for the purpose of separating certain military training activities from IFR traffic. Whenever a MOA is being used, nonparticipating IFR traffic may be cleared through if IFR separation can be provided by ATC. Otherwise, ATC will reroute or restrict nonparticipating IFR traffic. Most military training activities necessitate acrobatic or abrupt flight maneuvers. Military pilots flying DOD aircraft within a designated and active MOA are exempted from the provisions of 14 CFR Section 91.3(c) and (d) which prohibit acrobatic flight within Federal airways and Class B, Class C, Class D, and Class E surface areas.

Restricted Areas—Restricted areas occur over surfaces of the earth within which aircraft flight, while not wholly prohibited, is subject to restrictions. Flight activities within these areas are confined because of their nature, or the limitations imposed upon aircraft operations that are not a part of those activities, or both. Restricted areas denote the existence of unusual, often invisible, hazards to aircraft such as artillery fire, aerial gunnery, or guided missiles. Penetration of restricted areas without authorization from the using or controlling agency may be extremely hazardous to the aircraft and its occupants. Restricted areas are published in Federal Register 14 CFR Part 73.

Four Restricted Areas are discussed under the Proposed Action: R-2303A, R-2303B and R-2303C designated by the FAA as Joint Use with Fort Huachuca being the Using Agency and the Albuquerque ARTCC the Controlling Agency; and R-2312 which contains a tethered air balloon and is operated jointly by the U.S. Customs Department and the U.S. Air Force. (Table 3.5-2) These four areas are in the vicinity of LAAF and are depicted on sectional charts, VFR Terminal Area charts, and Enroute Low Altitude charts.

Table 3.5-2. Restricted Areas

Restricted Area	Airspace Area	Active Times
R-2303A (Excludes LAAF)	Surface to 15,000 ft	7:00 a.m. to 4:00 p.m. Monday through Friday
R-2303B	8,000 ft 30,000 ft	7:00 a.m. to 4:00 p.m. Monday through Friday
R-2303C	15,000 ft to 30,000 ft	Intermittently, with 24-hour advance notice
R-2312	Surface to 15,000 ft	Continuously

3.5.2.3 Flights Over Charted U.S. Wildlife Refuges, Parks, and Forest Service Areas

Pilots are requested to maintain a minimum altitude of 2,000 ft (610 m) above national parks, monuments, recreation areas, and scenic riverways administered by the National Park Service; National Wildlife Refuges, Big Game Refuges, Game Ranges and Wildlife Ranges administered by the U.S. Fish and Wildlife Service (USFWS); and Wilderness and Primitive areas administered by the U.S. Forest Service (USFS). FAA Advisory Circular AC 91-36, VFR Flight Near Noise-Sensitive Areas, defines the surface of a national park area (including parks, forests, primitive areas, wilderness areas, recreational areas, national seashores, national monuments, national lakeshores, and national wildlife refuge and range areas) as the highest terrain within 2,000 ft (610 m) laterally of the route of flight or the upper-most rim of a canyon or valley.

LAAF is located within 33 NM of five conservation, wilderness, and national monument areas. The San Pedro Riparian NCA (see Section 3.1) is located approximately 6 NM east of the airport; Miller Peak Wilderness Area approximately 8 NM south; Mt. Wrightson Wilderness Area approximately 22 NM west; Rincon Mountain Wilderness Area approximately 29 NM north, and Saguaro National Monument approximately 33 NM north of LAAF.

The takeoff and landing of aircraft in national conservation areas, wilderness areas, or national monument areas is prohibited, and aircraft are requested to maintain altitudes of at least 2,000 ft (610 m) above ground level (AGL) from the highest elevation in the area. Exceptions to this rule include activities at officially designated landing sites; activities on approved official business of the Federal Government; or when aircraft are forced to land due to an emergency beyond the control of the operator.

3.5.2.4 Regional

There are five public airports and eight private airports within a 40 NM range of Fort Huachuca (Coffman Associates Inc. 1995). Table 3.5-3 show these airports, their distance from Fort Huachuca, and facilities.

3.5.2.5 Fort Huachuca

Four runways exist on Fort Huachuca: LAAF, Rugge-Hamilton Runway, Pioneer Runway, and Hubbard Assault Airstrip (see Section 3.1). Aviation activities at these four facilities include fixed-wing piloted aircraft training, rotary-wing piloted aircraft training, and UAV testing and training.

Table 3.5-3. Public and Private-Use Airports

Public Airports	Distance from Fort Huachuca (In nautical miles)	Facility
Bisbee Municipal	26 NM southeast	one paved runway
Cochise College	35 NM east-southeast	one paved runway
Bisbee Douglas International	38 NM east-southeast	two paved runways
Tombstone Municipal	15 NM east-northeast	one paved runway
Nogales International	28 NM southwest	one paved runway
Private-Use Airports		
Hereferd	15 NM southeast	one paved runway
Thompson International	15 NM southeast	one paved runway
Tribal Air	34 NM east	one paved runway
Four Pillars	10 NM northeast	one paved runway
Ammon	32 NM northeast	one unpaved runway
Whetstone	6 NM north	one unpaved runway
Benson	22 NM north	one unpaved runway
Continental	35 NM northwest	one paved runway

Military aviation activities generally occur at LAAF. Air operations at this runway are sustained by numerous support facilities including a flight control tower, navigational aids building, airfield operations building, airfield fire and rescue station, utilities support structures, and storage buildings. Approaches to LAAF are considered Class D Controlled Airspace since the facility contains a manned operating control tower. The airport's airspace includes a horizontal radius of 4.3 statute miles, extending from the surface up to 7,200 ft MSL. Aircraft are not allowed to enter the airspace until given clearance by the LAAF ATC tower. During the time the ATC tower is closed, the airspace reverts to Class G, or uncontrolled airspace. Total LAAF radar and tower traffic counts for 1999 are presented in Table 3.5-4.

Table 3.5-4. LAAF Consolidated Traffic Count 1999

	Radar Traffic Count (1999)	Tower Traffic Count (1999)
Air Carrier	2,638	3,361
General Aviation	6,545	12,050
Military (UAV)	36,130 (18,647)	48,459
Total[1]	**45,313**	**63,870**

Source: LAAF Air Traffic Control
[1] An additional 189 miscellaneous flights are included in this total

As shown, 1999 UAV operations accounted for approximately 52 percent of the 36,130 military aircraft radar traffic counts, and 41 percent of the 45,313 total radar traffic counts at LAAF (including air carrier and general aviation).

Airspace used by UAVs at Fort Huachuca and airspace over the installation are shown in Section 2, Figure 2.1-4. Other aviation-related training areas and facilities at Fort Huachuca are below shown in Table 3.5-5.

Table 3.5-5. Aviation Training Areas and Facilities at Fort Huachuca

Training Area	Facilities
Victor	C-5A Aircraft Training Mock-up (a concrete platform depicting a C-5A aircraft cargo bay used to simulate cargo loading) An emergency helicopter landing area
November, Romeo, India, and Kilo	Helicopter landing areas for proficiency and emergency operations
Bravo and Delta	Hubbard Assault Airstrip, a dirt assault strip/landing zone, surveyed and approved by the U.S. Air Force, which can accommodate C-130 aircraft (675 x 1600 m)
Bravo	Humor Drop Zone (825 x 1660 m)
Charlie and Delta	Hubbard Drop Zone (850 x 1700 m) Havoc Drop Zone (850 x 1700 m)
Echo	Hyena Drop Zone (300 x 300 m)

3.6 PUBLIC SERVICES, UTILITIES, ENERGY RESOURCES

This section describes the public services, utilities, and energy resources that may be affected by the Proposed Action and alternatives. The ROI for these services and resources will vary by media.

3.6.1 Regional

Emergency services for Sierra Vista are provided by the city's fire department with 4 ambulances, 20 emergency technicians, and 2 to 3 paramedics on every crew (ENRD 1999). If needed, the city can call upon assistance from the Fry, Whetstone, and Palominas Fire Districts as well as from Huachuca City's fire departments. Together, these communities maintain 7 ambulances, 48 emergency technicians, and 18 paramedics. Fort Huachuca is also available to assist Sierra Vista in emergencies with 2 ambulances and 40 emergency technicians. The Fort also has a helicopter for medivac services, if needed. The Red Cross has local offices in both Sierra Vista and on Fort Huachuca. The Sierra Vista office is capable of assisting about 100 persons in the event of an emergency and can call on the Red Cross office in Tucson for additional assistance. The Fort Huachuca Red Cross could assist 2,000 persons in an emergency with tents, cots, and ready-to-eat meals provided by the Army (Red Cross 1997).

Fire Protection within the County is provided by 15 fire districts with a total of 277 paid and volunteer fire fighters (Arizona Fire Districts Handbook 1997). In addition, the cities of Bisbee, Benson, Sierra Vista, Huachuca City, Douglas, and Tombstone all have fire departments with a total

of 159 fire fighters. Sierra Vista's Fire Department is staffed with 18 paid full-time and 12 part-time fire fighters. If needed, the city can request additional help from the Fry, Whetstone, and Palominas Fire Districts as well as from the Fort Huachuca and the Huachuca City (Sierra Vista Fire Department 1997). Forty-four fire fighters staff the three fire stations at Fort Huachuca, including one station located at LAAF. The base maintains two P19 Crash Trucks and four to five additional pieces of fire equipment (ENRD 1999).

The USFS maintains and operates additional fire suppression facilities that are available to respond to forest and range fires within Coronado National Forest and adjacent areas, including lands within the installation, pursuant to a cooperative fire agreement between Fort Huachuca and the USFS. In addition, the USFS maintains an aviation fire suppression support facility (tanker base) at LAAF. The purpose of the tanker base is to provide logistical support and fire suppression supplies necessary for regional fire-fighting activities. Fire suppression supplies consist of a fire-suppressing dry chemical, that when mixed with water creates a slurry compound that the USFS aircraft can store and deposit on or near the perimeter of a fire. During a fire, the USFS aircraft will land at LAAF, refill with slurry, and then depart to the fire scene. After the aircraft drops its load of slurry on the fire, it will return to LAAF for slurry replenishment, if necessary, and continues to do so until USFS aviation fire fighting units are no longer needed.

In addition to the above services, a plan is on file with the Coronado National Forest that addresses the procedures and assigns responsibilities for the rapid assessment of crashes/incidents and mishaps, addresses their recovery, disposition, and investigation, and provides recommendations for test modifications, if needed (USAEPG 1992).

Cochise County is served by 5 hospitals located in Sierra Vista, Bisbee, Wilcox, Douglas, and Benson with a total of 233 hospital beds. All of the hospitals have capabilities for helicopter landings and medivac. None have burn units, but burn victims can be airlifted to St. Mary's Hospital in Tucson. The Sierra Vista Community Hospital has 88 beds of which 7 are acute and 4 are critical emergency room beds. The hospital has a helicopter pad and helicopter located on site. Patients are usually airlifted to one of three Tucson hospitals, Tucson Medical Center, University Medical Center, or St. Mary's Hospital, which are all about 12 minutes away by air transport (ENRD 1999).

3.6.2 Fort Huachuca

Several local and regional utility providers serve Fort Huachuca. The Fort also maintains systems for water, sewer, drainage, and fire protection services, independently from the City of Sierra Vista utility services.

3.6.2.1 Emergency Services

Emergency 911 calls are directed to the Fort Huachuca Fire Department. This fire department maintains two ambulances, which are used to transfer victims with acute injuries to the Fort Huachuca Super Clinic to be treated or stabilized or to the Sierra Vista Community Hospital for treatment. All urgent care victims are taken from the installation to Sierra Vista Community Hospital for treatment (ENRD 1999).

The Wildlands Fire Management Plan at Fort Huachuca consists of two parts. The first provides descriptive information and is a planning tool that contains policy, direction, and prescription, while the second is operational, and directs actions that can be used to implement fire management strategies, particularly, managed or prescribed fires.

Aircraft Rescue and Firefighting (ARFF) services are provided, maintained, and operated at LAAF by the U.S. Army. These facilities are located on the south side of the airfield and house the emergency fire suppression equipment necessary for initial response to aircraft fires. The City of Sierra Vista Fire Department and the Fort Huachuca Fire Department, depending on the location and intensity of the accident, support this facility. The ARFF meets the requirements of an Index A Facility Plan, a certification awarded by the FAA under Federal Aviation Regulation 139. An Index A facility, serves aircraft of less than 90 ft in length, and is required to carry at least 500 pounds of sodium-based dry chemical or halon 1211, or equivalent (Coffman 1995).

3.6.2.2 Electricity

The primary electrical power for the Fort is obtained from a Tucson Electric Power Company (TEP) 138/46/14 kV Substation, located 800 ft due west of Greely Hall. Power is delivered from TEP's Vail Substation via a 54-mile (87 km) long 138 kV transmission line. Back-up power is available from TEP's South-end Substation near Nogales, Arizona, via a 70-mile (113 km) long 46 kV transmission line and a 46/14 transformer. The voltage is stepped down to standard working voltages via transformers at each point of use. Table 3.6-1 shows Fort Huachuca's yearly electricity usage from 1993 to 1999.

Table 3.6-1. Electricity Usage at Fort Huachuca

Year	Kilowatt Hours (kWh)
1993	103,723,000
1994	106,478,000
1995	106,645,800
1996	107,980,400
1997	105,712,000
1998	101,018,400
1999	96,712,000

The table indicates a 4.1 percent increase from 1993 to 1996, but a 10.4 percent decrease from 1996 to 1999. Existing electricity supply facilities on Fort Huachuca can support a population growth of over 13,000 persons (Nakata Planning Group 1997).

3.6.2.3 Water Supply and Use

Groundwater is the source of Fort Huachuca's potable water supply. Eight wells on Fort Huachuca are considered municipal water supply wells with depths between 202 ft (62 m) and 1,230 ft (ADWR). Two of the wells, of 800 gallons per minute pump (gpm) capacity, are located on the East Range and six wells, of 500- to 700-gpm pump capacity, are located on post between the Main Gate and the East Gate. Another five wells support military testing and research activities across the post and have minimal production.

Due to conservation and reuse efforts, the net reduction in the installation's withdrawal of water from the local aquifer system and net consumptive use are anticipated to continue. Total annual pumpage data comes from metering at the wellhead. From the most recent high annual withdrawals of 3,200 ac-ft (1,046 MG) in1989, Fort Huachuca has reduced its annual withdrawal by 1,314 ac-ft (426 MG) (or 41 percent) to 1,893 ac-ft (617 MG) in 1999 (Table 3.6-2).

Detailed usage information to distinguish residential use from military industrial use is not available because water is metered at the well-head and not at all end-user locations. A Water Wise education program began in July 1998, with a focus on individual contributions to conservation through reduction of waste at home and within administrative and industrial areas on the installation. Other water conservation efforts include the installation of low-flow and low-water use fixtures and an aggressive leak detection and repair program. Water use in 1999 decreased from the 1998 level by 13 percent.

Water extraction from wells at the installation has steadily decreased as a result of the use of treated effluent for irrigation, an aggressive water conservation program, and the net decrease in Fort Huachuca personnel. Fort Huachuca uses treated effluent to irrigate the Chaffee Parade Field, the golf course, and the new outdoor sports complex. During 1999, Fort Huachuca produced approximately 1,100 ac-ft (358 MG) of treated effluent.

Table 3.6-2 shows the FY00 projected annual water use for the UAV program at Fort Huachuca. This table reflects student throughput estimates and does not include instructors or additional support personnel.

Table 3.6-2. Projected FY00 Annual Water Use for UAV Student Training (Students)

	Estimated Number of FTEs	Gallons per Person per Day [1]	Total Gallons per Year (ac-ft)
Pioneer UAV Program	82	75	2,244,750 (6.89)
Short Range UAV Program	449	75	12,291,375 (37.72)
TOTAL			**14,536,125 (44.61)**

[1] 75 gpd per student (assumes reduced domestic use)

3.6.2.4 Stationary Fuels

Stationary fuels are used primarily for space heating and in absorption chillers to provide cooling. Heating and cooling fuels used at Fort Huachuca are natural gas and propane. Southwest Gas Company furnishes natural gas to Fort Huachuca through two high pressure underground supply lines. The gas is then distributed within the installation via a network of buried transmission lines. Natural gas consumption at Fort Huachuca was an estimated 383,299 Million British Thermal Units (MBTU) in FY99, a 14 percent reduction from 447,106 MBTU in 1997 (Stein, personal communication). Natural gas consumption for the past few years has been well below peak historical consumption levels. The highest natural gas consumption in the past several years (1992) was 632,436 MBTUs, which was 84 percent of the peak year consumption over the past 20 years (1975). There are no current limitations on the system's capacity to meet current or future demands (Nakata Planning Group 1997).

Propane is produced off-site and transported to Fort Huachuca via truck. There are only 15 buildings on the Fort currently using propane. In FY99, propane usage was 2,804 MBTU (Stein, personal communication). The highest propane consumption for the past several years (1992) was 3,962 MBTU, which was 64 percent of the peak year consumption (1986). Given these trends, the delivery and distribution capacities for these energy products are not likely to be reached or exceeded within five years.

Table 3.6-3. Fort Huachuca Population and Water Pumpage History (Population Data is from 30 September of Each Year)

Year	Military Assigned	Employees [1]	Military Family Members Residing on Post	Water Pumpage (ac-ft)
1999	5,878	5,262	4,326	1,893
1998	5,421	4,941	4,431	2,176
1997	5,703	4,413	4,734	2,357
1996	5,670	4,613	5,027	2,355
1995	5,854	5,010	4,978	2,428
1994	7,533	5,779	5,108	2,568
1993	5,823	5,430	4,930	3,028
1992	5,682	5,944	4,760	2,846
1991	5,914	5,506	4,775	2,709
1990	6,448	5,671	4,897	2,747
1989	6,440	5,802	4,891	3,207

Source: DRM 1997, 2000
[1]Represents DOD civilian workers and non-DOD civilian workers on Fort Huachuca.

3.6.2.5 Mobility Fuels

Because of the mix of activities, consumption of vehicle and aircraft fuels (mobility fuels) at Fort Huachuca is a smaller fraction of total energy consumption than at most other military installations. Mobility fuels are used in military training programs, as well as in facility operation, and include unleaded gasoline (MOGAS), diesel fuel, aviation gasoline (AVGAS), and JP8 jet fuel. Fort Huachuca's FY99 consumption was 34,566 gallons of unleaded gasoline and 198,529 gallons of jet fuel. These totals were all smaller than in recent previous years. Total annual consumption of diesel and AVGAS are not currently available (Bill Stein, personal communication, June 14, 2000).

The total quantity of mobility fuels used at the Fort has a minimal effect on the fuel supply and distribution system in southeastern Arizona. The total annual consumption of petroleum fuels represents less than two days of production of a typical refinery. This quantity can be delivered using standard tank trucks at the rate of slightly more than one truck per workday.

3.7 PUBLIC HAZARDS, HEALTH, AND SAFETY

This section presents a description of the current status of the installation's hazardous materials storage and handling, solid waste management units including types and locations of materials used; a description of the hazardous waste disposal process including the RCRA permit status; and a description of the current status of the Installation Spill Contingency Plan (ISCP) for oil and hazardous substances.

This section also addresses Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks (April 21, 1997), which recognizes a growing body of scientific knowledge that demonstrates that children may suffer disproportionately from environmental health risks and safety risks.

3.7.1 Hazardous Materials/Waste and Waste Management

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) regulates the cleanup of releases or threats of releases of hazardous substances, pollutants, and

contaminants. The Resource Conservation and Recovery Act (RCRA) regulates the management of hazardous waste, including storage, handling, transportation, treatment, and disposal of the waste. Generally, RCRA provides regulation of current hazardous waste generators, transporters, and of facilities that treat, store, or dispose of hazardous wastes, whereas CERCLA provides regulation for the cleanup of past or abandoned hazardous substance release sites.

A variety of wastes, including municipal solid waste, regulated waste, and hazardous waste, are produced at Fort Huachuca. Fort Huachuca is aggressively implementing several environmental plans and programs (Nakata 1997b) for hazardous waste management and monitoring including the AR 420-47 Solid and Hazardous Waste Management; Hazardous Waste Management Plan; Hazardous Waste Analysis Plan; Hazardous Waste Training Plan; ISCP; Spill Prevention, Control and Countermeasures Plan (SPCCP); and Pollution Prevention Plan (Hazardous Waste Minimization).

Safeguards to protect the environment from accidental spills of hazardous materials or petroleum, oils, or lubricants (POLS) during off-post field training exercises (FTX) and communications and electronic equipment testing, have been established by the U.S. Army Intelligence Center at Fort Huachuca for EPG, 111th MI Brigade, 11th Signal Brigade, and TEXCOM operations.

3.7.1.1 Hazardous Materials

Hazardous material storage follows the National Fire Prevention Association standard codes, and is subject to inspection by both the Installation Safety Office and the Fire Department. In general, existing UAV facilities at the Fort do not store, use, or generate large amounts of hazardous materials or wastes. Table 3.7-1 lists the Satellite and POL accumulation points for five UAV program facilities (Buildings 11640, 12607, 68052, 82012, and 91302). There are no PCB-containing transformers still in use at any UAV facility at Fort Huachuca (ENRD 1999).

Table 3.7-1 UAV Program Facilities' Satellite and POL Accumulation Points at Fort Huachuca

BUILDING	HAZARDOUS MATERIALS
11640	POL 230 gallons Haz Materials 11 gallons
12607	POL 270 gallons Haz Materials 12 gallons
68052	Gasoline 2,000 gallons (AST) JP8 5,000 gallons (AST)
82012	Haz Materials 55 gallons
91302	Haz Materials 200 lithium batteries

Source: FH Installation Spill Contingency Plan , April 2000

The Fort Huachuca ISCP, dated 20 December 1996, describes the procedures to be implemented in the event of hazardous materials or POL spill, on- or off-post. A copy of this plan is available for review at the office of the DIS Environmental and Natural Resources Division. In the event of a hazardous material release, the Directorate of Public Safety has first responder responsibilities on the installation, with the DIS maintenance contractor responsible for cleanup once imminent danger to life and health has passed. Cochise County and the City of Sierra Vista provide backup for response to accidental spills of hazardous substances or POL on Fort Huachuca.

Fort Huachuca transports, stores, and uses munitions. Munitions may be classified as hazardous materials under the Hazardous Materials Transportation Act (HMTA) (these are DOT regulations) depending upon what they contain. However, unless expired or discarded, military munitions generally do not meet the RCRA definition of hazardous waste. Fort Huachuca does not maintain stockpiles of non-conventional munitions (i.e. chemical, nuclear, etc.).

The Army has generated rules, regulations, and guidance manuals detailing procedures and practices for handling, storing, and disposing of munitions. All on-post activities comply with existing Army guidance documents and federal and state regulations (including RCRA and ARS Title 49). Army guidance documents relevant to the handling, storage, and disposal of munitions include the U.S. Army, 415S.19-R-I; Hazardous Commodities Storage; DEQPM 80-5, U.S. Army Hazardous Materials Disposal Policy, and DEQPM 80-8, RCRA.

3.7.1.2 Hazardous Wastes

Both the EPA and the ADEQ under the provisions of the Federal Resource Conservation and Recovery Act (RCRA) of 1976 and the Arizona Hazardous Waste Management Act regulate hazardous waste management on Fort Huachuca. The Fort is a large quantity generator, but does not maintain a Part B permit to operate a treatment, storage, and disposal facility (TSDF) under RCRA. The Fort operates one 90-day accumulation point and approximately 35 satellite accumulation points. Transportation to an approved TSDF is through contracts established by the Defense Reuse and Marketing Organization (DRMO) of the Defense Logistics Agency. The DRMO ensures that transporters are qualified, maintain required permits and licenses, and manifest the packaged waste off the installation to a permitted TSDF.

In the case of a hazardous waste release, the Directorate of Public Safety has first responder responsibilities on the installation, and the DIS maintenance contractor is responsible for cleanup once imminent danger to life and health has passed. Under agreement with Cochise County and the City of Sierra Vista, backup for response to accidental spills of hazardous substances or POL on Fort Huachuca is available. The Installation Hazardous Waste Management Plan (HWMP), dated January 1997, was designed to provide the procedures to achieve compliance with the foregoing regulations regarding the accumulation, storage, transportation, and disposal of hazardous wastes generated by various organizations on the Fort. A copy of this plan is available for review at the office of the DIS ENRD.

3.7.1.3 Solid Waste Disposal/Toxic Materials

Currently, collection and disposal of on-site-generated solid waste is conducted in accordance with state permits. Solid waste from the Fort is disposed of in the Huachuca City landfill. Approximately 5,778 tons of solid waste was sent to the landfill in the 1999 calendar year (Tom Webb, personal communication, May 15, 2000). It is estimated that the landfill will close within five years, at which time the Fort's solid waste will be sent to the Cochise County landfill in Elfrida, Arizona.

Fort Huachuca is under an Executive Order to reduce current levels of solid waste generated to 50 percent of the amount generated in 1994. Currently, the Fort is short of meeting this goal and consequently is increasing recycling efforts on the installation. Recycling efforts include motor oil, antifreeze, food service grease, white paper, newspaper, cardboard, and aluminum cans. Paper and cans are collected by an organization called SHARK. In the 1999 calendar year approximately 55 tons of newspaper, 67 tons of cardboard, 403 tons of white bond paper, one ton of aluminum cans, and 0.4 tons of magazines were collected by SHARK (Tom Webb, personal communication, May 5, 2000).

3.7.1.4 Wastewater

The wastewater system at Fort Huachuca consists of collection and treatment facilities. Included in these facilities are a limited number of portable toilets and septic tanks and the components of the sewage system itself: individual sanitary sewers and trunk lines, lift stations, force mains, sewage ejectors and Wastewater Treatment Plant #2 (WWTP #2). The wastewater system capability is largely determined based on the capacity of the plant. WWTP #2 received extensive improvements in 1995, and now has a maximum treatment capacity of 3.1 million gallons per day (MGD). WWTP #1 was closed many years ago and the ponds are now used as a treated-effluent holding/pumping facility. Portable facilities and individual holding tanks serve isolated facilities and outlying range and training areas. Collection of sanitary wastewater in outlying areas of the installation for later treatment at WWTP #2 adequately disposes of the current waste levels.

The Fort's wastewater collection system is primarily a branched gravity flow system, with approximately 95 percent of total flow conveyed by gravity alone. Two lift stations and associated force mains collect a small amount of sewage from the West Range and from a small low-lying area in the southeastern portion of the cantonment area.

3.7.1.5 HAZMART

Fort Huachuca was the first Army installation to implement HAZMART–the Army's first fully centralized facility for handling hazardous materials. The goal is to foster reduction, reuse, and replacement of hazardous materials, and to reduce the generation of hazardous waste. The facility allows expedited sharing and acquisition of hazardous materials required for mission-related work on the Fort. The "cradle to grave" system at HAZMART allows for ease in tracking the materials from the time they are brought on to the installation until they are either used up, returned for reuse, or disposed of as hazardous waste. HAZMART has the potential to reduce the generation of hazardous wastes by 50 percent and net a savings estimated between $0.5 and $1.5 million.

Common hazardous materials, which may be found at the HAZMART, include bleach, solvents, paints, and adhesives. No pesticides, explosives or medical products are stored at the HAZMART site. Fort Huachuca residents may also bring their household hazardous materials, such as varnish or cleaning products to the HAZMART for reissue. This is especially important when families move, because these materials often cannot be transported in their household goods. The HAZMART will allow products to be used for their intended purpose only and prevents illegal or improper disposal methods.

3.7.2 Off-Post Areas

Target sites within the Coronado National Forest were previously surveyed for hazardous materials (USAEPG 1995); no hazardous materials were found on the sites. No target sites are located such that their use by target elements would result in oil spills into or upon navigable U.S. waters.

3.7.3 Protection of Children

Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks (April 21, 1997) recognizes a growing body of scientific knowledge that demonstrates that children may suffer disproportionately from environmental health risks and safety risks. These risks arise because (1) children's bodily systems are not fully developed, (2) children eat, drink, and breathe more in proportion to their body weight, (3) their size and weight may diminish protection from standard safety features, and (4) their behavior patterns might make them more susceptible to accidents. Based on these factors, the President directed each federal agency to make it a high

priority to identify and assess environmental health risks and safety risks that may disproportionately affect children. The President also directed each federal agency to ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks.

3.8 SOIL AND WATER

This section discusses the existing soils and hydrological conditions that will be considered as the baseline conditions for soil, surface water, and groundwater. This information will be used as a point of comparison when evaluating impacts that may be caused by ongoing and proposed UAV developmental testing and operational training activities discussed in this EA.

The ROI is defined as the Sierra Vista subwatershed that contains Fort Huachuca, the City of Sierra Vista, Huachuca City, and most of the San Pedro Riparian NCA. The principal geographic features of the Sierra Vista subwatershed include the Mule Mountains and Huachuca Mountains; pediment surface and floodplain; several washes, canyons, and draws; a small tributary system feeding Soldier Creek; and the Babocomari and San Pedro River channels.

3.8.1 Soils

3.8.1.1 Regional

The Sierra Vista subwatershed soil types (Figure 3.8-1), exhibit wide variations in depth, texture, and chemical properties. This diversity is directly related to differences in climate, parent material, and topography at the installation. Soil physical and chemical properties have an influence on the plant communities that exist within the subbasin and uses and management of soils.

The Natural Resources Conservation Service (NRCS) system classifies soils into one of four groups based upon infiltration capacity and ability to transmit water. The Sierra Vista subwatershed is dominated by soils classified in the hydrologic soil group "D", with some types being classified in hydrologic soil group "C". Group "D" soil types have very slow infiltration rates when saturated and have an extremely low water transmission rate. Both these soil types promote higher amounts of runoff and streamflow from storm events. Gypsum content within the soils is relatively high in most areas of the Sierra Vista subwatershed, which leads to a very high erosion hazard (NRCS 1997).

3.8.1.2 Fort Huachuca

Soil management is a significant operational consideration at Fort Huachuca. The Soil Survey of Fort Huachuca (NRCS 1997) characterizes the types of soils that occur at the installation, locations of the soil types, and potential uses (Figure 3.8-2). Many soils of the hilly and mountainous areas on the South and West Ranges are shallow; roughly 30 percent are less than 2 ft (0.6 m) deep over bedrock. The installation is dominated group "D" soils, with some types classified in group "C". The soils tend to be droughty with low available water capacity and are susceptible to erosion.

The high sodium and gypsum contents of many soils on the East Range make these soils subject to gully erosion and piping, and are very corrosive to concrete and steel. The soil of the cantonment area consists of alluvial fan soils, including the White House complex, Lanque soil, Courtland-Sasabe-Diaspar complex, Blacktail-Pyeatt complex, Blakeney soil, and Combate soil (Svetlic 1994). Almost one-quarter of the post has deep red clay soils that have slow permeability, tend to be poorly drained, become very slippery when wet, and are susceptible to compaction. Soil properties that influence land use and management at the installation include gravely or rocky soils; soils with hard pans; and deep, doughty, sandy soils.

1

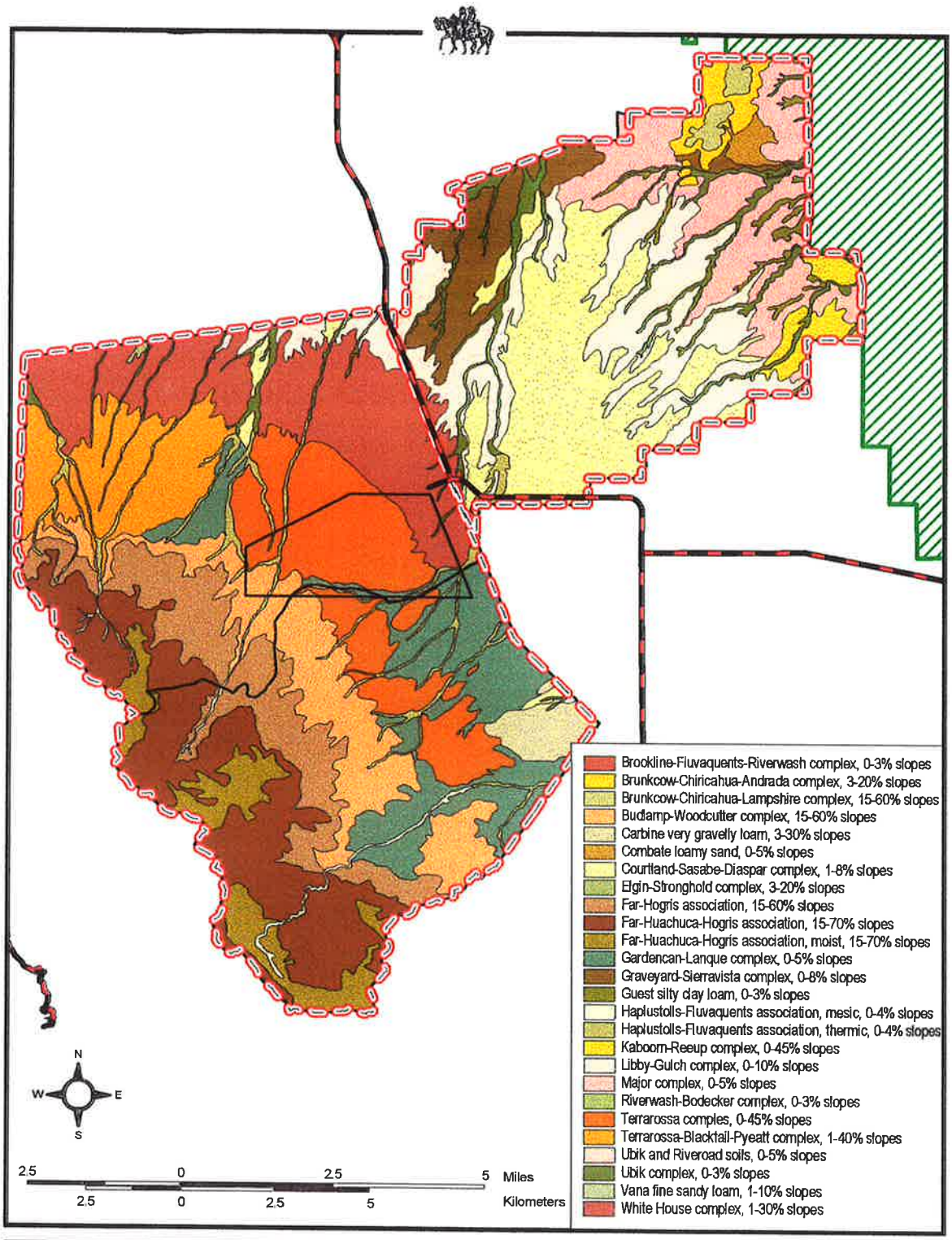

FIGURE 3.8-1

Fort Huachuca Soils

Major Roads
Fort Huachuca
San Pedro River NCA

2
3

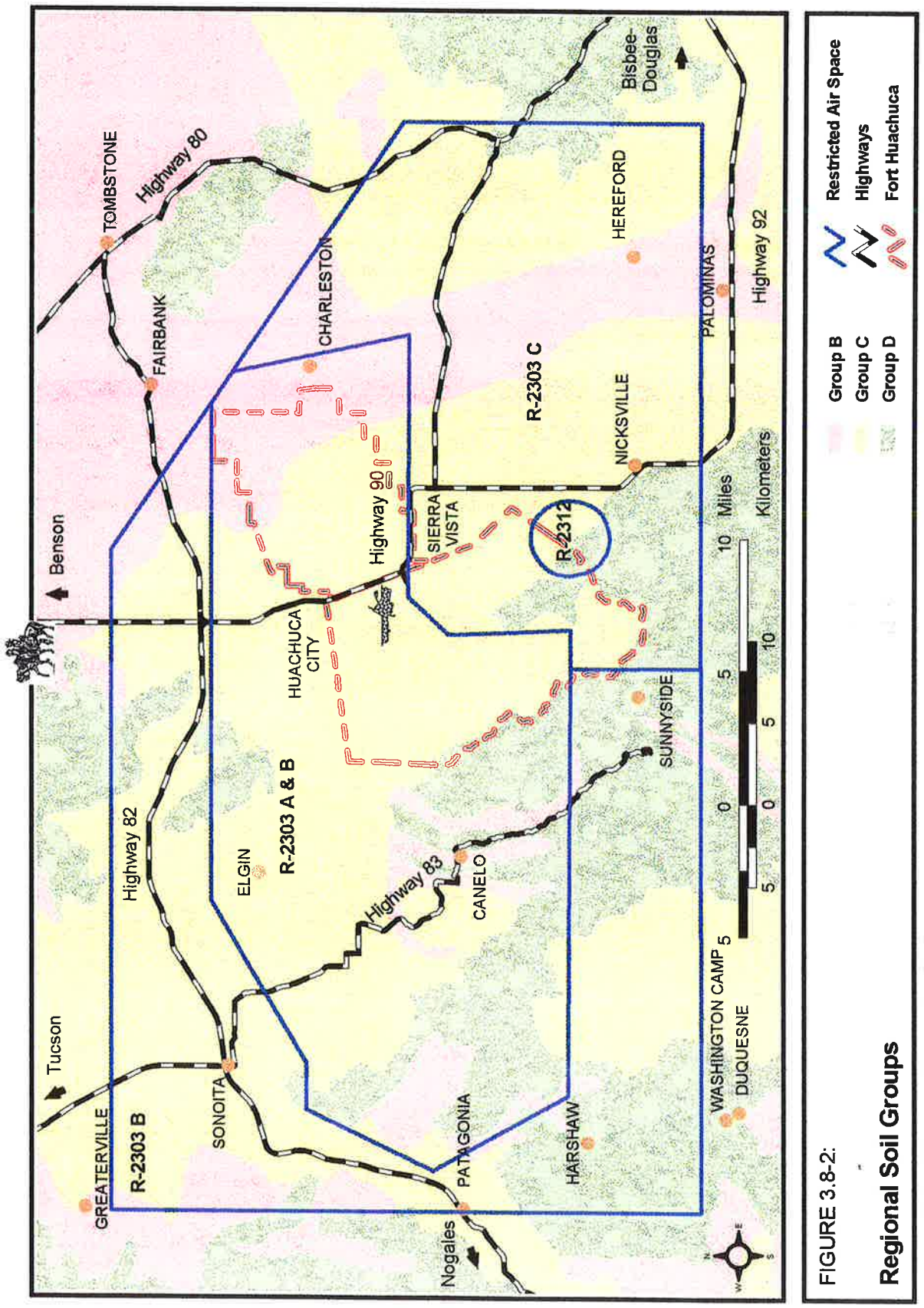

FIGURE 3.8-2:

Regional Soil Groups

Source: National Resource Conservation Service

3.8.2 Water

Several federal laws and related statutes are applicable to the protection of water resources. The two principal laws governing water quality are the Clean Water Act of 1972 (as amended in 1977, 1981, and 1987) and the 1974 Safe Drinking Water Act (as amended in 1986 and 1996). The preservation and enhancement of wetlands is governed by Executive Order 11990, Protection of Wetlands; development in floodplains is governed by Executive Order 11988, Floodplain Management. Numerous state and local laws also apply to the protection and management of water resources.

3.8.2.1 Regional Surface Water

The San Pedro River is a major regional stream, draining a land area of approximately 4,600 square miles (11.9M km) and extending almost 200 miles (322 km) from its headwaters in Sonora, Mexico to its confluence with the Gila River near Winkleman, Arizona (Figure 3.8-3). Surface water discharges originating within the Sierra Vista Subbasin are tributary to either the San Pedro or the Babocomari River, which discharges into the San Pedro River. The Babocomari River is ephemeral throughout most of its length although sections near the headwaters, and for about four miles above the mouth, sustain perennial flow due to special geologic conditions (ADWR 1988).

The San Pedro River has discharged an average of 47 cubic ft per second (cfs) over the 65-year period of record at the U.S. Geological Survey (USGS) Gauging Station at Charleston. River flow is highly variable with annual averages ranging from about 129 cfs during 1978 to about 13 cfs in 1980. Flow patterns are distinct, with flooding in the winter and summer rainy seasons separated by low flow periods during spring and autumn. As is characteristic of most lower elevation southwestern streams, a large percentage of the total water yield results from infrequent storm events. Surface water derived from the San Pedro and Babocomari Rivers is considered of relatively good quality but recent concerns over turbidity levels along portions of the river have been reported. Water quality in the San Pedro River has been monitored for decades by a number of state and federal agencies.

3.8.2.2 Regional Groundwater

Sierra Vista and Huachuca City depend entirely on groundwater. The municipal water wells servicing these population centers are located within 6 miles of Fort Huachuca. All have depths exceeding 800 ft (240 m). Most have pumping capacities exceeding 500 gpm. The municipal wells are typically pumped at a high continuous rate throughout the peak demand period.

Groundwater generally occurs under confined or water table conditions in most of the regional aquifer. It occurs under confined conditions where permeable and saturated alluvium is overlain by impervious silt or clay lenses. The two areas where confined conditions exist in the aquifer in the Upper San Pedro Basin (USPB) are the Palominas-Hereford area and the St. David-Benson area (Roeske and Werrel 1973).

Another local water table aquifer also exists on the pediment in the Fort Huachuca area (Harshbarger and Associates 1974). Groundwater flow in the unconfined portion of the aquifer is generally from the valley margins near the mountains toward the San Pedro River. Local barriers to flow and centers of groundwater pumping cause exceptions to the general flow direction in some areas.

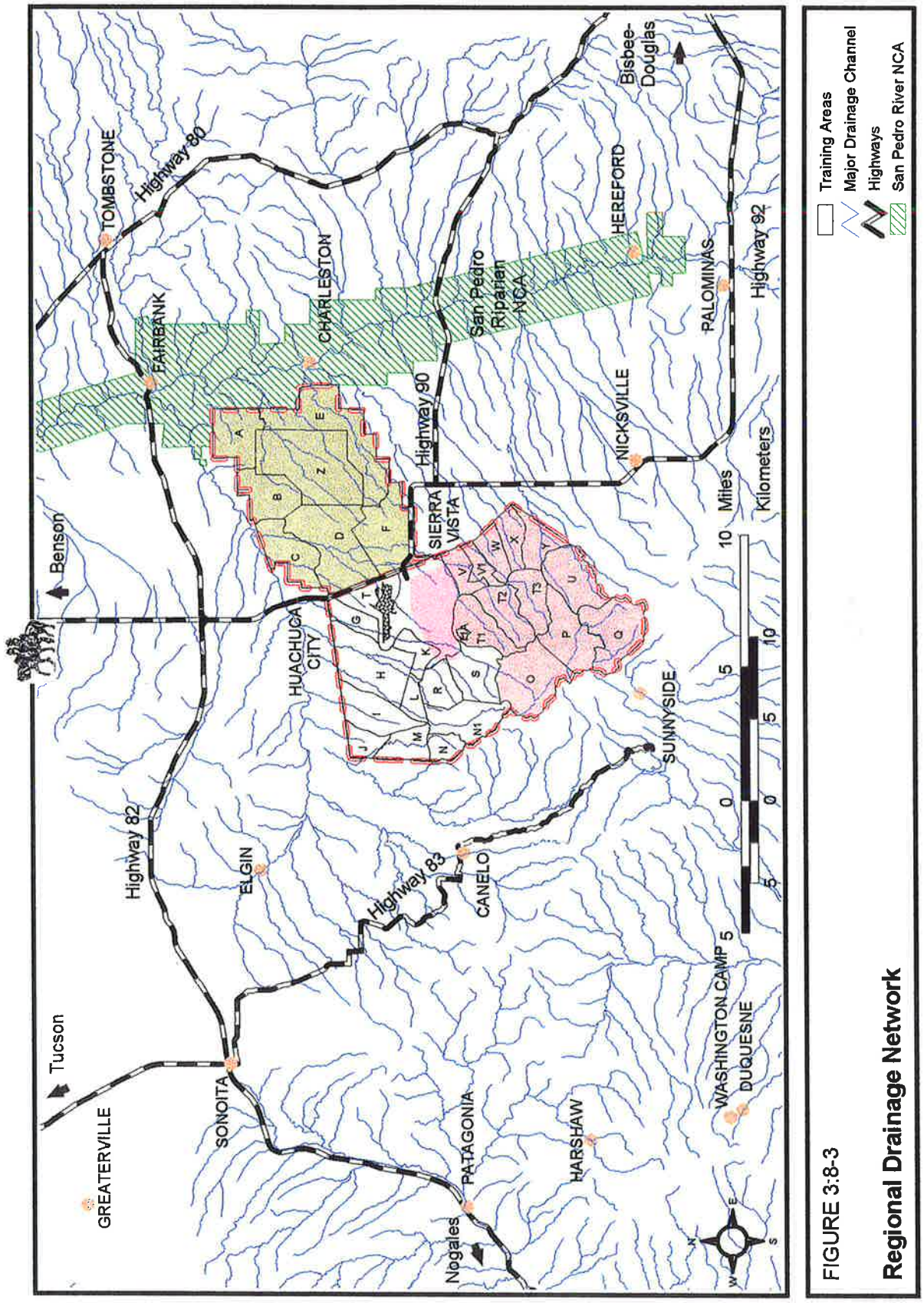
Training Areas
Major Drainage Channel
Highways
San Pedro River NCA
Regional Drainage Network
TOMBSTONE
Highway 80
FAIRBANK
CHARLESTON
San Pedro Riparian NCA
HEREFORD
Bisbee-Douglas
PALOMINAS
Highway 92
Highway 90
NICKSVILLE
SIERRA VISTA
Benson
HUACHUCA CITY
SUNNYSIDE
Tucson
Highway 82
ELGIN
Highway 83
CANELO
GREATERVILLE
SONOITA
PATAGONIA
HARSHAW
Nogales
WASHINGTON CAMP
DUQUESNE
Miles
Kilometers
0 5 0 5
5 0 5 10

FIGURE 3:8-3

1

3.8.2.3 Fort Huachuca Surface Water

A majority of the ephemeral surface water features on Fort Huachuca consist of dry washes, locally known as arroyos, or continuous and discontinuous gullies. The streams are usually dry and only flow in response to significant precipitation events. Ephemeral streams on the installation are typically narrow channels with a sand and gravel layer at the bottom. Some of these channels are entrenched. The channels conduct runoff to larger drainage systems.

Local surface water is generated as storm runoff, snowmelt, and springs discharging into the stream channels of Garden and Huachuca Canyons. Other canyons located within the boundaries of Fort Huachuca yield little water except for during short periods following precipitation events. Springs provide the primary source of perennial surface water within the Fort. Potable springs are located in Garden and Huachuca Canyons.

Fort Huachuca has approximately 4.5 miles (7.2 km) of perennial streams, of which Garden Canyon has 3.5 miles (5.6 km) and Huachuca Canyon has 0.75 miles (1.2 km) of perennial stream segments. Minor lengths of perennial reaches also occur in McClure and Blacktail Canyons. Wetlands are associated with the perennial streams, springs and ponds on the installation. Inadvertent wetlands have developed in association with plugged drainage culverts. Other wetlands have developed around ponds, sewage lagoons, and erosion control impoundments

The Eastern Reservation is relatively flat with a gentle slope southwest to northeast, towards the San Pedro River. The Western Reservation slopes upwards to the north from the Huachuca Mountains. The cantonment area is relatively flat, with a slope of approximately two percent. Mountains with slopes of 50 degrees or more succeed foothills with steep slopes (up to 35 degrees rise) to the west of the cantonment area. Ephemeral streambeds flow out of the mountains and across the cantonment area towards the San Pedro River or Babocomari Creek. These beds are deeply incised from flash-flood events, with rock, gravel, sand and debris scattered throughout the channels.

3.8.2.4 Fort Huachuca Groundwater

The Huachuca Mountains consist of a faulted complex of granite, carbonate rocks, conglomerate and claystone beds. The thick limestone, dolomite and claystone beds dip 30 to 40 degrees are highly fractured and cavernous where water has dissolved carbonate along fractures and bedding planes. Groundwater generally moves downward through interconnected fractures and caverns following local topography. Large springs occur in canyons where downward flow is interrupted by impermeable rocks such as cemented sandstone, siltstone, mudstone, granite, or intrusive dikes.

Groundwater generally flows northeasterly from the east face of the Huachuca Mountains. The San Pedro Basin groundwater is recharged by infiltration through canyon stream channels where runoff collects from side slopes and alluvial fan slopes along the mountain front. Although some storm runoff recharges the groundwater basin, most of the infiltrated water is eventually lost to the transpiration of plants. Springs in the Huachuca Mountains are recharged by infiltration of water captured by fractures in the carbonate rocks.

Besides the regional aquifer, at least one local perched aquifer exists along the pediment of the Huachuca Mountains in a zone where the alluvium of the basin fill is underlain at shallow depths by bedrock. A perched aquifer is an isolated pocket of water that occurs above the regional water table. The perched aquifer extends from the area of Carr Canyon toward the Fort Huachuca Military Reservation boundary and extends northeasterly toward the San Pedro River (Harshbarger and Associates 1974).

Two cones of depression, one at the Fort Huachuca-Huachuca City well field, the other in the area of Fort Huachuca-Sierra Vista, have been created by groundwater withdrawal. Groundwater declines have lead to significant soil subsidence in other parts of the United States, however, at Fort Huachuca the geology and soils are considered relatively low risk for subsidence. From 1989 to 1999 wells at Fort Huachuca withdrew an average of 2,814 ac-ft (917 MG) of water per year from the aquifer (ENRD 2000). Water table elevations at Fort Huachuca decreased 40 to 50 ft in the period between 1940 and 1985. Groundwater levels continued to decline at a rate of 1 to 2 ft per year, primarily as a result of withdrawal rates that exceeded recharge rates until the late 1980's when water management surfaced as an issue. Since that time, annual water withdrawals from the aquifer have decreased by as much as 1300 ac-ft (423 MG) due to successful water management by the installation.

Generally, the chemical quality of the groundwater obtained by Fort Huachuca and other users in the USPB is good and is considered suitable for domestic uses. However, in several areas (St. David and Benson), fluoride and sulfate concentrations at or above drinking water standards have been noted. The chemical quality of water withdrawn from the floodplain aquifer is good and considered suitable for most uses, although there may be areas with elevated readings of fluoride and sulfate. Groundwater on the installation is treated with chlorine.

3.9 BIOLOGICAL RESOURCES

The ROI for biological resources includes Fort Huachuca and the adjacent region, but is limited to areas where ground disturbance or UAV flight activities related to the Proposed Action or alternatives could occur. This section discusses biological resources within the ROI that could potentially be affected by the Proposed Action. Additional consideration is directed to the San Pedro Riparian NCA. Information on the study area was obtained from environmental documents and reports as well as personal contact with the USFWS, Arizona Game and Fish Department (AGFD) and USFS.

3.9.1 Vegetation

Potentially affected vegetation is limited to those areas in the regional environ (Canelo Hills and Patagonia Mountains), on the installation where ground-disturbing activities occur (target placement and field training), and those areas on Fort Huachuca where proposed facility construction would occur. A discussion of the San Pedro Riparian NCA is also presented because of its close proximity to the Fort Huachuca installation, although no UAV activities are proposed on or over the NCA. May 15, 2000A copy

3.9.1.1 Canelo Hills and Patagonia Mountains

Southeastern Arizona's very diverse flora and fauna is a result of topography that varies from desert to forested mountains. The specific plant communities present in the Canelo Hills are in many ways a reflection of the communities present on Fort Huachuca, described below in Section 3.9.1.2. The two most abundant communities are the Semidesert Grasslands and the Madrean Evergreen Forest and Woodland Encinal, the last represented by oak forest and oak-grasslands. The Canelo Hills are not as high in elevation as the Huachuca Mountains and the pine and pine-oak woodlands and forests are generally lacking. However riparian areas and cienegas are more developed and widespread. Developed areas of Interior Southwestern Riparian Deciduous Forests are present in several valley bottoms within the Canelo Hills.

Virtually all the plant series and communities found in the Huachuca Mountains are present in the Patagonia Mountains, except perhaps those based on the presence of extensive limestone substrates. It is obvious that the Patagonia Mountains, at least in part, are the result of volcanic activities. Steep vertical relief characterizes sections of the mountain range and rapid changes in aspect and slope—best exemplified by Red Mountain. From lowest to highest elevation, habitats transition through riparian, semidesert grassland to oak encinal to interior chaparral, and at the top, elements from the pine-oak woodland are present, all over a short horizontal distance. Elsewhere, near-continuous stands of oak encinal and semidesert grassland are present. Sonoita Creek at the north edge of the Patagonia Mountains contains a well-developed southwestern deciduous forest with a flowing stream and associated aquatic vegetation.

The USFS requires that proposed projects within the Coronado National Forest evaluate impacts on USFS-sensitive species under the National Forest Management Act of 1976. Compliance with this act requires a separate Biological Evaluation (BE) that addresses sensitive species in the area and makes determinations of potential effect on these species from proposed activities. In April 2000, Engineering and Environmental Consultants Inc. (EEC) biologists prepared a BE for sensitive species in the Coronado National Forest and made determinations of potential UAV program effects on each applicable species.

Table 3-9.1 briefly describes the existing environment for each selected target site. All selected target sites exhibited recent evidence of human activity. This evidence includes wood cutting, off-road vehicle use, camping, staking for previous target site use, and livestock grazing. A complete description of these sites is provided in Appendix B *Biological Evaluation for UAV Field Activities at Selected Sites in the Coronado National Forest.*

Table 3.9-1. Soil and Vegetation at Coronado National Forest Target Sites

Target Site	Elevation	Acres	Soil	Vegetation
West 1	4960'	6.0	Clayey-Sand	Mesquite, Oak, Juniper
West 2	5225'	20.0	Gravel	Juniper, Oak, Grasses, Forbs
West 3	5450'	1.5	Sandy Gravel, Alluvium	Juniper, Oak, Grasses, Forbs
West 10	5250'	4.0	Clayey-Sand	Oak, Juniper, Grasses
West 11	5350'	24.0	Rocky	Oak, Juniper, Grasses
West 12	5325'	7.0	Rocky, Sandy Clay	Juniper, Oak, Grasses
West 13	5500'	0.25	Rocky	Manzanita, Oak, Juniper, Grasses, Forbs
West 14	5500'	0.25	Rocky Clay	Manzanita, Oak, Juniper, Grasses, Forbs
West 15	4575'	7.0	Rocky, Sandy Clay	Mesquite, Oak, Grasses
West 16	4500'	2.0	Sandy, Rocky	Oak, Mesquite, Grasses
West 18	5183'	6.0	Sandy, Rocky	Oak, Grasses, Yucca
West 19	5300'	7.0	Sandy, Rocky	Juniper, Oak, Grasses
West 20	5225'	10.0	Sandy	Oak, Juniper, Manzanita, Grasses
West 21	5150'	13.0	Sandy, Rocky	Juniper, Cliffrose, Grasses

3.9.1.2 Fort Huachuca

Over 10 vegetation types have been mapped on Fort Huachuca (Figure 3.9-1). The following discussion describes the vegetation found on the East, West, and South Ranges and the cantonment area (including LAAF).

East Range—Shrub-grassland plant communities dominate this range. Mesquite woodlands occur primarily in the drainages and washes. Grasslands occur in areas in the western portion of the range, and upland areas are dominated by mesquite and creosote associations. The area has been disturbed to varying degrees. The major plant community occurring on the East Range is shrublands of the Chihuahuan desert scrub type (Brown 1994). Elevations for this habitat type range from 4,000 to 4,400 ft (1,220 to 1,341 m). The desert scrub community was historically desert grassland that has been altered by severe livestock overgrazing prior to government ownership. Since 1960, when the Army fenced the East Range, the area has been improving, but bushy and non-native species have largely replaced the natural desert grassland.

The same type of dense scrub vegetation, as described above, surrounds the East Range and Hubbard Assault Airstrips. Elements from two formations come into contact in this area: the scrub-grassland and Chihuahuan desert scrub (Brown 1994). The East Range Airstrip has not been used in many years and is overgrown with Lehmann lovegrass (*Eragrostis lehmanniana*) and other introduced invasive annual grasses. These grasses are indicative of disturbance, and abundant within most vegetation associations on the East Range.

West Range—Up-slope from the basin scrub lands, between 4,400 to 5,100 ft (1,341 to 1,524 m), vegetation transitions into semi-desert grassland habitat. This is the predominate assemblage found on the lower elevations of this range. This range has a savanna-like character at lower elevations developing into true woodlands at higher elevations. Vegetation includes open grassland on the lower elevation portions in the north and east, transitioning through oak-grass savanna to oak and mixed woodlands in the south and west. Deciduous riparian vegetation is found near Antelope Pond and Blacktail, Slaughterhouse, and Huachuca Creeks. Disturbed areas include paved and unpaved roads, parking areas, a concrete helipad, power lines, a pipeline, several buildings and antenna installations, and UAV runways. Perennial streams are found at higher elevations, with maple, ash, walnut, sycamore, and cottonwood trees along the banks. At lower elevations, cottonwood, willow, and sycamore trees usually line intermittent streams.

The Demonstration Hill Airstrip is located at the interface of oak woodland and semi-desert grassland formations. Major floristic elements at the site and nearby include juniper (*Juniperus deppeana*), Arizona and Emory oaks (*Querus arizonica* and *Q. Emoryi*), agave (*Agave parryi* and *A. palmeri*), mimosa (*Mimosa dysocarpa*), desert broom (*Baccharis sarothorides*), mesquite (*Prosopsis velutina*), Opuntia engelmanii (*O. discolor* and *O. macrorhiza*), and a variety of grasses. Nearby, a small drainage contains a few riparian elements such as cottonwood (*Populus fremontii*).

The UAV Training Center and Rugge-Hamilton Runway, Pioneer Facility and Runway, and Black Tower Complex are located on the mesas of flat fingers developed from erosion of the original plain and lie within the desert grassland formation typical of most of the West Range. Evidence of the invasion of mesquite (*P. velutina*) is indicated by the presence of scattered plants, not yet dense or dominant. Other obvious floristic features of this area include agave (*A. parryi*), an occasional juniper (*J. deppeana*), desert broom (*B. sarothorides*), mimosa (M. dysocarpa), bear grass (*Nolina microcarpa*), sotol (*Dasylirion wheeleri*) and cacti (*Opuntia macrorhiza*, O. *phaeacantha*, and *O. spinostor*).

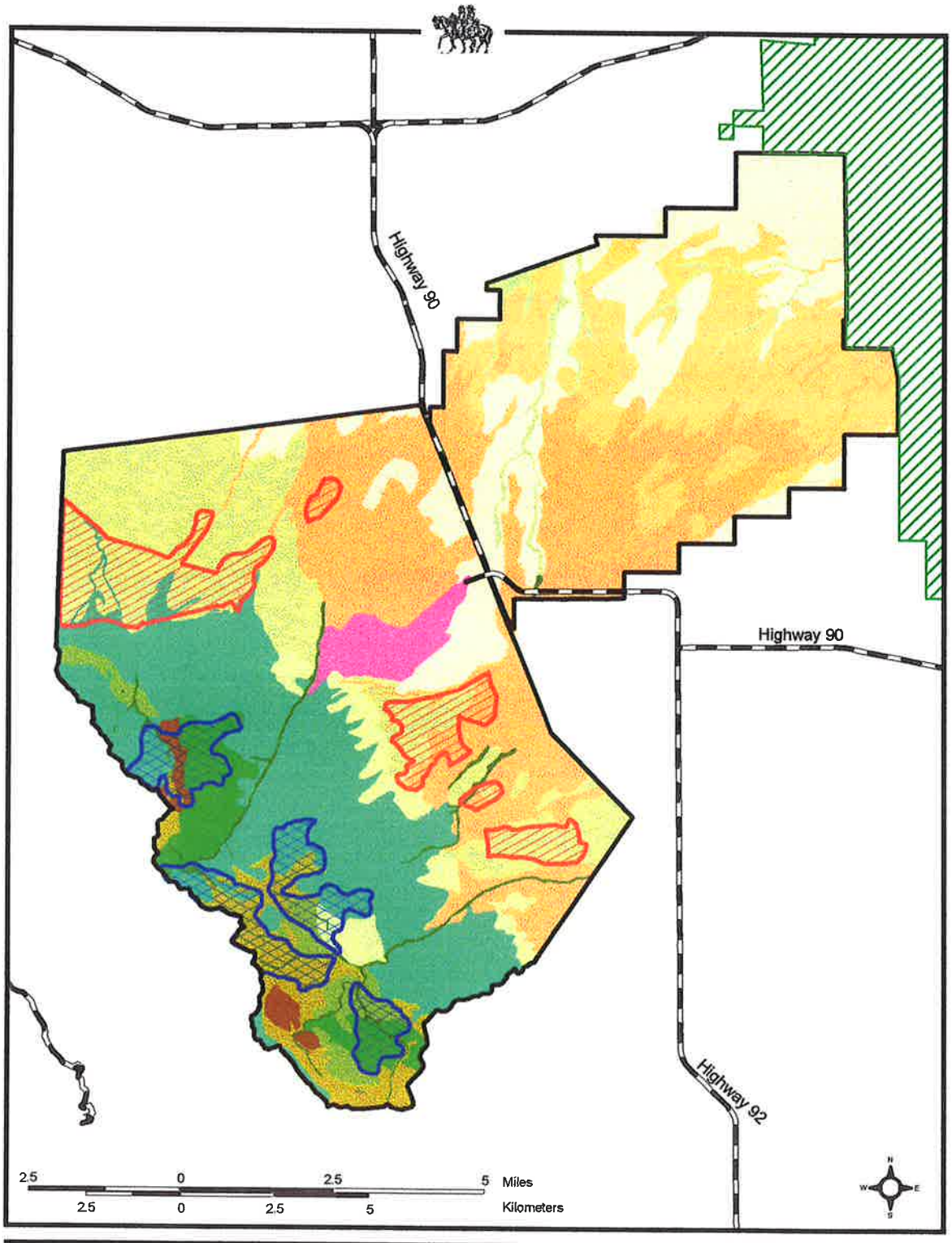

FIGURE 3.9-1

Fort Huachuca Vegetation

- Mexican Spotted Owl Protected Activity Centers
- Agave Management Areas
- Deciduous Woodland
- Mahogany Woodland
- Mesquite Woodland
- Mesquite-Grass Savanna
- Mixed Woodland
- Oak Woodland
- Oak-Grass Savanna
- Open Grassland
- Pine Woodland
- Pinyon-Juniper Woodland
- Shrub-Grassland
- Shrubland
- Urban and Built-Up Land

1

South Range—Open grasslands and mesquite-grass savanna cover 6,578 acres (2,664 ha) and occur on predominantly flat expanses and shallow drainages on the eastern portion of the South Range (Table 3.9-1). In the firing range areas, existing disturbance includes paved and unpaved roads, parking areas, towers, and firing structures in the predominately flat areas. Elevations for this habitat type, which represents the largest type occurring at Fort Huachuca, range from approximately 4,200 to 5,100 ft (1,280 to 1,554 m). An oak-grass savanna covers 1,563 acres (633 ha) and occurs from approximately 5,000 to 5,800 ft (1,524 to 1,768 m). Woodlands of various types cover 12,851 acres (5,204 ha) and occupy the western portion of the range, which has hilly and often steep terrain including several large canyons; these include oak, mahogany, and mixed woodlands and cover 6,928 ac (2,806 ha), 1,025 ac (415 ha), and 2,257 ac (914 ha) respectively (see Table 3.9-1). On limestone parent materials, mountain mahogany (*Cercocarpus spp.*) is a dominant species. Pine woodlands of the Madrean montane conifer type occur at higher elevations ranging from 6,000 to 8,600 ft (1,829 to 2,621 m).

Cantonment Area (including LAAF)—The vegetation on the cantonment area has changed from original conditions. The presence of roads, a large variety of buildings, residential housing and a variety of other structures, and landscaping with lawns and exotic plant species has replaced nearly all native plant communities. The areas of native vegetation that do remain are small and fragmented. Desert landscaping is common in administrative and common areas, with mowed lawns and grassy strips between residential buildings. Several large grassy areas are maintained. Two are parade fields. One of these, Chaffee Parade Grounds, and the golf course are watered with treated effluent. Other planted areas within the cantonment area include trees and shrubs that are maintained by the Post Forester.

3.9.1.3 San Pedro Riparian NCA

The upper San Pedro River is characterized by a relatively broad floodplain that meanders through the San Pedro River Valley. The riparian zone consists of cottonwood-willow and herbaceous associations near the river channel, with mesquite bosque on the higher terraces. Pond and marshland communities, saltceder (*Tamarix chinensis)* four-wing saltbush, (*Atriplex canescens)*, and sacaton (*Sporobolus wrightii*) associations also exist in the riparian zone of the river. The upper San Pedro River flows perennially from approximately Hereford to about four miles north of the Charleston Stream Gage. The Babocomari River, which drains portions of the Mustang, Huachuca, Whetstone Mountains, and Canelo Hills is the largest tributary, and enters the San Pedro River just south of Fairbank. O'Donnel Creek, Ramsey Canyon, and Miller Canyon are other important tributaries

3.9.2 Wildlife

The following discussion is limited to areas in the regional environment (Canelo Hills and Patagonia Mountains) and on the installation where ground-disturbing activities occur (target placement and field training) and where UAV operation might have the potential to affect wildlife. Also discussed are areas on Fort Huachuca where proposed facility construction would occur. A discussion of the San Pedro Riparian NCA is presented because of its close proximity to the Fort.

3.9.2.1 Canelo Hills and Patagonia Mountains

Southeastern Arizona has a diverse avian population, with up to 500 known species identified and well over 400 species occurring annually (Taylor 1995). In addition to the large number of bird species, two salamander species, 21 species of frogs and toads, 7 species of tortoises and turtles, 38 species of lizards, and 47 species of snakes have also been identified within southeastern Arizona

(reviewed in Davis and Russell 1995). Mammalian affinities discussed in Hoffmeister (1986) also reflect several different source areas. As many as 246 species of true butterflies and skippers have been recorded, with 200 species identified in Santa Cruz County and 214 species in Cochise County (Bailowitz and Brock 1991).

As expected, the wildlife of the Canelo Hills is reflective of the lower elevation habitats present on Fort Huachuca and elsewhere in the region. The developed riparian and cienega communities found within Canelo Hills add to this wildlife diversity. However, species associated with higher elevation plant communities can be expected to be absent or of reduced abundance. The generally low rolling nature of the Canelo Hills is in contrast to the vertical relief found in the Huachuca Mountains and Patagonia Mountains.

3.9.2.2 Fort Huachuca

The biotic diversity on Fort Huachuca is similar to habitats outside installation boundaries. More than 175 species of butterfly have been observed, collected, and positively identified in Garden and Sawmill Canyons at Fort Huachuca (Hessil, personal communication 2000). Among the butterfly species known to have very limited ranges are the Huachuca giant skipper, occurring in the Huachuca Mountains and having a dependent relationship with an agave species; and the orange-headed roadside skipper, found only in the Huachuca and Chiricahua Mountains (Williamson, personal communication 1996).

Fort Huachuca also supports a very diverse population of mammals. Large mammals found on post include Coues white-tailed deer (*Odocoileus virginianus*), desert mule deer (*O. hemionus*), pronghorn antelope (*Antilocapra americana*), collared peccary or javelina (*Dicotyles tajacu*), mountain lion (*Felis concolor*), and black bear (*Ursus americanus*). At least 14 species of bats occur on the installation, many of which are candidate species for federal listing. Despite development and other human activity, many species of wildlife are still present within the cantonment area.

Bird species commonly observed on the installation include mourning doves (*Zenaida macroura*), ruby-crowned kinglet (*Regulus calendula*), Gila woodpecker (*Melanerpes uropygialis*), turkey vulture (*Catartes aura*), and several species of quail, flycatchers, and hummingbirds. Due to the wide range of habitats available on the installation, the variety of birds includes a cross-section of upland, grassland, woodland, and wetland species too numerous to mention.

3.9.2.3 San Pedro Riparian NCA

The San Pedro watershed is home to one of the largest surviving expanses of southwestern cottonwood-willow riparian forest, serving as an important corridor for millions of migratory birds. Each year, millions of songbirds migrate from their wintering grounds in Mexico and Central America to their summer breeding habitats in Canada and northern United States. To successfully cross the desert landscapes of northern Mexico and the southwestern United States, migrating songbirds congregate and travel along a small number of north-south oriented corridors where they find food, water and shelter.

3.9.3 Federally-listed Species

The USFWS has regulatory responsibility for implementation and enforcement of the Endangered Species Act of 1973 (ESA), as amended. It classifies safeguarded species as either endangered, threatened, proposed (threatened or endangered), or candidate according to guidelines within the ESA. In October 1999, the USFWS responded to the Fort's request for consultation pursuant to section 7 of the ESA. At issue were impacts that might result from activities authorized, carried out,

or funded by the Department of the Army at and near Fort Huachuca. These activities included all ongoing military activities at Fort Huachuca, including the existing UAV testing and training program.

The USFWS found that activities proposed by the Department of the Army at and near Fort Huachuca over the next ten years (including a continuation of 1998/99-level UAV activities) were not likely to jeopardize the continued existence of the Huachuca water umbel, southwestern willow flycatcher, Mexican spotted owl, lesser long-nosed bat, or Sonora tiger salamander, and were not likely to result in adverse modification or destruction of critical habitat designated for the flycatcher or Huachuca water umbel.

The USFWS concurred with the Army that military activities at and near Fort Huachuca may affect, but were unlikely to adversely affect the spikedace, loach minnow, and Canelo Hills ladies' tresses. The Fort also received concurrence from the USFWS that military activities would have no effect on the Yaqui topminnow, Yaqui catfish, Yaqui chub, beautiful shiner, razorback sucker, Cochise pincushion cactus, bald eagle, cactus ferruginous pygmy-owl, Chiricahua leopard frog, Gila topminnow, ocelot, jaguarundi, jaguar, Mexican gray wolf, northern aplomado falcon, or desert pupfish. Since the conclusion of the consultation, Critical Habitat for the loach minnow and spikedace has recently been established in the San Pedro Riparian NCA.

Table 3.9-3 summarizes the status for federally-listed species identified by the USFWS as having the potential for occurrence at Fort Huachuca, the Canelo Hills, the Patagonia Mountains, and the San Pedro Riparian NCA. This table was developed as a basis for summarizing the potential occurrence of these species in the ROI for the Proposed Action. The ROI for federally-listed species includes Fort Huachuca and the adjacent region, but is limited to areas where ground disturbance or UAV flight activities related to the Proposed Action could occur. This table was prepared by analyzing the range, distribution, abundance, and habitat parameters for each species through a review of recovery plans, listing packages, scientific literature, and consultation with endangered species biologists. A summary of baseline data for each species that the Proposed Action could impact appears in Appendix C.

3.10 CULTURAL RESOURCES

This section presents the existing conditions that can be found in the ROI relating to cultural resources. The ROI for cultural resources is also identified as the Area of Potential Effect (APE) and includes on-post and off-post sites identified under Section 2, *Description of Proposed Action and Alternatives,* for proposed UAV program developmental training, operational testing and construction activities.

Previous cultural resource surveys for off-post sites in the Coronado National Forest were reviewed and incorporated within this EA. Because of the significant amount of baseline data for each of these sites, and the limited potential for disturbance associated with the Proposed Action and alternatives, it was concluded that additional surveys for off-post sites were not required. Available literature was also reviewed with regard to on-post sites where new construction has been proposed.

The majority of these sites have already been surveyed and the results of these surveys are included in each section as appropriate. This baseline information will be used as a point of comparison when evaluating cultural resource impacts that may be caused by the Proposed Action and alternatives discussed in this EA.

Table 3.9-3. Species of Concern at Fort Huachuca, Canelo Hills, Patagonia Mountains, and San Pedro Riparian NCA[1] (1 of 2)

Species	Federal Status	Has, Does or May Occur in		Occurrence Code				Potential to occur in areas affected by the Proposed Action [2]
		Cochise County	Santa Cruz County	FH	CH	PM	NCA	
PLANTS								
Cochise pincushion cactus (*Coryphantha robbinsorum*)	Threatened	Yes	No	2	3	3	3	No
Pima Pineapple cactus (*Coryphantha* scheeri *rogustispina*)	Endangered	No	Yes	3	3	3	3	No
Canelo Hills Ladies' tresses (*Spiranthes delitescens*)	Endangered	Yes	Yes	2	1	3	2	**Yes**
Huachuca water umbel (*Lilaeopsis schaffneriana*)	Endangered	Yes	Yes	1	1	1	1	**Yes**
Lemmon fleabane (*Erigeron lemmonii*)	Candidate	Yes	No	1	3	3	3	No
INVERTEBRATES								
Huachuca springsnail (*Pyrgulopsis thompsoni*)	Candidate	Yes	Yes	1	1	1	2	**Yes**
BIRDS								
Bald Eagle (*Haliaeetus leucocephalus*)	Threatened	Yes	Yes	1	1	1	1	**Yes**
Northern aplomado falcon (*Falco femoralis septentrionalis*)	Endangered	Yes	Yes	2	2	2	2	No
Whooping crane (*Grus americana*)	Endangered	Yes	No	3	3	3	3	No
Mountain Plover (*Charadrius montanus*)	Candidate	Yes	No	2	2	3	2	No
Mexican spotted owl (*Strix occidentalis lucida*)	Threatened	Yes	Yes	1	2	1	3	**Yes**
Cactus ferruginous pygmy-owl (*Glaucidium brasilianum cactorum*)	Endangered	Yes	Yes	3	3	3	2	No
Southwestern willow flycatcher (*Empidonax traillii extimus*)	Endangered	Yes	Yes	3	3	3	1	**Yes**
MAMMALS								
Lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*)	Endangered	Yes	Yes	1	1	1	3	**Yes**
Mexican gray wolf (*Canis lupus baileyi*)	Endangered	Yes	Yes	2	2	2	2	No
Jaguar (*Panthera onca*)	Endangered	Yes	No	2	2	2	2	No
Ocelot (*Felis pardalis*)	Endangered	Yes	Yes	3	3	3	2	No
Jaguarundi (*Felis yagouaroundi tolteca*)	Endangered	Yes	Yes	3	3	3	2	No

[1] Based on: USFWS July 15, 1999. Listed, proposed, and candidate species for Cochise County; USFWS July 15, 1999. Listed, proposed, and candidate species for Santa Cruz County; and October 27, 1999 Biological Opinion for ongoing and proposed future military activities at Fort Huachuca.

[2] A "Yes" indicates that the species has the potential to occur at location(s) used by the UAV program.

DEFINITIONS
FH=Fort Huachuca, CH=Canelo Hills, PM=Patagonia Mountains, NCA=San Pedro NCA
Federal status as defined by the USFWS under the ESA:
Proposed Threatened: species proposed for listing as threatened
Endangered:species which are in imminent jeopardy of extinction
Threatened: species which are in imminent jeopardy of becoming endangered
Candidate: species for which there is sufficient information to support a proposal for listing under the ESA

OCCURRENCE STATUS:
1: species occurs in area
2: potential habitat present but species is not known to occur
3: no potential habitat present and species is not known to occur

Table 3.9-3. Species of Concern at Fort Huachuca, Canelo Hills, Patagonia Mountains and San Pedro Riparian NCA[1] (2 of 2)

Species	Federal Status	Has, Does or May Occur in		Occurrence Code				Potential to occur in areas affected by the Proposed Action [2]
		Cochise County	Santa Cruz County	FH	CH	PM	NCA	
AMPHIBIANS AND REPTILES								
Sonora tiger salamander (*Ambystoma tigrinum stebbinsi*)	Endangered	Yes	Yes	1	1	1	3	**Yes**
Ramsey leopard frog (*Rana subaquavocalis*)	Conservation Agreement	Yes	No	1	3	3	3	**Yes**
Chiricahua leopard frog (*Rana chiricahuensi*)	Candidate	Yes	Yes	2	2	2	2	No
New Mexican ridge-nosed rattlesnake (*Crotalus willardi obscurus*)	Threatened	Yes	No	3	3	3	3	No
FISH								
Gila Chub (*Gila intermedia*)	Candidate	Yes	Yes	2	3	3	2	No
Yaqui Chub (*Gila purpurea*)	Endangered	Yes	No	3	3	3	2	No
Sonora Chub (*Gila ditaenia*)	Threatened	No	Yes	3	3	3	2	No
Yaqui catfish (*Ictalurus pricei*)	Threatened	Yes	No	3	3	3	2	No
Yaqui topminnow (*Poeciliopsis occidentalis sonoriensis*)	Endangered	Yes	No	2	3	3	2	No
Gila topminnow (*Poeciliopsis occidentalis occidentalis*)	Endangered	No	Yes	2	3	3	2	No
Beautiful shiner (*Cyprinella formosa*)	Threatened	Yes	No	3	3	3	2	No
Desert pupfish (*Cyprinodon macularius*)	Endangered	No	Yes	3	3	3	2	No
Loach minnow (*Rhinichthys cobitis*)	Threatened	No	No	3	3	3	2	No
Spikedance (*Meda fulgida*)	Threatened	No	No	3	3	3	2	No
Razorback sucker (*Xyrauchen texanum*)	Endangered	No	No	3	3	3	2	No

[1] Based on: USFWS July 15, 1999. Listed, proposed, and candidate species for Cochise County; USFWS July 15, 1999. Listed, proposed, and candidate species for Santa Cruz County; and October 27, 1999 Biological Opinion for ongoing and proposed future military activities at Fort Huachuca.

[2] A "Yes" indicates that the species has the potential to occur at location(s) used by the UAV program.

DEFINITIONS
FH=Fort Huachuca, CH=Canelo Hills, PM=Patagonia Mountains, NCA=San Pedro NCA
Federal status as defined by the USFWS under the ESA:
Proposed Threatened: species proposed for listing as threatened
Endangered:species which are in imminent jeopardy of extinction
Threatened: species which are in imminent jeopardy of becoming endangered
Candidate: species for which there is sufficient information to support a proposal for listing under the ESA

OCCURRENCE STATUS:
1: species occurs in area
2: potential habitat present but species is not known to occur
3: no potential habitat present and species is not known to occur

NEPA requires consideration of "important historic, cultural, and natural aspects of our national heritage" but provides no specific definition of these "aspects." Based on statutory requirements, cultural resources for NEPA analyses are considered to include the following:

- Historic properties, as defined in the National Historic Preservation Act (NHPA).
- Sacred sites, as defined in Executive Order 13007, to which access is provided under the American Indian Religious Freedom Act (AIRFA).

- Cultural items, as defined in the Native American Graves Protection and Repatriation Act (NAGPRA).
- Archeological resources, as defined in the Archeological Resources Protection Act (ARPA).
- Historic and prehistoric resources, as defined by the Antiquities Act.
- Sites that are scientifically significant, as defined by the Archeological and Historic Data Preservation Act (AHPA).
- Collections, as defined in 36 CFR Part 79, Curation of Federally-Owned and Administered Collections.

3.10.1 Regional

The Fort Huachuca area holds a prominent position in the cultural history of the southwestern United States. Cultural resources within the USPB, and specifically the Hereford to Benson area, encompass sites spanning approximately 12,000 years, from the Paleoindian Period to the present. In addition to the prehistoric and protohistoric cultures listed for the Middle San Pedro Valley, Fort Huachuca holds special historic significance for the Apache, Apache Scouts, and African American "buffalo soldiers." Many cultural sites at Fort Huachuca have high scientific value and provide excellent opportunities for public education and interpretation.

3.10.1.1 Coronado National Forest

The Sierra Vista Ranger District archeologist previously completed an archeological assessment of all 26 UAV target sites (Cultural Resources Report #1991-05-09). No cultural resources were found. A copy of the report is included as Appendix D. The USFS has approval authority for uses of Natural Forest lands for UAV program activities. The Forest Supervisor of the Coronado National Forest concurred with previous findings of no impact and signed a letter of approval on February 5, 1991. A copy of the letter is also included in Appendix D. In addition, Gutierrez-Palmenberg, Inc. conducted an EA and archaeological survey under contract with TEXCOM for the Coronado National Forest sites. Again, no significant archaeological findings were identified for the 21 target locations.

3.10.1.2 Off-Post ASA Sites

All off-post ASA sites have been surveyed for the presence of protected archaeological or historical artifacts under the direction of the Post Archeologist, prior to establishment of the site as a potential training/staging area. Previous correspondence with the State Historic Preservation Office (SHPO) has documented a long-history of cultural resource regulatory compliance for the use of off-post ASA sites and staging areas. This existing documentation is available for review at the Fort Huachuca ENRD.

3.10.2 Fort Huachuca

Prehistoric archaeological sites on Fort Huachuca tend to be associated with the larger drainages in the northern and eastern portions of the installation. Historic sites tend to be clustered within the developed area of the cantonment area or associated with old ranching homesteads on the East Reservation. Three hundred and twenty-one recorded cultural sites are located within the installation boundaries (Statistical Research 1995).

As of 1999, approximately 45,290 acres (18,342 ha) or 65 percent of the installation had been surveyed for archaeological sites. The unsurveyed land (Figure 3.10-1) is mostly within the canyons and slopes of the Huachuca Mountains or on the East Reservation.

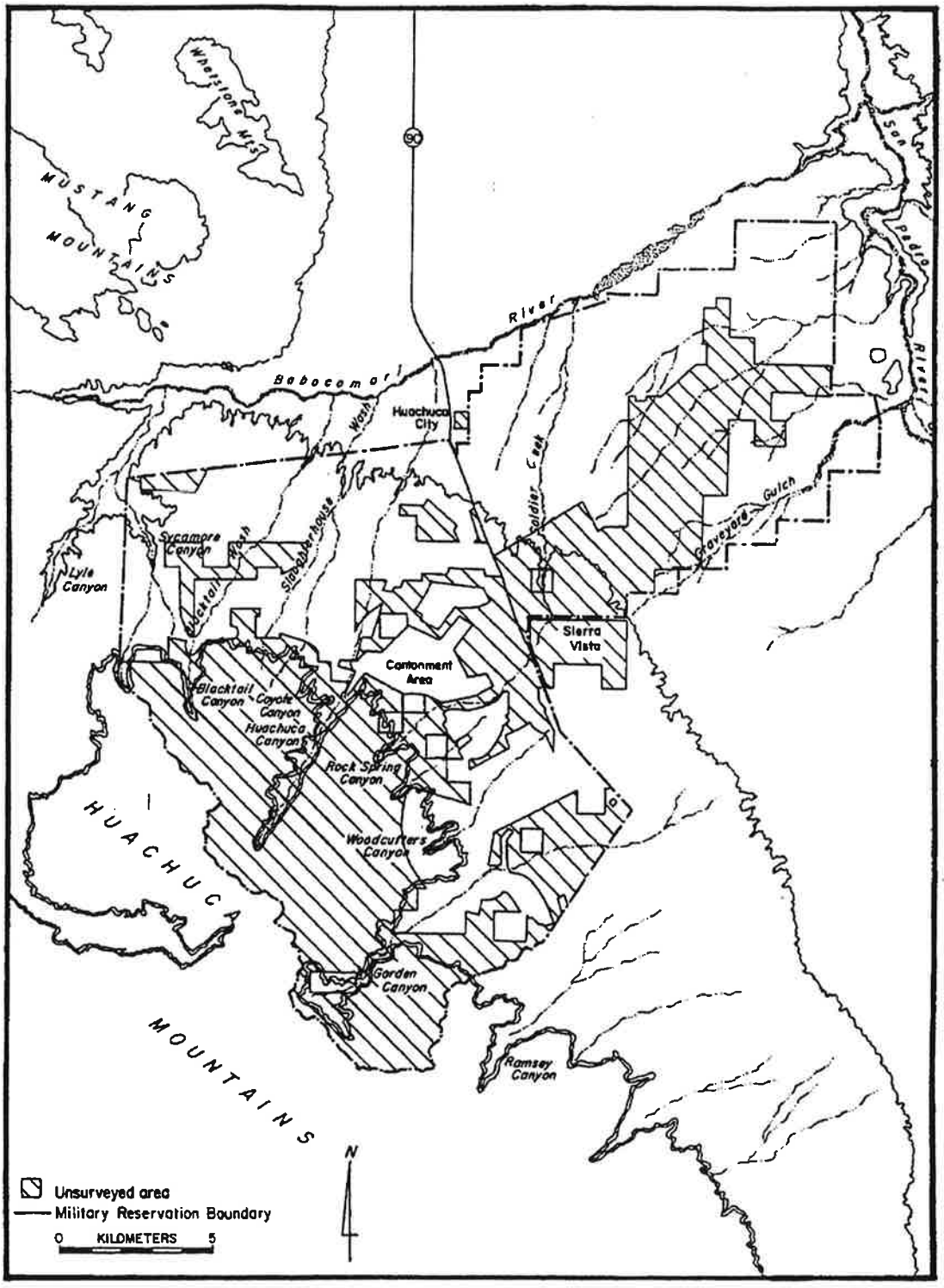

Figure 3.10-1. Unsurveyed Areas of Fort Huachuca (Statistical Research 1995)

Three prehistoric sites in Garden Canyon and the Old Post area of the cantonment are currently listed in the National Register of Historic Places. Of the remaining archaeological sites identified, 7 have been evaluated as eligible for listing on the National Register, 227 are classified as potentially eligible for listing, 29 have been deemed ineligible for listing, and the significance of 75 sites has not been determined as of yet (Nakata 1997b). Numerous other sites at Fort Huachuca, both prehistoric and historic, are considered "eligible" or "potentially eligible" for listing in the National Register (Statistical Research Inc. 1995). Evaluation and listing of sites will be a long-term effort, given the large number of sites and limited resources. However, cultural resource sites on Fort Huachuca are generally better protected and in better condition than nearby sites off the installation.

The Old Post historic district of Fort Huachuca's cantonment area was placed on the NRHP in 1974, listed as a National Historic Landmark (NHL) in 1976, and revised in 1997. Twenty-six primary buildings dating from 1880 to 1920 were listed within the original NHL boundaries, and 48 within the revised 1997 boundaries.

3.10.3 Protection and Monitoring of Sites

As an active military facility, a large number of operational activities (training, maneuver, equipment testing, live fire, and facilities management) can potentially disturb cultural resources. Because most of the installation is also open to public recreational use, the general public also presents some potential for alteration of sites. In addition, natural events such as flooding, silt deposition, erosion, and wildfire can also damage cultural resources. Finally, particularly with respect to the pictograph sites and historic buildings, ongoing weathering and gradual deterioration must be addressed.

Fort Huachuca has implemented a number of activities and programs to help protect artifacts. The first level of protection includes specific physical measures focused on major impacts (erosion control structures at the Garden Canyon Village Site, fencing to restrict access to the pictograph sites, fire suppression systems in vulnerable historic structures). The second level of protection involves operational and procedural changes designed to prevent alteration of sites (personnel training; designating sites near maneuver or bivouac areas as "chemically contaminated zones" or "minefields" during field exercises; and prohibition of civilian off-road vehicle use away from established roads).

The third level of protection involves site monitoring, which is conducted by the Post Archaeologist and volunteers. Site monitoring ranges from almost daily at the most visible and vulnerable sites to a small annual sampling of minor, relatively inaccessible sites.

The fourth level of protection, applied to any construction or redevelopment project, requires a pre-construction surface survey of the construction site and ongoing monitoring of the project once underway. All contractors are required to immediately cease activity and call in the Post Archaeologist if any evidence of a cultural site is uncovered during construction.

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4.0 ENVIRONMENTAL CONSEQUENCES

This section describes the potential environmental consequences associated with the Proposed Action and Alternatives A through D (fully described in Section 2, *Description of Proposed Action and Alternatives*). In order to determine whether an impact is considered significant as it relates to NEPA, the following assessment considers both the context and intensity of impact.

The context of an impact relates to the setting in which the impact takes place. For example, an increase in traffic on a local roadway connecting two buildings would likely impact traffic just in the local area, and the context of the impact would be the local street system. On the other hand, closure of an interstate highway could have impacts on local, regional, and even national circulation. In this case, the context of impacts would need to be assessed on a local, regional, and national level. Context also takes into account the existing conditions of a resource.

The intensity of an impact is related to the magnitude of the change over the existing conditions. Based on the above example, increasing traffic on a local roadway by five trucks a day may be a very low-intensity impact if current trips average 500 trucks per day, but would be a high intensity impact if current trips average one truck per day.

Consistent with the discussion of the affected environment, this section has been organized by resource area to provide a comparative framework for evaluating the impacts of the Proposed Action and alternatives on the individual resources. Each resource section states the criteria used to determine whether an impact is considered significant.

4.1 LAND USE

Potential land use impacts were projected based on compatibility of land uses associated with the Proposed Action and alternatives with adjacent land uses and zoning, and consistency with general plans and other applicable land use plans and regulations. A determination of significant impact on land use could result if either of the following criteria were met:

- The action is incompatible with surrounding land use.
- Activities take place on or adjacent to non-military lands, and are inconsistent or in conflict with the applicable environmental goals, objectives, or guidelines of a community, county general plan, or other applicable federal or state agency land use plan for the area affected.

4.1.1 Proposed Action

Three activities associated with the Proposed Action have the potential to affect land use in the ROI: increased frequency of UAV flight operations, target placement and field activities associated with testing and training, and construction activities associated with the improvement of UAV program facilities on Fort Huachuca.

Increased Frequency of UAV Flight Operations

The estimated 30 percent increase in annual UAV operation training, including night time activities both at on-post UAV facilities and off-post within special use restricted airspace, will not create any land use conflicts and will be compatible with on-site and underlying land uses. Noises generated during UAV activities will not change or affect any existing or planned land uses and will not conflict with any land use planning guidelines. On-post facilities that will be used are designed and developed for these activities with awareness to compatibility with the surrounding land uses. These

areas of the installation have a long history of UAV program use, and have already been designated for further such use (Nakata 1997b), Off-post areas that would be exposed to UAV overflights are predominantly unpopulated, with the exception of small towns and scattered houses between Elgin and Patagonia to the west.

The impact of noise on public health and human safety is described in Section 4.3, below, and not addressed here. However, because of the relatively low noise levels and frequency of overflights, their impact will not create any adverse land use conflicts or contribute to any degradation of existing land use value. There will be no significant impacts to land use within the ROI due to proposed increases in the frequency of UAV flight operations at existing aviation-related facilities on Fort Huachuca and off-post areas within local restricted-use airspace.

Target Placement and Field Activities

The placement of UAV targets and other ground activities in support of testing or training will occur at existing ASA sites and surveyed areas within Cochise and Santa Cruz counties (including the Coronado National Forest) as well as on the installation. The use of existing ASA sites and surveyed areas that are adjacent to established roadways within Cochise and Santa Cruz counties will have no adverse impact to the use of such roadways. Most lands associated with off-post ASA sites and surveyed areas, are leased by, or permitted to, the Army for uses such as the UAV program.

The use of ASA sites and surveyed areas within the Coronado National Forest was evaluated by the USFS in 1994. Similar to the findings of the 1994 USFS Decision Memorandum (USFS 1994), it is anticipated that UAV program activities at these sites will have no impact on, or conflict with, existing or planned land use capabilities of Forest Service lands. The proposed use of public lands are in accordance with the multi-use objectives of the most recent Forest Management Plan for the Sierra Vista Ranger District (USFS 1999).

Land uses on public lands will not be affected, changed, or precluded as a result of the Proposed Action. No farmlands, parks, parklands, recreational areas (specifically designated as such), or scenic or aesthetic areas are located on selected off-post target sites.

All land uses associated with the placement of targets and use of ASA sites under the Proposed Action, both on and off the installation, are consistent with surrounding land uses and are within the scope of applicable land use controls, and none of the thresholds of significance are exceeded. Therefore, no significant impacts to land use will occur within the ROI as a result of conducting these activities.

Construction Activities

Most of the proposed facility improvements and new construction activities will occur at locations at or adjacent to existing UAV program facilities (i.e. Black Tower Complex, UAV Training Center and Rugge-Hamilton Runway, and Pioneer Training Facility and Runway). These activities will not result in any new or conflicting land use at these locations. The facilities are already within an area designated for aviation and UAV program activity, and new construction within these areas will concentrate similar land uses across the installation, as is called for in the Real Property Master Plan (Nakata 1997b)

Proposed construction activities outside the existing UAV facilities include Demonstration Hill Airstrip (paving), LAAF (construction of a new antenna tower and two maintenance buildings), East Range training areas (construction of Urban Landscape Training Facility and East Range Test

and Evaluation Facility), and East Range Airstrip (grading). None of these new land uses, however, will conflict with any existing or planned land use at or adjacent to the site.

The only location not entirely isolated from off-post influences where construction is proposed is on the East Range Airstrip. This existing grass airstrip is located approximately 0.25 miles (0.4 km) from the Fort's southern boundary. However, the proposed grading activities at the airstrip will not cause a change in land use character or conditions along the installation boundary, and will not conflict with any existing or planned land use at or adjacent to the site.

The construction of facilities associated with the Proposed Action is compatible with the surrounding land uses, both on- and off-post. Since the thresholds of significance defined at the beginning of this section will not be exceeded during or after the proposed construction, no significant impacts are anticipated.

4.1.1.1 Mitigation Measures for Land Use

Mitigation measures are currently practiced during UAV activities. While no significant impacts to land use are anticipated, these measures will continue to be employed to help lessen overall impacts. To reduce conflicts between the military and public forest users, forest target sites will be publicly signed "Caution – Military Maneuvers" before and during test use.

Portable toilets may be used at target sites. Toilets would be removed upon completion of each test. Any garbage and litter will be collected and removed from the sites after each use.

4.1.2 Alternative A – Full Facilities Plus Navy

Alternative A has the same activities and potential to affect land use within the ROI as described above under the Proposed Action. Under the Proposed Action, it is projected that the existing U.S. Navy Pioneer UAV program would relocate to Pensacola Florida in FY01, and an Army UAV program element would assume the use of the existing Pioneer Training Facility and Runway.

The continued presence of the U.S. Navy Pioneer program at Fort Huachuca under this alternative will have no separate impact on land use on the installation and will not contribute to any new or changed land use on or off the installation. Therefore, similar to the Proposed Action as described in Section 4.1.1, Alternative A will have no significant impact on land use within the ROI.

4.1.3 Alternative B – Enhanced Facilities

Under Alternative B, Fort Huachuca will continue with the exact same use of existing facilities, UAV operations, support services, and number of personnel requirements as the Proposed Action. This alternative is identical to the Proposed Action but there will be a reduced level of facility construction. Specifically the following construction activities will not occur:

- New runway at the UAV Training Center and Rugge-Hamilton Runway.
- Renovation of the East Range Airstrip.
- Paving of Demonstration Hill Airstrip.

Reduced levels of construction will result in a decreased potential for adverse impact, as compared to the Proposed Action. As with the Proposed Action, Alternative B will not result in any significant adverse impacts on land use within the ROI.

4.1.4 Alternative C – Existing Facilities

Under Alternative C, the Fort will increase UAV operations and ancillary services as described in the Proposed Action while using the same existing facilities. No new facilities or upgrades to existing facilities will occur. Alternative C will have no significant impact on existing or planned land uses in the ROI since there will be no changes in or modifications to existing land use.

4.1.5 Alternative D – No Action

Under the No-Action Alternative, there will be no change to the existing land use (on or off the installation) and no construction would occur. Since there are currently no significant conflicting land uses, and no changes in land use would occur, the thresholds of significance would not be exceeded. Therefore, implementation of Alternative D will have no significant impact on land use within the ROI.

4.2 AIR QUALITY

Impacts on air quality can be divided into both short-term and long-term. Short-term impacts are usually associated with construction and grading activities, and long-term impacts are typically associated with build-out conditions. Most long-term emissions would be due to increased vehicle use. Reactive organic gas (ROG) emissions are associated with storing and dispensing fuel used in the operation of project-related training activities and heavy vehicle transportation. A determination of significant impact on air quality could result if either of the following criteria were met:

- Activities would release criteria pollutants that would exceed the federal primary and secondary standards for pollutant species adopted by the State of Arizona.
- Activities are not in conformity with Section 176 of the Federal Clean Air Act for federal actions.

On November 1993, the EPA published the general conformity Final Rule in the Federal Register (58 FR 63214). The purpose of the rule, titled "Determining Conformity of General Federal Actions to State or Federal Implementation Plans" is to ensure that all federal actions conform to the SIP applicable to the project site. The applicable regulations are cited in 40 CFR 6, 51 Subpart W, and 93. A "federal action" is defined as any activity engaged in by a federal agency, department, or other entity licensed, permitted, funded, or otherwise supported by a federal entity. "Conformity to SIP" is defined as conformity to a SIP's purpose of eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of such standards.

As a result of the general conformity rule, federal actions must be evaluated to assess whether emissions associated with the action will interfere with an area's air quality improvement plan. The general conformity rule applies only to federal actions that may emit a criteria pollutant for which an area has been designated as non-attainment or maintenance. While there are areas within Cochise County that are in non-attainment for PM_{10} (near Douglas), emissions from Fort Huachuca do not contribute to the non-attainment of the area (ENRD 1999). Since the area within which activities will occur is an attainment area, the activities associated with the Proposed Action or any of the alternatives will not result in a violation of the general conformity rule. The procedural requirements of the General Conformity Rule are not applicable to the Proposed Action because it occurs entirely within a NAAQS attainment area.

4.2.1 Proposed Action

Four activities within the Proposed Action have the potential to affect air quality in the ROI: increased frequency of UAV flight operations; use of motor vehicles and portable generators during

target placement activities associated with testing and training; increased motor vehicle use resulting from additional testing and training personnel at Fort Huachuca; and construction activities associated with the improvement of UAV program facilities on Fort Huachuca.

Increased Frequency of UAV Flight Operations

Under the Proposed Action, the annual number of UAV flights will increase by approximately 30 percent. Unlike larger aircraft, the small engines on UAVs emit a reduced quantity of pollutants. Similar to larger aircraft, however, the majority of the pollution emissions occur during ground activities, take off, and landing. Pollutants emitted at altitude by flying aircraft are diluted and dispersed prior to reaching the ground and are well below significant levels (ENRD 1999). Even with proposed increases in UAV activity, the amount of pollution emitted by these aircraft will not cause the ambient air quality to exceed the federal or state standards for air quality nor will they result in a violation of standards or requirements established in the SIP. Therefore, due to short flight duration and the small size of UAV engines, the increase in flights associated with the Proposed Action will not result in a significant impact on air quality.

The launching of UAVs using RATO would only occur within the Fort's boundaries. The RATO emits a cloud of gas when launched. However, studies have indicated that the RATO exhaust is non-toxic, and is quickly dispersed (USAIC 1993). Given the low number of anticipated RATO launches, there would be no significant impact on air quality as a result of this emission source.

Target Placement and Field Activities

The use of motor vehicles associated with target setting and the use of portable generators will result in temporary and occasional fossil fuel emissions. Likewise, vehicular traffic on dirt roads during testing and training will result in temporary and occasional increased emissions of total suspended particulates (TSP). The ambient level of TSPs and fossil fuel-related pollutants is well below all federal and state standards for attainment and the nominal contribution of pollutants as a result of these activities will not result exceed any standards. Therefore, no significant impacts associated with the Proposed Action will occur to air quality within the ROI due to use of motor vehicles and portable generators during target placement and field activities

Motor Vehicle Use

Under the Proposed Action, UAV personnel (students, instructors, and support staff) will be stationed at the Fort. Full-time support and civilian positions will commute to and from the Fort Monday through Friday and on some weekends. Students will have less annual travel than full-time personnel will because many will live on the installation and will not have to commute to and from school. Total emission (0.6 tons of PM_{10} per year and 262 pounds of ROG per year) from these activities will not exceed federal or state air quality standards for any criteria pollutant, and subsequently, the thresholds of significance will not be exceeded. Therefore, this component of the Proposed Action will not result in any significant impacts to air quality within the ROI.

Construction Activities

Proposed construction activities will be a minor source of PM_{10} and ROG emissions. The quantity of dust emissions from this activity is estimated using the procedure "E = 1.2 tons/acre/month of activity." as presented in EPA Guidance Document AP-42. It is estimated that proposed construction activity will disturb approximately 40 acres (16 ha). Based on this level of activity, the contribution of temporary dust emissions to the local ambient air would be less than 8 tons per year over a period of seven years. This level of emission would not cause the Fort to exceed federal or state air quality standards, and therefore, would not be significant. Regardless, the use of dust

control measures (wet suppression, paving, or chemical stabilization) during construction is a simple measure that will significantly reduce these dust emissions.

In addition to dust, emissions of other criteria pollutants, such as ROG, from construction equipment were also estimated using emission factors for fugitive sources. The total emission from these activities (0.08 tons/yr. of PM_{10} and 0.003 tons/yr. of ROG) will not exceed federal or state air quality standards for any criteria pollutant. Therefore, there will be no significant impacts to air quality within the ROI due to construction activities associated with the Proposed Action.

4.2.1.1 Mitigation Measures for Air Quality

No significant impacts on air quality would occur as a result of the activities included in the Proposed Action, and no mitigation measures are required.

4.2.2 Alternative A – Full Facilities Plus Navy

Alternative A includes the same activities and therefore has the same potential to affect air quality within the ROI as the Proposed Action described above. The continued presence of the U.S. Navy Pioneer program at Fort Huachuca under this alternative will have no separate impact (not already accounted for in the Fort's air emission estimates) on air quality, and will not contribute to any new major air pollution source on the installation. Construction activities will result in less than 8 tons of particulates per year over a seven-year period. These levels of emissions will not exceed the standards defining the thresholds of significance. Therefore, implementation of Alternative A will have no significant impact on the air quality within the ROI.

4.2.3 Alternative B – Enhanced Facilities

Alternative B is identical to the Proposed Action with the exception of a reduced level of construction activity. The reduced level of construction activities under this alternative will create even less of an adverse impact on air quality within the ROI and result in less than 8 tons of particulates per year. No federal or state standards would be exceeded, and likewise, no thresholds of significance will be surpassed. Therefore, similar to the Proposed Action, implementation of Alternative B will have no significant impact on air quality within the ROI.

4.2.4 Alternative C – Existing Facilities

Under Alternative C, Fort Huachuca will continue to use the same existing UAV facilities to support both the existing and proposed UAV programs. As there will be no new facility construction under this alternative, no construction-related emissions will be released. The pollutants released will be considerably lower than the Proposed Action, which are below the thresholds of significance. Therefore, similar to the Proposed Action, implementation of Alternative C there will have no significant impact on air quality within the ROI.

4.2.5 Alternative D – No Action

Under the No-Action Alternative, which maintains the status quo, there will be no change in the Fort's air quality or that of the region as a result of the UAV program. The existing UAV activities would continue, but the exhaust generated by UAVs is nominal. The existing air quality is within the standards set by the federal and states regulations, and therefore does not exceed the thresholds of significance established at the beginning of this section. No significant impacts on air quality in the ROI will occur as a result of the No-Action Alternative.

4.3 NOISE

Criteria for the assessment of noise impacts are based on established Land Use Compatibility Guidelines established by the FICUN 1980, *Guidelines for Considering Noise in Land Use Planning and Control* and the Federal Interagency Committee on Noise 1992: *Federal Agency Review of Selected Airport Noise Analysis Issues* (Figure 4.3-1). The signatories of these sources of criteria include DOD, Department of Housing and Urban Development (HUD), EPA, FAA, and Veterans Administration. These agencies are in substantial agreement concerning the levels and characteristics of noise from different sources on a wide variety of human activity and land use.

The effects of noise can be divided into short-term and long-term impacts. Short-term impacts are usually associated with construction and grading activities, where long-term impacts are associated with testing and training activities. The majority of the long-term noise level increases will be attributable to increased vehicle use (ground and aviation) in the ROI. Increased noise due to project implementation was quantified in accordance with supporting literature. A determination of significant noise impact on the human environment could result if one or more of the following criteria were met:

- Activities (more than one per week) result in frequent noises at very high levels (e.g., blasts with C-weighted sound exposure levels in excess of 110 dB) in areas not already designated and covered under previous environmental regulatory documentation for such noise events.
- Activity-generated noise emissions expose offsite receptors to long-term noise levels in excess of the 65 dBA as specified in AR 200-1.

4.3.1 Proposed Action

Four activities within the Proposed Action have the potential to increase noise conditions within the ROI: increased frequency of UAV flight operations; use of RATO during UAV operations on Fort Huachuca; use of generators during field exercises; and construction activities associated with the improvement of UAV program facilities on Fort Huachuca.

Increased Frequency of UAV Flight Operations

The Proposed Action will result in increased noise levels at and around facilities where UAV activities occur due to aircraft generated noise, support equipment, and increased traffic to and from training and testing locations.

In general, the operating noise levels from UAVs are relatively low due to of the size of their engines. Once medium UAVs and large UAVs reach operational altitudes, they are difficult to hear from the ground; while small UAVs are often more audible due to their low flight altitudes, stealth is the overall goal of these aircraft and every effort is taken to minimize the noise they emit.

A noise survey was conducted on September 18, 1998 by the U.S. Navy to determine the noise levels generated by UAVs during flight operations. Noise readings were taken at various altitudes. Noise levels were measured using dBA, which gives a bias to the human hearing range. The background noise registered at about 52 dBA. These values are provided in Table 4.3-1. While the noise levels are noticeable, they are not significant in terms of human health and safety.

Three UAV runways (Rugge-Hamilton, Pioneer and Hubbard) are a considerable distance away from the cantonment area of Fort Huachuca and other heavily populated areas. Flying the aircraft over sparsely populated areas reduces the number of people exposed to any level of noise the UAV may generate. Despite the quiet nature of these vehicles, the lack of ambient noise over the more

remote communities in the vicinity, such as Patagonia, Sonoita, and Elgin, makes the sound of UAVs more noticeable. While the perceived noise may prove to be an annoyance, the impact is not significant in terms of human health and safety due to the level of the noise and the brief duration of exposure.

One UAV runway (the East Range Airstrip) is approximately one-quarter mile from the Fort Huachuca-Sierra Vista boundary. The land use on the Sierra Vista side of the border is primarily residential. Potential impacts due to noise to this community have been reduced below levels of significance using mitigation measures. Special approach and departure profiles are used to ensure that UAV flights do not enter the residential areas.

Table 4.3-1. Estimated Noise Levels of Medium UAV Aircraft

Altitude (ft. above MSL)	Noise Level (dBA)	Comments
>9000	57	All times
8500	64	Max during banking and climbing
8000	65	Max during banking and climbing
7500	67	Max during banking and climbing

U.S. Navy Noise Survey, September 1998.

Use of RATO During UAV Operations

When UAVs are launched using RATO, the rocket fires for approximately 2.2 seconds before dropping off the aircraft and falling roughly 200 ft (61 m) to the ground. Within the human range of hearing (approximately 10-20 kHz at the higher end), the RATO creates noise between 88.3 dB and 92.9 dB at 226 ft (69 m) (Howell 1992). RATO launches would only occur at Pioneer, Rugge-Hamilton, Hubbard, and LAAF runways, all of which are removed from any population centers or noise sensitive uses. People present at the launches will be involved in the activity and the noises generated therein and will take appropriate measures to protect themselves against the noise.

Due to the expense involved in using RATO, it is anticipated that only four to ten RATO flights will occur annually at Fort Huachuca The noise generated from these periodic RATO launches will not result in significant impacts on the Fort's human population or surrounding communities. Since the noise levels generated by the RATO are customary for the airstrips at which they will occur, the related noise levels will not exceed the thresholds of significance. Therefore no significant impacts would occur. Potential effects on wildlife are considered in Section 4.9 of this EA.

Use of Generators During Field Exercises

Generators used during field training and testing may emit noise that can fall within the "loud" to "very loud" range (see Figure 3.3-1). Training and test personnel will be provided ear protection to prevent hearing loss. As these particular training and testing activities are conducted away from noise sensitive areas, the noise generated will not adversely affect the general public or exceed the thresholds of significance. There will be no significant noise impacts as a result of using generators during training and testing events. Potential effects on wildlife are considered in Section 4.9.

Construction Activities

Noise from the temporary operation of construction equipment can reach levels of 85 to 90 dBA measured from a distance of 50 ft (15 m) (USEPA 1971). Table 4.3-2 presents the anticipated noise from this construction at varying distances.

Table 4.3-2. Anticipated Noise Levels of Construction Heavy Equipment at Varying Distances

Noise Level (dBA)	Distance from Construction Site (In feet)
90	50
84	100
78	200
72	400
66	800
65	890
60	1,600

Based on an attenuation of 6 dBA per doubling of the distance for point source noise emissions

Short-term potential impacts may occur along trenching routes for any required utility trench if construction is performed near any sensitive receptors. Typically, a distance of 890 feet will be necessary to reduce construction noise to a normally acceptable level of 65 dBA (ENRD 1992). There are no sensitive human receptors within 890 ft (271 m) of any proposed construction location.

After the completion of the new facilities, traffic may increase slightly along access roads. However, the number of vehicles will be small and will not raise ambient noise to or above significant levels. Therefore there will be no significant impact to the human environment due to construction-related noise associated with the Proposed Action. Potential effects on wildlife are considered in Section 4.9.

4.3.1.1 Mitigation Measures for Noise

Increased Frequency of UAV Flight Operations

Special approach and departure profiles will be applied to UAV activities at the East Range Airstrip. These profiles will direct UAVs away from residential areas during approach, take-off, and ascent. All flight activities will operate to the north of the airstrip.

Use of RATO During UAV Operations

The use of RATO is only permitted at Pioneer Runway, Rugge-Hamilton Runway, Hubbard Assault Airstrip and LAAF.

4.3.2 Alternative A – Full Facilities Plus Navy

Alternative A has the same activities and potential to result in noise impacts on the human environment as described above under the Proposed Action. The continued presence of the U.S. Navy Pioneer program at Fort Huachuca under this alternative will have no separate impact on the generation of noise on the installation (not already accounted for in the Fort's ICUZ and ENMP). Therefore, implementation of Alternative A will have no significant noise impact on the human environment for the reasons stated in the Proposed Action discussion.

4.3.3 Alternative B – Enhanced Facilities

Alternative B is identical to the Proposed Action with the exception of a reduced level of construction activity. The reduced level of construction activity under this alternative will create even less of a noise impact. within the ROI. Therefore, similar to the Proposed Action, implementation of Alternative B will have no significant noise impact to the human environment.

4.3.4 Alternative C – Existing Facilities

Under Alternative C, Fort Huachuca will continue to use the same existing facilities to support both the existing and proposed UAV programs. Noise impacts from increased UAV program activities and UAV operations will be identical to the Proposed Action. There would be no construction noise generated under this alternative. Since none of the operational and testing activities was found to generate noises sufficient to trigger the thresholds of significance, implementation of Alternative C will have no significant noise impact to the human environment.

4.3.5 Alternative D – No Action

Under the No Action Alternative, which maintains the status quo, there will be no change in noise conditions at Fort Huachuca or the surrounding area. Therefore, under this alternative there will be no significant noise impact on the human environment.

4.4 SOCIOECONOMIC ENVIRONMENT

Although the federal government uses a number of economic models to address different economic issues, the Army has developed the Economic Impact Forecast System (EIFS): a series of models, on-line databases, and other tools specifically designed to address regional economic effects and to measure the significance of these effects. Many academic and professional economists and regional scientists assisted in the development of this system. As a result of its designed applicability, and in the interest of uniformity, the EIFS is recommended for use in Army NEPA analyses. The EIFS algorithms are simple and easy to understand and have a firm, defensible basis in regional economic theory.

Economic impacts to the region are predicted through the application of a set of standard models developed by CERL and designed to provide data relative to socioeconomic impacts of mission changes, operations, construction activity, and training activities.

Potential environmental justice impacts are also assessed to determine whether the Proposed Action or alternatives will result in disproportionately high adverse human or environmental effects to minority or low income populations (Executive Order 12898, Environmental Justice, 59 Federal Register 7629 [1994]).

A determination of significant impact on local or regional socioeconomic conditions could result if the alternative was found to induce substantial growth or decline in local or regional population either through provision of employment or permanent housing.

4.4.1 Proposed Action

The number of full time equivalent (FTE) positions for UAV student throughput in FY00 was projected to be 531 positions (USAIC 1993). This figure includes the US Navy Pioneer program. Under the Proposed Action, which includes the departure of the US Navy Pioneer program, projected student throughput (in FTE positions) for FY01 (the inception of the Action) are projected

to be approximately 161. The proposed changes in the UAV program would, in effect, result in a decrease of approximately 370 FTE positions authorized at the Fort in FY01. CERL multipliers of 3.71 for Arizona and 1.684 (taken from DRM 1999) for Cochise County were used and the estimated impact to the State and County are approximately 1,372 and 620 respectively. The loss will vary as the student population changes. The effects of this change in workforce at the Fort will not be significant in a local or regional context. There will be no significant socioeconomic impact to Fort Huachuca or the surrounding communities as a result of the Proposed Action.

All components of socioeconomics evaluated will only change nominally, and none of the actions associated with the Proposed Action will affect any particular population significantly. No single group or population will be disproportionately adversely affected by any of these changes. Therefore, no significant impact in the area of environmental justice is anticipated.

4.4.2 Alternative A – Full Facilities Plus Navy

Alternative A includes 161 FTE positions associated with the Proposed Action in FY01 plus the FTEs associated with the US Navy's Pioneer program. The total level of student throughput (in FTE positions) that will be trained at the Fort under Alternative A for FY01 is approximately 261. This is a decrease from previous projections for FY00 by approximately 270. When the CERL economic multiplier of 3.71 for the State of Arizona is applied to the loss of 270 FTE positions, it is indicated that Alternative A would result in a an equivalent of 1001 jobs in the State that would not be filled. Likewise, when the Cochise County multiplier of 1.684 is applied, approximately 623 job equivalents within the County may not be filled. While this is a slight decrease in the existing workforce, the change will be nominal (less than 1 percent). In a similar fashion, the effects on the economic activity and housing markets in the area will be very slight. Overall, there will be no significant socioeconomic impact to the region as a result of Alternative A.

Like the Proposed Action, all components of socioeconomics evaluated will only change nominally, and none of the actions associated with this alternative will affect any particular population significantly. No single group or population will be disproportionately adversely affected by any of these changes. Therefore, no significant impact in the area of environmental justice is anticipated.

4.4.3 Alternative B – Enhanced Facilities

Under Alternative B, the number of FTE positions and the impacts to the job market are identical as in the Proposed Action. The local and regional impacts are nominal. Likewise, no single population will be disproportionately adversely affected by the activities evaluated for Alternative B. No significant impact to socioeconomics and no significant impact to environmental justice are anticipated as a result of this alternative.

4.4.4 Alternative C – Existing Facilities

Under Alternative C, the number of FTE positions and the impacts to the job market are identical to the Proposed Action. The local and regional impacts are nominal and would not affect any population disproportionately. No significant impact to socioeconomics and no significant impact to environmental justice are anticipated as a result of this alternative.

4.4.5 Alternative D – No-Action

Under the No-Action Alternative, there would be no changes to the employment market related to the UAV program to any group or population. No significant impacts on socioeconomics and no significant impact to environmental justice are anticipated as a result of this alternative.

4.5 TRANSPORTATION

Potential impacts to transportation under the Proposed Action and alternatives focus on key roadways and airspace in the ROI, including the transportation networks in the region that serve as direct or mandatory indirect linkages to UAV program facilities. The need for improvements to roads and arterials is also considered. A determination of significant impact on transportation could result if one or more of the following criteria were met:

- Traffic or construction activities result in a substantial safety hazard to motorists, pedestrians or bicyclists (military or civilian).
- Construction activities would result in the restriction of one or more lanes of a primary or secondary arterial or intersection during peak-hour traffic, thereby cutting its capacity and creating significant congestion.
- A situation involving endangerment or unusual risk to aircraft is created.
- An existing flight corridor is restricted to all public users.

4.5.1 Proposed Action

Three activities within the Proposed Action have the potential to impact transportation systems and conditions within the ROI: increased frequency of UAV flight operations; use of ASA sites and surveyed areas during field exercises, and construction activities associated with the improvement of UAV program facilities on Fort Huachuca.

Increased Frequency of UAV Flight Operations

As of 1999, the UAV program was responsible for 52 percent of all military-aviation radar traffic counts and 42 percent of total radar traffic counts at LAAF. With the proposed land exchange of 203 acres (82 ha) near LAAF to the city of Sierra Vista and the resulting increase in aviation traffic related to that action, airspace conditions at LAAF will become more congested (Coffman Associates Inc., 2000).

The contribution of UAV activity within the region will be most noticeable at LAAF, which tracks UAV operations by radar. The Proposed Action includes an estimated 30 percent increase in annual UAV flight operations in the region, bringing the number of flights that will be counted by LAAF to approximately 24,250. These increased UAV flight operations within the vicinity of LAAF have the potential to interfere with normal airfield operation. Further, if control of a UAV is lost, or if the UAV and associated chase aircraft veer off course, there is the potential to interfere with approaches, departures, and runway activities at LAAF and Hubbard Assault Airstrip. This additional air traffic will result in an impact on LAAF and Hubbard Assault Airstrip, but the effects will be localized and not experienced throughout the region.

Use of ASA Sites and Surveyed Areas

UAV testing and training traffic associated with target placement activities will result in increased traffic level on regional roadways, but would not introduce any substantial safety hazard to motorists, pedestrians or bicyclists (military or civilian). As part of the permitting process, State

Highway regulations that have been incorporated into County regulations, require that UAV program testing events not impede traffic or become a road hazard on public highways and roadways. The program is required to notify the State and County of dates and locations prior to any tests. The State and County conduct inspections to ensure that the terms of the permits are being upheld. In the event of roadside target placement, proper traffic control activities will be used at all times to ensure that no potential safety hazard exists. Under these circumstances, the thresholds of significance will not be exceeded, and there will be no significant impacts to regional highways or road networks due to the use of off-post ASA sites and surveyed areas under the Proposed Action.

Construction Activities

Due to the remote location of proposed construction sites (including the East Range Training Areas), and the lack of any significant traffic flow in or around these sites, construction activities will not result in significant delays or inconveniences to traffic. Further, there will be no restrictions of one or more lanes of primary or secondary arterials or intersections during peak-hour traffic. Therefore, no significance thresholds will be exceeded and there will be no significant impacts on regional highways or road networks due to construction activities associated with the Proposed Action.

4.5.1.1 Mitigation Measures for Transportation

Increased Frequency of UAV Flight Operations

Any UAV activity near LAAF and Hubbard Assault Airstrip must be carefully coordinated though the LAAF ATC in order to minimize any potential conflict with ongoing military, general aviation, or air carrier traffic. In addition, close supervision of personnel and students controlling the UAVs is necessary to minimize risks associated with a loss of control. Use of simulators and the gradual progression of student training will further help minimize risks to air traffic associated with uncontrolled UAVs. The Proposed Action will not create a situation involving endangerment or unusual risk to airspace users or the restriction of all public use of an existing flight corridor once all of the above-mentioned mitigation measures were implemented. Therefore, no significant impact would occur.

Use of ASA Sites and Surveyed Areas

While no significant adverse impacts are anticipated from the use of ASA sites and surveyed areas, simple mitigation measures can reduce the impacts that will occur and thereby reduce the overall impact of the program even further. Ground personnel will be briefed on proper driving conduct on all roads. They will be instructed to drive slowly and only on existing, passable roads. Normal traffic will not be blocked. Gates will be left as they are found. The UAV Test Officer (TO) will ensure inspection of roads to determine passable conditions. A schedule will be established for transporting the guard force, test personnel, and horses to the target sites. Vehicles transporting personnel and equipment will not leave established roadways. Personnel will disembark from vehicles at roadside areas and then walk to the adjacent target sites.

All target convoy activities will be limited to existing trails and roads. These and other target vehicles in the Coronado National Forest and on the Fort Huachuca Military Reservation will be restricted to predesignated sections and established routes. Armored tracked vehicles will be utilized only within the Fort Huachuca Military Reservation. No tracked vehicles will be used in the Coronado National Forest. All vehicles will stay on established trails and roads. Only dry, passable roads where rutting can be minimized will be used. The TO will coordinate convoy movements with the Coronado National Forest Sierra Vista District Ranger and the Fort Huachuca Range

Control Officer. To reduce conflicts between the military and public forest users, roads will be publicly signed "Caution – Military Maneuvers" before and during test use.

4.5.2 Alternative A – Full Facilities Plus Navy

Alternative A has the same activities and potential to generate transportation impacts within the ROI as described above under the Proposed Action. The continued presence of the U.S. Navy Pioneer program at Fort Huachuca under this alternative will have no separate impact on the generation of ground or air traffic in the region that is not already accounted for in existing air traffic counts. The impacts associated with implementing Alternative A are identical to the Proposed Action. No significant impacts on transportation will occur within the ROI.

4.5.3 Alternative B – Enhanced Facilities

Activities that will be conducted under Alternative B are identical to the Proposed Action with the exception of the reduced level of construction. This reduced level of construction will create even less of a transportation impact. Therefore, similar to the Proposed Action, implementation of Alternative B will have no significant impact on transportation with the ROI.

4.5.4 Alternative C – Existing Facilities

Under Alternative C, the UAV activities discussed in the Proposed Action will be conducted using only existing facilities. As there will be no new facility construction with this alternative there will be no impact on transportation. While the operational and testing impacts would occur at the same level as described in the Proposed Action, none will result in significant impacts. Alternative C will not exceed any significance thresholds and will not result in any significant impacts.

4.5.5 Alternative D – No Action

Under the No-Action Alternative, which maintains the status quo, there will be no change in transportation conditions at Fort Huachuca or the surrounding area. Therefore, under this alternative there will no significant impact on transportation within the ROI.

4.6 PUBLIC SERVICES, UTILITIES, AND ENERGY RESOURCES

Potential impacts on public services, utilities or energy could be determined significant if any of the following occurred as a result of the Proposed Action and alternatives:

- A resource exceeds its present and/or future capacity to serve.
- A long-term interruption to, or interference of, service.
- A significant increase in annual energy consumption or peak potential loading is calculated to exceed the capacity of the transmission lines and transformers.

4.6.1 Proposed Action

There are no activities associated with the Proposed Action with the potential to significantly impact the human environment regarding the provision of public services, utilities, or energy consumption. All utilities at Fort Huachuca are well under maximum capacity (as described in Section 3.6 of this EA) and the Proposed Action will not cause any utility to exceed its present and/or future capacity to serve.

The only potential for UAV operations to cause a long-term interruption to, or interference of, utility service, would be the result of accidental damage to underground utility lines during

construction activities. Standard Army construction management regulations require existing utilities to be clearly marked and avoided (if possible) during any ground disturbing activity. Accidental damage to underground utility lines during construction activities may temporarily impact the provision of utilities, but those potential impacts will not be significant on the human environment. There will be no significant increase in the potential for accidental damage due to construction activities associated with the Proposed Action.

4.6.2 Alternative A – Full Facilities Plus Navy

Like the Proposed Action, Alternative B does not consist of any activity having the potential to significantly impact the human environment regarding the provision of public services or utilities, or energy consumption. The continued presence of the U.S. Navy Pioneer Program at Fort Huachuca under this alternative will have no separate impact on utility service. There will be no significant impacts to utilities under this alternative.

4.6.3 Alternative B – Enhanced Facilities

As with the Proposed Action, Alternative B does not consist of any activity having the potential to significantly impact the human environment regarding the provision of public services or utilities, or energy consumption.

4.6.4 Alternative C – Existing Facilities

As with the Proposed Action, Alternative C does not consist of any activity having the potential to significantly impact the human environment regarding the provision of public services or utilities, or energy consumption.

4.6.5 Alternative D – No Action

This alternative reflects a continuation of baseline conditions at the Fort and as such does not consist of any activity having the potential to significantly impact the human environment regarding the provision of public services or utilities, or energy consumption.

4.7 PUBLIC HAZARDS, HEALTH, AND SAFETY

Evaluation of the potential generation, use, or transport of hazardous materials and/or waste and its effect on public safety is based on both the potential for upset (accident) and the consequences of any project-related adverse event (negative effect associated with normal operations). Beneficial impacts may result from any direct or indirect safety improvements due to project implementation. A determination of significant impact related to hazardous waste and public safety could result if one or more of the following criteria were met:

- Exposure of humans to unsafe levels of hazardous materials or hazardous waste.
- Generation of hazardous materials or hazardous waste in quantities or of a type that could not be accommodated by the current disposal system.
- Increase in likelihood of an uncontrolled release of hazardous materials that could contaminate soil, surface water, and groundwater.
- Create a situation involving endangerment or unusual risk to military personnel, visitors, nearby residents, and the general public off-site.

4.7.1 Proposed Action

Three activities within the Proposed Action have the potential to subject the human environment to safety hazards or hazardous materials: routine vehicle use during field activities at ASA sites and surveyed areas; UAV mishaps; and electromagnetic radiation and laser use.

Vehicle Use During Field Activities

Petroleum products power electrical generators and vehicles used to transport workers and equipment to the test sites during UAV operations. On-site refueling and leaking vehicles have the potential to result in an increased likelihood of an uncontrolled release of hazardous materials that could contaminate soil, surface water, and groundwater. Left unmitigated these potential releases could pose a significant adverse impact to public health and safety.

During routine use of vehicles for training or testing events, no human will be exposed to unsafe levels of hazardous materials or waste, and no large quantities of hazardous materials will be generated. Measures are routinely taken to ensure that there are no uncontrolled releases of hazardous materials onto soil, surface water, or groundwater.

UAV Mishaps

Since UAVs are remotely controlled and the programs at the Fort are instructional on the use of these aircraft, the potential exists for a UAV to crash during testing and training activities. If there would be loss of control of an in-flight UAV, the vehicle could travel some distance before hitting the ground. Given the unpredictable and uncontrollable nature of these possible mishaps, the UAV Crash/Incident/Mishap Investigation and Recovery Plan (EPG 1994) was written to direct actions following a mishap. To further reduce the chance of mishap, operators are taught to fly smaller scale models of the UAV vehicles prior to flying the full-size version. Also, for Large UAVs, operators are required to complete an equivalent of the Federal Aviation Administration (FAA) ground school for private pilots prior to operation of the actual vehicle.

While there is a potential for a mishap to occur, but the potential for loss of control of a UAV in or near populated areas is negligible. Flight profiles do not traverse highly populated areas. Most UAV mishaps occur during take-off and landing, both of which take place on-post in remote areas designated for this type of use. The likelihood of catastrophic loss of control is low outside of take-off and landing is low. Responses to the mishaps as delineated in the Plan will mitigate the significance of the impacts below the threshold of significance.

Use of Electromagnetic Radiation and Laser

Electromagnetic energy has a heating effect that can raise an exposed person's body temperature and lead to health complications. High levels of electromagnetic energy can also cause a thermal burn and during transmissions, and some antennae have the potential to cause electrical shock on contact. Typically, small hand held communication-electronic devices do not present a health hazard. Large vehicle-mounted radios and electromagnetic emitters may have a radiation hazard distance of just a few centimeters or up to and over 100 meters.

UAV testing may also involve the use of lasers. The most prevalent safety hazard associated with the use of lasers is eye injury. Low power lasers may have the potential to damage the human eye at distances of up to several hundred feet. Destructive high power lasers or laser weapons are not tested or trained upon at Fort Huachuca. As a safety precaution, the U.S. Army tasks the U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM) to evaluate all electromagnetic emitters and lasers used. The USACHPPM conducts analytical studies and field surveys to determine the extent of health hazards, if any.

Safety warnings and precautions are incorporated into military technical manuals to ensure that testing and training personnel, and the general public at large, are not exposed to harmful levels of electromagnetic or laser radiation. Per safety protocols, barriers will be placed around an area where potentially hazardous activities take place to prevent public and unauthorized access and signs will be posted to warn personnel (and others) of the hazards.

During routine use of equipment that release electromagnetic energy or uses lasers, standard precautions, supervision, and training will be employed to ensure that no humans are inadvertently harmed. Overall, the use of lasers and electromagnetic energy will not endanger any personnel, visitors, residents, or general public on-base or at off-site locations. Since none of the threshold criteria will be exceeded, no significant impact is anticipated to occur.

4.7.1.1 Mitigation Measures for Public Hazards, Health, and Safety

Vehicle Use During Field Activities

To prevent spillage of petroleum products onto exposed soil or water resources, drip pans will be placed beneath generators during refueling. Fuel containers will also be placed on drip pans and positioned at least 25 feet from ignition sources. Vehicles will be routinely inspected for coolant and petroleum products leakage. Overpack drums, shovels, and other equipment necessary to clean up oil or fuel spills will be taken into the field during each activity. All releases will be packed in drums, labeled and turned into the HAZMAT facility at Fort Huachuca for proper disposal. This activity may temporarily expose humans to hazardous materials or hazardous waste, but this exposure is strictly regulated by the Fort's ISCP and will be within safe standards and guidelines.

A fire control station, consisting of a fire extinguisher and a shovel will be provided with each portable generator. If UAV Test Officers determine that 24-hour operation of a generator at an ASA site or surveyed area is required, refueling will be performed using drip pans beneath the fuel tank and fill spouts to prevent soil contamination. When vehicles are parked at an ASA site, survey area, or staging area for over 2 hours, drip pans will be placed underneath each vehicle and a fire control station will be set up before any generator is started. This fire control measure should be adequate to ensure that no uncontrollable fires are started. Disposal of any hazardous material, batteries, petroleum, etc., will be in accordance with all federal ands state regulations. No vehicle maintenance (i.e. oil changes), other than emergency repair, will be conducted on the Coronado National Forest. No pyrotechnic device (ammunition, flares, explosives) will be used.

UAV Mishaps

During UAV activities that traverse outside of restricted airspace, chase aircraft are required to visually monitor the UAV. These aircraft have communication and flight termination capabilities. Determination as to whether a flight should be terminated is made based on traffic in the area, surveillance capability, tracking radar quality, and performance of the UAV. In the event of a mishap, the test director will activate the React Team, a pre-assigned group of personnel designated to respond in the event of a crash or other mishap. If the mishap is off military property, permissions will be obtained before trespassing occurs, and the React Team will immediately begin to disarm any hazards. In the event of the UAV catching fire, the vehicle will be left to burn. Personnel will maintain a distance of more than 1,500 feet upwind per protocol, a precaution since some UAVs have the potential to produce toxic gases when burning due to the foam inside the wings. Future systems will be designed to minimize this risk. Once the UAV is recovered, the site would be cleaned and cleared of any remaining hazards to meet standards specified in the Fort Huachuca POL Spill Reporting and Containment Plan.

Immediate response by the React Team to a mishap will minimize any potential risks or hazards to personnel or civilians in the area. Measures will be taken to ensure that there are no uncontrolled releases of hazardous materials onto soil, surface water, air, or groundwater. Overall, the routine use of vehicles will not endanger any personnel, visitors, residents, or general public on base or at off-site locations. Since none of the threshold criteria will be exceeded, no significant impact will occur.

4.7.2 Alternative A - Full Facilities Plus Navy

The continued presence of the U.S. Navy Pioneer program at Fort Huachuca will have no significantly different impact on the presence or generation of hazardous materials or waste on the installation. It is possible that the U.S. Navy program will generate some additional hazardous materials in the form of coolant or petroleum spills during UAV activities or field exercises, but this additional amount would not be significant and would be regulated by existing Fort Huachuca hazardous material rules and regulations. Overall, the impacts associated with Alternative A mirror those of the Proposed Action. As with the Proposed Action, implementation of Alternative A will have no significant impact on the human environment from hazardous materials once mitigation measures for UAV mishaps are employed.

4.7.3 Alternative B – Enhanced Facilities

Alternative B is identical to the Proposed Action with downscaled construction. Under the Proposed Action it was concluded that hazardous wastes and materials potentially stored on site or leaking from machinery during construction or field activities would have no significant impact on the human environment. There is the potential for UAV mishaps to occur, which have a potential for significant impact. Appropriate mitigation measures would reduce these impacts to a level below the significance thresholds. Therefore, similar to the Proposed Action, implementation of Alternative B will have no significant impact on the human environment from hazardous materials.

4.7.4 Alternative C – Existing Facilities

Under Alternative C, Fort Huachuca will continue to use the same existing UAV facilities to support both the existing and proposed UAV programs. Potential impacts from increased UAV program activities and UAV operations would be identical to those of the Proposed Action. Like the Proposed Action, Alternative C will pose no significant impact on the human environment from hazardous materials once appropriate mitigation measures are taken in the event of a UAV mishap.

4.7.5 Alternative D – No Action

Under the No-Action Alternative, which maintains the status quo, there will be no change in the handling or potential release of hazardous materials at Fort Huachuca or in the surrounding area. These activities are subject to the JTUAV Crash/Incident/Mishap Investigation and Recover Plan discussed in the Proposed Action. Since there are no significant impacts associated with the current activities and there would be no changes in the existing programs under this alternative, there will be no significant impacts as a result of this alternative.

4.8 SOIL AND WATER RESOURCES

The following discussion addresses the potential impacts to regional and local soils and water resources (surface and ground) that could result from the implementation of the Proposed Action and alternatives.

4.8.1 Soil Resources

Impacts to soils resulting from project implementation are related to the amount and type of projected soil disturbance that can be attributed to the Proposed Action and alternatives. A determination of significant impact on soils could result from construction activities or field operations resulting in a significant amount of additional erosion (either short-term or long-term).

In addition, a significant impact could also result if construction activities or field operations have a high potential for soil contamination. This consideration is discussed in Section 4.6 *Public Hazards, Health, and Safety,* and is not repeated here.

4.8.1.1 Proposed Action

Two activities within the Proposed Action have the potential to affect soils within the ROI: Construction activities associated with UAV program facility improvements on the Fort, or the use of ASA and target sites for UAV testing and training both on- and off-post.

Construction Activities

Some excavation and ground clearing will occur as a result of facility construction. Surface disturbance from excavation and construction will be limited to the extent possible. The excavated soils will be temporarily maintained nearby at predetermined stockpile locations and eventually redistributed to other areas of the Fort as needed. During excavation, soils have the potential to be carried by strong winds or washed away by heavy rains, which would constitute an impact. The stockpiled dirt from construction has the same potential for erosion.

For disturbances of one acre or more, a stormwater pollution prevention plan is required prior to implementation. The purpose of the plan is to minimize erosion through the use of Best Management Practices (BMPs). These will then be followed to ensure that construction-related soil erosion is kept to a minimum. BMPs would be specifically designed to control the amount and velocity of runoff and its ability to carry sediment (soil) by diverting incoming flows. BMPs also include sediment traps to retain sediment on the project site.

Use of ASA and Target Sites for UAV

All field activities will occur on existing roads or at ASA and target sites that are already disturbed (see Section 4.9.1, *Vegetation*). Activities at these sites will be temporary and of little direct or indirect impact. All vehicle travel within the Coronado National Forest will be conducted at slow rates of speed and no dirt or unimproved roads will be used immediately following a rain event or when the ground is saturated. No construction or earth-moving activities will occur off-post. Since these actions will occur in areas that are already disturbed and will not result in any significant erosion, the threshold of significance will not be exceeded. Therefore, activities associated with the use and setting of ASA target sites as described in the Proposed Action will not result in any significant impacts to soil resources within the ROI.

4.8.1.2 Mitigation Measures for Soil Resources

Mitigation measures will include minimizing the areas of disturbance, short-term and long-term erosion control, seeding with native species, and provision of silt barriers and detention basins. During trenching or excavation work, soil would need to be deposited on the upgrade side of the excavation wherever possible to minimize soil migration from the excavated areas. Standard Industry BMPs must be in place to mitigate sediment transport during high winds and heavy rains. Soil preparation, fertilizing and seeding with native species would follow construction as soon as

possible. With mitigation, soil erosion would be minimized. No significant impact to soil would occur from the Proposed Action.

4.8.1.3 Alternative A – Full Facilities Plus Navy

Alternative A has the same activities and potential to affect soil resources as described above under the Proposed Action. The continued presence of the U.S. Navy Pioneer program at Fort Huachuca will have no separate impact on soil resources on or off the installation. Therefore, similar to the Proposed Action, Alternative A will potentially result in adverse impacts to soils, but these impacts would be mitigated to eliminate any significant impact to soils within the ROI.

4.8.1.4 Alternative B – Enhanced Facilities

Alternative B is identical to the Proposed Action with the exception of three specific construction activities that would not be implemented under this alternative (as described in Section 2.3, *Enhanced Facilities—Alternative B*). Under the Proposed Action there is a potential for erosion to occur as a result of construction activities. Reduction of earth-moving activities under this alternative would decrease this potential. Therefore, similar to the Proposed Action, Alternative B could potentially result in adverse impacts to soils, but these impacts would be mitigated to eliminate any significant impact to soils within the ROI.

4.8.1.5 Alternative C – Existing Facilities

Under Alternative C, Fort Huachuca will continue with the exact same use of existing facilities as the Proposed Action. No new construction would occur. Use of ASA and target placement areas would have little impact on soils. Overall, implementation of this alternative will have no significant impact on soil resources.

4.8.1.6 Alternative D – No-Action Alternative

Under the No-Action Alternative there will not be any changes in soil conditions on or off the installation. Activities associated with the Proposed Action and the alternatives will not occur, and soil conditions will continue to be influenced by the existing activities at the Fort. There will be no significant impact to soil resources under this alternative.

4.8.2 Water Resources

Impacts to water resources (surface water and groundwater) could be direct, indirect, short-term, or long-term. A determination of significant impact to surface water could result if:

- Grading or other construction activities discontinue the function of drainage facilities or watercourses.
- Stormwater and/or runoff constituents significantly degrade downstream surface water quality.

A determination of significant impact to groundwater could result if:

- A usable groundwater aquifer for municipal, private, or agricultural purposes is adversely affected from depletion or contamination.
- An increase in soil settlement or ground swelling that damages structures, utilities, or other facilities caused by inundation and/or changes in the groundwater level.
- An unmitigated net increase in annual water use is created at the Fort.

4.8.2.1 Proposed Action

Surface Water

Section 404 of the Clean water Act of 1977 (33 U.S.C. 1251) establishes a permit program for activities that will discharge dredged or fill material into "Waters of the United States". Section 404 permits may be required for any construction of UAV facilities with the potential to impact U.S. waters. The ultimate determination of permit applicability to this action would be made by the regulatory agencies after formal application. Conformance with the erosion control and restoration requirements associated with these types of permits would reduce potential surface water impacts to any "jurisdictional waters" to below a level of significance. Because some degree of uncertainty exists regarding the applicability of these types of permits to the Proposed Action, a number of erosion control BMPs are identified below as mitigation measures. Implementation of these would also reduce water quality impacts for the Proposed Action below a level of significance.

If applicable, the Army will prepare a Stormwater Pollution Prevention Plan (SWPPP) for all activities that involve the disturbance of one or more acre. BMPs for erosion control and stormwater management will be included in the SWPPP. Conformance with the erosion control requirements associated with the plan will reduce potential water quality impacts to below a level of significance.

Construction activities would involve the short-term use and storage of hazardous substances such as vehicle fuels and lubricants. Accidental discharges of such substances during operation or maintenance activities (e.g., while refueling or changing vehicle fluids) could result in significant impacts to surface water quality, especially in areas within or adjacent to drainage courses. This type of discharge could result in significant effects to downstream areas along the Babocomari and San Pedro Rivers. The Fort Huachuca ISCP describes the procedures to be implemented in the event of hazardous materials or POL spill, on- or off-post. Those potentially significant impacts would be reduced below a level of significance through the mitigation measures identified below.

Ground Water

The Proposed Action is not anticipated to impact groundwater conditions with regards to groundwater supply (at the local and regional level). No increase in annual groundwater pumping is anticipated from the Proposed Action. No impact on groundwater quality is anticipated from the Proposed Action.

The Proposed Action is not a new mission at the Fort. An estimated 6.96 ac-ft (2,267,742 gallons) of water is estimated for FY00 UAV testing activities. Another 44.61 ac-ft (14,535,053 gallons) of water is estimated for FY00 UAV training activities (students only). Combined, this baseline water use for the FY00 UAV program at Fort Huachuca is estimated at 51.57 ac-ft (16,802,795 gallons). Tables 4.8-1 and 4.8-2 show the projected water use associated with testing and training under the Proposed Action starting in FY01 and continuing through FY07. Because of changes in the Fort's UAV program composition (to reflect a change in UAV developmental and operational programs) and projected student requirements, the water use projection for the UAV Program will decline from its FY00 estimate by 36.36 ac-ft (11,849,325 gallons) to an estimated 15.21 ac-ft (4,956,772 gallons) in FY01. For purposes of this analysis, it is assumed that the instructor and support personnel requirements will remain constant and not exceed FY00 projections for the Short Range UAV program (see Section 3, Table 3.6-2).

Table 4.8-1. Estimated Annual Water Use for UAV Testing[1]

	Estimated Number of FTEs	Number of Events	Number of Days per Event	Gallons per Person per Day[2]	Total Gallons per Year (ac-ft)
Small Event	26	Up to 5	Up to 90	75 gpd	877,500 (2.70)
Medium Event	43	Up to 5	Up to 90	75 gpd	1,451,250 (4.45)
Large Event	43	Up to 5	Up to 90	75 gpd	1,451,250 (4.45)
TOTAL	**112**	**15**	**270**	**n/a**	**3,780,000 (11.60)**

[1]No anticipated rate of increase between FY01 and FY07
[2]75 gpd per TDY personnel (assumes reduced domestic use)

Table 4.8-2. Estimated Annual Water Use for UAV Student Training

Rating	Course Length (weeks)	Total Gal. FY 01 (ac-ft)	Total Gal. FY 02 (ac-ft)	Total Gal. FY 03 (ac-ft)	Total Gal. FY 04 (ac-ft)	Total Gal. FY 05 (ac-ft)	Total Gal. FY 06 (ac-ft)	Total Gal. FY 07 (ac-ft)
33W[1,2]	Up to 11	13	19	29	35	23	23	23
52D	Up to 11	26	40	61	74	48	48	48
96U	23 [3]	56	142	174	268	325	210	210
TOTAL		**125**	**246**	**332**	**460**	**450**	**335**	**335**
FTEs [2]		43	75	96	141	158	108	108
Water Use [4]		1,177,125 (3.61)	2,053,125 (6.30)	2,628,000 (8.07)	3,859,875 (11.85)	4,325,250 (13.27)	2,956,500 (9.07)	2,956,500 (9.07)

[1] Approximately 70% of the 33W students will already be stationed at Fort Huachuca.
[2] Represents those students not already stationed at Fort Huachuca and who would be relocating to the FH area.
[3] 33 in FY01
[4] 75 gpd per TDY personnel (assumes reduced domestic use)

The estimated water use for FY01, based on the forecast number of authorized students is substantially less than the projected water use for the FY00 program. The relocation of the U.S. Navy Pioneer Program will remove an additional 47.23 ac-ft (15,388,714 gal) of water use per year, which further reduces overall UAV Program water consumption. Cumulatively, these water use reductions are estimated at an 83.59 ac-ft (27,235,711 gallons) decline from projected FY00 levels. Because of these estimates and ongoing and planned water conservation, recharge and reuse programs at Fort Huachuca through FY07, the Proposed Action is not anticipated to result in a net increase in annual water use at the Fort.

Although the concern over regional groundwater withdrawal remains, the Proposed Action is not anticipated to significantly impact the aquifer through accelerated depletion, or contamination. The Proposed Action will not result in an increase in soil settlement or ground swelling that damages structures, utilities, or other facilities caused by changes in the groundwater level. The Proposed Action will not result in any significant impact to local or regional groundwater resources.

4.8.2.2 Mitigation Measures for Water Resources

Surface Water

Vehicle refueling and maintenance procedures and hazardous substance storage areas will be designed to preclude the discharge of hazardous substances used during construction (e.g., fuels, solvents and lubricants). Such designations will include specific measures to preclude spills or contain hazardous substances, including proper handling and disposal techniques, and the use of temporary impervious liners or barriers to prevent soil and water contamination.

Water used for dust suppression will not contain contaminants that could violate ADEQ water quality standards for surface waters or aquifers. Fort Huachuca will obtain all necessary permits for such activities, if warranted. No fill will be taken from any watercourse outside the boundaries of the permitted work area.

Heavy equipment traffic is restricted from entering the watercourses outside the boundaries of the permitted work area. Appropriate barricades will be installed to preclude this activity. During construction, the work sites will be maintained such that no construction debris or material spillover is allowed in the watercourses. Upon completion of the work, all construction debris and excess material will be removed from the job sites.

If a dewatering operation is needed, Fort Huachuca will not discharge into jurisdictional waters of the U.S. unless the quality meets the appropriate water quality criteria for the receiving waterbody and Fort Huachuca obtains the necessary permits.

Debris (such as soil, silt, sand, rubbish, cement, asphalt, oil or petroleum products, organic materials, tires or batteries) derived from construction activities shall not be deposited at any site where it may be washed into the waters of the U.S. After the completion of this project, the washes shall be left in an environmentally acceptable condition with all trash and nonnative materials removed from the watercourse.

Groundwater

Due to conservation and reuse efforts, the net annual reduction in the installation's water withdrawal from the local aquifer system and net reduction in annual consumptive use are anticipated to continue. All additional UAV facilities will be equipped with water conservation technology to ensure that this trend continues in light of the Proposed Action. All new UAV facilities will incorporate water saving features (i.e. waterless urinals, low flow faucets and toilets, etc.) to the maximum extent possible. Each UAV unit will work to educate its personnel on the importance of water conservation and will participate in the Fort's water wise program to the maximum extent possible.

4.8.2.3 Alternative A – Full Facilities Plus Navy

Alternative A has a similar potential to affect water resources as described above under the Proposed Action, however the continued presence of the U.S. Navy Pioneer program at Fort Huachuca will require the continued allocation of 47.23 ac-ft (15,388,714 gal) of water per year. This water use is already accounted for in the Fort's 1998/99 water consumption budget. The continued presence of the Pioneer program will only decrease the overall level of water use reduction associated with the Proposed Action. All mitigation measures listed above (under the Proposed Action) will be implemented under this alternative. No significant impact to local or regional groundwater will occur.

4.8.2.4 Alternative B – Enhanced Facilities

Under the Proposed Action it was concluded that there would be no significant impact to water resources. Reduction of earth-moving activities under this alternative would further decrease any potential for adverse impacts because of a reduced level of water consumption during construction activities. Therefore, there will be no significant impact to local or regional water resources as a result of Alternative B.

4.8.2.5 Alternative C – Existing Facilities

Under Alternative C, Fort Huachuca will continue with the exact same use of existing facilities, UAV operations, support services, and number of personnel requirements as the Proposed Action. Therefore, implementation of this alternative will not have a significant impact on regional or local water resources.

4.8.2.6 Alternative D – No Action Alternative

The No-Action Alternative represents the status quo. Activities associated with the Proposed Action and the alternatives will not occur. There will be no significant adverse impacts to local or regional groundwater resources under this alternative.

4.9 BIOLOGICAL RESOURCES

Impacts on biological resources could occur from testing and training of UAVs and ancillary ground and aviation activities in support of the UAV program or the upgrade or construction of UAV program facilities on the installation. These impacts (including vegetation, wildlife and protected species) could be determined significant if one or more of the following conditions would result from implementation of the Proposed Action or alternatives:

- Jeopardy to populations of a Federally-listed threatened or endangered species.
- Adverse modification to designated critical habitat.
- Substantial loss of a critical, yet limited resource of critical importance to a Federally-listed threatened or endangered species.
- Substantial certainty of regularly recurring fires from the use of UAVs, ordinance or fuel spills.
- Substantial increase in impact from vehicular or human activity on generally pristine or sensitive vegetation resources in the project area as a whole.
- Substantial interference with or complete disruption of heavy-use wildlife movement corridors.

4.9.1 Proposed Action

Activities under the Proposed Action have the potential to affect vegetation, wildlife and listed species in several different ways. Therefore separate discussions on each resource are provided.

4.9.1.1 Vegetation

Two activities associated with the Proposed Action have the potential to impact vegetation within the ROI: use of ASA sites and surveyed areas during target placement and field activities associated with testing and training, and construction activities associated with the improvement of UAV program facilities on Fort Huachuca.

Use of ASA Sites and Surveyed Areas

There is a potential for vegetation to be affected during field exercises and activities on- and off-post associated with UAV testing and training. This disturbance is limited to the specific locations where target placement and troop movements are proposed. The BE prepared for USFS sites that determined that target placement and associated field activities will not significantly impact USFS-sensitive vegetation at any of these sites is provided as Appendix B.

In the course of conducting UAV activities, the potential for permanent loss of habitat is very low. While some direct impact to grasses and other groundcover may occur at these sites, this impact is limited both in intensity and frequency. There will be no significant impact on off-post vegetation as a result of the Proposed Action. Existing ASA sites and surveyed areas on the Fort are already disturbed and potential direct impact to grasses and groundcover at these sites would likewise not be significant.

There would be no substantial certainty of regularly recurring fires from the use of UAVs, ordinance or fuel spills. Standard protocol described in Section 4.7, *Public Hazards, Health and Safety* will be followed in addition to all fire-related mitigation measures that were included in the *1999 USFWS Biological Opinion on Ongoing and Programmed Future Military Operations and Activities at Fort Huachuca, Arizona* (USFWS 1999). A copy of these mitigation measures are provided in Appendix D. When activities are conducted within the protocols, the risks of fuel spills and fire are very low and will not be significant.

There would be no substantial increase in impact from vehicular or human activity on generally pristine or sensitive vegetation resources in the project area as a whole. As mentioned before, the ASA sites that will be used during UAV target deployment are already disturbed by previous activities. The temporary and sporadic use of any particular ASA site will not result in any significant changes in the vegetation quality of these sites.

Construction Activities

Proposed construction activities on Fort Huachuca will disturb existing vegetation in the areas proposed for site development (see Section 2, Figure 2.1-4 and Table 4.9-1, below). This development will require the permanent removal of approximately 20 acres (8.1 ha) and temporary disturbance of 40 acres (16.8 ha) of native grasses and vegetation. It is estimated that only 5 acres (2.0 ha) of native vegetation would be lost on the West Range, 10 acres (4.0 ha) on the East Range, and 5 acres (2.0 ha) within the cantonment area (at LAAF).

Table 4.9-1. Estimated Area of Disturbance for Proposed Construction Activities

Proposed Construction Location [1]	Area of Temporary Disturbance [2]	Area of Long-term Disturbance [2]	Federally-listed Species at Location (y/n)
UAV Training Center and Rugge-Hamilton Runway	8 acres (3.2 ha)	4 acres (1.6 ha)	No
Pioneer Training Facility and Runway	3 acres (1.2 ha)	< 1 acre (0.41 ha)	No
East Range Urban Landscape Training Facility and East Range Test and Evaluation Facility	20 acres (8.1 ha)	10 acres (4 ha)	No
LAAF	9 acres (3.6 ha)	5 acres (2 ha)	No
TOTAL	**40 acres (ha)**	**20 acres (ha)**	**No**

[1] Location approximated: specific location and layout of construction not known at this time
[2] Estimated: specific location unknown at this time

The remainder of the areas to be disturbed during construction would be revegetated with native species and thus only temporarily disturbed. Without mitigation, this loss of vegetation would have an adverse impact of the availability of wildlife habitat, but this impact would not be significant.

4.9.1.2 Mitigation Measures for Vegetation

All relevant mitigation measures included in Appendix B of the *1999 USFWS Biological Opinion on Ongoing and Programmed Future Military Operations and Activities at Fort Huachuca, Arizona* (USFWS 1999) will be implemented as a part of the proposed action. A copy of these mitigation

measures are provided as Appendix D. Additional mitigation measures (listed hereafter) will also be implemented to further reduce the potential for adverse impact on this resource.

All selected target sites are located adjacent to existing roads or jeep trails. Authorized vehicle entry and exit routes will be established from existing roads to equipment stations within each site. Drivers will be instructed to follow these established trails. Only the minimum number of vehicles required for the test will enter the target site. Damage to understory plants such as shrubs will be limited to the level necessary for single-file ingress and egress of vehicles and personnel at target sites. In all cases, avoidance of damage to vegetation will be a primary concern of target controllers and test site personnel.

Vehicles will park close to trees, but far enough away to prevent damage. Tents and other equipment will also be set up near trees and natural cover. During set-up, operation, and removal of site equipment, damage to or destruction of woody vegetation (trees and shrubs), including snags (standing dead trees) and substantially intact fallen dead materials, will not be allowed. Woody vegetation includes, but is not limited to, oaks, mesquite, juniper, acacia, manzanita, and creosote bushes. "Damage" is defined as breakage of trunks, limbs, branches, or exposed roots, or removal of bark.

Unless prohibited due to extreme fire danger, some site operations may include the establishment of open campfires as required by the performance of duty. All open fires will require prior approval on a daily basis by Range Control Officer and Fire Chief. Charcoal will be transported to sites. No foraging for firewood will be allowed. Each target vehicle will be equipped with fire fighting equipment as required by the USFS. All fire rings (including those previously assembled by other forest users) will be dismantled, rocks spread out, and areas raked before sites are abandoned. No digging will occur at the sites except for the removal of the active campfires.

The disturbance of vegetation will be restricted to areas proposed for facility construction, utility trenching, roadways, and building sites to limit the size of the impact area. Disturbed areas outside of these development footprints would be revegetated with native species. After the revegetation period, natural successional changes would be allowed to proceed wherever possible. Implementation of mitigation measures will ensure that the level of impact associated with constructions activities will remain below a level of significance.

4.9.1.3 Wildlife

Three activities of the Proposed Action have a potential to impact wildlife within the ROI: UAV flight operations, use of ASA sites and surveyed areas during target placement and field activities associated with testing and training; and construction activities associated with the improvement of UAV program facilities on Fort Huachuca. Federally-listed Threatened, Endangered, and Candidate Species in the ROI are discussed in Section 4.9.1.5 below.

Increased Frequency of UAV Flight Operations

The Proposed Action involves an increased level of UAV flight activity at Fort Huachuca and within the regional environment. Because the standard flight level of UAVs associated with target identification and other field activities are generally above 1000 ft (301 m), UAV flights are not anticipated to impact common wildlife either on the ground or in the air.

The particular concern over collisions between birds, bats and low-flying UAVs is restricted to areas on Fort Huachuca where approach and departure activities (take-offs and landings) and low level training occur. Student training on Fort Huachuca can include the use of Small UAVs at

altitudes less that 1,000 ft (301 m) near the Pioneer Runway, Rugge-Hamilton Runway, Demonstration Hill airstrip, Hubbard assault strip and East Range airstrip. While these UAVs have the potential to disturb birds and bats in flight, the natural dexterity of these species and the slow rate of speed associated with Small UAVs largely precludes the potential for a mid-air collision. There will be no significant impact to wildlife from UAV flight activities associated with the Proposed Action.

Target Placement and Field Activities

Field activities would not significantly impact habitat for wildlife either on- or off-post. A minor, temporary impact on wildlife is possible during field activities, where noise and human activity may disturb a roaming or foraging animal. Target placement activities may occur overnight and lights and noise from this activity could potentially disrupt the common (non-special status) wildlife species found at and surrounding the testing event location. However, considering that similar habitat exists in the immediate vicinity, the impact of this habitat displacement is expected to be relatively minor and is not significant.

Because of the small and non-invasive nature of target placement activities, disruption will be negligible and will not result in a significant impact on wildlife at Fort Huachuca and within the regional environment. To further minimize the potential for impact to common wildlife, several mitigation measures are listed below. Implementation of these measures would further ensure that no significant impact to wildlife would result.

Construction Activities

Construction activities would not significantly impact habitat for wildlife on Fort Huachuca. A minor, temporary impact on wildlife is possible during construction activities, where noise and human activity may disturb a roaming or foraging animal. This impact will be negligible, of short duration, and will not result in a significant impact on wildlife at Fort Huachuca.

The common wildlife species found at and surrounding the proposed construction sites on the Fort would be displaced during construction. However, considering that similar habitat exists in the immediate vicinity, the impact of this habitat displacement is expected to be relatively minor and is not expected to be significant.

The loss of acreage due to construction would result in a reduction of breeding and foraging habitat for wildlife using the sites. Habitat removed during the construction of new UAV-related facilities that are not in the immediate footprint of the building or airstrip would be revegetated with native species to a natural state upon completion of the project. In total, less than 20 acres (10 ha) of vegetation would be permanently lost, and 40 acres (16.8 ha) would be temporarily disturbed and revegetated upon project completion.

In addition to the area of disturbance, there would be a decrease in the quality of the habitat immediately adjacent to the construction sites due to increased noise levels, traffic, lights, and other human activities. Wildlife species that require isolation from such impacts may be displaced into surrounding, less disturbed areas. However, after construction has been completed, it is expected that some of the displaced species, particularly birds, would return.

4.9.1.4 Mitigation Measures for Wildlife

All relevant mitigation measures included in Appendix B of the *1999 USFWS Biological Opinion on Ongoing and Programmed Future Military Operations and Activities at Fort Huachuca, Arizona* (USFWS 1999) will be implemented as a part of the proposed action. A copy of these mitigation

measures are provided as Appendix D. Additional mitigation measures (listed hereafter) will also be implemented to further reduce the potential for adverse impact on this resource.

Ground personnel will be briefed with explicit directions to avoid all contact with animals. Snakes will be avoided. No razor wire barriers will be used for any phase of this project. If cattle are in or affecting a target site on the Coronado National Forest, personnel on foot will gently encourage the cattle to move on; no vehicles will be used to move cattle. Personnel will be instructed not to disturb grazing cattle unless the cattle create a direct hazard to test operations.

All ground disturbance will be minimized to the extent practical. Disturbed areas outside of the permanent facility footprints would be revegetated with native species to facilitate the return of the areas to native habitat. After the re-vegetation period, natural successional changes would be allowed to proceed wherever possible. Implementation of revegetation measures will reduce the level of permanent habitat loss. No significant impact to wildlife would occur.

4.9.1.5 Federally-Listed Threatened, Endangered, and Candidate Species

The Proposed Action has the potential to directly impact Federally-listed and candidate species only if the following requirements is met: They occur at the same place, within immediate proximity, or immediately downstream of activities associated with the Proposed Action; and they occur at the same time as activities associated with the Proposed Action.

The following discussion evaluates the potential for direct impacts and indirect impacts to Federally-listed species (listed as having the potential to occur at areas affected by the Proposed Action) from facility construction, UAV flights, target placement and other field-related testing and training activities under the Proposed Action. A discussion of species-specific findings is presented. As described in Table 3.10-1, this includes the following species: Canelo Hills ladies' tresses, Huachuca water umbel, Huachuca springsnail, bald eagle, Mexican spotted owl, southwestern willow flycatcher, lesser long-nosed bat, and Sonora tiger salamander.

Activities associated with the 1998/99 level of UAV activities at Fort Huachuca were addressed in the *1999 USFWS Biological Opinion on Ongoing and Programmed Future Military Operations and Activities at Fort Huachuca, Arizona.* This Biological Opinion concurred with the Army that the 1998/99 level of UAV activity at Fort Huachuca would not jeopardize the existence of any federally-listed threatened or endangered species. It also stated that UAV activity would not cause any adverse modification to critical habitat for the southwestern willow flycatcher, Huachuca water umbel, spikedace and loach minnow in the San Pedro Riparian NCA.

To ensure compliance with terms and conditions of the 1999 Biological Opinion, all proposed UAV Program activities shall conform to the Reasonable and Prudent Measures and Mitigation measures listed in the BO. As a result, (as discussed in detail below), the proposed increase in UAV activity associated with alternatives evaluated in this EA will not cause any additional potential for significant impact to federally-listed species or critical habitat.

Canelo Hills Ladies' Tresses

The Canelo Hills ladies' tresses are known to occur within cienegas in the Canelo Hills near Canelo. The species is not known to exist on Fort Huachuca or in the Patagonia Mountains where UAV program activities are proposed. Ladies' tresses are subject to impact from direct mortality, human disturbance, fire, and water use.

Ground activities associated with the UAV program, such as target placement, vehicle movement, and construction activities will not impact this species. No target placement sites are located in or near Canelo where this species occurs. In addition, the road crossing of wetlands near Canelo is paved and a culvert is present. Even if vehicles were to travel through the area, they will not come into contact with the wetlands. UAV flights will not impact this species or its habitat. None of the proposed construction activities occur in areas containing habitat for this species nor is any site located near habitat for this species.

In the event of a mishap, the test director will activate the React Team. In the event of the UAV catching fire, the vehicle will be left to burn. The occurrence of fires near wetlands might lead to erosion and silting of areas where the species is present, and possibly impact individual plants. Whether fire would impact the wetlands may depend on the time of year and the intensity of the fire. The potential for fire exists but is low, and as addressed in Section 4.7, *Public Hazards, Health and Safety*, fire prevention and suppression measures will be employed at every target site and during field activities.

The Proposed Action does not involve any use of ground or surface water in the Coronado National Forest and is not anticipated to result in any increase in groundwater use. When UAV target placement activities occur, personnel will carry their own water. There would be no effect on available water for this species due to UAV activities.

Considering the small numbers of this species, their limited distribution, and the absence of the species at any target placement, the chances of the UAV program affecting the species are very low or discountable. However, there is a remote chance that a fire caused by the Proposed Action could affect the species. Therefore, the Proposed Action may affect, but is not likely to adversely affect the Canelo Hills ladies tresses , and will have no significant impact on this natural resource.

Huachuca Water Umbel

The Huachuca water umbel is a plant that is known to occur in wetlands located in both the Canelo Hills and the Patagonia Mountains. The Huachuca water umbel is also known to occur on Fort Huachuca and the nearby Babocomari River and San Pedro Riparian NCA. The water umbel is subject to impact from direct mortality, human disturbance, fire, and water use.

Ground activities associated with the UAV program, such as target placement, vehicle movement and construction activities will not impact this species. No ASA sites or surveyed target placement areas contain habitat for this species nor is any site located near habitat for this species. Where local paved roads that might be utilized while traveling to these sites from Fort Huachuca cross wetlands (cienegas), culverts are in place and vehicles would not come into direct contact with this species should the species be present at the crossing. UAV target placement activities would not occur immediately after rainfall or when the ground is saturated. Even if vehicles were to travel through the area, they will not come into contact with potential habitat for the species. UAV flights will not impact this species or its habitat. None of the proposed construction activities occur in areas containing habitat for this species nor is any site located near habitat for this species.

In the event of a mishap, the test director will activate the React Team. In the event of the UAV catching fire, the vehicle will be left to burn. The occurrence of fires near wetlands might lead to erosion and silting of areas where the species is present, and possibly impact individual plants. Whether fire would impact the wetlands may depend on the time of year and the intensity of the fire. The potential for fire exists but is low, and as addressed in Section 4.7, *Public Hazards, Health*

and Safety, fire prevention and suppression measures will be employed at every target site and during field activities.

The Proposed Action does not involve any increase in groundwater pumping or surface water. When UAV target placement activities occur, personnel will carry their own water. There would be no impact on available water for this species (primarily of concern for the San Pedro Riparian NCA populations) due to UAV activities. The Proposed Actions are not expected to have either a direct or indirect impact on the character or health of critical habitats within the San Pedro Riparian NCA.

Considering species limited distribution and absence at any proposed target, testing, or construction site, the chances of UAV program activities affecting water umbel are very low and discountable. However, there is a remote chance that a fire caused by the Proposed Action could affect the species or its critical habitat. Therefore, the Proposed Action may affect, but is not likely to adversely affect the water umbel and critical habitat designated for the species and will have no significant impact on this natural resource.

Huachuca springsnail

The Huachuca springsnail is known to occur in shallow areas of cienegas, near spring sources in the Canelo Hills and Patagonia Mountains. The Huachuca springsnail is also known to occur on Fort Huachuca and potential habitat exists in the San Pedro Riparian NCA. The springsnail is subject to impact from direct mortality, human disturbance, fire, and water use.

No ASA sites or surveyed target placement areas contain habitat for this species nor is any site located near habitat for this species. Where local paved roads that might be utilized while traveling to UAV sites from Fort Huachuca cross wetlands (cienegas) culverts are in place and vehicles would not come into direct contact with this species should the species be present at the crossing. No off road travel is proposed. None of the proposed construction activities occur in areas containing habitat for this species nor is any site located near habitat for this species.

In the event of a mishap, the test director will activate the React Team. In the event of the UAV catching fire, the vehicle will be left to burn. The occurrence of fires near wetlands might lead to erosion and silting of areas where the species is present, and possibly impact individual plants. Whether fire would impact the wetlands may depend on the time of year and the intensity of the fire. The potential for fire exists but is low, and as addressed in Section 4.7, *Public Hazards, Health and Safety*, fire prevention and suppression measures will be employed at every target site and during field activities.

There is also the potential for erosion to affect this species, should it occur with sufficient magnitude in a watershed occupied by this species. This species is not known to be present near any of the construction or target placement sites and this erosion is not considered a significant factor for this species relative to ground activities and access.

Considering the small numbers of this species, their limited distribution, and the absence of the species at any target placement, the chances of the UAV program affecting the species are very low or discountable. However, there is a remote chance that a fire caused by the Proposed Action could affect the springsnail populations. Therefore, the Proposed Action may affect, but is not likely to adversely affect the Huachuca springsnail, and will have no significant impact on this natural resource.

Bald Eagle

The bald eagle is known to occur in the region of southern Arizona and has the potential to occur in the Canelo Hills, Patagonia Mountains and on Fort Huachuca. However, habitats preferred by this species are not present at any of the proposed ASA sites, target placement areas or construction sites, and the species is not expected to occur at any UAV activity location. Potential impact to the bald eagle, should this species be found in the Canelo Hills or Patagonia Mountains in the winter or during the migration period are likely limited to disturbance and direct mortality.

The bald eagle is attracted to lakes and rivers, such as Parker Canyon Lake in the Canelo Hills and to dead animals. An individual bird could be attracted to dead animals on the roads within the ROI, but this is highly unlikely considering the very small number of this highly mobile species found in southern Arizona during migration and winter. It is highly unlikely that an individual of this species would be attracted to a particular ASA site or surveyed target area, as there are no specific resources at these sites to attract this species. The bald eagle is well known for its tolerance of human activities during the winter and migration period. There is the very remote possibility that an eagle eating a road-kill could be hit by a vehicle. This is even less likely in the case of slow moving military vehicles. Should an eagle be in the area of UAV activities, its response to approaching humans on the ground or in a vehicle would be to fly off

The presence of UAVs in flight in the vicinity of a flying or roosting bald eagle may cause a bird to interrupt its activities and possibly fly off. The potential for direct contact between UAVs and a bald eagle is very low. This is because eagles, like many birds, are highly maneuverable and avoid a flying UAV. In addition, UAVs generally fly at high altitudes where eagles are unlikely to be present. Therefore, the Proposed Action is not anticipated to have an effect on the bald eagle, and will have no significant impact on this natural resource.

Mexican Spotted Owl

The Mexican spotted owl is known to nest in the Sky Island mountain ranges of southeastern Arizona and northern Sonora (Block et al. 1995), including the Huachuca and Patagonia Mountains. There are over a dozen designated Protective Activity Centers (PAC) in the Huachuca and three in the Patagonia Mountains. Owls are usually found in or near their respective PACs throughout the year, although owls do disperse during the fall. This is especially true of immature owls, known to move between mountain ranges. The Mexican spotted owl is subject to impact from direct mortality, human disturbance, and fire.

Dispersing owls can be expected to roost almost anywhere in the Canelo Hills, Patagonia and Huachuca Mountains where there is sufficient cover, such as is found in larger oaks and riparian vegetation. In these areas the potential for direct mortality (through vehicle strike) is present, and there are several examples of this species being hit by vehicles (R.B. Duncan and S.M. Speich unpublished data). The potential is most likely limited to night and crepuscular periods. Such an occurrence in the Canelo Hills is remote, and only slightly more likely in the Huachuca and Patagonia Mountains.

The two UAV target areas in the Patagonia Mountains are located adjacent to two established Mexican Spotted Owl PACs. Both sites are within one half mile of known nest sites, and the access roads pass through the PACs. These sites and their associated Mexican spotted owls are exposed to daily traffic on the nearby roads and people associated with rural residences. There is the possibility that owls may roost during the day near the UAV target sites or forage during the night near the sites. Experience suggests that a deliberate attempt to disturb roosting birds would be needed for

them to leave their roost sites. In the unlikely event that vehicles and personnel were to establish an overnight target and "camp" directly under roosting owls, the birds may then fly to a new roost site. The effects of such disturbance would likely be short-lived, as the owls would likely find a new roost and resume their roosting activities. Recent studies of the potential effects of helicopters on roosting spotted owls in New Mexico also suggest that aircraft, even flying at tree top levels, would unlikely cause significant disturbance to roosting owls (Delaney, et al 1997)

There is the possibility that moving ground vehicles associated with UAV testing and training could strike an owl during the night when owls are moving about. However, considering the low speeds of ground vehicle travel (less than 25 mph) and infrequent use of target areas, the possibility of an interaction between owls and personnel or their vehicles is considered low.

The flight of UAV vehicles near roosting, foraging or nesting Mexican Spotted Owls is unlikely to significantly affect their behavior. Although owls may be aware of the presence of a UAV flying overhead, such presence is likely to only momentarily alter owl behavior. There is the possibility that moving air vehicles associated with the UAV testing and training could strike an owl when owls are moving about. However, considering the high altitude of UAV travel (higher than 1000 ft AGL), the possibility of an interaction between owls and UAV flights is considered very low.

Considering the small numbers of birds involved, the seasonal nature of movements, the variable nature of the movements, and the low rate of target placement area utilization, the probability of interaction between UAV activities and roosting or dispersing owls is very limited.

Construction activities associated with the Proposed Action will not affect areas with known populations of this species. Further, testing and training activities will not occur within or above Fort Huachuca PACs. The proposed construction activities are not expected to result in any disturbance of or impact to this species. The only exception to the above might be found at the Demonstration Hill airstrip, when oak woodlands are present on three sides of the site. This habitat is capable of providing roosting cover for a dispersing spotted owl, however it is unlikely an individual owl would be found in this habitat. Thus, it is very unlikely that any construction related activities would affect an individual of this species.

Fire in nesting, roosting, or foraging areas has the potential to affect the behavior of owls, should they be present. Little is known of the behavior of owls in the presence of fire. One owl in the Huachuca Mountains is known to have survived a fire, with singed feathers. If owls were present at the known nest sites in the Patagonia Mountains during a fire, danger from actual contact is limited by the presence of cliffs and caves at the sites. While the potential for fire exists, it is low. As addressed in Section 4.7, *Public Hazards, Health and Safety*, fire prevention and suppression measures will be employed at every target site during field activities.

The chances of the UAV program encountering an individual of this species is low and proposed activities are not likely to cause harm to or jeopardize the species. In the event that an individual of the species is present during target placement activities near PACs in the Coronado National Forest, the activity will likely only momentarily alter owl behavior. It is anticipated that the Proposed Action may affect, but is not likely to adversely affect the Mexican spotted owl, and will have no significant impact on this natural resource.

Southwestern Willow Flycatcher

The southwestern willow flycatcher is not known to occur within the Canelo Hills, Patagonia Mountains, or on Fort Huachuca. Suitable habitat for this species - dense and wet stands of willow,

cottonwood and saltcedar - does not exist and there are no known nesting locations of this species in the ROI (Paradzick et al. 2000). However, the flycatcher is known to occur in the San Pedro Riparian NCA to the east of the Fort. The southwestern willow flycatcher is subject to impact from direct mortality, human disturbance, fire and groundwater use.

Although an individual bird could appear in any area used by the UAV program during migration, the possibility of this happening is very low. If an individual were to occur it would probably remain in the area for only a short period of time before leaving.

Considering the very small numbers of this bird in the southwest, the limited time when they can be expected to pass through the region, and the lack of suitable flycatcher habitat in the ROI, the likelihood of UAV associated activities affecting the flycatcher is remote.

The Proposed Action a net decrease in water allocation for the UAV Program at Fort Huachuca. Therefore, no increase in water use is anticipated. The Proposed Actions is not expected to have either a direct or indirect impact on the character or health of habitats within the San Pedro Riparian NCA. Therefore, the Proposed Action is not anticipated to have an effect on the southwestern willow flycatcher or its critical habitat in the San Pedro Riparian NCA and will have no significant impact on this natural resource.

Lesser Long-nosed Bat

This species is known to roost in the Canelo Hills, Patagonia Mountains and on Fort Huachuca during the summer months in a number of abandoned caves and mines. Foraging areas for this species also exist in the Canelo Hills, Patagonia Mountains, and on Fort Huachuca where bats can be expected to occur at night, foraging on nectar and pollen of agave. The lesser long-nosed bat is subject to direct impact from human disturbance and direct mortality, although significant loss of foraging habitat by eliminating source food plants, such as agave, can also impact the species.

Daytime activities are not expected to impact the species as the bat is then confined to day roost sites or maternity colonies. It is at night that low flying UAVs could potentially affect foraging bats. The potential for direct contact between UAVs and bats does exist, although the actual probability of such an encounter is very low. This is because bats, like many birds, are very maneuverable and avoid a flying UAV. In addition, UAVs generally fly at high altitudes where bats are unlikely to be present.

In a study on the effects of noise on a maternity colony of lesser long-nosed bats, noise levels from military jet aircraft of 85 to 119 dBA outside the cave had little impact on the bats in the cave due to attenuation (Dalton and Dalton 1993). This may indicate that noise levels from the proposed action will have no impact on the lesser long-nosed bat in the roost sites on Fort Huachuca.

Agave are present in the vicinity of the Black Tower complex and the Demonstration Hill airstrip. However, agave are not dense in the areas immediately surrounding the airstrips and pre-construction surveys would be conducted and all agave impacted by construction would be mitigated (i.e. replaced or relocated). If construction activities were to take place at night, then potential exists for the temporary disturbance of bats that may pass, and perhaps forage, in the vicinity of the construction sites. Mitigation measures listed in Appendix D will reduce the potential for impact to the species and any foraging habitat to below a level of significance. Any short-term and localized disturbance is not likely to significantly effect individual bat fitness or population viability.

The presence of uncontrolled fire, ignited by construction activities, field activities, or UAV crashes does have the potential to impact the species but the potential for this impact is substantially reduced through the implementation of mitigation measures listed in Section 4.9.1.6. It is anticipated that the Proposed Action may affect, but is not likely to adversely affect the lesser long-nosed bat and will have no significant impact on this natural resource.

Sonora Tiger Salamander

The Sonora tiger salamander is known to occur on Fort Huachuca and may occur in stock tanks and springs in the Patagonia Mountains and Canelo Hills. The Sonora tiger salamander is subject to direct impact from human disturbance and direct mortality, although loss of aquatic habitat can also impact the species.

No ASA sites or surveyed target areas are located in habitat for this species. Thus, the potential for direct mortality at these sites as a result of target placement activity is very remote.

The access roads to some ASA or target placement areas pass through or across areas that are wet, with standing water, at least part of the year during periods of heavy rainfall. These include the access to Sites West 2 and 3, where the access road crosses Brushy Creek, and West 15 and 16, where the access road crosses Harshaw Creek and tributaries. Other roads cross usually dry creek beds. Whether this salamander is present at these crossing during wet periods is unknown, but the potential would exist to impact individuals during wet periods should they be present. Dispersing individuals could be encountered crossing roads during wet periods. However, target placement activities would not occur immediately after rainfall or when the grounds are saturated (see Mitigation Measures below).

In the event of a mishap, the test director will activate the React Team. In the event of the UAV catching fire, the vehicle will be left to burn. The occurrence of fires near wetlands might lead to erosion and silting of areas where the species is present, and possibly impact individual plants. Whether fire would impact the wetlands may depend on the time of year and the intensity of the fire. The potential for fire exists but is low, and as addressed in Section 4.7, *Public Hazards, Health and Safety*, fire prevention and suppression measures will be employed at every target site and during field activities.

Considering the small numbers of this species, their limited distribution, and the absence of habitat at proposed ASA sites and target placement areas, the chances of the UAV program activities affecting the salamander are very low and discountable. As a result, the Proposed Action may affect, but is not likely to adversely affect the Sonora tiger salamander and will have no significant impact on this natural resource.

4.9.1.6 Mitigation Measures for Federally-listed species

All relevant mitigation measures included in Appendix B of the *1999 USFWS Biological Opinion on Ongoing and Programmed Future Military Operations and Activities at Fort Huachuca, Arizona* (USFWS 1999) will be implemented as a part of the proposed action. A copy of these mitigation measures are provided as Appendix D. Additional mitigation measures (listed hereafter) will also be implemented to further reduce the potential for adverse impact on this resource. To further ensure compliance with the 1999 Biological Opinion, all proposed UAV program activities shall comply with the reasonable and prudent measures and their implementing terms and conditions, listed in the BO. To comply with USFS Mexican Spotted Owl management guidelines, activities at sites West 16 and 17 will be limited to the season from August 1 to January 31, annually.

No rocket-assisted night launches will occur from Pioneer and Rugge-Hamilton airstrips when the lesser long-nosed bats are present. When the bats are present, UAVs will launch to the east at the Rugge-Hamilton airstrip and will continue east until reaching normal flight altitude. Recoveries will be from the east to the west. UAVs will launch to the north or to the north with turns to the west at Pioneer airstrip and will continue in that direction until reaching normal flight altitude. Recoveries will be from the north to the south, or east. Standard launches and recoveries may occur at any time. UAV flight operations will have no adverse effect upon threatened and endangered species.

4.9.2 Alternative A – Full Facilities Plus Navy

Alternative A has the same activities and potential to affect biological resources within the ROI as described above under the Proposed Action. The continued presence of the U.S. Navy Pioneer program at Fort Huachuca will have no separate impact on biological resources on the installation and will not contribute to any additional disturbance or impact on listed species. Therefore, similar to the Proposed Action, implementation of Alternative A is anticipated to have no significant impact on biological resources within the ROI.

4.9.3 Alternative B – Enhanced Facilities

Alternative B is identical to the Proposed Action with the exception of three specific construction activities that will not be implemented under this alternative (described in Section 4.1.3). Under this alternative, the failure to implement these three construction activities will create even less of a potential for adverse impact on biological resources within the ROI. Therefore, similar to the Proposed Action, as described in Section 4.9.1, Alternative B is not anticipated to have any significant impact to biological resources within the ROI.

4.9.4 Alternative C – Existing Facilities

Under Alternative C, Fort Huachuca would continue to use current UAV facilities in support both existing and proposed UAV programs as described in the Proposed Action. Implementation of Alternative C is not anticipated to have any significant impact on biological resources.

4.9.5 Alternative D – No Action

There would be no significant impact on biological resources (on or off of the installation) under the No-Action Alternative.

4.10 CULTURAL RESOURCES

Potential environmental consequences to cultural resources could result from ground-disturbing activities such as grading and excavation for new construction. A determination of significant impact to cultural resources (prehistoric, historic or traditional) could result if one or more of the following criteria were met:

- Any adverse effect on properties listed on, or determined eligible for, the National Register of Historic Places.
- Proposed construction activities were to disturb or damage cultural resources and/or cultural resource sites.

4.10.1 Proposed Action

Two activities associated with the Proposed Action have the potential to impact cultural resources: use of ASA sites and target sites during field exercises, and construction activities associated with the improvement of UAV program facilities on Fort Huachuca.

Use of ASA Sites and Surveyed Areas

In selecting ASA and targeting sites for UAV testing and training activities, care was used to avoid all prehistoric and historic cultural resources located within the region. All off-post and on-post ASA and target sites have been surveyed and were found to be without historic or cultural resources. All training ranges have been in use for many years and have been selected to avoid all known cultural and historic sites. If cultural or historic material is discovered during the course of UAV activities, training will be stopped at the site pending a review by the Post Archaeologist. Using surveyed locations and halting activities at the first sign of an archaeological discovery will ensure that thresholds of significance are not exceeded. The proposed use of on-post and off-post ASA and target sites and staging areas will not significantly impact cultural resources. Archaeology survey reports are on file at the ENRD office, Fort Huachuca.

Construction Activities

The proposed locations for new construction activities have not been surveyed for cultural or historic resources because the exact site layout for these facilities has not yet been determined. Prior to any site-specific construction, a site-appropriate survey will be conducted under the direction of the Post Archaeologist. If any sites of archaeological significance are discovered during earth-moving activities associated with construction, all activity will stop immediately pending a review by the Post Archaeologist.

Given the precautions that will be taken and that no activities will occur in the vicinity of the historic portion of the Fort, it is unlikely that the significance criteria listed above would be met or exceeded. Therefore, it is concluded that the Proposed Action will have no adverse effect on properties listed on, or determined eligible for, the National Register of Historic Places, and will not disturb or damage cultural resources and/or cultural resource sites. A concurrence letter from the SHPO will be requested.

No mitigation measures are required for cultural resources, however, personnel involved in UAV activities will be instructed on the importance of avoiding historic and cultural resource sites. A qualified archaeologist will monitor any earth moving activities to ensure that neither direct nor indirect impacts occur. The archaeologist will also monitor construction procedures. Any prehistoric or historic sites encountered will be evaluated and avoided. Any necessary mitigation will be coordinated with the SHPO and implemented prior to resumption of construction activities. In this way, any potential cultural resource impacts will be reduced.

4.10.2 Alternative A – Full Facilities Plus Navy

Alternative A has the same activities and potential to affect cultural resources within the ROI as described above under the Proposed Action. The continued presence of the US Navy Pioneer program at Fort Huachuca would have no separate impact on cultural resources on the installation. Therefore, similar to the Proposed Action, implementation of Alternative A will have no significant impact on cultural resources within the ROI.

4.10.3 Alternative B – Enhanced Facilities

Alternative B is identical to the Proposed Action with the exception of the reduced level of construction. Under this alternative, the reduced construction activities will create even less of a potential for adverse impact on cultural resources within the ROI. Since the potential impacts associated with Alternative B will be less than the Proposed Action and the Proposed Action is not anticipated to result in any significant impacts, it is concluded that Alternative B will not result in any significant impacts on properties listed on, or determined eligible for, the National Register of Historic Places, and will not disturb or damage cultural resources and/or cultural resource sites.

4.10.4 Alternative C – Existing Facilities

Under Alternative C, Fort Huachuca will continue with the exact same use of current UAV facilities in support of existing and proposed UAV program activity as under the Proposed Action. However, this alternative will not include any new facilities or any upgrades to existing facilities at the Fort. There is the same potential for effect on ASA sites during training and testing activities as the Proposed Action. The precautions surrounding the use of ASA sites described in the Proposed Action will be employed under Alternative C. Therefore, this continuation of UAV program activities at Fort Huachuca will have no significant impact on properties listed on, or determined eligible for, the National Register of Historic Places, and will not disturb or damage cultural resources and/or cultural resource sites within the ROI.

4.10.5 Alternative D – No Action

Currently proposed increases in UAV testing and training at Fort Huachuca may not occur, and this would have no impact on local or regional prehistoric or historic resources. Therefore, under the No-Action Alternative there will be no adverse impact on cultural resources within the ROI.

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5.0 CUMULATIVE IMPACT ANALYSIS

Cumulative impacts are defined in the CEQ regulations (40 CFR 1500-1508) as those impacts attributable to the Proposed Action combined with other past, present, or reasonably foreseeable future impacts regardless of the source or agency causing them. This cumulative impact analysis looks at the impacts of the Proposed Action and alternatives in connection with related past, present, and reasonably foreseeable future actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. However, in order to be considered a cumulative impact, the effects must:

- Occur in a common locale or region.
- Not be localized (i.e., they would contribute to effects of other actions).
- Impact a particular resource in a similar manner.
- Be long-term (short-term impacts would be temporary and would not typically contribute to significant cumulative impacts).

5.1 ANALYSIS OF CUMULATIVE IMPACTS

Analysis of cumulative impacts requires the evaluation of a broad range of information that may have a relationship to the Proposed Action and alternatives. A good understanding of the politics, sociology, economics, and environment of the region is key to this analysis, as is an accurate evaluation of factors that contribute to cumulative impacts. The most common regional and local environmental concerns voiced during previous public scoping activities included:

- Trends relating to water resources (the San Pedro River, groundwater mining, water quality).
- Trends affecting ecological resources (particularly federally-listed species and their habitats).
- Population growth and economic activity in the Fort Huachuca/Sierra Vista area and the resulting implications on water and ecological resources in the region.

All resource areas were examined for regional conditions and the potential for the Proposed Action and alternatives to contribute to regional trends or environmental conditions. Impacts from the Proposed Action were determined to have no substantial contribution (and no significant impact) to regional trends or conditions of the environment on the following resources:

- Land Use
- Air Quality
- Noise
- Transportation
- Public Services, Utilities, Energy
- Public Hazards, Health, and Safety
- Cultural Resources

These areas are not further discussed from a cumulative impact perspective.

Although population growth and economic activity were listed above as a primary area of regional concern, the Proposed Action would decrease the level of FTE authorizations for the UAV Program at Fort Huachuca which represents only a fraction of local and regional economic activity. The Proposed Action would have no contribution to regional growth patterns and is not considered significant in a regional context.

The cumulative impacts of socioeconomic changes in the Sierra Vista area present quite a different picture. Despite the decline in employment and a decrease in the total economic contribution from the Fort to the Sierra Vista area since 1995, the Sierra Vista area population has continued to grow at a rate of approximately two-percent per year.

The following sections address the only two resource areas where the impacts of the Proposed Action and alternatives, in connection with related past, present, and reasonably foreseeable future actions warrant further consideration (i.e. water resources and biological resources and ecosystems). This consideration is given because of the elevated sensitivity regarding these resources, not because the Proposed Action or alternatives would create any significant contribution to cumulative impacts on these resources. In fact, the Proposed Action and alternatives would have no significant contribution to past, present, and reasonably foreseeable future actions in the local or regional context for any given resource including water resources and biological resources and ecosystems.

5.1.1 Water Resources

The Sierra Vista subwatershed of the Upper San Pedro River is an extremely active area with respect to water resource management activities. Concern about regional groundwater withdrawal and potential impacts to the stream flow in the San Pedro River have increased in recent years. Considerable effort has been devoted to assessing the nature and extent of these impacts, as well as to developing and implementing plans to mitigate any adverse impacts. The City of Sierra Vista, Fort Huachuca, numerous federal, state, and local agencies, and a large number of citizens and interest groups have been involved in this process. The City of Sierra Vista and Fort Huachuca are actively pursuing and are in the process of implementing a wide variety of water recharge and consumption-reduction projects that will have a positive cumulative impact on regional water resources (Table 5.1-1).

Through careful planning, Fort Huachuca has experienced an overall decline in installation water use. In addition, several regional watershed improvement and recharge projects are anticipated to contribute to favorable trends in regional water resource management.

The Fort's contribution to cumulative impacts on water resources has declined significantly in recent years. While the reduced employment at the installation has contributed somewhat to this decline, better management of water resources and treated effluent reuse have been a more significant factor. The Proposed Action includes a reduced level of FTE authorizations for the UAV Program and will ensure the trend in downward water use trend continues.

The region is experiencing a continuing population increase despite declines in employment at Fort Huachuca over the last decade. This decline increases the complexity of determining the interrelation of local positive trends with regional trends with respect to water and dependent ecological resources. If off-post population, urban growth, and urban water consumption in the region continue to increase as projected, additional measures will be required in the region to protect the Sierra Vista subwatershed and existing environmental resources. Another risk to both the water resources and ecological resources of the region is posed by economic activities within the San Pedro River watershed in Mexico. Existing and planned mining activity (USGS 1996) could pose a direct impact to regional water resources. Ongoing expansion of mining activity in northern Mexico, combined with the possible development of at least one additional major mine within the basin, would result in major increases in water consumption upstream of the international border (USGS 1996).

Table 5.1-1. Major Water Resource Projects and Studies at Fort Huachuca As of January 2000

Project	Goal	Status
Demolish WWII Wood Structures	Remove/shut off leaky potable water and sewer infrastructure	Work began in 1992 and will continue through 2002, subject to availability of funds. Over 1 million sq. ft demolished since 1992.
Low-flow fixture retrofit Replacement of urinals in high-use areas with waterless models	Replace older, higher use fixtures to reduce water use	Began in 1992. Replaced shower heads and toilets and added aerating faucets to reduce consumption. 275 waterless urinals installed from July 1997 to present, 80 pending installation. Each can save approximately 45,000 gal. per year in high use areas. Replacement of 2.5 gpm to 1.5 gpm showerheads underway since July 1999.
Landscape renovation	Reduce irrigation	Xeriscaped some existing areas, required desert landscaping in new construction. Goal is at least 1 acre per year for conversion
Use of effluent for irrigation	Use treated effluent where irrigation required, if cost effective	Began in 1969. Effluent used for Chaffee Parade Field, Outdoor sports complex and Golf Course. New ET monitoring system installed in Nov. 1999 to reduce watering and make more effluent available for recharge.
Lawn watering reduction (installation irrigation policy)	Minimal, prudent use of water	March 1994 (and updates) policy restricts all watering to low-evaporation times of day. Residential units allowed only 4 hr. per week, 2 months per year. Enforcement by Commanders and Military Police.
East Range Watershed Improvement	Improve infiltration and recharge, reduce erosion	Funding greatly reduced by TRADOC. Most ITAM funds are in withhold for TRADOC Operations
Riparian Area Protection Projects	Restore or protect riparian areas on post	Funding varies year-to-year
Artificial Aquifer Recharge	Return 1,000 ac.ft. or more of treated effluent and stormwater to the aquifer annually	2 projects funded. Both are in design. Major project on the East Range will be state-of-the-art shallow basin recharge.
Groundwater monitoring	Monitor static groundwater levels to determine trends	A line of wells was installed on Fort Huachuca between State Route 90 and the San Pedro River in 1994. Monitoring water levels every 50 days began in Feb. 1995. HEC provides annual analysis Fort Huachuca also funded the establishment and maintenance of a USGS stream gage on a major tributary to the San Pedro
Regional and other geophysics studies	To better understand the hydrologic connectivity of the region	State-of-the-art geophysics to provide information on the basin configuration and the general health of the water table. First half was published by USGS in Jan. 1999, more is in progress.
Leak detection surveys	Find leaky infrastructure and repair	Potable lines surveyed in 1997, leaks repaired. Reservoir adjustments in 1999 measurably reduced pumpage. Sewer line lead detection funded to begin in FY2000.
Pilot projects: • Roof top capture, Vet Clinic • Hot water return systems • Horizontal axis washers	 • Capture and reuse roof runoff • Determine adaptability of technologies for use on the Fort	 • Installation complete, but design flaws discovered • Different status for each technology
Water Wise Conservation Education Program	To reduce unnecessary water use by Fort residents and employees	Publications and presentations tailored for Fort. Program began in October 1998.

Overall, the water resource future of the region is complex and difficult to predict because it is comprised of both negative and positive trends. However, the contribution of the Proposed Action to cumulative impacts on water resources will be positive although not significant. Because of the Proposed Action and its resulting changes in the Fort's UAV program composition (to reflect a change in UAV developmental and operational programs), the water use projection for the UAV Program will decline from its FY00 estimate by 36.36 ac-ft to an estimated 15.21 ac-ft in FY01. The relocation of the U.S. Navy Pioneer Program will remove an additional 47.23 ac-ft (15,388,714 gal) of water use per year, which further reduces overall UAV Program water consumption. Cumulatively, these water use reductions are estimated at an 83.59 ac-ft (27,235,711 gallons) decline from projected FY00 levels. Because of these estimates and ongoing and planned water conservation, recharge and reuse programs at Fort Huachuca through FY07, the Proposed Action is not anticipated to result in a net increase in annual water use at the Fort.

Selection of the No-Action Alternative would mean that existing levels of estimated water use associated with the UAV program would continue. Thus, while there would be no significant impact associated with the No Action alternative, the reduced level of water use associated with the Proposed Action and its resulting changes in the Fort's UAV program composition described above would not occur.

5.1.2 Biological Resources and Ecosystems

Cumulative impacts to ecological resources on Fort Huachuca and in the greater region (including the Patagonia Mountains, Canelo Hills, and San Pedro Riparian NCA) are the result of the complex interactions of several different trends. The Fort's water resources utilization and conservation as discussed above is a factor in the overall future of local ecological resources and protected species. It addresses both groundwater and local riparian concerns, and will provide an important long-range contribution to the overall health of the region's ecological resources, particularly that of the San Pedro Riparian NCA. This NCA is critical habitat for a number of species (to include avian, plant, and fish) and serves as a significant international migratory bird corridor in the Southwest.

As a result of Fort Huachuca's activities, the Army's effect on ecological resources is diminishing. This positive trend will continue and strengthen in the future. Implementation of the Proposed Action would not impact the Fort's efforts to directly improve regional groundwater conditions and support the recovery of species populations. Likewise, regional population growth and economic activity not associated with the Fort (and resulting increases in private groundwater consumption in the Sierra Vista subwatershed) may overshadow and offset these efforts.

Another regional issue that presents significant environmental concerns to biological resources is the intrusion of non-native or exotic species into the area and the accompanying displacement of vulnerable native species. Some non-native species have shown the ability under current conditions to out-compete native species. These include fish species in the San Pedro River, grasses (i.e., buffel, Johnson, and Lehmann's lovegrass), bullfrogs, and tamarisk. Several programs introduced by Fort Huachuca address these concerns. The Proposed Action does not contribute to any cumulative impact with respect to this non-native species concern.

In the larger regional and international context, Fort Huachuca's contribution to cumulative impacts on ecological resources has been quite positive for many years. Fort Huachuca serves as a federal protectorate of several species of federally-protected threatened and endangered species

and their on-post habitats. Both independently and together, the various components of the Proposed Action would have no contribution to trends in ecological resources already being experienced on the Fort or in the region. With respect to the San Pedro Riparian NCA, the Proposed Action will have no impact on ecological conditions and the quality of habitat in the area.

Alternative A will have a similar potential for cumulative impact on the human environment as the Proposed Action with the exception of a slightly higher level of water use associated with the US Navy Pioneer program. This additional water use is not anticipated to cause any increase in annual water use at Fort Huachuca and as such is not considered a significant impact or contribution to cumulative impacts on water resources in the region. Alternative A would have no significant contribution to past, present, and reasonably foreseeable future actions in the local or regional context for any given resource.

Alternative B and Alternative C will have similar impacts to the human environment as the Proposed Action but to a much smaller degree. Because the Proposed Action is anticipated to have no significant contribution to cumulative impacts on regional resources, Alternative B and Alternative C would likewise have no significant contribution to past, present, and reasonably foreseeable future actions in the local or regional context for any given resource.

With Alternative D (No-Action Alternative), the program and actions would not be implemented. There would be no reduction in UAV Program authorizations (FTEs) and the associated reduction in water use allotment to the UAV Program would not occur. While this would represent an adverse impact, it would not be significant in the regional or local context of biological resources and ecosystems.

5.2 SUMMARY

In summary, neither the Proposed Action nor any alternative would be anticipated to result in any significant contribution to past, present, and reasonably foreseeable future actions in the local or regional context for any given resource including water resources and biological resources and ecosystems. The Proposed Action, however, is a more favorable alternative because of projected reductions in program-related water use (see Section 6 for a more thorough discussion of potential impacts related to the various alternatives under analysis).

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6.0 FINDINGS AND CONCLUSIONS

Fort Huachuca is a center for Department of Defense (DOD) UAV developmental testing and operational training programs. UAV activities that currently occur on Fort Huachuca include the developmental testing of a wide variety of UAVs, operational training of UAV operators and maintainers (maintenance technicians), and the development of operational combat units. The Fort's geography, climate, remote location, and facilities provide the DOD with excellent conditions for a national UAV testing and training center. Fort Huachuca has been serving the DOD in this capacity for over 10 years, but existing facilities are inadequate to meet the future needs of the program. In short, Fort Huachuca is proposing to expand its capability to support future UAV programs.

All land uses associated with the construction of facilities, the placement of targets, and the use of ASA sites both on and off the installation under the Proposed Action are consistent with surrounding land uses and are within the scope of applicable land use controls; no thresholds of significance will be exceeded. Additionally, the Proposed Action will have no significant impact on, or conflict with, existing or planned land use capabilities of Forest Service lands. The proposed use of public lands is in accordance with the multi-use objectives of the Forest Management Plan for the Sierra Vista Ranger District.

The air quality of the region will not be adversely affected by the Proposed Action. The total emissions (0.6 tons of PM_{10}/yr. and 262 pounds of ROG/yr.) generated by the proposed UAV flight and target placement activities is not anticipated to exceed any federal or state air quality standards. Likewise, the disturbance of approximately 40 acres (16.1 ha) for construction purposes will produce a temporary impact of less than 10 tons of PM_{10} and 0.003 tons of ROG per year over the seven year period. Again, this level of emissions is not anticipated to cause the Fort to exceed federal or state air quality standards. The procedural requirements of the General Conformity Rule are not applicable to these actions, since activities will occur within a NAAQS attainment area.

Three UAV runways (Rugge-Hamilton, Pioneer, and Hubbard) are a considerable distance from the cantonment area at the Fort or any other populated area, which decreases any impacts to surrounding communities due to noise. By flying UAVs over sparsely populated areas, the number of people exposed to any increases in noise is reduced. Despite the quiet nature of the vehicles, some extremely rural communities in the area (Sonoita, Patagonia, Elgin) find the UAVs more noticeable due to a lack of ambient noise. However, studies have found that the noise emitted from the UAVs does not exceed 67 dBA. Given the brief and sporadic exposure to the slightly elevated noise levels, no significant impacts occur. One UAV runway (the East Range Airstrip) is located within a mile of residential areas in Sierra Vista. At this location, all flights are required to approach and depart to the north, over the East Range. The neighborhoods of Sierra Vista are not flown over during any UAV activities.

Noise levels generated by RATO launches are far louder than typical UAV activities. However, these launches only occur at the remote UAV airstrips, and the noise generated dissipates prior to reaching any sound sensitive areas. Noise generated during construction is estimated to be approximately 85-90 dBA. At a distance of 890 feet, the noise will fall below the 65 dBA threshold. For the most part, construction activities will also occur in remote portions of the Fort, with the exception of the regrading of the East Range Airstrip. Noise from grading activities will dissipate prior to reaching any noise sensitive areas; the East Range Airstrip is more than 890 feet from the residential areas so these levels will not have an adverse affect on the surrounding

community. Overall, there are no significant impacts associated with the proposed UAV activities as it pertains to noise.

The number of full time equivalent (FTE) positions for UAV student throughput in FY00 was projected to be 531 positions (USAIC 1993). This figure includes the US Navy Pioneer program. Under the Proposed Action, which includes the departure of the US Navy Pioneer program, projected student throughput (in FTE positions) for FY01 (the inception of the Action) are projected to be approximately 161. The proposed changes in the UAV program would, in effect, result in a decrease of approximately 370 FTE positions authorized at the Fort in FY01. CERL multipliers of 3.71 for Arizona and 1.684 (taken from DRM 1999) for Cochise County were used and the estimated impact to the State and County are approximately 1,372 and 620 respectively. The loss will vary as the student population changes. The effects of this change in workforce at the Fort will not be significant in a local or regional context. There will be no significant socioeconomic impact to Fort Huachuca or the surrounding communities as a result of the Proposed Action.

Overall, the change in the job equivalents represents a stabilization in the workforce at Fort Huachuca. The effects of this change in workforce will not be significant in a local or regional context. There will be no significant socioeconomic impact on Fort Huachuca or the surrounding communities as a result of the Proposed Action. All Socioeconomic components evaluated will only change nominally, and none of the actions associated with the Proposed Action will affect any particular population significantly. No single group or population will be disproportionately adversely affected by any of these changes.

The increased activities associated with the Proposed Action will have some effect on both aviation and road traffic. As of 1999, the UAV program was responsible for 52 percent of all military-aviation radar traffic counts and 42 percent of the total radar traffic counts at LAAF. A proposed land exchange would also increase the Sierra Vista portion of LAAF by approximately 203 acres, which would result in an increase in aviation operations. As a result, airspace conditions will become more congested at LAAF (Coffman Associates 2000) and increased UAV activity within the region will be most noticeable at LAAF. The Proposed Action includes an estimated 30 percent increase in annual UAV flight operations, bringing the number of flights counted by LAAF ATC to approximately 24,250. These increased UAV flight operations within the vicinity of LAAF have the potential to interfere with normal airfield operation. Further, if control of a UAV is lost, or if the UAV and associated chase aircraft veer off course, there is the potential for these aircraft to interfere with approaches, departures, and runway activities at LAAF and Hubbard Assault Airstrip. This additional air traffic will result in an impact on LAAF and Hubbard Assault Airstrip, but the effects will be localized and not experienced throughout the region.

Target placement activities will result in increased road traffic on regional roadways, but would not introduce any substantial safety hazard to motorists, pedestrians, or bicycles (military or civilian). As part of the permitting process, State Highway Regulations that have been incorporated into County regulations require that UAV program testing events not impede traffic or become a road hazard on public highways or roadways.

There are no activities associated with the Proposed Action with the potential to significantly impact the human environment regarding the provision of public services, utilities, or energy consumption. All utilities at Fort Huachuca are well under maximum capacity and the Proposed Action will not cause any utility to exceed its present and/or future capacity to serve.

During the routine use of vehicles for training or testing events, no human will be exposed to unsafe levels of hazardous materials or waste, and no hazardous materials will be generated. Measures will be taken to ensure that there are no uncontrolled releases of hazardous materials onto soil, surface water, or groundwater. Overall, the routine use of vehicles will not endanger any personnel, visitors, residents, or general public on base or at off-site locations.

UAVs are remotely controlled and the programs at the Fort are instructional on the use of these aircraft; the potential exists for UAVs to crash during testing and training activities. Losing control of the UAV while it is at altitude can result in the vehicle travelling some distance before hitting the ground. Given the unpredictable and uncontrollable nature of these possible mishaps, the UAV Crash/Incident/Mishap Investigation and Recovery Plan was written to direct actions following a mishap. The occurrence of a mishap has the potential to result in a significant impact. The potential for the loss of control of a UAV in or near populated areas is negligible. Flight profiles do not traverse highly populated areas. Further, most UAV mishaps occur on take-off and landing, both of which will be conducted on-post in remote areas designated for this type of use. The likelihood of catastrophic loss of control is low. Responses to the mishaps as delineated in the Plan will mitigate the impacts to below the threshold of significance.

During routine use of equipment that release electromagnetic energy or use lasers (only proposed on the East Range) standard precautions, supervision, and training will be employed to ensure that no humans are inadvertently harmed. Overall, the use of lasers and electromagnetic energy will not endanger any personnel, visitors, residents, or general public on base or at off-site locations.

A number of erosion control BMPs have been identified as mitigation measures. Implementation of these measures (i.e., in lieu of Section 404 permit requirements) will reduce water quality impacts for the Proposed Action below a level of significance.

Project-related construction activities would involve the short-term use and storage of hazardous substances, such as vehicle fuels and lubricants. Accidental discharges of such substances during operation or maintenance activities (e.g., while refueling or changing vehicle fluids) could result in significant impacts to surface water quality, especially in areas within or adjacent to drainage courses. This type of discharge could result in significant effects to downstream areas along the Babocomari and San Pedro Rivers. Mitigation measures will prevent accidents that could result in a significant impact.

Because of changes in the Fort's UAV program composition (to reflect a change in UAV developmental and operational programs) and projected student requirements, the water use projection for the UAV Program will decline from its FY00 estimate by 36.36 ac-ft to an estimated 15.21 ac-ft in FY01. The relocation of the U.S. Navy Pioneer Program will remove an additional 47.23 ac-ft of water use per year, which further reduces overall UAV Program water consumption. Cumulatively, these water use reductions are estimated at an 83.59 ac-ft decline from projected FY00 levels. Because of these estimates and ongoing and planned water conservation, recharge and reuse programs at Fort Huachuca through FY07, the Proposed Action is not anticipated to result in a net increase in annual water use at the Fort.

Although the concern over regional groundwater withdrawal remains, the Proposed Action will not significantly impact the usable groundwater aquifer for municipal, private, or agricultural purposes through depletion, recharge, or contamination. The action will not result in any increase to the Fort's annual water withdrawal. The Proposed Action is not anticipated to result in an increase in soil settlement or ground swelling that damages structures, utilities, or other facilities caused by

inundation and/or changes in the groundwater level. The Proposed Action will not result in any significant impact to local or regional groundwater resources.

Proposed construction activities on Fort Huachuca will disturb existing vegetation in the areas proposed for site development. This development will require the permanent removal of approximately 20 acres (8.1 ha) and temporary disturbance of 40 acres (16.8 ha) of native grasses and vegetation. It is estimated that only 5 acres (2.0 ha) of native vegetation would be lost on the West Range, 10 acres (4.0 ha) on the East Range, and 5 acres (2.0 ha) within the cantonment area (at LAAF). The remainder of the areas to be disturbed during construction would be revegetated with native species and thus only temporarily disturbed. Without mitigation, this loss of vegetation would have an adverse impact on the availability of wildlife habitat, but this impact would not be significant.

The concern over collisions between birds and low-flying UAVs is restricted to areas on Fort Huachuca where approach and departure activities (take-offs and landings), and low-level operational training occur. Student training on Fort Huachuca can include the use of Small UAVs at altitudes less that 1000 ft near the Pioneer Runway, Rugge-Hamilton Runway, Demonstration Hill airstrip, Hubbard assault strip and East Range airstrip. While these UAVs have the potential to disturb birds in flight, the natural dexterity of birds and the slow rate of speed associated with the Small UAVs largely precludes the potential for a mid-air collision. UAV activities at Fort Huachuca over the past several years have not encountered any problems with collisions with wildlife and this is not anticipated to be a major concern in the future. It is anticipated that there will be no significant impact to wildlife from UAV flight activities associated with the Proposed Action.

The common wildlife species found at and surrounding the proposed construction sites on the Fort would be displaced during construction. However, considering that similar habitat exists in the immediate vicinity, the impact of this habitat displacement is expected to be relatively minor and is not expected to be significant.

It is anticipated that the Proposed Action would have no effect on the bald eagle and southwestern willow flycatcher and their critical habitats. The Proposed Action may affect, but is not likely to adversely affect the Mexican spotted owl, lesser long-nosed bat, Canelo Hills ladies' tresses, Huachuca springsnail, Sonora tiger salamander, and the Huachuca water umbel and their critical habitats. The impact of the Proposed Action on these species is not significant. All relevant mitigation measures included in Appendix B of the *1999 USFWS Biological Opinion on Ongoing and Programmed Future Military Operations and Activities at Fort Huachuca, Arizona* (USFWS 1999) will be implemented as a part of the proposed action. A copy of these mitigation measures are provided as Appendix D. To further ensure compliance with the 1999 Biological Opinion, all proposed UAV program activities shall comply with the reasonable and prudent measures and their implementing terms and conditions, listed in the PBO.

In selecting ASA and targeting sites for UAV developmental testing and operational training activities, care was used to avoid all prehistoric and historic cultural resources located within the region. All off-post and on-post ASA and target sites have been previously surveyed and were found to be without historic or cultural resources. All training areas have been in use for many years and have been selected to avoid all known cultural and historic sites. If cultural or historic material is discovered during the course of UAV developmental testing or operational training exercises, activities will be stopped at the site pending a review by the Post Archaeologist. Using surveyed locations and halting activities at the first sign of an archaeological discovery will ensure the

thresholds of significance are not exceeded. The proposed use of on-post and off-post ASA and target sites and staging areas will not significantly impact cultural resources.

The proposed locations for new construction activities have not been surveyed for cultural or historic resources because the exact site layout for these facilities has not yet been determined. Prior to any site-specific construction, a site-appropriate survey will be conducted under the direction of the Post Archaeologist. If any sites of archaeological significance are discovered during earth-moving activities associated with the construction, all activity will stop immediately pending a review by the Post Archaeologist. Given the precautions that will be taken and that no activities will occur in the vicinity of the historic portion of the Fort, it is unlikely that any significance impacts will occur.

Population growth and economic activity are a primary area of local and regional concern. The Proposed Action is anticipated to result in a decrease in the levels of FTE authorizations for the UAV Program at Fort Huachuca, which represents only a fraction of local and regional economic activity. The Proposed Action is not anticipated to contribute to regional growth patterns and therefore, will have no significant impact on the regional economy or regional growth. The cumulative impacts of socioeconomic changes in the Sierra Vista area present quite a different picture. Despite the decline in employment and a decrease in the total economic contribution from the Fort to the Sierra Vista area since 1995, the Sierra Vista area population has continued to grow at a rate of approximately two-percent per year.

Through careful planning, Fort Huachuca has experienced an overall decline in installation water use. Because of this trend, the Fort's contribution to cumulative impacts on water resources has declined significantly in recent years. While the declining employment at the installation has contributed somewhat to this reduction, better management of water resources has been a more significant factor. The reduced level of FTE authorizations for the UAV Program under the Proposed Action is anticipated to contribute to the trend in downward water use.

As a result of Fort Huachuca's activities, its impacts on ecological resources is diminishing, and its contribution to the recovery of species populations and their habitats is increasing. This positive trend will continue and strengthen in the future. Implementation of the Proposed Action is not anticipated to impact the Fort's efforts to directly improve regional groundwater conditions and support the recovery of species populations. Likewise, regional population growth and economic activity not associated with the Fort (and resulting increases in private groundwater consumption in the Sierra Vista subwatershed) may overshadow and offset these efforts.

Impacts associated with Alternative A (Full Facilities with Navy) vary slightly from those described for the Proposed Action. These differences are due directly to the fact that the presence of the Navy Pioneer program will mean additional people who are associated with UAV activities would be stationed at the Fort. The two areas that would be affected by this increase in personnel are socioeconomics and potable water issues Alternative A includes 161 FTE positions associated with the Proposed Action in FY01 plus the FTEs associated with the US Navy's Pioneer program. The total level of student throughput (in FTE positions) that will be trained at the Fort under Alternative A for FY01 is approximately 261. This is a decrease from previous projections for FY00 by approximately 270. When the CERL economic multiplier of 3.71 for the State of Arizona is applied to the loss of 270 FTE positions, it is indicated that Alternative A would result in a an equivalent of 1001 jobs in the State that would not be filled. Likewise, when the Cochise County multiplier of 1.684 is applied, approximately 623 job equivalents within the County may not be filled. While this

is a slight decrease in the existing workforce, the change will be nominal (less than 1 percent). In a similar fashion, the effects on the economic activity and housing markets in the area will be very slight. Overall, there will be no significant socioeconomic impact to the region as a result of Alternative A.

Alternative A has a similar potential to affect water resources as described above under the Proposed Action, however the continued presence of the U.S. Navy Pioneer program at Fort Huachuca will require the continued allocation of 47.23 ac-ft (15,388,714 gal) of water per year. This water use is already accounted for in the Fort's 1998/99 water consumption budget and the continued presence of the Pioneer program will only decrease the overall level of water use reduction associated with the Proposed Action. All mitigation measures listed above (under the Proposed Action) will be implemented under this alternative. Therefore no significant impact to regional groundwater is anticipated should Alternative A be implemented.

The impacts associated with Alternative B and Alternative C are either identical or slightly less than those described in the Proposed Action. Some impacts are less that with the Proposed Action because of a reduced level (Alternative B) or the elimination (Alternative C) of construction activities. The proposed number of students, instructors and personnel and the activities that will be conducted are otherwise identical to the Proposed Action. Therefore no significant impact to the human environment is anticipated should Alternatives B or C be implemented.

Alternative D (the No-Action Alternative) represents the continuation of the status quo. Under this alternative, the current UAV activities would continue without the addition of programs, personnel, or facilities. While no environmental impacts would be expected to occur under this alternative, it fails to meet the needs of the DOD for increased UAV activities.

Therefore, it is the conclusion of this analysis that neither the Proposed Action nor any of the alternatives constitute a major federal action with significant impact on the human environment, and a Finding of No Significant Impact should be issued to complete the documentation.

7.0 PREPARERS AND CONTRIBUTORS

Michael G. Collins, Project Manager. Postgraduate Studies, Environmental Planning and Design, Arizona State University, Master of Environmental Planning, Arizona State University, B.S. Urban Planning and Development, University of Southern California.

Jeanine Gomez-Byl, B.A. Business Administration, George Washington University, Averett College.

Daniel D. Haws. Environmental Attorney, US Army Garrison, Fort Huachuca, Arizona.

Kathleen Hill, Hydrogeologist. M.S. Environmental Pollution Control (Hydrology), Pennsylvania State University, B.A. Geological Sciences, Lehigh University.

Gretchen R. Kent, Physical Scientist/National Environmental Policy Act (NEPA) Program Coordinator. Fort Huachuca, AZ. M.S. Geology, (Geochemistry/Volcanics), Michigan Technological University. B.A. Earth Science, Dartmouth College

Eric Matranga, Environmental Planner. Postgraduate Studies, Geography (Environmental), Arizona State University, M.A. Geography (Economic), Arizona State University, B.A. Art, Boise State University.

Julio Morais, Environmental Specialist. Civil Engineering Program, University of Arizona, M.S. Soils and Water Science, University of Arizona.

Gregory Rodzenko, P.E. Senior Hydrogeologist. Postgraduate Studies, Fluvial Geomorphology, University of Arizona, M.S. Geomorphology, Southern Illinois University, B.A. Geology and Mathematics, Oberlin College

Nancy Shelton, Environmental Planner. Master of Environmental Planning, Arizona State University, B.A. Political Science, Arizona State University.

Steve Speich, Senior Wildlife Biologist. Graduate Studies University of Arizona, University of Washington, M.S. Zoology, University of Arizona, B.A. Biological Science, Cal State University, Sacramento.

Brian Wooldridge, Wildlife Biologist. M.S. Biology, University of Texas at El Paso, B.S. Biology, Iowa State University.

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9.0 AGENCIES CONTACTED

Jay H. Anderson
Environmental Coordinator, Unmanned
Aerial Vehicle Test Team
Intelligence Electronic Warfare Test
Directorate
Operational Test Command
USA ATEC

Ernest Beil
Range Control Officer
US Army Garrison
Fort Huachuca, Arizona

Duane A. Bennett
Land, Minerals & Special Uses
Sierra Vista Ranger District
Coronado National Forest
US Forest Service

Bill Gillespie
Archaeologist
Sierra Vista Ranger District
Coronado National forest
US Forest Service

David L. Harlow
Field Supervisor
US Fish and Wildlife Service

Beverly I. Hawks
UAV Test Director
USA WSMR Electronic Proving Ground

Jim Hessil
Wildlife Biologist
US Army Garrison
Fort Huachuca, Arizona

C. Michael North
Manager of Environmental Resources
Sierra Vista Regional Hospital

Jim Riedmann
Arizona State Land Department
Arizona Land Resource Information System

Michael M. Shaughnessey
Realty Specialist
U.S. Army Garrison
Fort Huachuca, Arizona.

Charles Slaymaker, Ph. D.
Post Archeologist
US Army Garrison
Fort Huachuca, Arizona.

Douglas C. Snow
Assistant TRADOC System Manager
Unmanned Aerial Vehicles
U.S. Army Intelligence Center and Fort
Huachuca
Fort Huachuca, Arizona

Ron Webster
CERL POC
Army Environmental Research Center

Nancy Wilcox
Administrative Officer
Coronado National Memorial

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10.0 DISTRIBUTION LIST

United States Department of the Interior
U.S. Fish and Wildlife Service
Arizona Ecological Services Field Office
ATTN: Field Supervisor
2321 W. Royal Palm Road, Suite 103
Phoenix, Arizona 85021-4951

United States Department of the Interior
Bureau of Land Management
District Manager, Safford District Office
711 - 14th Avenue
Safford, Arizona 85546

Arizona Game and Fish Department
Tucson Regional Office
ATTN: Field Supervisor
555 N. Greasewood Road
Tucson, Arizona 85745

Arizona State Land Department
ATTN: Mr. Joel Gilmore
1616 West Adams
Phoenix, Arizona 85007

Environmental Protection Agency
Region IX
Office of Federal Activities CMD-2
ATTN: Mr. Jeff Philliber
75 Hawthorne Street
San Francisco, California 94105

U.S. Army Corps of Engineers
Los Angeles District, Phoenix Office
ATTN: Mr. Robert Hall
3636 N. Central Avenue
Phoenix, Arizona 85012

Coronado National Forest Service
District Ranger
Mr. Steve Gunzel
5990 South Highway 92
Hereford, Arizona 85615

U.S. Forest Service
ATTN: Mr. Randall Smith
300 W. Congress Street
Tucson, Arizona 85701

Arizona Department of Environmental Quality
ATTN: Director
3033 North Central Avenue
Phoenix, Arizona 85004

Arizona Department of Water Resources
ATTN: Director
500 N. Third St.
Phoenix, Arizona 85004-3903

Arizona State Clearinghouse
ATTN: Manager
Department of Commerce
3800 N. Central Avenue
Phoenix, Arizona 85012

Cochise County Board of Supervisors
1415 West Melody Lane, Building B
Bisbee, Arizona 85603

City of Sierra Vista
ATTN: Mr. Patrick Bell
1011 N. Coronado Drive
Sierra Vista, Arizona 85635

Mr. Ed Lopez
Coronado National Memorial
4101 East Montezuma Canyon Road
Hereford, Arizona 85615-9376

Friends of the San Pedro, Inc.
ATTN: President
3577 Kalispell Drive
Sierra Vista, Arizona 85635

Huachuca Audubon Society
P.O. Box 63
Sierra Vista, Arizona 85635

National Audubon Society
ATTN: Mr. Bill Branan
Box 44
Elgin, Arizona 85611

San Pedro Natural Resources Conservation
District
ATTN: Ms. Gail Getzwiller
880 West 4th Street, #2
Benson, Arizona 85602

The Sierra Club
ATTN: Chairman, Southeast Arizona Group
1354 Andrea Drive
Sierra Vista, Arizona 85635

Border Ecology Project
Box 5
Naco, Arizona 85615

The Southwest Center for Biological
Diversity
ATTN: Robin D. Silver
P. O. Box 39629
Phoenix, Arizona 85069-9629

Upper San Pedro Watershed Management
Association
ATTN: Mr. Roger Tabar
1730 North Sander Road
Huachuca City, AZ 85616

Librarian
Bisbee Public Library
P.O. Box 187
Bisbee, Arizona 85603

Librarian
Huachuca City Public Library
506 N. Gonzales Blvd.
Huachuca City, Arizona 85616

Librarian
Sierra Vista Public Library
2950 E. Tacoma Street
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Librarian
Benson Public Library
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Benson, Arizona 85602

11.0 ACRONYMS AND ABBREVIATIONS

AAQS	Ambient Air Quality Standards
ACS	Aerial Common Sensor
ADEQ	Arizona Department of Environmental Quality
ADES	Arizona Department of Economic Security
ADWR	Arizona Department of Water Resources
AGFD	Arizona Game and Fish Department
AGL	Above Ground Level
AHPA	Archeological and Historic Data Preservation Act
AIB	Applied Instruction Building
AIRFA	American Indian Religious Freedom Act
APE	Area of Potential Effect
ARLM	Aerial Reconnaissance Low-Multifunction
ARPA	Archeological Resources Protection Act
ARTCC	Albuquerque Air Traffic Control Center
ASA	Accurate Survey Area
ASIP	Army Stationing and Installation Plan
ATC	Air Traffic Control
AVGAS	Aviation Gasoline
BEA	Bureau of Economic Analysis
BLM	Bureau of Land Management
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERL	U.S. Army Corps of Engineers' Construction Engineering Research Laboratory
CGS/GCS	Common Ground Station/Ground Control Station
CO	Carbon Monoxide
dBA	A-weighted Decibels
dB	Decibels
DIS ENRD	Directorate of Installation Support, Environmental and Natural Resources Division
DOD	Department of Defense
DRM	Directorate of Resource Management
DRMO	Defense Reuse and Marketing Organization
EA	Environmental Assessment
EIFS	Economic Impact Forecasting System
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
EPG	Electronic Proving Ground

V&V Validation + Verification (Training Materials)

ESA	Endangered Species Act
FAA	Federal Aviation Administration
FICUN	Federal Interagency Committee on Noise
FLOT	Forward Line Own Troops
FLPMAF	ederal Land Protection and Management Act
FTE	Full Time Equivalent
FTX	Field training exercises
FY	Fiscal Year
GPF	Ground Processing Facility
GR/CS	Guardrail Common Sensor
Ha	Hectare
HAZMAT	Hazardous Materials
HAZMART	Centralized facility for handling hazardous materials
HMMWV	High Mobility Multi-Wheeled Vehicle
HMTA	Hazardous Materials Transportation Act
HUD	Housing and Urban Development
HWMP	Hazardous Waste Management Plan
IEWTD	Intelligence Electronics Warfare Test Directorate
IFR	Instrument Flight Rules
ISCIP	Installation Spill Contingency Plan
JTUAV	Joint Tactical Unmanned Aerial Vehicle
LAAF	Libby Army Airfield
L_{dn}	Day-night Decibal Measurement
L_{eq}	Equivalent Noise Value
L_{max}	Maximum Noise Reading
MBTU	Million British Thermal Units
MG	Million Gallons
MOA	Military Operating Area
MOGAS	Unleaded Gasoline
MSL	Mean sea level
MI	Military Intelligence
NAGPRA	Native American Graves Protection and Repatriation Act
NAMTRAGRUDET	Naval Air Maintenance Training Group Detachment
NCA	National Conservation Area
NEPA	National Environmental Policy Act
NHL	National Historic Landmark
NHPA	National Historic Preservation Act
nm	Nautical Miles
NOA	Notification of Availability
NO_x	Nitrogen Dioxide
NRCS	National Resource Conservation Service

O_3	Ozone
OHWM	Ordinary High Water Mark
PM_{10}	Particulate matter smaller than 10 microns in diameter
POLs	Petroleum, oil, and lubricants
RATO	Rocket Assisted Take-Off
RCRA	Resource Conservation and Recovery Act
RF	Remote Frequency
ROG	Reactive Organic Gases
ROI	Region of Influence
ROW	Right-of-Way
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SO_x	Sulfur Dioxide
SPCCP	Spill Prevention, Control and Countermeasures Plan
TDY	Temporary Duty
TEXCOM	U.S. Army Operational Test Command
TO	Test Officer
TR	Transitional Residence
TRADOC	U.S. Army Training and Doctrine Command
TSM	TRADOC System Manager
TSP	Total suspended particulate
TUAV	Tactical Unmanned Aerial Vehicle
UAV	Unmanned Aerial Vehicle
USACHPPM	U.S. Army Center for Health Promotion and Preventive Medicine
USAIC	U.S. Army Intelligence Center
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Service
UXO	Unexploded Ordinance
VFR	Visual Flight Rules
WSMR-EPG	White Sands Missile Range-Electronic Proving Ground
WWTP	Waste Water Treatment Plant
$\mu g/m^3$	Micrograms per cubic meter
µm	Microns

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APPENDICES

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APPENDIX A

DESCRIPTION OF UAV TYPES

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DESCRIPTION OF UAV TYPES

A buildup of domestic UAV configurations, promoted by the DOD, occurred in the late 1980s and well into the 90s. This occurred as the DOD sought UAVs to satisfy their mission unique surveillance requirements in either a Close Range, Short Range or Endurance category of vehicle. A Close Range UAV system could fly 50 kilometers beyond the forward line of own troops (FLOT) into the enemy's area, and a Short Range was defined as a UAV system that could fly 200 kilometers beyond the FLOT into the enemy's area. An Endurance UAV system was one which could fly beyond 200 kilometers to an undetermined distance. The current classes or combination of these type of vehicles are called the UAV, followed by the Endurance category.

This Appendix provides a general overview of the different types of UAVs that have been or may be used during future testing and training activities associated with the UAV program at Fort Huachuca. The constantly changing role of UAVs in DOD activities has necessitated a large variety in the sizes and configuration of the aircraft: from under 15 centimeters to a wingspan of over 115 feet with altitudes from 100 feet to over 65,000 feet. Because of this wide variety in UAV sizes and system configurations, UAVs were grouped together based on three general size ranges (Small Unit, Medium Tactical, and Large Tactical) for the ease of evaluation. Where applicable, UAV models in each size category are briefly described to help the reader understand what a typical UAV system may include.

Small Unit Unmanned Aerial Vehicles

Small Unit UAVs (currently described as micro and mini air vehicles) typically have dimensions less than 10 feet long with wingspans up to 12 feet. These UAVs have been proposed for use in military surveillance, law enforcement, and civilian rescue efforts.

The ground-based portion of these systems typically includes a PC-based machine vision (image processing) system, a joystick for manual flight control, and an RF uplink. The UAV is designed to be able to launch, cruise, dash, loiter (virtual hover about a point or an area), and return to the launch site or another site, where it lands.

Medium Unmanned Aerial Vehicles

Medium UAVs (UAV) (currently including Pioneer, Hunter, and Shadow 200) are larger than Small Unit UAVs but less than 25 feet long with a wingspan less than 30 feet. These aircraft have been designed to perform accurate surveillance and reconnaissance missions under adverse environments and battlefield conditions. The following are typical components of current medium UAV systems.

A typical Pioneer UAV system consists of up to 5 air vehicles, a Ground Control Station, a Tracking Control Unit, a Portable Control Station, 4 Remote Receiving Stations, pneumatic or rocket assisted launchers, and runway arrestment recovery systems. The 14 feet long Pioneer air vehicle is pusher-propeller driven, powered by a 26 hp, two stroke, twin-cylinder, rear-mounted engine, and carries 49 liters of 100 octane aviation gasoline (AVGAS). Since 1990, the 463 lb. air vehicle has been modified to incorporate reliability and maintainability improvements including a streamlined fuselage design which results in mission endurance capabilities exceeding six hours.

The Hunter UAV grew out of the operational requirements document for the Short Range UAV system that DOD published in 1992. The 1,600 lb. Hunter UAV is 23 feet long with a wingspan of 29.2 feet. It is propelled by two, reciprocating gas engines. It has a range of 160 kilometers and an endurance at that radius of about 7 hours. It can carry roughly 200 pounds and provide imagery in both day and night operations.

Large Unmanned Aerial Vehicles

Large UAVs, such as the Predator, are larger than Medium UAVs with wing spans up to 115 feet or larger. These UAVs can provide long-range, near-real-time reconnaissance, surveillance, target acquisition, and battle-damage assessment day or night and in some difficult weather conditions, as well as work in tandem with other, smaller UAVs

The Predator UAV has a wing span of 48.6 feet and length of 26.6 feet. With no fuel it weighs approximately 1,223 pounds and has the capacity to carry 650 pounds of fuel. Its payload suite can contain synthetic aparture radar (SAR), electro-optical (EO) and infrared (IR) sensors. Predator's normal operating altitude is 15,000 feet, although it can function at altitudes as high as 25,000 feet. The Predator is typically slower than that of other existing and planned UAV

systems; its normal operating (or "cruise") speed is about 120 kilometers per hour. Aside from the sensor payload that the air vehicle carries, Predator's real assets are its endurance (more than 20 hours at its radius of 926 kilometers) and its communications system, which includes a satellite link. This means the air vehicle can operate beyond the line of sight of the Ground Control Station and still relay images back to the user. Currently, the Air Force expects to acquire 12 Predator systems, each with four air vehicles and one ground control station.

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APPENDIX B

BIOLOGICAL EVALUATION
FOR UAV FIELD ACTIVITIES AT SELECTED SITES
IN THE CORONADO NATIONAL FOREST

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TECHNICAL MEMORANDUM

Date: August 15, 2000

From: Engineering and Environmental Consultants, Inc.
Steven M. Speich, Senior Biologist
4625 East Fort Lowell Road
Tucson, Arizona 85712

To: Sierra Vista Ranger District
Coronado National Forest
Sierra Vista, Arizona

Subject: Biological Evaluation for UAV Field Activities at Selected Sites in the Coronado National Forest

1.0 SUMMARY OF FINDINGS

US Forest Service Forest Sensitive Species were evaluated for their potential to occur in the Region of Influence (ROI) on Forest Service lands in the Canelo Hills and Patagonia Mountains, Santa Cruz and Cochise Counties, Arizona. The proposed action entails flying Unmanned Air Vehicles (UAVs), placing testing targets within the Coronado National Forest, and the use of vehicles and personnel to place these targets. These actions could potentially affect species known to occur, or that have the potential to occur within the ROI. All activities would begin and end at Fort Huachuca. Maps showing the locations of potential target sites are provided as Attachment 1.

The Forest Sensitive Species list includes both Endangered Species Act (ESA) listed species and species otherwise considered Sensitive by the US Forest Service. The proposed actions may impact several Forest Service Sensitive Species (Table 1), but are not likely to result in a trend towards federal listing or loss of viability. For the ESA-listed species it is anticipated that the proposed actions will not adversely affect any of the evaluated species (Table 2). It is recommended that the target placement sites on Forest Service lands be surveyed for the potential occurrence of Forest Sensitive Plant Species prior to activities at the sites.

2.0 PROPOSED ACTION

The US Army Garrison Fort Huachuca is a recognized national center for the testing, operation and crew training of UAVs. The program involves the mid-level flights of UAVs over both Fort Huachuca and adjacent portions of the Coronado National Forest in the Canelo Hills and Patagonia Mountains. UAV operators attempt to locate and document the presence of light military vehicles and equipment temporarily parked at predetermined and target placement sites in the forest. Ground vehicles utilize existing roads to access the established UAV sites. This Biological Evaluation of Forest Sensitive Species focuses on the potential impacts of UAV flights and the presence of military vehicles and personnel in the Coronado National Forest.

The UAV flights originate and conclude at airstrips on Fort Huachuca. UAVs vary in size from small "model aircraft" vehicles to those approaching small "manned aircraft" in size – all are remote controlled. Once past the initial takeoff, the vehicles are powered by piston driven "gasoline" engines. Flight altitudes are typically over 1,000 feet above ground level (AGL). Noise levels are low, due to the lightweight and small form of these aircraft.

Ground activities associated with the UAV flights similarly originate and end at Fort Huachuca. Light wheeled vehicles and an assortment of associated trailers, small vans, and passenger vehicles, depart Fort Huachuca, usually from the West Gate. They proceed to predetermined, numbered, long established and marked "target placement sites" in the Canelo Hills and Patagonia Mountains. Vehicles utilize existing paved, improved dirt roads, and unimproved dirt roads to access the sites. Once at the sites, vehicles are confined to roadways and off-road areas depicted on topographic maps. The number of vehicles can vary from just one to a few, with a corresponding number of personnel. Once an activity period is completed at a target placement site, all equipment and material are removed. Individual sites may be occupied from one to several days during each activity period.

3.0 EVALUATION OF SITES AND SPECIES

All identified sites on the Coronado National Forest that are utilized in the UAV program were evaluated in the field. EEC biologists Steven M. Speich and Joanne M. Kirchner visited all the sites on May 2, 2000. There are 12 identified sites in the Canelo Hills (numbers 1, 2, 3, 10, 11, 12, 13, 14, 18A, 19, 20, and 21) and 2 identified sites in the Patagonia Mountains (numbers 15 and 16). Sites were evaluated for the potential occurrence of Forest Sensitive Species and potential impacts on them from planned activities should species occur.

The UAV sites were established a number of years ago, and previously evaluated (USAIC 1993). Site locations were confirmed prior to field visits during a meeting with Duane A. Bennett and Bill Gillispe, Sierra Vista Ranger District staff personnel, on April 3, 2000. During this meeting it was decided that since all the identified sites had been previously evaluated for archaeological elements, and since planned activities are confined to the known sites, further archaeological evaluations were not required.

The National Forest Management Act of 1976 requires the preparation of a Biological Evaluation of Forest Sensitive Species for all permitted activities on National Forest lands. To aid in this process, the US Forest Service, Southwest Region released a Sensitive Species List Revision, July 21, 1999. This list was modified April 25, 2000 to reflect the potential occurrence of Forest Sensitive Species in the Sierra Vista Ranger District (Special Status Species That Do or Could Occur on the Sierra Vista Ranger District, Coronado National Forest). The species in the Sierra Vista Ranger District list are considered in this Biological Evaluation (Tables 1 and 2).

The potential occurrence of Forest Sensitive Species was evaluated utilizing several sources. Foremost, was the experience of the field investigation team and the information acquired during the site visit. This was supplemented by a variety of literature sources and reports, including the recently released Element Occurrence Notebook prepared for the Rare Plant Workshop for Sensitive Plants of the Coronado National Forest, Tucson, Arizona, March 7-9, 2000. This source was supplemented by standard faunal and floral works of Arizona and of the region (see references below). Information on federally-listed species was also obtained from the various Federal Register notices relating to their status reviews, listings, and critical habitat designations. Evaluations were made based on the best available information.

For those species that are known to occur in the project's ROI, or that may reasonably occur therein, the potential impact of UAV-related activities on the viability of species' populations was evaluated as per the National Forest Management Act (1976). First, species were evaluated for their potential to occur in the ROI, the Canelo Hills and Patagonia Mountains. Second, species were evaluated for their potential to occur at the designated target placement sites within the ROI. Third, potential impacts of air operations and ground operations were evaluated separately. Finally, ground operations, including the use specified target placement sites and the use of access roads to these sites was considered.

Both Forest Sensitive Species (section 4.0) and the ESA-listed species (section 5.0) are evaluated on the potential for the proposed actions to affect species.

4.0 FOREST SENSITIVE SPECIES

Eighty-five Forest Sensitive Species are listed in Table 1. UAV-related activities are not expected to affect species that do not occur or are unlikely to occur in the ROI, therefore these species are not discussed. Only one species may be affected by air activities associated with the proposed action. There are 32 species that may occur at the UAV sites where proposed activities may affect individual animals, but the ground and air operations are not likely to result in a trend towards federal listing or a loss of species viability for any of the species. For most species, the probability of occurrence at target placement sites or on access roads is low or remote, and the period of vulnerability is limited by seasonal activity periods. Potential impacts are further reduced by the infrequent use of the UAV sites and access roads for UAV operations.

Birds

There are two listed ESA bird species known to occur in the ROI (Table 2), and eight species that occur on the Forest Sensitive Species list (Table 1). Four of these species are unlikely to occur in the ROI, while four species do occur in the ROI. Of those known to occur, only one species (not already addressed as an ESA listed species) may occur in the vicinity of UAV sites or access roads in the ROI: America Peregrine Falcon.

The America Peregrine Falcon may occur in the vicinity of the target placement sites and access roads. This species was recently de-listed (Federal Register 64(164):46554-46558) and is no longed considered an Endangered Species. During migration and the winter periods this highly mobile species has the potential to occur anywhere in the ROI (Davis and Russell 1995; Monson and Phillips 1981; Phillips et al. 1964; Taylor 1995). This species is known to nest in the Patagonia Mountains, and the target placement sites are each 2.5 miles or more from the nest site. If an individual of this species were to occur in the vicinity of the UAV sites or access roads while that are in use, the resulting impacts, if any, are likely to be momentary and are not likely to result in a trend towards federal listing or a loss of viability.

4.2 Mammals

Only one listed ESA mammal species is known to occur in the ROI (Table 2). In addition, there are three mammal species on the Forest Sensitive Species list (Table 1). Two do not occur in the ROI, while one does occur in the ROI and may occur at the target placement sites and along access roads.

The Huachuca Mountains Pocket Gopher does occur in the ROI and may occur at individual target placement sites or along access roads. This largely fossorial species spends little time above ground. UAV aerial activities are not expected to affect this species. Individuals do forage above ground for short periods of time and young animals are known to disperse from natal areas by traveling above ground. Vehicles may impact individuals by the crushing burrows. Considering the small area within the ROI affected by the UAV program activities, the potential for a direct impact is very small, and no impacts from aerial activities are expected. Ground activities may affect individuals but are not likely to result in a trend towards federal listing or a loss of viability.

4.3 Amphibians

Only one "listed" ESA amphibian species is known to occur in the ROI (Table 2). In addition, there are three species on the Forest Sensitive Species list (Table 1). Of those, the Western Barking Frog may occur at the UAV sites or along access roads.

Frogs are usually associated with wetlands and other aquatic habitats, and this species has the potential to occur in such areas within the Canelo Hills. However, no target placement sites are located in or near wetlands or riparian areas, although access roads to pass by and though intermittent watered areas, and over a wetland near Canelo. Dispersing animals are most likely to move during periods of rain, at which time they may occur on road ways and target placement sites for very short periods. The potential for impacts to this species from ground related UAV activities are considered remote, particularly since UAV activities are not authorized in the National Forest during times of heavy precipitation. Aerial UAV activities are not expected to affect this species. The proposed actions may affect individuals, but are not likely to result in a trend towards federal listing or a loss of viability.

4.4 Reptiles

There are no "listed" ESA reptile species known to occur in the ROI (Table 2) and only four from the Forest Sensitive Species list (Table 1). One of these species are does not occur in the ROI, while three species do occur in the ROI and may occur in the vicinity of UAV sites or along access roads in the ROI.

The three species, one lizard and two snakes (Table 1), have the potential to occur at the target placement sites and along access roads. Although they may occur in such areas, the rate of their occurrence is likely very low. The potential for impacts is related to the rate of occurrence of animals at target placement sites and roads and the co-occurrence of activities. No impacts are expected to occur as a result of UAV related air activities. While it is unlikely that activities will affect these species as a whole, individual animals may be affected. The potential effects that may result from conducting UAV activities are not likely to result in a trend towards federal listing or a loss of viability of the species.

4.5 Fish

There are no "listed" ESA fish species known to occur in the ROI (Table 21). While there are two species on the Forest Sensitive Species list (Table 1), none occur in the ROI, and none occur in the vicinity of target placement sites or access roads in the ROI. No impacts are expected as a result of UAV-related activities.

4.6 Snails

Only one "listed" ESA snail species is known to occur in the ROI (Table 2), and none occur on the Forest Sensitive Species list (Table 1). The UAV-related activities are not expected to have any effect on the Huachuca springsnail.

4.7 Butterflies

No ESA-listed butterfly species are known to occur within the ROI (Table 2). However, thirteen butterfly species are on the Forest Sensitive Species list (Table 1). Of these, one species is known to occur, and six species may occur in the ROI (after Bailowitz and Brock 1991). In addition, five species may occur at the target placement sites and along access roads.

There are only a few ways that ground related UAV activities may impact butterfly species. These include direct mortality from moving vehicles, removal of larval host plants such as from wild fire or from being run over by a vehicle, and loss of food sources. Many species have a limited period during the year when adults are present and flying and thus vulnerable to collisions with vehicles. Some species are present for extended periods of time, such as the summer months, and are vulnerable to collisions with vehicles during these longer time periods. No species is so restricted in distribution that vehicle related mortality would have a significant impact on the species as a whole. Only the Poling's Giant Skipper is reported to be restricted in the ROI to a colony near Lake Patagonia. However, no target placement sites are near Lake Patagonia and access to target placement sites is by roads to the north of Lake Patagonia. The identity of larval food plants of many species is unknown, while other species are known to utilize agave or yucca. Wild fires have the potential to temporarily eliminate or reduce available larval food plants over limited areas, but affected plant species often re-grow after wild fires.

Whether individuals of species do or can reasonably be expected to occur at the UAV ground activity sites or along access roads is problematic. Overall, the proposed actions may impact individuals of these species, but it is unlikely that activities would result in a trend towards federal listing or a loss of viability of the species. UAV aerial related activities are not expected to impact any butterfly species.

4.8 Plants

There are two "listed" ESA plant species known to occur in the ROI (Table 2). In addition, there are 54 species of plants on the Forest Service species list (Table 1). Of these, sixteen species are known to occur in the ROI, eight species may occur in the ROI, and 21 species may occur at the target placement sites or along access roads.

Potential impacts to plant species are limited by individual plant growth cycles and the co-occurrence of activities during these growth periods. Many plant species are present for only limited periods during the year, have limited distributions, or are dependent upon the presence of specific site conditions, such as soil types, presence of specific minerals, light conditions, the presence or absence of other plant species, exposure, and soil moisture. Such information about growing conditions and the distribution of many of the Forest Sensitive Species is not well known. Therefore, determining if ground activities at target placement sites or on access roads may or will directly impact specific plant species is difficult to determine. Similarly, indirect impacts, such as from fire started by UAV activities, are also difficult to evaluate.

A field evaluation of each target placement site and access roads for the potential presence of Forest Sensitive plant species that have a reasonable chance of occurring is recommended. The evaluation should take place during the period, or periods, of the year when plants would be visible if present. If a plant species is only known to occur at a specific target placement site and that activities will destroy the plants present, then the proposed actions would impact individuals species. It is unlikely that UAV ground activities will to result in a trend towards federal listing or a loss of viability. UAV aerial activities are not expected to affect any plant species.

5.0 FEDERALLY-LISTED THREATENED, ENDANGERED, PROPOSED THREATENED OR ENDANGERED AND CANDIDATE SPECIES

5.1 Birds

Bald Eagle

The notice to list the Bald Eagle as an Endangered Species without Critical Habitat was published on February 25, 1986 (Federal Register 32:4001) and February 14, 1978 (Federal Register 43:6233). The species was proposed for down-listing to Threatened on July 12, 1995 (Federal register 60:36010). There is an approved Recovery Plan. A proposed rule to remove the Bald Eagle from the list of Endangered and Threatened Wildlife in the lower 48 states was published July 6, 1999 (Federal register 64(128):36454).

The bald eagle occurs throughout North America, all of Arizona (Phillips et al. 1964; Rosenberg et al. 1991) and southeastern Arizona (Monson and Phillips 1981; Taylor 1995). In southeastern Arizona, the species is known to winter in the Sulphur Springs Valley, and birds have been observed at Parker Canyon Lake during the winter. The Bald Eagle does not nest in southern Arizona, and is generally not present during summer months. When present during the winter, this highly mobile species can occur virtually anywhere in southern Arizona. Eagles, like all birds-of-prey, are attracted to food sources, such as fish in lakes and streams, carrion of any species, and concentrations of water birds such as those found at lakes. Within the ROI the most likely location for an eagle to occur is Parker Canyon Lake, when water birds such as ducks are present. It will feed on dead water birds and attempt to capture living water birds. In addition, the eagle could be found roosting anywhere in the ROI, such as in large oak trees or pines.

The period of overlap between the occurrence of the Bald Eagle in the ROI and the proposed action is limited. The species is not present in the ROI during the late spring, summer and early fall months; thus, occurrence of the proposed action during that period would not affect the species. During the winter there is the potential for overlap of proposed UAV-associated activities and the presence of Bald Eagles. The most obvious interaction would be between eagles soaring in the proximity of UAVs in flight. Considering the substantial flight capabilities of the eagle it is doubtful that the presence of UAVs in flight would do more than alter of the flight path of an eagle. There is little reason to expect UAV-associated ground activities to affect eagles, as there are no specific features to attract an eagle to the UAV ground sites. Perhaps, an eagle could be encountered on a road, feeding on carrion, but the possibility of the co-occurrence of a UAV vehicle and an eagle on a particular road are minimal. It is anticipated that the proposed action will have no effect on this species.

Mexican Spotted Owl

The notice to list the Mexican Spotted Owl as a Threatened Species without Critical Habitat was published March 16, 1993 (Federal register 58:14271). The process is now proceeding through a recent court order to designate critical habitat for the species. There is an approved recovery plan for the Mexican Spotted Owl. The Mexican spotted owl is known to nest in the Sky Island mountain ranges of southeastern Arizona and northern Sonora (Block et al. 1995), including the Huachuca and Patagonia Mountains. There are over a dozen designated Protective Activity Centers (PAC) in the Huachuca and only three in the Patagonia Mountains. Owls are usually found in or near their respective PACs throughout the year, although they do disperse during the fall. Movement between mountain ranges is especially true of immature owls.

Dispersing owls are expected to move through the Canelo Hills, although the number is very small and it is unlikely that movement through the area occurs every year. When dispersing owls are present there is the possibility, however remote, that they could pass near a target placement site and they would no doubt cross access roads. Dispersing owls can be expected to roost almost anywhere in the Canelo Hills or Patagonia Mountains where there is sufficient cover, such as is in larger oaks and developed riparian vegetation. Considering the small numbers of birds involved, the seasonal nature of movements, the variable nature of the movements, and the low rate of UAV ground site utilization, the probability of interaction between ground UAV activities and dispersing owls is very limited.

The two target placement sites in the Patagonia Mountains are located adjacent to or within established Mexican Spotted Owl PACs. Both sites are within one half mile of known nest sites, and access roads pass through the PACs. These sites and their associated Mexican Spotted Owls are exposed to daily traffic from existing nearby roads and to people associated with rural residences. There is the possibility that owls may roost during the day near the target placement sites or forage during the night near the sites. Experience with the species suggests that UAV ground associated activities could possibility cause roosting owls to wake from their sleep or cause them to change

roost sites. Activities could cause foraging owls to move to other foraging areas. There is the possibility that moving vehicles associated with the target placement sites could strike an owl during the night when owls are moving about. However, considering the low use rate of the target placement sites by ground personnel, the possibility of an interaction between owls and UAV personnel or their vehicles is considered low.

The flight of UAV vehicles near roosting, foraging, or nesting Mexican Spotted Owls is unlikely to significantly affect their behavior. Although owls may be aware of the presence of a UAV flying overhead, such presence is likely to only alter owl behavior momentarily.

Wild fire in nesting, roosting, or foraging areas has the potential to affect the behavior of owls, should they be present, however little is known of the behavior of owls in the presence of fire. One owl in the Huachuca Mountains is known to have survived a fire with only singed feathers. If owls were present at the known nest sites in the Patagonia Mountains during a fire, danger from actual contact is limited by the presence of cliffs and caves at the sites. Roosting owls could be more vulnerable to wild fire. The very small number of dispersing owls that pass through the ROI, the few owls that nest in the Patagonia Mountains, the low fire occurrence rate, and the limited area of any given fire suggests that the possibility of owls being affected by UAV program-related wild fire is very low. It is anticipated that the proposed action may affect, but is unlikely to adversely affect this species.

Southwestern Willow Flycatcher

The notice to list the Southwestern Willow Flycatcher as an Endangered Species was published February 27, 1995 (Federal Register 60:10715). Critical habitat for this species was designated July 22, 1997 (Federal register 60:10694). There is a recovery team for this species. The Southwestern Willow Flycatcher was once more widespread in the southwest. The loss of desert riparian habitat areas consisting of dense willow and cottonwood stands is largely responsible for the restricted range and low population size. In southern Arizona the flycatcher is present from the spring through early fall (May through September). During the spring and fall migration periods, individuals of this subspecies may occur anywhere in southern Arizona; however, they are not likely to remain long in most areas.

Suitable habitat for this species - dense and wet stands of willow, cottonwood and saltcedar - does not exist in the ROI, and there are no known nesting locations of this species in the ROI (Paradzick et al. 2000). Although an individual could appear in the ROI during migration, the possibility of this happening is very low. If an individual were to occur it would only remain in the area for a short period of time before moving on to appropriate habitat areas.

Considering the very small numbers of this bird in the southwest, the limited time when they can be expected to pass through the ROI, and the limited periods of UAV activity in the ROI, the likelihood of UAV-associated activities occurring when and where a bird is present is remote. Even if they do co-occur, effects are likely to be limited and momentary in nature. It is anticipated that the proposed action will have no effect on this species.

5.2 Mammals

Lesser Long-nosed Bat

The notice to list the Lesser Long-nosed Bat as an Endangered Species was published September 30, 2000 (Federal Register 53:38460). Although Critical Habitat has not been designated for the species, there is an approved Recovery Plan. The lesser long-nosed bat is a nectar and pollen feeding bat species found in desert grasslands and scrublands, to the edge of oak woodlands in southeastern Arizona (Hoffmeister 1986). The Canelo Hills and Patagonia Mountains are within the known range of the species (Cockrum 1960; Hoffmeister 1986). In Arizona this species is present during the spring and summer, when females move north to form maternity colonies. Individuals of the species are then found in areas where appropriate caverns of colonies are present within foraging distance of flowering agave, saguaro, ocotillo, palo verde or prickly pear. This species utilizes caves and abandoned tunnels as day roosts.

The proposed action in the ROI during the day is not expected to effect the species as the bat is then confined to day roost sites or maternity colonies. The only possible time period when interactions between UAV ground or aerial activities are possible is during spring and summer nights when bats are foraging in the ROI (April through September). UAV ground-related activities are likely to have little effect on foraging bats. There is the remote possibility that a UAV in flight could strike a foraging bat; is more likely that UAVs in flight would change the flight path of bats. Any strike with this highly maneuverable species is unlikely. Wild fire could affect the species by removing forage plants, but the effects only last for a few years, as agave typically sprout from roots after fires.

UAV program-related fire is unlikely to affect flying or roosting bats. It is anticipated that the proposed action may affect, but is unlikely to adversely affect this species.

5.3 Amphibians and Reptiles

Sonora Tiger Salamander

A notice to list the Sonora Tiger Salamander as an Endangered Species without Critical Habitat was published January 6, 1997 (Federal Register 62:665). This sub-species is known from stock tanks and cienegas in the San Rafael Valley grassland and the surrounding uplands, including the Patagonia and Huachuca Mountains (USFWS 1997), and can be expected to occur in appropriate wetland and aquatic habitats, particularly at the edge of the San Rafael Valley grasslands in the Patagonia Mountains. Genetic studies are now underway to determine the purity of the population and the degree of contamination from introduced Tiger Salamanders from other locations.

None of the UAV sites in the Canelo Hills or the Patagonia Mountains are located in or near wetlands or perennial stock tanks. Most existing access roads are located in dry uplands. The access road crossing near Canelo is paved and elevated above the wetlands with culverts in place, to keep water from flowing over the road. Ground activities associated with the UAV program are not expected to affect this species in perennial wetlands.

The access road to the two target placement sites situated in Brushy Canyon crosses Brushy Canyon Creek at several locations. Similarly, the are several creek crossings associated with the access roads in the Patagonia Mountains. These creeks are usually dry, but do fill with water and often flow during the monsoon and winter rain periods. It is during wet periods when salamanders disperse and occur in the running creeks, that vehicles associated with the ground activities may affect this species. However, considering the small size of the population and limited UAV ground activities, the probability of UAV ground activities actually affecting this species is small. The potential to affect is even further reduced because UAV field activities on Forest Service lands are not authorized immediately after major rain events when the roads and trails are saturated or when stream crossings are wet as a result of precipitation.

UAV flights will not affect this terrestrial species, which spends most of its time under water or in burrows. UAVs take off and land on airstrips located on Fort Huachuca only. No contact between UAV and individual Sonoran tiger salamanders is expected to occur. It is doubtful that any noise associated with the flight of UAV would affect the behavior of this species.

There is the remote possibility that a wild fire could occur as a result of UAV ground activities. Wild fire is unlikely to affect individuals when it burrows in the ground or in ponds. During the summer monsoon or winter rain periods when salamanders would be most likely to be moving across the surface of the ground, the occurrence of fire is unlikely. It is unlikely that UAV program-related wild fire would affect this species. It is anticipated that the proposed action will have no effect on this species.

5.4 Plants

Canelo Hills Ladies' - Tresses

A notice to list the Canelo Hills Ladies' - Tresses as an Endangered Species without Critical Habitat was published January 6, 1997 (Federal Register 62:665). This species is known from only a few sites in Arizona, including one in the Canelo Hills, near Canelo, in a cienega (Arizona Game and Fish Department 1998).

Ground activities associated with the UAV program, such as vehicle movement, camps, and personnel activities, are not anticipated to affect this species. No target placement sites in the ROI are located in or near Canelo where this species occurs. The road crossing of wetlands near Canelo is paved and a culvert is present. This alignment prevents vehicles from coming in contact with the wetland. UAV flights will not affect this species or its habitat. The occurrence of UAV program-related wild fire near wetlands might lead to erosion and silting of areas where the species is present, and possibly directly affect individual plants. Whether wild fire would directly affect the wetlands may depend on the time of year. For example, during the dry months leading up to the summer monsoon wild fire may have the potential to indirectly affect the species. Overall, it is anticipated that the proposed action will have no effect on this species.

Huachuca Water Umbel

A notice to list the Huachuca Water Umbel as an Endangered Species without Critical Habitat was published January 6, 1997 (Federal Register 62:665). The notice to designate Critical Habitat was published July 12, 1999 (Federal Register 64:37441). Included in the Critical Habitat areas are locations in the Huachuca Mountains

(Gardner Canyon near Sawmill Canyon on Fort Huachuca; Scotia and Sunnyside Canyons, Coronado National Forest), Sonoita Creek southwest of Sonoita, and the upper San Pedro River from near Fairbanks to near Hereford, San Pedro NCA. The species is present in other wetland locations on private lands within the Canelo Hills. It is typically associated with mid-elevation wetlands where highly organic soils are permanently or seasonally saturated, such as perennial springs and stream headwaters, cienegas, streams and rivers (Ibid, Arizona Game and Fish Department 1997).

Ground activities associated with the UAV program, such as vehicle movement, camps, and personnel activities are not anticipated to affect this species. No target placement sites in the ROI are located in or near wetlands where this species might occur. Road creek crossings are located in areas where creeks are normally dry and therefore not habitat for this species. The road crossing of a wetland near Canelo is paved and a culvert is present. This alignment prevents vehicles from coming in contact with the wetland. UAV flights will not affect this species or its habitat. The likelihood of UAV program-related wild fire near wetlands that could lead to erosion and silting of areas where the species is present is small. Whether wild fire would directly affect the wetlands may depend on the time of year. For example, during the dry months leading up to the summer monsoon wild fire may have the potential to direct affect the species. It is anticipated that the proposed action will have no effect on this species.

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Table 1. Expected Occurrence of and Potential Impacts to Forest Sensitive Species and Sensitive Plant Species near or in the Coronado National Forest in the Sierra Vista Ranger District (1 of 5)

Species	Expected Occurance	Expected Occurance at Designated UAV Sites	Potential for Impact from UAV Program Activies
BIRDS			
Goshawk, Apache *Accipter gentilis apache*	Does occur	Unlikely to occur	Air – No impact on species Ground – No impact on species
Hawk, Northern Gray *Asturina nitida maxima*	Does occur	Unlikely to occur	Air – No impact on species Ground – No impact on species
Black-Hawk, Common *Buteogallus anthracinus*	Unlikely to occur	Unlikely to occur	Air – No impact on species Ground – No impact on species
Cuckoo, Western Yellow-Billed *Coccyzus americanus occidentalis*	Unlikely to occur	Unlikely to occur	Air – No impact on species Ground – No impact on species
Trogon, Eared *Euptilotis neoxenus*	Unlikely to occur	Unlikely to occur	Air – No impact on species Ground – No impact on species
Falcon, American Peregrine *Falco peregrinus anatum*	Does occur	May occur	Air – May impact individuals, but not likely to result in a trend towards federal listing of loss of viability Ground – May impact individuals, but not likely to result in a trend towards federal listing of loss of viability
Turkey, Gould's *Meleagris gallopavo mexicana*	Does occur	Unlikely to occur	Air – No impact on species Ground – No impact on species
Sparrow, Chihuahua Savannah *Passerculus sandwichensis rufofuscus*	Unlikely to occur	Unlikely to occur	Air – No impact on species Ground – No impact on species
MAMMALS			
Mouse, Cactus *Peromyscus eremicus papagensis*	Does not occur	Does not occur	Air – No impact on species Ground – No impact on species
Shrew, Arizona *Sorex arizonae*	Does not occur	Does not occur	Air – No impact on species Ground – No impact on species
Gopher, Huachuca Mountains Pocket *Thomomys umbrinus intermedius*	Does occur	May occur	Air – No impact on species Ground – May impact individuals, but not likely to result in a trend towards federal listing of loss of viability
AMPHIBIANS			
Frog, Western Barking *Eleutherodactylus augusti cactorum*	Does occur	May occur	Air – No impact on species Ground – May impact individuals, but not likely to result in a trend towards federal listing of loss of viability
REPTILES			
Whiptail, Giant Spotted *Cnemidophorus burti stictogrammus*	Does occur	May occur	Air – No impact on species Ground – May impact individuals, but not likely to result in a trend towards federal listing of loss of viability
Rattlesnake, Arizona Ridgenosed *Crotalus willardi willardi*	Does occur	May occur	Air – No impact on species Ground – May impact individuals, but not likely to result in a trend towards federal listing of loss of viability
Massagua, Desert *Sistrus catenatus edwardsi*	Does not occur	Does not occur	Air – No impact on species Ground – No impact on species
Snake, Mexican Garter *Thamnophis eques megalops*	Does occur	May occur	Air – No impact on species Ground – May impact individuals, but not likely to result in a trend towards federal listing of loss of viability

Note: List compiled April 25, 2000. Does not included Endangered Species Act "listed" species.
Forest Sensitive species and species of special concern list obtained from the Sierra Vista Ranger District, Coronado National Forest, Sierra Vista. Sensitive plant list based upon plant list provided at the Coronado Rare Plant Workshop, March 7-9, 2000, Tucson, Arizona.
Potential impacts to the viability of species can be determined to have:

1. no impact on species;
2. beneficial impact on species;
3. may impact individuals, but not likely to result in a trend towards federal listing or a loss of viability;
4. will impact individuals, and is likely to result in a trend towards federal listing and a loss of viability.

Table 1. Expected Occurrence of and Potential Impacts to Forest Sensitive Species and Sensitive Plant Species near or in the Coronado National Forest in the Sierra Vista Ranger District (2 of 5)

Species	Expected Occurance	Expected Occurance at Designated UAV Sites	Potential for Impact from UAV Program Activies
FISH			
Sucker, Desert *Catostomus clarki*	Does not occur	Does not occur	Air – No impact on species Ground – No impact on species
Sucker, Sonora *Catostomus insignis*	Does not occur	Does not occur	Air – No impact on species Ground – No impact on species
BUTTERFLIES			
Skipper, Aryxna Giant *Agathymus aryxna*	Does occur	May occur	Air – No impact on species Ground – May impact individuals, but not likely to result in a trend towards federal listing of loss of viability
Skipper, Brigadier *Agathymus evansii*	May occur	May occur	Air – No impact on species Ground – May impact individuals, but not likely to result in a trend towards federal listing of loss of viability
Skipper, Poling's Giant *Agathymus polingi*	May occur	Unlikely to occur	Air – No impact on species Ground – No impact on species
Orange Tip, Pima *Anthocharis pima (A. cethura pima)*	May occur	May occur	Air – No impact on species Ground – May impact individuals, but not likely to result in a trend towards federal listing of loss of viability
Metalmark, Crescent *Apodemia phyciodoides*	Does not occur	Does not occur	Air – No impact on species Ground – No impact on species
Metalmark, Arizona *Calephelis arizonensis*	May occur	May occur	Air – No impact on species Ground – May impact individuals, but not likely to result in a trend towards federal listing of loss of viability
Dusky Wing, Scudder's *Erynnis scudderi*	May occur	Unlikely to occur	Air – No impact on species Ground – No impact on species
Butterfly, Obsolete Viceroy *Limenitis archippus obsoleta*	Does not occur	Does not occur	Air – No impact on species Ground – No impact on species
Skipper, Ursine Giant *Megathymus ursus*	May occur	May occur	Air – No impact on species Ground – May impact individuals, but not likely to result in a trend towards federal listing of loss of viability
Hairstreak, Clytie's *Ministrymon clytie*	Does not occur	Does not occur	Air – No impact on species Ground – No impact on species
Butterfly, Chiricahua Pine White *Neophasia terlootii*	Does not occur	Does not occur	Air – No impact on species Ground – No impact on species
Skipperling, Spotted *Piruna polingii*	Does not occur	Does not occur	Air – No impact on species Ground – No impact on species
Butterfly, Blue Silverspot *Speyeria nokomis coerulescens*	Does not occur	Does not occur	Air – No impact on species Ground – No impact on species
PLANTS			
Agave, Santa Cruz *Agave parviflora* ssp. *parviflora*	Does not occur	Does not occur	Air – No impact on species Ground – No impact on species
Onion, Redflower *Allium rhizomatium*	Does occur	May occur	Air – No impact on species Ground – May impact individuals, but not likely to result in a trend towards federal listing of loss of viability

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Forest Sensitive species and species of special concern list obtained from the Sierra Vista Ranger District, Coronado National Forest, Sierra Vista. Sensitive plant list based upon plant list provided at the Coronado Rare Plant Workshop, March 7-9, 2000, Tucson, Arizona.

Potential impacts to the viability of species can be determined to have:

1. no impact on species;
2. beneficial impact on species;
3. may impact individuals, but not likely to result in a trend towards federal listing or a loss of viability;
4. will impact individuals, and is likely to result in a trend towards federal listing and a loss of viability.

Table 1. Expected Occurrence of and Potential Impacts to Forest Sensitive Species and Sensitive Plant Species near or in the Coronado National Forest in the Sierra Vista Ranger District (3 of 5)

Species	Expected Occurance	Expected Occurance at Designated UAV Sites	Potential for Impact from UAV Program Activies
PLANTS (continued)			
Star, Large-Flowered Blue *Amsonia grandiflora*	Does occur	May occur	Air – No impact on species Ground – May impact individuals, but not likely to result in a trend towards federal listing of loss of viability
Cress, Chiricahua Rock *Arabis tricornuta*	Does not occur	Does not occur	Air – No impact on species Ground – No impact on species
Milkweed, Lemmon *Asclepias lemmonii*	Does not occur	Does not occur	Air – No impact on species Ground – No impact on species
Milkweed, Greene *Asclepias uncialis*	Does occur	May occur	Air – No impact on species Ground – May impact individuals, but not likely to result in a trend towards federal listing of loss of viability
Vetch, Huachuca Milk *Astragalus hypoxylus*	Does occur	May occur	Air – No impact on species Ground – May impact individuals, but not likely to result in a trend towards federal listing of loss of viability
Browalia eludens	Does occur	May occur	Air – No impact on species Ground – May impact individuals, but not likely to result in a trend towards federal listing of loss of viability
Chiltepin *Capsicum annuum*	Does not occur	Does not occur	Air – No impact on species Ground – No impact on species
A Sedge *Carex chihuahuensis*	May occur	May occur	Air – No impact on species Ground – May impact individuals, but not likely to result in a trend towards federal listing of loss of viability
Sedge, Arizona Great *Carex ultra*	May occur	May occur	Air – No impact on species Ground – May impact individuals, but not likely to result in a trend towards federal listing of loss of viability
Parsley, Mexican Hemlock *Conioselinum mexicanum*	Does not occur	Does not occur	Air – No impact on species Ground – No impact on species
Cactus, Santa Cruz Beehive *Coryphantha recurvata*	Does not occur	Does not occur	Air – No impact on species Ground – No impact on species
Coursetia glabella	Does occur	May occur	Air – No impact on species Ground – May impact individuals, but not likely to result in a trend towards federal listing of loss of viability
Cactus, Needle-Spined Pineapple *Echinomastus erectrocentrus* var. *erectrocentrus*	Does not occur	Does not occur	Air – No impact on species Ground – No impact on species
Erigeron arsolius	Does occur	May occur	Air – No impact on species Ground – May impact individuals, but not likely to result in a trend towards federal listing of loss of viability
Thistle, Huachuca Mountain Coyote *Eryngium phyteumae*	Does not occur	Does not occur	Air – No impact on species Ground – No impact on species
Throughwort, Bigelow *Eupatorium bigelovii*	Does not occur	Does not occur	Air – No impact on species Ground – No impact on species
Gentian, Wislizenii *Gentianella wislizeni*	Does not occur	Does not occur	Air – No impact on species Ground – No impact on species

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Potential impacts to the viability of species can be determined to have:

1. no impact on species;
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Table 1. Expected Occurrence of and Potential Impacts to Forest Sensitive Species and Sensitive Plant Species near or in the Coronado National Forest in the Sierra Vista Ranger District (4 of 5)

Species	Expected Occurance	Expected Occurance at Designated UAV Sites	Potential for Impact from UAV Program Activies
PLANTS (continued)			
Stonecrop, Bartram's *Graptopetalum bartramii*	Does occur	May occur	Air – No impact on species Ground – May impact individuals, but not likely to result in a trend towards federal listing of loss of viability
Pennyroyal, Chiricahua Mock *Hedoma costatum*	Does not occur	Does not occur	Air – No impact on species Ground – No impact on species
Pennyroyal, Mock *Hedoma dentatum*	Does occur	May occur	Air – No impact on species Ground – May impact individuals, but not likely to result in a trend towards federal listing of loss of viability
Aster, Huachuca Golder *Heterotheca rutteri*	Does not occur	Does not occur	Air – No impact on species Ground – No impact on species
Alum Root, Arizona *Heuchera glomerulata*	Does not occur	Does not occur	Air – No impact on species Ground – No impact on species
Chisos Coral-Root *Hexalectris revoluta*	Does not occur	Does not occur	Air – No impact on species Ground – No impact on species
Spike, Texas Purple *Hexalectris warnockii*	Does not occur	Does not occur	Air – No impact on species Ground – No impact on species
Hawkweed, Rusby *Hieracium rusbyi*	Does not occur	Does not occur	Air – No impact on species Ground – No impact on species
Morning Glory, Huachuca *Ipomoea plummerae var. cuneifolia*	Does not occur	Does not occur	Air – No impact on species Ground – No impact on species
Morning Glory, Lemmon's *Ipomoea tenuiloba var. lemmonii*	Does not occur	Does not occur	Air – No impact on species Ground – No impact on species
Morning Glory, Thurber's *Ipomoea thurberi*	May occur	May occur	Air – No impact on species Ground – May impact individuals, but not likely to result in a trend towards federal listing of loss of viability
Fleabane, Wooly *Laennecia eriophylla*	May occur	May occur	Air – No impact on species Ground – May impact individuals, but not likely to result in a trend towards federal listing of loss of viability
Lily, Lemon *Lilium parryi*	Does not occur	Does not occur	Air – No impact on species Ground – No impact on species
Lupine, Huachuca Mountain *Lupinus huachucanus*	Does not occur	Does not occur	Air – No impact on species Ground – No impact on species
Berry, Lemmon Globe *Margaranthus lemmonii*	Does not occur	Does not occur	Air – No impact on species Ground – No impact on species
Escoba *Marina diffusa*	Does occur	May occur	Air – No impact on species Ground – May impact individuals, but not likely to result in a trend towards federal listing of loss of viability
Vine, Wiggins Milkweed *Metastelma mexicanum*	Does occur	May occur	Air – No impact on species Ground – May impact individuals, but not likely to result in a trend towards federal listing of loss of viability
Box Canyon Muhly *Muhlenbergia dubioides*	May occur	Does not occur	Air – No impact on species Ground – No impact on species

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Table 1. Expected Occurrence of and Potential Impacts to Forest Sensitive Species and Sensitive Plant Species near or in the Coronado National Forest in the Sierra Vista Ranger District (5 of 5)

Species	Expected Occurance	Expected Occurance at Designated UAV Sites	Potential for Impact from UAV Program Activies
PLANTS (continued)			
Paspalum, Virlet *Paspalum virletii*	May occur	May occur	Air – No impact on species Ground – May impact individuals, but not likely to result in a trend towards federal listing of loss of viability
Chinch Weed, Beardless *Pectis imberbis*	Does occur	May occur	Air – No impact on species Ground – May impact individuals, but not likely to result in a trend towards federal listing of loss of viability
Beardtongue, Catalina *Penstemon discolor*	Does not occur	Does not occur	Air – No impact on species Ground – No impact on species
Beardtongue, Superb *Penstemon superbus*	Does not occur	Does not occur	Air – No impact on species Ground – No impact on species
Vine, Huachuca Milkweed *Pherotrichis balbisii*	Does not occur	Does not occur	Air – No impact on species Ground – No impact on species
Brookweed, Chiricahua Mountain *Samolus vagans*	Does not occur	Does not occur	Air – No impact on species Ground – No impact on species
Groundsel, Seemann *Senecio hartwegii (S. carlomasonii)*	May occur	Does not occur	Air – No impact on species Ground – No impact on species
Groundsel, Huachuca *Senecio huachucanus*	Does not occur	Does not occur	Air – No impact on species Ground – No impact on species
Blue-eyed Grass, Nodding *Sisyrinchium cernuum*	Does not occur	Does not occur	Air – No impact on species Ground – No impact on species
Nightshade, Lumholtz *Solanum lumholtzianum*	Does not occur	Does not occur	Air – No impact on species Ground – No impact on species
Starwort, Prosild's *Stellaria porsildii*	Does not occur	Does not occur	Air – No impact on species Ground – No impact on species
Stevia, Lemmon's *Stevia lemmonii*	Does occur	May occur	Air – No impact on species Ground – May impact individuals, but not likely to result in a trend towards federal listing of loss of viability
Flame Flower, Pinos Altos *Talinum humile*	Does occur	May occur	Air – No impact on species Ground – May impact individuals, but not likely to result in a trend towards federal listing of loss of viability
Flame Flower, Tepic *Talinum marginatum*	Does occur	May occur	Air – No impact on species Ground – May impact individuals, but not likely to result in a trend towards federal listing of loss of viability
Pea, Thurber Hoary *Tephrosia thurberi*	Does occur	May occur	Air – No impact on species Ground – May impact individuals, but not likely to result in a trend towards federal listing of loss of viability
Noseburn, Sonora *Tragia laciniata*	May occur	Does not occur	Air – No impact on species Ground – No impact on species
Violet, Shade *Viola umbraticola*	Does not occur	Does not occur	Air – No impact on species Ground – No impact on species

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Table 2. Expected Occurrence of and Potential Impacts to Federal ESA-listed Species at Fort Huachuca, Canelo Hills, Patagonia Mountains, and San Pedro Riparian NCA[1] (1 of 2)

Species	Federal Status	Has, Does or May Occur in		Occurrence Code				Potential to occur in areas affected by the Proposed Action[2]
		Cochise County	Santa Cruz County	FH	CH	PM	NCA	
PLANTS								
Cochise pincushion cactus (*Coryphantha robbinsorum*)	Threatened	Yes	No	2	3	3	3	No
Pima Pineapple cactus (*Coryphantha* scheeri *rogustispina*)	Endangered	No	Yes	3	3	3	3	No
Canelo Hills Ladies' tresses (*Spiranthes delitescens*)	Endangered	Yes	Yes	2	1	3	2	**Yes**
Huachuca water umbel (*Lilaeopsis schaffneriana*)	Endangered	Yes	Yes	1	1	1	1	**Yes**
Lemmon fleabane (*Erigeron lemmonii*)	Candidate	Yes	No	1	3	3	3	No
INVERTEBRATES								
Huachuca springsnail (*Pyrgulopsis thompsoni*)	Candidate	Yes	Yes	1	1	1	2	**Yes**
BIRDS								
Bald Eagle (*Haliaeetus leucocephalus*)	Threatened	Yes	Yes	1	1	1	1	**Yes**
Northern aplomado falcon (*Falco femoralis septentrionalis*)	Endangered	Yes	Yes	2	2	2	2	No
Whooping crane (*Grus americana*)	Endangered	Yes	No	3	3	3	3	No
Mountain Plover (*Charadrius montanus*)	Candidate	Yes	No	2	2	3	2	No
Mexican spotted owl (*Strix occidentalis lucida*)	Threatened	Yes	Yes	1	2	1	3	**Yes**
Cactus ferruginous pygmy-owl (*Glaucidium brasilianum cactorum*)	Endangered	Yes	Yes	3	3	3	2	No
Southwestern willow flycatcher (*Empidonax traillii extimus*)	Endangered	Yes	Yes	3	3	3	1	**Yes**
MAMMALS								
Lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*)	Endangered	Yes	Yes	1	1	1	3	**Yes**
Mexican gray wolf (*Canis lupus baileyi*)	Endangered	Yes	Yes	2	2	2	2	No
Jaguar (*Panthera onca*)	Endangered	Yes	No	2	2	2	2	No
Ocelot (*Felis pardalis*)	Endangered	Yes	Yes	3	3	3	2	No
Jaguarundi (*Felis yagouaroundi tolteca*)	Endangered	Yes	Yes	3	3	3	2	No

[1] Based on: USFWS July 15, 1999. Listed, proposed, and candidate species for Cochise County; USFWS July 15, 1999. Listed, proposed, and candidate species for Santa Cruz County; and October 27, 1999 Biological Opinion for ongoing and proposed future military activities at Fort Huachuca.

[2] A "Yes" indicates that the species has the potential to occur at location(s) used by the UAV program.

DEFINITIONS
FH=Fort Huachuca, CH=Canelo Hills, PM=Patagonia Mountains, NCA=San Pedro NCA
Federal status as defined by the USFWS under the Endangered Species Act (ESA):
Proposed Threatened: species proposed for listing as threatened
Endangered: species which are in imminent jeopardy of extinction
Threatened: species which are in imminent jeopardy of becoming endangered
Candidate: species for which there is sufficient information to support a proposal for listing under the ESA

OCCURRENCE STATUS:
1: species occurs in area
2: potential habitat present but species is not known to occur
3: no potential habitat present and species is not known to occur

Table 2. Expected Occurrence of and Potential Impacts to Federal ESA-listed Species at Fort Huachuca, Canelo Hills, Patagonia Mountains, and San Pedro Riparian NCA[1] (2 of 2)

Species	Federal Status	Has, Does or May Occur in		Occurrence Code				Potential to occur in areas affected by the Proposed Action [2]
		Cochise County	Santa Cruz County	FH	CH	PM	NCA	
AMPHIBIANS AND REPTILES								
Sonora tiger salamander (*Ambystoma tigrinum stebbinsi*)	Endangered	Yes	Yes	1	1	1	3	**Yes**
Ramsey Canyon leopard frog (*Rana subaquavocalis*)	Conservation Agreement	Yes	No	1	3	3	3	**Yes**
Chiricahua leopard frog (*Rana chiricahuensi*)	Candidate	Yes	Yes	2	2	2	2	No
New Mexican ridge-nosed rattlesnake (*Crotalus willardi obscurus*)	Threatened	Yes	No	3	3	3	3	No
FISH								
Gila Chub (*Gila intermedia*)	Candidate	Yes	Yes	2	3	3	2	No
Yaqui Chub (*Gila purpurea*)	Endangered	Yes	No	3	3	3	2	No
Sonora Chub (*Gila ditaenia*)	Threatened	No	Yes	3	3	3	2	No
Yaqui catfish (*Ictalurus pricei*)	Threatened	Yes	No	3	3	3	2	No
Yaqui topminnow (*Poeciliopsis occidentalis sonoriensis*)	Endangered	Yes	No	2	3	3	2	No
Gila topminnow (*Poeciliopsis occidentalis occidentalis*)	Endangered	No	Yes	2	3	3	2	No
Beautiful shiner (*Cyprinella formosa*)	Threatened	Yes	No	3	3	3	2	No
Desert pupfish (*Cyprinodon macularius*)	Endangered	No	Yes	3	3	3	2	No
Loach minnow (*Rhinichthys cobitis*)	Threatened	No	No	3	3	3	2	No
Spikedace (*Meda fulgida*)	Threatened	No	No	3	3	3	2	No
Razorback sucker (*Xyrauchen texanum*)	Endangered	No	No	3	3	3	2	No

[1] Based on: USFWS July 15, 1999. Listed, proposed, and candidate species for Cochise County; USFWS July 15, 1999. Listed, proposed, and candidate species for Santa Cruz County; and October 27, 1999 Biological Opinion for ongoing and proposed future military activities at Fort Huachuca.

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- Proposed Threatened: species proposed for listing as threatened
- Endangered: species which are in imminent jeopardy of extinction
- Threatened: species which are in imminent jeopardy of becoming endangered
- Candidate: species for which there is sufficient information to support a proposal for listing under the ESA

OCCURRENCE STATUS:

1: species occurs in area
2: potential habitat present but species is not known to occur
3: no potential habitat present and species is not known to occur

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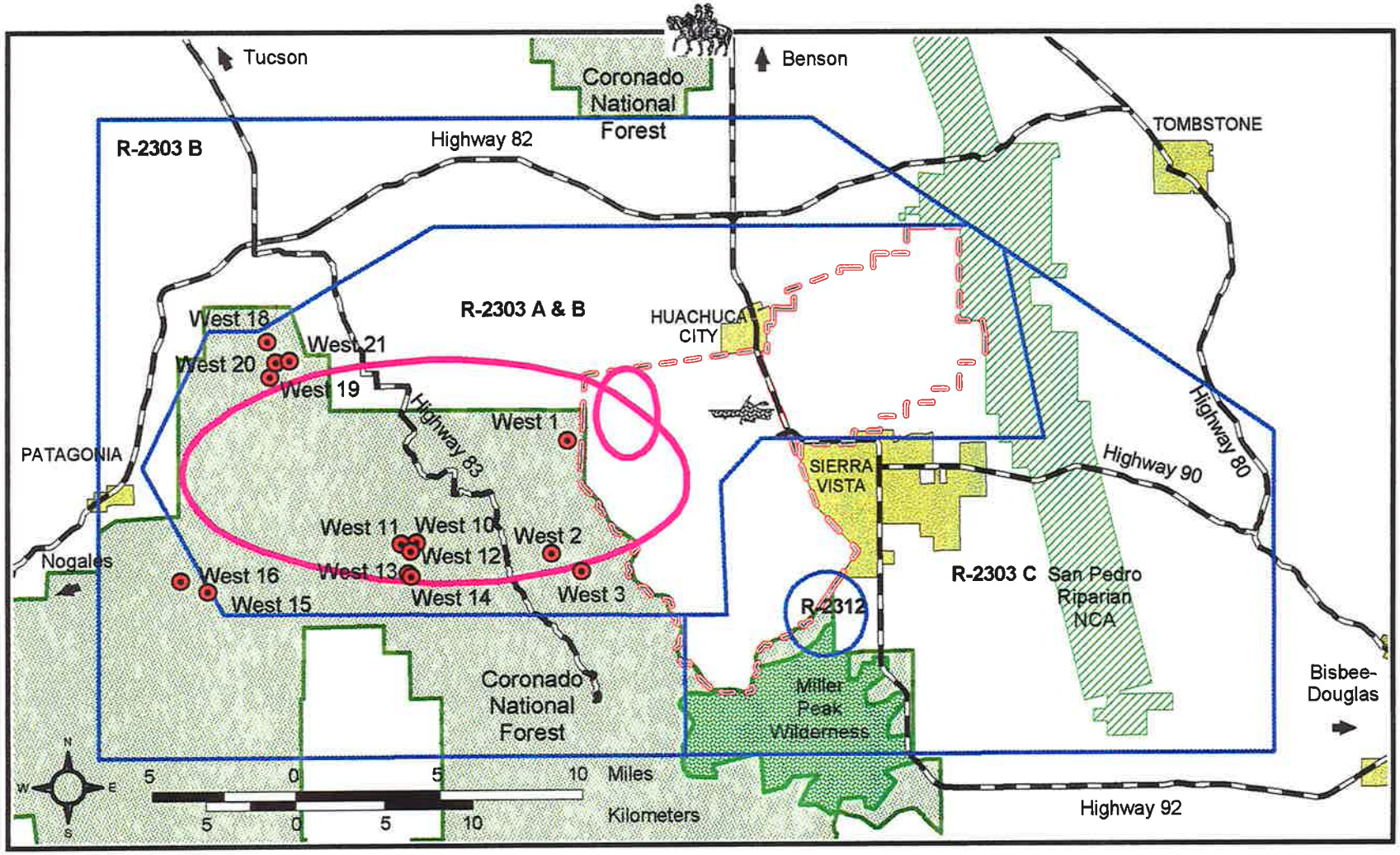

ATTACHMENT 1

Fort Huachuca
Off-Post UAV Activity Areas

Activity Areas
UAV Flight Areas
Restricted Air Space

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APPENDIX C

SUMMARY OF BASELINE SPECIES DATA AND USFWS CORRESPONDENCE

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SUMMARY OF BASELINE SPECIES DATA

CANELO HILLS LADIES' TRESS

The Canelo Hills ladies' tresses (Spiranthes delitescens) was listed endangered by the USFWS and is classified as "highly safeguarded" by the Arizona Native Plant Law of 1993 (ENRD 1998). Critical habitat has not been designated for this plant species. A wetlands orchid, the Canelo Hills ladies' tresses occurs in finely grained, organic soils that are seasonally or perennially saturated. The primary threat to this species is alteration of ground and surface water flows, which may degrade or destroy wetland habitat (ENRD 1998).

Today, this plant is only known to occur in southern Arizona in four cienegas (wetland communities located in arid areas): one in Cochise County and three in Santa Cruz County. Canelo Hills ladies' tresses are not known to occur on Fort Huachuca and no potential habitat for this plant is present on the Fort (ENRD 1998).

HUACHUCA WATER UMBEL

The Huachuca water umbel (*Lilaeopsis schaffneriana recurva*) was listed endangered by the USFWS and is classified as "highly safeguarded" by the Arizona Native Plant Law of 1993. Critical habitat has been designated for this plant species (USFWS 1997). The Huachuca water umbel inhabits cienegas and associated vegetation within Sonoran desertscrub, grassland, oak woodland and coniferous forests at elevations of 4,000 to 6,500 ft (1,210 to 1,980 m). The primary threat to this species is alteration of ground and surface water flows, which may degrade or destroy wetland habitat (ENRD 1998). In addition, wildfires are of concern because of increased erosion, reduced water infiltration, and other negative impacts that can occur after a fire. Excessive rates of erosion and disturbance near a site from wildfires, recreationalists, or road construction could result in a flash flood scouring a population. Likewise, the reduction or diversion of water could eliminate a site (ENRD 1998).

Presently, the Huachuca water umbel occurs in southwestern New Mexico, southeastern Arizona, and adjacent Sonora, Mexico (ENRD 1998). In Arizona, populations occur in Pima, Santa Cruz, and Cochise counties. The water umbel has been documented from 24 sites in Arizona, six of which have been extirpated. These sites occur in four major watersheds: the San Pedro River, Santa Cruz River, Rio Yaqui, and Rio Sonora (ENRD 1998). Potential habitat for this plant may exist around ponds in the southwestern corner of the East Range of Fort Huachuca; however, no plants have been found during formal or incidental surveys of the pond area (ENRD 1998).

Populations of this species are also known in the Canelo Hills and Patagonia Mountains.

HUACHUCA SPRINGSNAIL

The Huachuca springsnail (*Pyrgulopsis thompsoni*) is a federal candidate species and it has no state protection status. It is a very small (1.7 to 2.3 mm or 0.7 to 0.9 in) mollusk and its shell is conical in shape. Species identification must be accomplished by examining characteristics of the reproductive organ. This species occupies the shallow areas of cienegas, often at the rocky seep

of a spring source, between 4,500 to 6,000 ft (1370 and 1830 m) in elevation (ENRD 1998). These springs contain vegetation, have a slow to moderate flow, with firm substrates such as roots, wood, and rocks. Populations can be locally abundant, but habitat within cienegas is limited. Threats to the species are habitat destruction by residential development, water diversions, recreational use, and livestock grazing (ENRD 1998).

The springsnail is found in springs of southern Santa Cruz and Cochise counties as well as northern Sonora, Mexico. This species may also exist within similar habitat within the SPRNCA (ENRD 1998).

Populations of this species are also known in the Canelo Hills and Patagonia Mountains.

BALD EAGLE

Previously listed as federally endangered in most states, the bald eagle (*Haliaeetus leucocephalus*) was reclassified as threatened because of significant increases in the number of breeding pairs (ENRD 1998). In Arizona, this bird is listed as Wildlife of Special Concern. While bald eagles breed throughout most of North America, sizable breeding populations occur near sparsely human-populated coasts, rivers, and large lakes. Bald eagles generally nest in forest stands near water that contain a mixture of tall, old, and dead and dying trees. Nest trees must be structurally suitable to hold a large stick nest (ENRD 1998).

In the winter months bald eagles may expand their home range in search of food or migrate to areas where food is available. Bald eagles are known to congregate at reservoirs, lakes, or rivers where waterbirds or fish are abundant (ENRD 1998). In addition to food, another important component of eagle winter ecology is the availability of roosting habitat. Roosting habitat consists of trees that extend above the forest canopy and provide a protected microclimate for resting eagles (ENRD 1998). Eagles feed primarily on fish and waterbirds, but also on small mammals and mammal carcasses. Some eagle populations are migratory whereas others remain near their breeding areas year round (ENRD 1998).

The bald eagle has a limited distribution in Arizona, with nesting populations found only in the northern and central portions of the state (Hunt et al. 1992). Wintering areas include the Colorado River and various reservoirs in northern and central Arizona. Consistent wintering areas have not been documented in southeastern Arizona, although transient bald eagles have occasionally been recorded along the San Pedro River.

A bald eagle was observed flying over the West Range in January 1998 (ENRD 1998). However, suitable nesting habitat or habitat for congregations of wintering birds does not exist on Fort Huachuca. Small numbers of eagles may winter intermittently in large cottonwood or sycamore trees in the San Pedro NCA adjacent to Fort Huachuca (ENRD 1998).

Populations of this species are not known to occur in the Canelo Hills and Patagonia Mountains.

MEXICAN SPOTTED OWL

The Mexican spotted owl (*Strix occidentalis lucida*) is a federally threatened species and an Arizona Wildlife of Special Concern. Spotted owl habitat on Fort Huachuca is not included as "critical habitat" as designated by the USFWS. The habitat characteristics of Mexican spotted

owl nesting and roosting sites generally consist of multi-layered, uneven-aged forests with high canopy closure or rocky, shaded canyons (ENRD 1998). In the Huachuca Mountains many spotted owl nest sites were described as Madrean pine-oak woodland with montane conifer species and some broadleaf riparian component (ENRD 1998). Cliffs are present at some sites and used for nesting.

The Mexican spotted owl's geographic range covers portions of the southwestern United States and extends into Mexico. Because the breeding habitat of this species is confined to mountain ranges and canyons, owl distribution is patchy throughout its range. The Mexican Spotted Owl Recovery Team delineated six recovery units (RU) in the United States and five in Mexico. The Huachuca Mountains are included in the Basin and Range, West RU, which is characterized by mountain ranges isolated by desert basins. This RU along with the Upper Gila Mountains and the Basin and Range, East RUs, are believed to be important habitat because of the high number of spotted owls relative to the other RUs (ENRD 1998).

The Mexican spotted owl is also known to nest in the Patagonia Mountains (Block et al. 1995), as well as in other "Sky Island" mountains of southeastern Arizona and Sonora. There are three locations where this species has been found in the Patagonia Mountains and a small number of historic locations as well (S. Speich personal observations). Known nest sites are all at lower locations, in association with Madrean Woodlands, chaparral and rock canyons and cliffs.

NORTHERN APLOMADO FALCON

The northern aplomado falcon (*Falco femoralis septentrionalis*) is a federally endangered species, but critical habitat has not been designated. The aplomado falcon recovery plan was established in 1990 with the goal of achieving 60 breeding pairs within the US (ENRD 1998). In Arizona, this falcon is listed as Wildlife of Special Concern. Habitat requirements for the northern aplomado falcon consist of open grassland savanna with widely scattered woody vegetation and relatively little ground cover (The Peregrine Fund 1994). Nests are located in arboreal bromeliads, at the base of palm fronds, and in small abandoned corvid and raptor (*Buteo* sp.) nests. Aplomado falcons feed primarily on large insects and small-to-medium-sized birds.

No breeding aplomado falcons have been documented in Arizona since the 1940s. Occasional sightings of individual aplomado falcons have been confirmed in western Texas and eastern New Mexico, but no confirmed sightings have been reported for Arizona (Ward and Ingraldi 1994). The nearest known breeding population to Fort Huachuca is in Chihuahua, Mexico, approximately 350 miles from Fort Huachuca (The Peregrine Fund 1994). Most known populations are found in the Mexican states of Veracruz, Chiapas, Tabasco, and Campeche. In addition, two breeding pairs produced an average of 1.5 young towards the reestablishment of the population in Texas (Mora et al. 1997). Presently, the northern aplomado falcon is not known to occur on Fort Huachuca and has been extirpated from Arizona (AGFD 1996a).

Populations of this species are not known to exist in the Canelo Hills and Patagonia Mountains.

LESSER LONG-NOSED BAT

The lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*) was listed as endangered on 22 September, 1988. In Arizona this bat is listed as Wildlife of Special Concern. The USFWS has

not designated critical habitat for the lesser long-nosed bat (ENRD 1998). This species is found in arid regions ranging from Central America to a small portion of the southwestern United States. In the southwestern United States lesser long-nosed bat roosts are known to occur in six counties in southern Arizona and one county in New Mexico. These bat populations occupy the northern portion of their range from spring to autumn then migrate south for the winter. Seasonal movements of bats apparently coincide with the blooming of appropriate food plant species, namely agave and columnar cacti such as organ pipe. This bat was found to be in jeopardy because of disturbance of roost sites, loss of food sources (paniculate agave), and direct killing by humans. Subsequent work and review have indicated that despite this bats' sensitivity, historical disturbance to roosts, and fragility of its foraging habitat, listing may have been unwarranted (USFWS 1993a).

The greatest densities of lesser long-nosed bats are located in northern Mexico and in southern Arizona (ENRD 1998). Estimated sizes of roosts ranged from 200-150,000 bats in 1992-1993. At least two large post-maternity roosts are located near Fort Huachuca (Sidner 1996). Historic and more recent surveys have identified lesser long-nosed bat roost locations on Fort Huachuca during the post-breeding season.

The habitat requirements of lesser long-nosed bats vary seasonally and are apparently synchronized with the flowering of food plants. During the reproductive season of April through June, lesser long-nosed bats are found in Sonoran desertscrub habitat in the northern part of their range. At this time, the bats feed on the flowers and fruits of saguaro and organ pipe cacti and use caves and mines as maternity roosts. Because Sonoran desertscrub vegetation does not occur at Fort Huachuca, it is unlikely that lesser long-nosed bat maternity roosts exist in the immediate area. From late summer through fall (July to October), the bats are found at higher elevations in grassland habitat foraging primarily on agaves. Caves and mines are used by adults and young for day and night roosting. By November, lesser long-nosed bats have vacated their northern grassland habitat and begun their southward migration.

There are no known mines or caves on the South Range that would be suitable roosting habitat for lesser long-nosed bats. There is also no known roosting habitat for lesser long-nosed bats on the East Range. Only a few agaves are present in the grasslands located in the northwestern corner of this range (Chambers Group 1993).

Populations of this species are not known to exist in the Canelo Hills and Patagonia Mountains.

MEXICAN GRAY WOLF

The Mexican gray wolf (*Canis lupus baileyi*) was listed as a federally endangered species in 1976 and a federal recovery plan was approved in 1982. Critical habitat will not be designated for experimental, non-essential populations of this canid (USFWS 1998). In Arizona this wolf is considered a Wildlife of Special Concern. The Mexican wolf historically occupied oak woodlands, pine/oak woodlands, or pine forests with adjacent grasslands of mountainous terrain, dense cover, and accessible water (ENRD 1998). Historic observations of this species in New Mexico indicate that they were primarily found in the upper Sonoran and transition zones associated with densely forested terrain composed of ponderosa pine (*Pinus ponderosa*), pinyon pine (*Pinus edulis*), and oak (*Quercus* spp.). The Mexican wolf tends to avoid desert habitats, although they have been known to cross the desert floor to suitable habitat (ENRD 1998).

Historically, the Mexican wolf inhabited areas from southern Arizona (including the Huachuca Mountains) and Texas down to southern Mexico. Currently, the Mexican wolf is believed to be extirpated from the US (ENRD 1998). Recently, however, (USFWS 1988) efforts were initiated to reintroduce an experimental population of this species into east-central Arizona in the Apache and Gila National Forests. It is very unlikely that an individual of this species would be encountered in this area of the ROI.

SONORA TIGER SALAMANDER

The Sonora tiger salamander (*Ambystoma tigrinum stebbinsi*) was listed as federally endangered effective February 5, 1997 (ENRD 1998). No critical habitat was designated for this species and a recovery plan has not yet been approved. Arizona considers this amphibian a Wildlife of Special Concern. The habitat requirements for the genus include lakes, ponds, and stock tanks with surrounding vegetation types ranging from arid sagebrush plains and rolling grassland to mountain meadows and forests with elevations of near sea level to 3660 meters (12,000 ft). Jones *et al.* (1988) found the Sonora tiger salamander only in stock tanks and believe that these salamanders in Arizona were introduced into stock tanks by humans.

Currently all known populations are located in Santa Cruz and Cochise Counties, Arizona. Three populations of Sonora tiger salamanders are known to exist in the Huachuca Mountains.

The Sonora tiger salamander is known from stock tanks and impounded cienegas in the San Rafael Valley grassland and the surrounding uplands, including the Patagonia and Huachuca Mountains (USFWS 1997). This species can be expected to occur in appropriate wetland and aquatic habitats, particularly at the edge of the San Rafael Valley grasslands, in the Patagonia Mountains.

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United States Department of the Interior
U.S. Fish and Wildlife Service
2321 West Royal Palm Road, Suite 103
Phoenix, Arizona 85021-4951
Telephone: (602) 640-2720 FAX: (602) 640-2730

In Reply Refer To:
AESO/SE
2-21-00-I-259

May 17, 2000

RECEIVED MAY 18 2000

Mr. Michael Collins, Project Manager
Engineering and Environmental Consultants, Inc.
3501 North 16th Street
Phoenix, Arizona 85016

RE: EEC Project Reference 99190-.14; Unmanned Aerial Vehicle Program at Fort Huachuca

Dear Mr. Collins:

This letter responds to your May 10, 2000, requests for an inventory of threatened or endangered species, or those that are proposed to be listed as such under the Endangered Species Act of 1973, as amended (Act), which may potentially occur in your project area (Cochise and Santa Cruz Counties). The enclosed list may include candidate species as well. We hope the enclosed county list of species will be helpful. In future communications regarding this project, please refer to consultation number 2-21-00-I-259.

The enclosed list of the endangered, threatened, proposed, and candidate species includes all those potentially occurring anywhere in the county, or counties, where your project occurs. Please note that your project area may not necessarily include all or any of these species. The information provided includes general descriptions, habitat requirements, and other information for each species on the list. Also on the enclosed list is the Code of Federal Regulations (CFR) citation for each list and is available at most public libraries. This information should assist you in determining which species may or may not occur within your project area. Site-specific surveys could also be helpful and may be needed to verify the presence or absence of a species or its habitat as required for the evaluation of proposed project-related impacts.

Endangered and threatened species are protected by Federal law and must be considered prior to project development. If the action agency determines that listed species or critical habitat may be adversely affected by a federally funded, permitted, or authorized activity, the action agency must request formal consultation with the Service. If the action agency determines that the planned action may jeopardize a proposed species or destroy or adversely modify proposed critical habitat, the action agency must enter into a section 7 conference with the Service. Candidate species are those which are being considered for addition to the list of threatened or endangered species. Candidate species are those for which there is sufficient information to support a proposal for listing. Although candidate species have no legal protection under the Act, we recommend that

they be considered in the planning process in the event that they become listed or proposed for listing prior to project completion.

If any proposed action occurs in or near areas with trees and shrubs growing along watercourses, known as riparian habitat, the Service recommends the protection of these areas. Riparian areas are critical to biological community diversity and provide linear corridors important to migratory species. In addition, if the project will result in the deposition of dredged or fill materials into waterways or excavation in waterways, we recommend you contact the Army Corps of Engineers which regulates these activities under Section 404 of the Clean Water Act.

The State of Arizona protects some plant and animal species not protected by Federal law. We recommend you contact the Arizona Game and Fish Department and the Arizona Department of Agriculture for State-listed or sensitive species in your project area.

The Service appreciates your efforts to identify and avoid impacts to listed and sensitive species in your project area. If we may be of further assistance, please feel free to contact Tom Gatz.

Sincerely,

Jacqueline Hanson

David L. Harlow
Field Supervisor

Enclosure

cc: John Kennedy, Habitat Branch, Arizona Game and Fish Department, Phoenix, AZ

LISTED, PROPOSED, AND CANDIDATE SPECIES FOR THE FOLLOWING COUNTY: COCHISE

04/07/2000

1)LISTED TOTAL= 21

NAME: **CANELO HILLS LADIES' TRESSES** *SPIRANTHES DELITESCENS*

STATUS: ENDANGERED CRITICAL HAB No RECOVERY PLAN: No CFR: 62 FR 665, 01-06-97

DESCRIPTION: SLENDER ERECT MEMBER OF THE ORCHID FAMILY (ORCHIDACEAE). FLOWER: STALK 50 CM TALL, MAY CONTAIN 40 WHITE FLOWERS SPIRALLY ARRANGED ON THE FLOWERING STALK.

ELEVATION RANGE: about 5000 FT.

COUNTIES: COCHISE, SANTA CRUZ

HABITAT: FINELY GRAINED, HIGHLY ORGANIC, SATURATED SOILS OF CIENEGAS

POTENTIAL HABITAT OCCURS IN SONORA, MEXICO, BUT NO POPULATIONS HAVE BEEN FOUND.

NAME: **COCHISE PINCUSHION CACTUS** *CORYPHANTHA ROBBINSORUM*

STATUS: THREATENED CRITICAL HAB No RECOVERY PLAN: Yes CFR: 51 FR 952, 1-9-1986

DESCRIPTION: A SMALL UNBRANCHED CACTUS WITH NO CENTRAL SPINES AND 11-17 WHITE RADIAL SPINES. THE BELL-SHAPED FLOWERS ARE BORNE ON THE ENDS OF TUBERCULES (Protrusions). FLOWERS: BELL SHAPED, PALE YELLOW-GREEN. FRUITS: ORANGE-RED TO RED

ELEVATION RANGE: >4200 FT.

COUNTIES: COCHISE AND SONORA, MEXICO

HABITAT: SEMIDESERT GRASSLAND WITH SMALL SHRUBS, AGAVE, OTHER CACTI, AND GRAMA GRASS.

GROWS ON GRAY LIMESTONE HILLS.

NAME: **HUACHUCA WATER UMBEL** *LILAEOPSIS SCHAFFNERIANA ssp RECURVA*

STATUS: ENDANGERED CRITICAL HAB Yes RECOVERY PLAN: No CFR: 62 FR 665, 01-06-97

DESCRIPTION: HERBACEOUS, SEMI-AQUATIC PERENNIAL IN THE PARSLEY FAMILY (UMBELLIFERAE) WITH SLENDER ERECT, HOLLOW, LEAVES THAT GROW FROM THE NODES OF CREEPING RHIZOMES. FLOWER: 3 TO 10 FLOWERED UMBELS ARISE FROM ROOT NODES.

ELEVATION RANGE: 3500-6500 FT.

COUNTIES: PIMA, SANTA CRUZ, COCHISE

HABITAT: CIENEGAS, PERENNIAL LOW GRADIENT STREAMS, WETLANDS

AND IN ADJACENT SONORA, MEXICO, WEST OF THE CONTINENTAL DIVIDE. POPULATIONS ALSO ON FORT HUACHUCA MILITARY RESERVATION. CRITICAL HABITAT IN COCHISE AND SANTA CRUZ COUNTIES (63 FR 37441)

LISTED, PROPOSED, AND CAN. .ATE SPECIES FOR THE FOLLOWING COUNTY: COCHISE

04/07/2000

NAME: **NEW MEXICAN RIDGE-NOSED RATTLESNAKE** *CROTALUS WILLARDI OBSCURUS*

STATUS: THREATENED CRITICAL HAB Yes RECOVERY PLAN: Yes CFR: 43 FR 34479, 04-04-1978

DESCRIPTION: SMALL 12-24 INCHES, SECRETIVE GRAYISH-BROWN WITH DISTINCT RIDGE ON THE END OF THE SNOUT. THE DORSAL SURFACE HAS OBSCURE, IRREGULARLY SPACED WHITE CROSSBARS EDGED WITH BROWN (NOT A BOLD PATTERN).

ELEVATION RANGE: 5000-6600 FT.

COUNTIES: COCHISE

HABITAT: PRIMARILY CANYON BOTTOMS IN PINE-OAK COMMUNITIES

THE SUBSPECIES HAS BEEN DOCUMENTED IN THE PELONCILO MOUNTAINS IN ARIZONA. ONLY THREE KNOWN RECORDS FROM ARIZONA. ALSO OCCURS IN ANIMAS MOUNTAINS OF NEW MEXICO AND SIERRA SAN LUIS IN SONORA/CHIHUAHUA.

NAME: **JAGUAR, UNITED STATES POPULATION** *PANTHERA ONCA*

STATUS: ENDANGERED CRITICAL HAB No RECOVERY PLAN: No CFR: 62 FR 39147, 7-22-97

DESCRIPTION: MUSCULAR CAT WITH RELATIVELY SHORT, MASSIVE LIMBS AND A DEEP-CHESTED BODY. CINNAMON-BUFF IN COLOR WITH BLACK SPOTS.

ELEVATION RANGE: <8000 FT.

COUNTIES: COCHISE, PIMA

HABITAT: IN ARIZONA, RANGED WIDELY THROUGHOUT A VARIETY OF HABITATS FROM SONORAN DESERT TO CONIFER FORESTS

MOST RECORDS ARE FROM THE MADREAN EVERGREEN-WOODLAND, SHRUB-INVADED SEMI-DESERT GRASSLAND, AND ALONG RIVERS. HISTORIC RANGE IS CONSIDERED TO HAVE EXTENDED BEYOND THE COUNTIES LISTED ABOVE. REPORTS OF INDIVIDUALS IN THE SOUTHERN PART OF THE STATE CONTINUE TO BE RECEIVED. THE MOST RECENT RECORDS OF A JAGUAR IN THE U.S. ARE FROM THE NEW MEXICO/ARIZONA BORDER AREA AND IN SOUTHCENTRAL ARIZONA, BOTH IN 1996, AND CONFIRMED THROUGH PHOTOGRAPHS. UNCONFIRMED SIGHTINGS AND TRACKS CONTINUE TO BE REPORTED. THIS SPECIES HAS A SIGNED CONSERVATION AGREEMENT IN PLACE, BUT THE DEVELOPMENT OF THE AGREEMENT WAS NOT SUFFICIENT TO REMOVE THE NEED TO LIST THIS SPECIES

NAME: **JAGUARUNDI** *HERPAILURUS (=FELIS) YAGOUAROUNDI TOLTECA*

STATUS: ENDANGERED CRITICAL HAB No RECOVERY PLAN: No CFR: 41 FR 24064; 06-14-76

DESCRIPTION: SMALL CAT WITH SHORT LEGS; SLENDER,ELONGATE BODY; AND LONG TAIL. HEAD SMALL & FLATTENED WITH SHORT ROUNDED EARS. REDDISH-YELLOW OR BLACKISH TO BROWN-GRAY IN COLOR AND WITHOUT SPOTS.

ELEVATION RANGE: 3500-6000 FT.

COUNTIES: SANTA CRUZ, PIMA, COCHISE

HABITAT: CAN BE FOUND IN A VARIETY OF HABITATS (SEE BELOW)

SEMI-ARID THORNY FORESTS, DECIDOUS FORESTS, HUMID PRE-MONTANE FORESTS, UPLAND DRY SAVANNAHS, SWAMPY GRASSLANDS, RIPARIAN AREAS, AND DENSE BRUSH. UNCONFIRMED REPORTS OF INDIVIDUALS IN THE SOUTHERN PART OF THE STATE CONTINUE TO BE RECEIVED. NO SPECIMENS HAVE BEEN COLLECTED IN ARIZONA.

NAME: **LESSER LONG-NOSED BAT** *LEPTONYCTERIS CURASOAE YERBABUENAE*

STATUS: ENDANGERED CRITICAL HAB No RECOVERY PLAN: Yes CFR: 53 FR 38456, 09-30-88

DESCRIPTION: ELONGATED MUZZLE, SMALL LEAF NOSE, AND LONG TONGUE. YELLOWISH BROWN OR GRAY ABOVE AND CINNAMON BROWN BELOW. TAIL MINUTE AND APPEARS TO BE LACKING. EASILY DISTURBED.

ELEVATION RANGE: <6000 FT.

COUNTIES: COCHISE, PIMA, SANTA CRUZ, GRAHAM, PINAL, MARICOPA

HABITAT: DESERT SCRUB HABITAT WITH AGAVE AND COLUNMNAR CACTI PRESENT AS FOOD PLANTS

DAY ROOSTS IN CAVES AND ABANDONED TUNNELS. FORAGES AT NIGHT ON NECTAR, POLLEN, AND FRUIT OF PANICULATE AGAVES AND COLUMNAR CACTI. THIS SPECIES IS MIGRATORY AND IS PRESENT IN ARIZONA , USUALLY FROM APRIL TO SEPTMBER AND SOUTH OF THE BORDER THE REMAINDER OF THE YEAR.

NAME: **MEXICAN GRAY WOLF** *CANIS LUPUS BAILEYI*

STATUS: ENDANGERED CRITICAL HAB No RECOVERY PLAN: Yes CFR: 32 FR 4001, 03-11-67; 43 FR 1912, 03-09-78

DESCRIPTION: LARGE DOG-LIKE CARNIVORE WITH VARYING COLOR, BUT USUALLY A SHADE OF GRAY. DISTINCT WHITE LIP LINE AROUND MOUTH. WEIGH 60-90 POUNDS.

ELEVATION RANGE: 4,000-12,00IFT.

COUNTIES: APACHE, COCHISE, GREENLEE, PIMA, SANTA CRUZ

HABITAT: CHAPPARAL, WOODLAND, AND FORESTED AREAS. MAY CROSS DESERT AREAS.

HISTORIC RANGE IS CONSIDERED TO BE LARGER THAN THE COUNTIES LISTED ABOVE. UNCONFIRMED REPORTS OF INDIVIDUALS IN THE SOUTHERN PART OF THE STATE (COCHISE, PIMA, SANTA CRUZ) CONTINUE TO BE RECEIVED. INDIVIDUALS MAY STILL PERSIST IN MEXICO. EXPERIMENTAL NONESSENTIAL POPULATION INTRODUCED IN THE BLUE PRIMITIVE AREA OF GREENLEE AND APACHE COUNTIES.

NAME: **OCELOT** *LEOPARDUS (=FELIS) PARDALIS*

STATUS: ENDANGERED CRITICAL HAB No RECOVERY PLAN: Yes CFR: 47 FR 31670; 07-21-82

DESCRIPTION: MEDIUM-SIZED SPOTTED CAT WHOSE TAIL IS ABOUT 1/2 THE LENGTH OF HEAD AND BODY. YELLOWISH WITH BLACK STREAKS AND STRIPES RUNNING FROM FRONT TO BACK. TAIL IS SPOTTED AND FACE IS LESS HEAVILY STREAKED THAN THE BACK AND SIDES.

ELEVATION RANGE: <8000 FT.

COUNTIES: SANTA CRUZ, PIMA, COCHISE

HABITAT: HUMID TROPICAL & SUB-TROPICAL FORESTS, SAVANNAHS, AND SEMI-ARID THORNSCRUB.

MAY PERSIST IN PARTLY-CLEARED FORESTS, SECOND-GROWTH WOODLAND, AND ABANDONED CULTIVATION REVERTED TO BRUSH. UNIVERSAL COMPONENT IS PRESENCE OF DENSE COVER. UNCONFIRMED REPORTS OF INDIVIDUALS IN THE SOUTHERN PART OF THE STATE CONTINUE TO BE RECEIVED.

NAME: **BEAUTIFUL SHINER** *CYPRINELLA FORMOSA*

STATUS: THREATENED CRITICAL HAB Yes RECOVERY PLAN: Yes CFR: 49 FR 34490, 8-31-1984

DESCRIPTION: SMALL (2.5 INCHES) SHINY MINNOW AND VERY SIMILAR TO RED SHINER. MALES COLORFUL DURING BREEDING (YELLOW-ORANGE OR ORANGE ON CAUDAL AND LOWER FINS AND BLUISH BODY.

ELEVATION RANGE: <4500 FT.

COUNTIES: COCHISE

HABITAT: SMALL TO MEDIUM SIZED STREAMS AND PONDS WITH SAND, GRAVEL, AND ROCK BOTTOMS.

VIRTUALLY EXTIRPATED IN THE UNITED STATES, WITH THE EXCEPTION OF A FEW ISOLATED POPULATIONS ON NATIONAL WILDLIFE REFUGES AND IN MEXICO. SAME CRITICAL HABITAT AS YAQUI CHUB AND CATFISH (SEE 49 FR 34490, 08-31-1984).

NAME: **SPIKEDACE** *MEDA FULGIDA*

STATUS: THREATENED CRITICAL HAB Yes RECOVERY PLAN: Yes CFR: 51 FR 23769,07-01-1986; 59 FR 10906, 03-08-1994

DESCRIPTION: SMALL (<3 INCHES) SLIM WITH SLIVERY SIDES & 'SPINE" ON DORSAL FIN. BREDING MALES BRASSY GOLDEN COLOR

ELEVATION RANGE: <6000 FT.

COUNTIES: GRAHAM, PINAL, GREENLEE, YAVAPAI, APACHE*, COCHISE*, GILA*, NAVAJO*, PIMA* (AZ); GRANT, CATRON, HIDALGO (NM)

HABITAT: MODERATE TO LARGE PERENNIAL STREAMS WITH GRAVEL COBBLE SUBSTRATES AND MODERATE TO SWIFT VELOCITIES

PRESENTLY FOUND IN ARAVAIPA CREEK, EAGLE CREEK, VERDE RIVER, EAST-WEST- MAIN AND MIDDLE FORKS OF THE GILA RIVER IN NEW MEXICO, AND GILA RIVER FROM SAN PEDRO RIVER TO ASHURST HAYDEN DAM. CRITICAL HABITAT WAS REMOVED IN MARCH 1998, BUT RE-PROPOSED DEC 1999 FOR APACHE, COCHISE, GILA, GRAHAM, GREENLEE, NAVAJO, PIMA, PINAL, AND YAVAPAI COUNTIES. ALSO CATRON, GRANT, AND HIDALGO COUNTIES IN NEW MEXICO. *COUNTIES WITH PROPOSED CRITICAL HABITAT BUT NO RECENT DOCUMENTATION OF SPECIES PRESENT

NAME: **YAQUI CATFISH** *ICTALURUS PRICEI*

STATUS: THREATENED CRITICAL HAB Yes RECOVERY PLAN: Yes CFR: 49 FR 34490, 08-31-1984

DESCRIPTION: SIMILAR TO CHANNEL CATFISH (Ictalurus punctatus) EXCEPT ANAL FIN BASE IS SHORTER AND THE DISTAL MARGIN OF THE ANAL FIN IS BROADLY ROUNDED WITH 23-25 SOFT RAYS. BODY USUALLY PROFUSELY SPECKLED.

ELEVATION RANGE: 4000-5000 FT.

COUNTIES: COCHISE

HABITAT: MODERATE TO LARGE STREAMS WITH SLOW CURRENT OVER SAND AND ROCK BOTTOMS

CRITICAL HABITAT ALL AQUATIC HABITATS IN THE MAIN PORTION OF SAN BERNADINO NATIONAL WILDLIFE REFUGE

NAME: **YAQUI CHUB** *GILA PURPUREA*

STATUS: ENDANGERED CRITICAL HAB Yes RECOVERY PLAN: Yes CFR: 49 FR 34490, 08-31-1984

DESCRIPTION: MEDIUM SIZED MINNOW (<6 INCHES) DARK COLORED, LIGHTER BELOW. DARK TRIANGULAR CAUDAL SPOT

ELEVATION RANGE: 4000-6000 FT.

COUNTIES: COCHISE (AZ), MEXICO

HABITAT: DEEP POOLS OF SMALL STREAMS, POOLS, OR PONDS NEAR UNDERCUT BANKS.

CRITICAL HABITAT INCLUDES ALL AQUATIC HABITATS OF THE MAIN PORTION SAN BERNADINO NATIONAL WILDLIFE REFUGE.

NAME: **YAQUI TOPMINNOW** *POECILIOPSIS OCCIDENTALIS SONORIENSIS*

STATUS: ENDANGERED CRITICAL HAB No RECOVERY PLAN: Yes CFR: 32 FR 4001, 03-11-1967

DESCRIPTION: SMALL (2 INCHES) TOPMINNOW GUPPY-LIKE, LIVE BEARING, LACKING DARK SPOTS. BREEDING MALES JET BLACK WITH YELLOW FINS.

ELEVATION RANGE: <4500 FT.

COUNTIES: COCHISE

HABITAT: SMALL TO MODERATE SIZED STREAMS, SPRINGS, & CIENEGAS GENERALLY IN SHALLOWS

NAME: **BALD EAGLE** *HALIAEETUS LEUCOCEPHALUS*

STATUS: THREATENED CRITICAL HAB No RECOVERY PLAN: Yes CFR: 60 FR 35999, 07-12-95

DESCRIPTION: LARGE, ADULTS HAVE WHITE HEAD AND TAIL. HEIGHT 28 - 38"; WINGSPAN 66 - 96". 1-4 YRS DARK WITH VARYING DEGREES OF MOTTLED BROWN PLUMAGE. FEET BARE OF FEATHERS.

ELEVATION RANGE: VARIES FT.

COUNTIES: YUMA, LA PAZ, MOHAVE, YAVAPAI, MARICOPA, PINAL, COCONINO, NAVAJO, APACHE, SANTA CRUZ, PIMA, GILA, GRAHAM, COCHISE

HABITAT: LARGE TREES OR CLIFFS NEAR WATER (RESERVOIRS, RIVERS AND STREAMS) WITH ABUNDANT PREY

SOME BIRDS ARE NESTING RESIDENTS WHILE A LARGER NUMBER WINTERS ALONG RIVERS AND RESERVOIRS. AN ESTIMATED 200 TO 300 BIRDS WINTER IN ARIZONA. ONCE ENDANGERED (32 FR 4001, 03-11-1967; 43 FR 6233, 02-14-78) BECAUSE OF REPRODUCTIVE FAILURES FROM PESTICIDE POISONING AND LOSS OF HABITAT, THIS SPECIES WAS DOWN LISTED TO THREATENED ON AUGUST 11, 1995. ILLEGAL SHOOTING, DISTURBANCE, LOSS OF HABITAT CONTINUES TO BE A PROBLEM. SPECIES HAS BEEN PROPOSED FOR DELISTING (64 FR 36454) BUT STILL RECEIVES FULL PROTECTION UNDER ESA.

NAME: **CACTUS FERRUGINOUS PYGMY-OWL** *GLAUCIDIUM BRASILIANUM CACTORUM*

STATUS: ENDANGERED CRITICAL HAB Yes RECOVERY PLAN: No CFR: 62 FR 10730, 3-10-97

DESCRIPTION: SMALL (APPROX. 7"), DIURNAL OWL REDDISH BROWN OVERALL WITH CREAM-COLORED BELLY STREAKED WITH REDDISH BROWN. SOME INDIVIDUALS ARE GRAYISH BROWN

ELEVATION RANGE: <4000 FT.

COUNTIES: MARICOPA, YUMA, SANTA CRUZ, GRAHAM, GREENLEE, PIMA, PINAL, GILA, COCHISE

HABITAT: MATURE COTTONWOOD/WILLOW, MESQUITE BOSQUES, AND SONORAN DESERTSCRUB

RANGE LIMIT IN ARIZONA IS FROM NEW RIVER (NORTH) TO GILA BOX (EAST) TO CABEZA PRIETA MOUNTAINS (WEST). ONLY A FEW DOCUMENTED SITES WHERE THIS SPECIES PERSISTS ARE KNOWN, ADDITIONAL SURVEYS ARE NEEDED. CRITICAL HABITAT IN PIMA, COCHISE, PINAL, AND MARICOPA COUNTIES (64 FR 37419).

NAME: **MEXICAN SPOTTED OWL** *STRIX OCCIDENTALIS LUCIDA*

STATUS: THREATENED CRITICAL HAB No RECOVERY PLAN: Yes CFR: 56 FR 14678, 04-11-91

DESCRIPTION: MEDIUM SIZED WITH DARK EYES AND NO EAR TUFTS. BROWNISH AND HEAVILY SPOTTED WITH WHITE OR BEIGE.

ELEVATION RANGE: 4100-9000 FT.

COUNTIES: MOHAVE, COCONINO, NAVAJO, APACHE, YAVAPAI, GRAHAM, GREENLEE, COCHISE, SANTA CRUZ, PIMA, PINAL, GILA, MARICOPA

HABITAT: NESTS IN CANYONS AND DENSE FORESTS WITH MULTI-LAYERED FOLIAGE STRUCTURE

GENERALLY NESTS IN OLDER FORESTS OF MIXED CONIFER OR PONDERSA PINE/GAMBEL OAK TYPE, IN CANYONS, AND USE VARIETY OF HABITATS FOR FORAGING. SITES WITH COOL MICROCLIMATES APPEAR TO BE OF IMPORTANCE OR ARE PREFERED.

NAME: **NORTHERN APLOMADO FALCON** *FALCO FEMORALIS SEPTENTRIONALIS*

STATUS: ENDANGERED CRITICAL HAB No RECOVERY PLAN: Yes CFR: 51 FR 6686, 01-25-86

DESCRIPTION: RUFOUS UNDERPARTS, GRAY BACK, LONG BANDED TAIL, AND A DISTINCT BLACK AND WHITE FACIAL PATTERN. SMALLER THAN PEREGRINE LARGER THAN KESTREL. BREEDS BETWEEN MARCH- JUNE

ELEVATION RANGE: 3500-9000 FT.

COUNTIES: COCHISE, SANTA CRUZ

HABITAT: GRASSLAND AND SAVANNAH

SPECIES FORMERLY NESTED IN SOUTHWESTERN US. NOW OCCURS AS AN ACCIDENTAL. GOOD HABITAT HAS LOW GROUND COVER AND MESQUITE OR YUCCA FOR NESTING PLATFORMS. CONTINUED USE OF PESTICIDES IN MEXICO ENDANGERS THIS SPECIES. NO RECENT CONFIRMED REPORTS FOR ARIZONA.

LISTED, PROPOSED, AND CANDIDATE SPECIES FOR THE FOLLOWING COUNTY: **COCHISE**

04/07/2000

NAME: **SOUTHWESTERN WILLOW FLYCATCHER** *EMPIDONAX TRAILLII EXTIMUS*

STATUS: ENDANGERED CRITICAL HAB Yes RECOVERY PLAN: No CFR: 60 FR 10694, 02-27-95

DESCRIPTION: SMALL PASSERINE (ABOUT 6") GRAYISH-GREEN BACK AND WINGS, WHITISH THROAT, LIGHT OLIVE-GRAY BREAST AND PALE YELLOWISH BELLY. TWO WINGBARS VISIBLE. EYE-RING FAINT OR ABSENT.

ELEVATION RANGE: <8500 FT.

COUNTIES: YAVAPAI, GILA, MARICOPA, MOHAVE, COCONINO, NAVAJO, APACHE, PINAL, LA PAZ, GREENLEE, GRAHAM, YUMA, PIMA, COCHISE, SANTA CRUZ

HABITAT: COTTONWOOD/WILLOW & TAMARISK VEGETATION COMMUNITIES ALONG RIVERS & STREAMS

MIGRATORY RIPARIAN OBLIGATE SPECIES THAT OCCUPIES BREEDING HABITAT FROM LATE APRIL TO SEPTEMBER. DISTRIBUTION WITHIN ITS RANGE IS RESTRICTED TO RIPARIAN CORRIDORS. DIFFICULT TO DISTINGUISH FROM OTHER MEMBERS OF THE EMPIDONAX COMPLEX BY SIGHT ALONE. TRAINING SEMINAR REQUIRED FOR THOSE CONDUCTING FLYCATCHER SURVEYS. CRITICAL HABITAT ON PORTIONS OF THE 100-YEAR FLOODPLAIN ON SAN PEDRO AND VERDE RIVERS; WET BEAVER AND WEST CLEAR CREEKS, INCLUDING TAVASCI MARSH AND ISTER FLAT; THE COLORADO RIVER, THE LITTLE COLORADO RIVER, AND THE WEST, EAST, AND SOUTH FORKS OF THE LITTLE COLORADO RIVER, REFERENCE 60 CFR:62 FR 39129, 7/22/97.

NAME: **WHOOPING CRANE** *GRUS AMERICANA*

STATUS: ENDANGERED CRITICAL HAB Yes RECOVERY PLAN: Yes CFR: 32 FR 4001, 03-11-1967; 43 FR 20938, 05-15-78

DESCRIPTION: TALLEST AMERICAN BIRD (UP TO 5 FEET) SNOWY WHITE, LONG NECK AND LEGS, BLACK WING TIPS, RED CROWN, AND BLACK WEDGE SHAPED PATCH OF FETHERS BEHIND ITS EYE.

ELEVATION RANGE: 4500 FT.

COUNTIES: COCHISE

HABITAT: MARSHES, PRAIRIES, RIVER BOTTOMS

BIRDS IN THE ROCKY MOUNTAIN POPULATION ARE OCCASIONAL VISITORS IN ARIZONA DURING MIGRATION. USUALLY NEAR WILCOX PLAYA.

NAME: **SONORA TIGER SALAMANDER** *AMBYSTOMA TIGRINUM STEBBINSI*

STATUS: ENDANGERED CRITICAL HAB No RECOVERY PLAN: No CFR: 62 FR 665, 01-06-97

DESCRIPTION: 2.6 TO 4.9" SNOUT-VENT LENGTH WITH LIGHT-COLORED BANDS ON A DARK BACKGROUND. AQUATIC LARVAE ARE UNIFORM DARK COLOR WITH PLUME-LIKE GILLS AND TAIN FINS.

ELEVATION RANGE: 4000-6300 FT.

COUNTIES: SANTA CRUZ, COCHISE

HABITAT: STOCK TANKS AND IMPOUNDED CIENEGAS IN SAN RAFAEL VALLEY, HUACHUCA MOUNTAINS

ALSO OCCURS IN THE FOOTHILLS OF THE EAST SLOPE OF THE PATAGONIA AND HUACHUCA MOUNTAINS. POPULATIONS ALSO ON FORT HUACHUCA.

LISTED, PROPOSED, AND CANDIDATE SPECIES FOR THE FOLLOWING COUNTY: COCHISE

04/07/2000

2) PROPOSED

TOTAL= 1

NAME: **MOUNTAIN PLOVER** *CHARADRIUS MONTANUS*

STATUS: PROPOSED THREATENED CRITICAL HAB No RECOVERY PLAN: No CFR: 64 FR 7587; 02-16-1999

DESCRIPTION: WADING BIRD; COMPACTLY BUILT; IN BREEDING SEASON WITH WHITE FOREHEAD AND LINE OVER THE EYE; CONTRASTING WITH DARK CROWN; NONDESCRIPT IN WINTER. VOICE IS LOW, VARIABLE WHISTLE. ELEVATION RANGE: VARIABLE FT.

COUNTIES: YUMA, PIMA, COCHISE, PINAL, APACHE

HABITAT: OPEN ARID PLAINS, SHORT-GRASS PRAIRIES, AND SCATTERED CACTUS.

AZ PROVIDES WINTERING HABITAT ONLY. SPECIES PRIMARILY FOUND IN ROCKY MOUNTAIN STATES FROM CANADA TO MEXICO; SERVICE ACCEPTING COMMENTS ON PROPOSED RULE UNTIL APRIL 19, 1999; R6 HAS LEAD

LISTED, PROPOSED, AND CANDIDATE SPECIES FOR THE FOLLOWING COUNTY: COCHISE

04/07/2000

3) CANDIDATE TOTAL= 4

NAME: **LEMMON FLEABANE** *ERIGERON LEMMONII*

STATUS: CANDIDATE CRITICAL HAB No RECOVERY PLAN: No CFR:

DESCRIPTION: A PROSTRATE PERENNIAL IN THE SUNFLOWER FAMILY. STEMS AND LEAVES ARE DENSELY HAIRY. FLOWERS LOOK LIKE SMALL DELICATE DAISIES, WITH WHITE TO LIGHT PURPLE OUTER PETALS AND YELLOW INNER PETALS.

ELEVATION RANGE: 1500-6000 FT.

COUNTIES: COCHISE

HABITAT: GROWS IN DENSE CLUMPS IN CREVICES, LEDGES, AND BOULDERS IN CANYON BOTTOMS IN PINE-OAK WOODLAND

ONE SITE ON FORT HUACHUCA MILITARY RESERVATION

NAME: **GILA CHUB** *GILA INTERMEDIA*

STATUS: CANDIDATE CRITICAL HAB No RECOVERY PLAN: No CFR:

DESCRIPTION: DEEP COMPRESSED BODY, FLAT HEAD. DARK OLIVE-GRAY COLOR ABOVE, SILVER SIDES. ENDEMIC TO GILA RIVER BASIN.

ELEVATION RANGE: 2000 - 3500 FT.

COUNTIES: SANTA CRUZ, GILA, GREENLEE, PIMA, COCHISE, GRAHAM, YAVAPAI

HABITAT: POOLS, SPRINGS, CIENEGAS, AND STREAMS

MULTIPLE PRIVATE LANDOWERS, INCLUDING THE NATURE CONSERVANCY, THE AUDUBON SOCIETY, AND OTHERS. ALSO FT. HUACHUCA. SPECIES ALSO FOUND IN SONORA, MEXICO.

NAME: **HUACHUCA SPRINGSNAIL** *PYRGULOPSIS THOMPSONI*

STATUS: CANDIDATE CRITICAL HAB No RECOVERY PLAN: No CFR:

DESCRIPTION: VERY SMALL (1.7-3.2mm) CONICAL SHELL. IDENTIFICATION MUST BE VERIFIED BY CHARARCTERISTICS OF REPRODUCTIVE ORGANS.

ELEVATION RANGE: 4500-6000 FT.

COUNTIES: COCHISE, SANTA CRUZ

HABITAT: AQUATIC AREAS, SMALL SPRINGS WITH VEGETATION SLOW TO MODERATE FLOW.

INDIVIDUALS FOUND ON FIRM SUBSTANCES (ROOTS, WOOD, AND ROCKS) OTHER POPULATIONS FOUND ON FORT HUACHUCA MILITARY PROPERTY

LISTED, PROPOSED, AND CAN. ATE SPECIES FOR THE FOLLOWING COUNTY: COCHISE

04/07/2000

NAME: **CHIRICAHUA LEOPARD FROG** *RANA CHIRICAHUENSIS*

STATUS: CANDIDATE CRITICAL HAB No RECOVERY PLAN: No CFR:

DESCRIPTION: CREAM COLORED TUBERCULES (spots) ON A DARK BACKGROUND ON THE REAR OF THE THIGH, DORSOLATERAL FOLDS THAT ARE INTERRUPTED AND DEFLECTED MEDIALLY, AND A CALL GIVEN OUT OF WATER DISTINGUISH THIS SPOTTED FROG FROM OTHER LEOPRD

ELEVATION RANGE: 3000-8300 FT.

COUNTIES: SANTA CRUZ, APACHE, GILA, PIMA, COCHISE, GREENLEE, GRAHAM, YAVAPAI, COCONINO, NAVAJO

HABITAT: STREAMS, RIVERS, BACKWATERS, PONDS, AND STOCK TANKS THAT ARE FREE FROM INTRODUCED FISH AND BULLFROGS

REQUIRE PERMANENT OR NEARLY PERMANENT WATER SOURCES. POPULATIONS NORTH OF THE GILA RIVER ARE THOUGHT TO BE CLOSELY-RELATED, BUT DISTINCT, UNDESCRIBED SPECIES. SPECIES ALSO FOUND ON FORT HUACHUCA

CONSERVATION AGREEMENT TOTAL= 2

NAME: **JAGUAR, UNITED STATES POPULATION** *PANTHERA ONCA*

STATUS: CONSERVATION AGREEMENT CRITICAL HAB No RECOVERY PLAN: No CFR:
DESCRIPTION: MUSCULAR CAT WITH RELATIVELY SHORT, MASSIVE LIMBS AND A DEEP-CHESTED BODY, CINNAMON-BUFF COLOR WITH BLACK SPOTS

ELEVATION RANGE: FT.

COUNTIES: COCHISE, PIMA

HABITAT: WIDELY RANGING HABITAT FROM SONORAN DESERT TO CONIFER FORESTS

MOST RECORDS ARE FROM THE MADREAN EVERGREEN-WOODLAND, SHRUB-INVADED SEMI-DESERT GRASSLAND, AND ALONG RIVERS. HISTORIC RANGE IS CONSIDERED TO HAVE EXTENDED BEYOND THE COUNTIES LISTED. THIS SPECIES HAS A SIGNED CONSERVATION AGREEMENT IN PLACE, BUT THE DEVELOPMENT OF THE AGREEMENT WAS NOT SUFFICIENT TO REMOVE THE NEED TO LIST THIS SPECIES.

NAME: **RAMSEY CANYON LEOPARD FROG** *RANA SUBAQUAVOCALIS*

STATUS: CONSERVATION AGREEMENT CRITICAL HAB No RECOVERY PLAN: No CFR: 59 FR 58996
DESCRIPTION: BROWN OR GREEN FROG, 2.5 TO 4 INCHES LONG; SPOTS ROUNDED WITH LIGHT BORDERS; DORSOLATERAL FOLDS ARE INTERRUPTED POSTERIORLY AND DEFLECTED MEDIALLY; YELLOWISH PIGMENTATION ON THE GROIN WHICH MAY EXTEND INTO THE POSTERIOR VENTER

ELEVATION RANGE: 5,000 FT FT.

COUNTIES: COCHISE

HABITAT: ARTIFICIAL PONDS IN TINKER, BROWN, AND RAMSEY CANYONS ON THE EAST SLOPE OF THE HUACHUCA MOUNTAINS.

CONSERVATION AGREEMENT BETWEEN THE SERVICE, ARIZONA GAME AND FISH DEPARTMENT, THE NATURE CONSERVANCY, BUREAU OF LAND MANAGEMENT, CORONADO NATIONAL FOREST, THE US ARMY INTELLIGENCE CENTER AND FORT HUACHUCA, AND A PRIVATE LANDOWNER WAS SIGNED IN AUGUST 1996. SPECIES ALSO OCCURS ON FORT HUACHUCA.

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LISTED, PROPOSED, AND CANDIDATE SPECIES FOR THE FOLLOWING COUNTY: **SANTA CRUZ**

08/26/1999

1)LISTED

TOTAL= 16

NAME: **CANELO HILLS LADIES' TRESSES** *SPIRANTHES DELITESCENS*

STATUS: ENDANGERED CRITICAL HAB No RECOVERY PLAN: No CFR: 62 FR 665, 01-06-97

DESCRIPTION: SLENDER ERECT MEMBER OF THE ORCHID FAMILY (ORCHIDACEAE). FLOWER: STALK 50 CM TALL, MAY CONTAIN 40 WHITE FLOWERS SPIRALLY ARRANGED ON THE FLOWERING STALK.

ELEVATION RANGE: about 5000 FT.

COUNTIES: COCHISE, SANTA CRUZ

HABITAT: FINELY GRAINED, HIGHLY ORGANIC, SATURATED SOILS OF CIENEGAS

POTENTIAL HABITAT OCCURS IN SONORA, MEXICO, BUT NO POPULATIONS HAVE BEEN FOUND.

NAME: **HUACHUCA WATER UMBEL** *LILAEOPSIS SCHAFFNERIANA ssp RECURVA*

STATUS: ENDANGERED CRITICAL HAB Yes RECOVERY PLAN: No CFR: 62 FR 665, 01-06-97

DESCRIPTION: HERBACEOUS, SEMI-AQUATIC PERENNIAL IN THE PARSLEY FAMILY (UMBELLIFERAE) WITH SLENDER ERECT, HOLLOW, LEAVES THAT GROW FROM THE NODES OF CREEPING RHIZOMES. FLOWER: 3 TO 10 FLOWERED UMBELS ARISE FROM ROOT NODES.

ELEVATION RANGE: 3500-6500 FT.

COUNTIES: PIMA, SANTA CRUZ, COCHISE

HABITAT: CIENEGAS, PERENNIAL LOW GRADIENT STREAMS, WETLANDS

AND IN ADJACENT SONORA, MEXICO, WEST OF THE CONTINENTAL DIVIDE. POPULATIONS ALSO ON FORT HUACHUCA MILITARY RESERVATION. CRITICAL HABITAT IN COCHISE AND SANTA CRUZ COUNTIES (63 FR 37441)

NAME: **PIMA PINEAPPLE CACTUS** *CORYPHANTHA SCHEERI ROBUSTISPINA*

STATUS: ENDANGERED CRITICAL HAB No RECOVERY PLAN: No CFR: 57 FR 14374, 04-20-1992

DESCRIPTION: HEMISHPERICAL STEMS 4-7 INCHES TALL 3-4 INCHES DIAMETER. CENTRAL SPINE 1 INCH LONG STRAW COLORED HOOKED SURROUNDED BY 6-15 RADIAL SPINES. FLOWER: YELLOW SALMON OR RARELY WHITE NARROW FLORAL TUBE.

ELEVATION RANGE: 2300-5000 FT.

COUNTIES: PIMA, SANTA CRUZ

HABITAT: SONORAN DESERTSCRUB OR SEMI-DESERT GRASSLAND COMMUNITIES

OCCURS IN ALLUVIAL VALLEYS OR ON HILLSIDES IN ROCKY TO SANDY OR SILTY SOILS. THIS SPECIE CAN BE CONFUSED WITH JUVENILLE BARREL CACTUS (FEROCACTUS). HOWEVER, THE SPINES OF THE LATER ARE FLATTENED, IN CONTRAST WITH THE ROUND CROSS-SECTION OF THE CORYPHANTHA SPINES. ALSO THE AREOLES (SPINE CLUSTERS) OF CORYPHANTHA ARE ON TUBERCULES (BUMPS), WHILE THE AREOLES OF FEROCACTUS ARE ON RIDGES (RIBS). 80-90% OF INDIVIDUALS ON STATE AND PRIVATE LAND.

LISTED, PROPOSED, AND CANDIDATE SPECIES FOR THE FOLLOWING COUNTY: **SANTA CRUZ**

08/26/1999

NAME: **JAGUARUNDI** *HERPAILURUS (=FELIS) YAGOUAROUNDI TOLTECA*

STATUS: ENDANGERED CRITICAL HAB No RECOVERY PLAN: No CFR: 41 FR 24064; 06-14-76

DESCRIPTION: SMALL CAT WITH SHORT LEGS; SLENDER,ELONGATE BODY; AND LONG TAIL. HEAD SMALL & FLATTENED WITH SHORT ROUNDED EARS. REDDISH-YELLOW OR BLACKISH TO BROWN-GRAY IN COLOR AND WITHOUT SPOTS.

ELEVATION RANGE: 3500-6000 FT.

COUNTIES: SANTA CRUZ, PIMA, COCHISE

HABITAT: CAN BE FOUND IN A VARIETY OF HABITATS (SEE BELOW)

SEMI-ARID THORNY FORESTS, DECIDOUS FORESTS, HUMID PRE-MONTANE FORESTS, UPLAND DRY SAVANNAHS, SWAMPY GRASSLANDS, RIPARIAN AREAS, AND DENSE BRUSH. UNCONFIRMED REPORTS OF INDIVIDUALS IN THE SOUTHERN PART OF THE STATE CONTINUE TO BE RECEIVED. NO SPECIMENS HAVE BEEN COLLECTED IN ARIZONA.

NAME: **LESSER LONG-NOSED BAT** *LEPTONYCTERIS CURASOAE YERBABUENAE*

STATUS: ENDANGERED CRITICAL HAB No RECOVERY PLAN: Yes CFR: 53 FR 38456, 09-30-88

DESCRIPTION: ELONGATED MUZZLE, SMALL LEAF NOSE, AND LONG TONGUE. YELLOWISH BROWN OR GRAY ABOVE AND CINNAMON BROWN BELOW. TAIL MINUTE AND APPEARS TO BE LACKING. EASILY DISTURBED.

ELEVATION RANGE: <6000 FT.

COUNTIES: COCHISE, PIMA, SANTA CRUZ, GRAHAM, PINAL, MARICOPA

HABITAT: DESERT SCRUB HABITAT WITH AGAVE AND COLUNMNAR CACTI PRESENT AS FOOD PLANTS

DAY ROOSTS IN CAVES AND ABANDONED TUNNELS. FORAGES AT NIGHT ON NECTAR, POLLEN, AND FRUIT OF PANICULATE AGAVES AND COLUMNAR CACTI. THIS SPECIES IS MIGRATORY AND IS PRESENT IN ARIZONA , USUALLY FROM APRIL TO SEPTMBER AND SOUTH OF THE BORDER THE REMAINDER OF THE YEAR.

NAME: **MEXICAN GRAY WOLF** *CANIS LUPUS BAILEYI*

STATUS: ENDANGERED CRITICAL HAB No RECOVERY PLAN: Yes CFR: 32 FR 4001, 03-11-67; 43 FR 1912, 03-09-78

DESCRIPTION: LARGE DOG-LIKE CARNIVORE WITH VARYING COLOR, BUT USUALLY A SHADE OF GRAY. DISTINCT WHITE LIP LINE AROUND MOUTH. WEIGH 60-90 POUNDS.

ELEVATION RANGE: 4,000-12,00IFT.

COUNTIES: APACHE, COCHISE, GREENLEE, PIMA, SANTA CRUZ

HABITAT: CHAPPARAL, WOODLAND, AND FORESTED AREAS. MAY CROSS DESERT AREAS.

HISTORIC RANGE IS CONSIDERED TO BE LARGER THAN THE COUNTIES LISTED ABOVE. UNCONFIRMED REPORTS OF INDIVIDUALS IN THE SOUTHERN PART OF THE STATE (COCHISE, PIMA, SANTA CRUZ) CONTINUE TO BE RECEIVED. INDIVIDUALS MAY STILL PERSIST IN MEXICO. EXPERIMENTAL NONESSENTIAL POPULATION INTRODUCED IN THE BLUE PRIMITIVE AREA OF GREENLEE AND APACHE COUNTIES.

NAME: **OCELOT** *LEOPARDUS (=FELIS) PARDALIS*

STATUS: ENDANGERED CRITICAL HAB No RECOVERY PLAN: Yes CFR: 47 FR 31670; 07-21-82

DESCRIPTION: MEDIUM-SIZED SPOTTED CAT WHOSE TAIL IS ABOUT 1/2 THE LENGTH OF HEAD AND BODY. YELLOWISH WITH BLACK STREAKS AND STRIPES RUNNING FROM FRONT TO BACK. TAIL IS SPOTTED AND FACE IS LESS HEAVILY STREAKED THAN THE BACK AND SIDES.

ELEVATION RANGE: <8000 FT.

COUNTIES: SANTA CRUZ, PIMA, COCHISE

HABITAT: HUMID TROPICAL & SUB-TROPICAL FORESTS, SAVANNAHS, AND SEMI-ARID THORNSCRUB.

MAY PERSIST IN PARTLY-CLEARED FORESTS, SECOND-GROWTH WOODLAND, AND ABANDONED CULTIVATION REVERTED TO BRUSH. UNIVERSAL COMPONENT IS PRESENCE OF DENSE COVER. UNCONFIRMED REPORTS OF INDIVIDUALS IN THE SOUTHERN PART OF THE STATE CONTINUE TO BE RECEIVED.

NAME: **DESERT PUPFISH** *CYPRINODON MACULARIUS*

STATUS: ENDANGERED CRITICAL HAB Yes RECOVERY PLAN: Yes CFR: 51 FR 10842, 03-31-1986

DESCRIPTION: SMALL (2 INCHES) SMOOTHLY ROUNDED BODY SHAPE WITH NARROW VERTICAL BARS ON THE SIDES. BREEDING MALES BLUE ON HEAD AND SIDES WITH YELLOW ON TAIL. FEMALES & JUVENILES TAN TO OLIVE COLORED BACK AND SILVERY SIDES.

ELEVATION RANGE: <5000 FT.

COUNTIES: LA PAZ, PIMA, GRAHAM, MARICOPA, PINAL, YAVAPAI, SANTA CRUZ

HABITAT: SHALLOW SPRINGS, SMALL STREAMS, AND MARSHES. TOLERATES SALINE & WARM WATER

CRITICAL HABITAT INCLUDES QUITOBAQUITO SPRING, PIMA COUNTY, PORTIONS OF SAN FELIPE CREEK, CARRIZO WASH, AND FISH CREEK WASH, IMPERIAL COUNTY, CALIFORNIA. TWO SUBSPECIES ARE RECOGNIZED: DESERT PUPFISH (C. m. macularis) AND QUITOBAQUITO PUPFISH (C. m. eremus).

NAME: **GILA TOPMINNOW** *POECILIOPSIS OCCIDENTALIS OCCIDENTALIS*

STATUS: ENDANGERED CRITICAL HAB No RECOVERY PLAN: Yes CFR: 32 FR 4001, 03-11-1967

DESCRIPTION: SMALL (2 INCHES), GUPPY-LIKE, LIVE BEARING, LACKS DARK SPOTS ON ITS FINS. BREEDING MALES ARE JET BLACK WITH YELLOW FINS.

ELEVATION RANGE: <4500 FT.

COUNTIES: GILA, PINAL, GRAHAM, YAVAPAI, SANTA CRUZ, PIMA, MARICOPA, LA PAZ

HABITAT: SMALL STREAMS, SPRINGS, AND CIENEGAS VEGETATED SHALLOWS

SPECIES HISTORICALLY OCCURRED IN BACKWATERS OF LARGE RIVERS BUT IS CURRENTLY ISOLATED TO SMALL STREAMS AND SPRINGS

NAME: **SONORA CHUB** *GILA DITAENIA*

STATUS: THREATENED CRITICAL HAB Yes RECOVERY PLAN: Yes CFR: 51 FR 16042, 04-30-1986
DESCRIPTION: MINNOW (<5 INCHES LONG) MODERATELY CHUBBY, DARK-COLORED FISH WITH TWO PROMINENT BLACK LATERAL BANDS ON THE SIDES AND A DARK OVAL SPOT AT THE BASE OF THE TAIL. BREEDING MALES HAVE RED LOWER FINS AND A ORANGE BELLY
ELEVATION RANGE: 3900 FT.
COUNTIES: SANTA CRUZ

HABITAT: PERENNIAL & INTERMITTENT SMALL TO MODERATE STREAMS WITH BOULDERS & CLIFFS

CRITICAL HABITAT IN SYCAMORE CREEK (SANTA CRUZ COUNTY). YANK SPRING TO INTERNATIONAL BORDER, 2.0 Km OF PENASCO CREEK, AND LOWER HALF OF UNNAMED STREAM ENTERING SYSCAMORE CREEK ABOUT 2.4 Km DOWNSTREAM FROM YANKS SPRING. SPECIES EXTENDS INTO MEXICO (ALTAR & MAGDELENA RIVERS).

NAME: **BALD EAGLE** *HALIAEETUS LEUCOCEPHALUS*

STATUS: THREATENED CRITICAL HAB No RECOVERY PLAN: Yes CFR: 60 FR 35999, 07-12-95
DESCRIPTION: LARGE, ADULTS HAVE WHITE HEAD AND TAIL. HEIGHT 28 - 38"; WINGSPAN 66 - 96". 1-4 YRS DARK WITH VARYING DEGREES OF MOTTLED BROWN PLUMAGE. FEET BARE OF FEATHERS.
ELEVATION RANGE: VARIES FT.
COUNTIES: YUMA, LA PAZ, MOHAVE, YAVAPAI, MARICOPA, PINAL, COCONINO, NAVAJO, APACHE, SANTA CRUZ, PIMA, GILA, GRAHAM, COCHISE
HABITAT: LARGE TREES OR CLIFFS NEAR WATER (RESERVOIRS, RIVERS AND STREAMS) WITH ABUNDANT PREY

SOME BIRDS ARE NESTING RESIDENTS WHILE A LARGER NUMBER WINTERS ALONG RIVERS AND RESERVOIRS. AN ESTIMATED 200 TO 300 BIRDS WINTER IN ARIZONA. ONCE ENDANGERED (32 FR 4001, 03-11-1967; 43 FR 6233, 02-14-78) BECAUSE OF REPRODUCTIVE FAILURES FROM PESTICIDE POISONING AND LOSS OF HABITAT, THIS SPECIES WAS DOWN LISTED TO THREATENED ON AUGUST 11, 1995. ILLEGAL SHOOTING, DISTURBANCE, LOSS OF HABITAT CONTINUES TO BE A PROBLEM. SPECIES HAS BEEN PROPOSED FOR DELISTING (64 FR 36454) BUT STILL RECEIVES FULL PROTECTION UNDER ESA.

NAME: **CACTUS FERRUGINOUS PYGMY-OWL** *GLAUCIDIUM BRASILIANUM CACTORUM*

STATUS: ENDANGERED CRITICAL HAB Yes RECOVERY PLAN: No CFR: 62 FR 10730, 3-10-97
DESCRIPTION: SMALL (APPROX. 7"), DIURNAL OWL REDDISH BROWN OVERALL WITH CREAM-COLORED BELLY STREAKED WITH REDDISH BROWN. SOME INDIVIDUALS ARE GRAYISH BROWN
ELEVATION RANGE: <4000 FT.
COUNTIES: MARICOPA, YUMA, SANTA CRUZ, GRAHAM, GREENLEE, PIMA, PINAL, GILA, COCHISE

HABITAT: MATURE COTTONWOOD/WILLOW, MESQUITE BOSQUES, AND SONORAN DESERTSCRUB

RANGE LIMIT IN ARIZONA IS FROM NEW RIVER (NORTH) TO GILA BOX (EAST) TO CABEZA PRIETA MOUNTAINS (WEST). ONLY A FEW DOCUMENTED SITES WHERE THIS SPECIES PERSISTS ARE KNOWN, ADDITIONAL SURVEYS ARE NEEDED. CRITICAL HABITAT IN PIMA, COCHISE, PINAL, AND MARICOPA COUNTIES (64 FR 37419).

LISTED, PROPOSED, AND CANDIDATE SPECIES FOR THE FOLLOWING COUNTY: **SANTA CRUZ**

08/26/1999

NAME: **MEXICAN SPOTTED OWL** *STRIX OCCIDENTALIS LUCIDA*

STATUS: THREATENED CRITICAL HAB No RECOVERY PLAN: Yes CFR: 56 FR 14678, 04-11-91

DESCRIPTION: MEDIUM SIZED WITH DARK EYES AND NO EAR TUFTS. BROWNISH AND HEAVILY SPOTTED WITH WHITE OR BEIGE.

ELEVATION RANGE: 4100-9000 FT.

COUNTIES: MOHAVE, COCONINO, NAVAJO, APACHE, YAVAPAI, GRAHAM, GREENLEE, COCHISE, SANTA CRUZ, PIMA, PINAL, GILA, MARICOPA

HABITAT: NESTS IN CANYONS AND DENSE FORESTS WITH MULTI-LAYERED FOLIAGE STRUCTURE

GENERALLY NESTS IN OLDER FORESTS OF MIXED CONIFER OR PONDERSA PINE/GAMBEL OAK TYPE, IN CANYONS, AND USE VARIETY OF HABITATS FOR FORAGING. SITES WITH COOL MICROCLIMATES APPEAR TO BE OF IMPORTANCE OR ARE PREFERED.

NAME: **NORTHERN APLOMADO FALCON** *FALCO FEMORALIS SEPTENTRIONALIS*

STATUS: ENDANGERED CRITICAL HAB No RECOVERY PLAN: Yes CFR: 51 FR 6686, 01-25-86

DESCRIPTION: RUFOUS UNDERPARTS, GRAY BACK, LONG BANDED TAIL, AND A DISTINCT BLACK AND WHITE FACIAL PATTERN. SMALLER THAN PEREGRINE LARGER THAN KESTREL. BREEDS BETWEEN MARCH- JUNE

ELEVATION RANGE: 3500-9000 FT.

COUNTIES: COCHISE, SANTA CRUZ

HABITAT: GRASSLAND AND SAVANNAH

SPECIES FORMERLY NESTED IN SOUTHWESTERN US. NOW OCCURS AS AN ACCIDENTAL. GOOD HABITAT HAS LOW GROUND COVER AND MESQUITE OR YUCCA FOR NESTING PLATFORMS. CONTINUED USE OF PESTICIDES IN MEXICO ENDANGERS THIS SPECIES. NO RECENT CONFIRMED REPORTS FOR ARIZONA.

NAME: **SOUTHWESTERN WILLOW FLYCATCHER** *EMPIDONAX TRAILLII EXTIMUS*

STATUS: ENDANGERED CRITICAL HAB Yes RECOVERY PLAN: No CFR: 60 FR 10694, 02-27-95

DESCRIPTION: SMALL PASSERINE (ABOUT 6") GRAYISH-GREEN BACK AND WINGS, WHITISH THROAT, LIGHT OLIVE-GRAY BREAST AND PALE YELLOWISH BELLY. TWO WINGBARS VISIBLE. EYE-RING FAINT OR ABSENT.

ELEVATION RANGE: <8500 FT.

COUNTIES: YAVAPAI, GILA, MARICOPA, MOHAVE, COCONINO, NAVAJO, APACHE, PINAL, LA PAZ, GREENLEE, GRAHAM, YUMA, PIMA, COCHISE, SANTA CRUZ

HABITAT: COTTONWOOD/WILLOW & TAMARISK VEGETATION COMMUNITIES ALONG RIVERS & STREAMS

MIGRATORY RIPARIAN OBLIGATE SPECIES THAT OCCUPIES BREEDING HABITAT FROM LATE APRIL TO SEPTEMBER. DISTRIBUTION WITHIN ITS RANGE IS RESTRICTED TO RIPARIAN CORRIDORS. DIFFICULT TO DISTINGUISH FROM OTHER MEMBERS OF THE EMPIDONAX COMPLEX BY SIGHT ALONE. TRAINING SEMINAR REQUIRED FOR THOSE CONDUCTING FLYCATCHER SURVEYS. CRITICAL HABITAT ON PORTIONS OF THE 100-YEAR FLOODPLAIN ON SAN PEDRO AND VERDE RIVERS; WET BEAVER AND WEST CLEAR CREEKS, INCLUDING TAVASCI MARSH AND ISTER FLAT; THE COLORADO RIVER, THE LITTLE COLORADO RIVER, AND THE WEST, EAST, AND SOUTH FORKS OF THE LITTLE COLORADO RIVER, REFERENCE 60 CFR:62 FR 39129, 7/22/97.

LISTED, PROPOSED, AND CANL. ATE SPECIES FOR THE FOLLOWING COUNTY: SANTA CRUZ

08/26/1999

NAME: **SONORA TIGER SALAMANDER** *AMBYSTOMA TIGRINUM STEBBINSI*

STATUS: ENDANGERED CRITICAL HAB No RECOVERY PLAN: No CFR: 62 FR 665, 01-06-97

DESCRIPTION: 2.6 TO 4.9" SNOUT-VENT LENGTH WITH LIGHT-COLORED BANDS ON A DARK BACKGROUND. AQUATIC LARVAE ARE UNIFORM DARK COLOR WITH PLUME-LIKE GILLS AND TAIN FINS.

ELEVATION RANGE: 4000-6300 FT.

COUNTIES: SANTA CRUZ, COCHISE

HABITAT: STOCK TANKS AND IMPOUNDED CIENEGAS IN SAN RAFAEL VALLEY, HUACHUCA MOUNTAINS

ALSO OCCURS IN THE FOOTHILLS OF THE EAST SLOPE OF THE PATAGONIA AND HUACHUCA MOUNTAINS. POPULATIONS ALSO ON FORT HUACHUCA.

3) CANDIDATE TOTAL= 3

NAME: **GILA CHUB** *GILA INTERMEDIA*

STATUS: CANDIDATE CRITICAL HAB No RECOVERY PLAN: No CFR:
DESCRIPTION: DEEP COMPRESSED BODY, FLAT HEAD. DARK OLIVE-GRAY COLOR ABOVE, SILVER SIDES. ENDEMIC TO GILA RIVER BASIN.

ELEVATION RANGE: 2000 - 3500 FT.

COUNTIES: SANTA CRUZ, GILA, GREENLEE, PIMA, COCHISE, GRAHAM, YAVAPAI

HABITAT: POOLS, SPRINGS, CIENEGAS, AND STREAMS

MULTIPLE PRIVATE LANDOWERS, INCLUDING THE NATURE CONSERVANCY, THE AUDUBON SOCIETY, AND OTHERS. ALSO FT. HUACHUCA. SPECIES ALSO FOUND IN SONORA, MEXICO.

NAME: **HUACHUCA SPRINGSNAIL** *PYRGULOPSIS THOMPSONI*

STATUS: CANDIDATE CRITICAL HAB No RECOVERY PLAN: No CFR:
DESCRIPTION: VERY SMALL (1.7-3.2mm) CONICAL SHELL. IDENTIFICATION MUST BE VERIFIED BY CHARARCTERISTICS OF REPRODUCTIVE ORGANS.

ELEVATION RANGE: 4500-6000 FT.

COUNTIES: COCHISE, SANTA CRUZ

HABITAT: AQUATIC AREAS, SMALL SPRINGS WITH VEGETATION SLOW TO MODERATE FLOW.

INDIVIDUALS FOUND ON FIRM SUBSTANCES (ROOTS, WOOD, AND ROCKS) OTHER POPULATIONS FOUND ON FORT HUACHUCA MILITARY PROPERTY

NAME: **CHIRICAHUA LEOPARD FROG** *RANA CHIRICAHUENSIS*

STATUS: CANDIDATE CRITICAL HAB No RECOVERY PLAN: No CFR:
DESCRIPTION: CREAM COLORED TUBERCULES (spots) ON A DARK BACKGROUND ON THE REAR OF THE THIGH, DORSOLATERAL FOLDS THAT ARE INTERRUPTED AND DEFLECTED MEDIALLY, AND A CALL GIVEN OUT OF WATER DISTINGUISH THIS SPOTTED FROG FROM OTHER LEOPRD

ELEVATION RANGE: 3000-8300 FT.

COUNTIES: SANTA CRUZ, APACHE, GILA, PIMA, COCHISE, GREENLEE, GRAHAM, YAVAPAI, COCONINO, NAVAJO

HABITAT: STREAMS, RIVERS, BACKWATERS, PONDS, AND STOCK TANKS THAT ARE FREE FROM INTRODUCED FISH AND BULLFROGS

REQUIRE PERMANENT OR NEARLY PERMANENT WATER SOURCES. POPULATIONS NORTH OF THE GILA RIVER ARE THOUGHT TO BE CLOSELY-RELATED, BUT DISTINCT, UNDESCRIBED SPECIES. SPECIES ALSO FOUND ON FORT HUACHUCA

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APPENDIX D

SUMMARY OF MITIGATION MEASURES IN 1999 USFWS BIOLOGICAL OPINION ON ONGOING AND PROGRAMMED FUTURE MILITARY OPERATIONS AND ACTIVITIES AT FORT HUACHUCA, ARIZONA

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
P.O. Box 1306
Albuquerque, New Mexico 87103

1849•1999

In Reply Refer To:
AESO/SE
2-21-98-F-266

October 27, 1999

Colonel Michael W. Boardman
Garrison Commander, U.S. Army Garrison
U.S. Army Intelligence Center and Fort Huachuca
Fort Huachuca, Arizona

Dear Colonel Boardman:

This biological opinion responds to your request for consultation with the U.S. Fish and Wildlife Service pursuant to section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544), as amended (Act). Your request for formal consultation was dated March 30, 1998, and received by us on April 1, 1998. By mutual written agreement, the consultation period was extended to September 30, 1999. At issue are impacts that may result from activities authorized, carried out, or funded by the Department of the Army at and near Fort Huachuca (Fort), Arizona. These impacts may affect the following listed species: Huachuca water umbel, *Lilaeopsis schaffneriana* var. *recurva*; southwestern willow flycatcher, *Empidonax traillii extimus*; Mexican spotted owl, *Strix occidentalis lucida*; lesser long-nosed bat, *Leptonycteris curasoae yerbabuenae*; Sonora tiger salamander, *Ambystoma tigrinum stebbinsi*; and critical habitat designated for the southwestern willow flycatcher and the Huachuca water umbel. Your March 30, 1998, letter also requested consultation on the American peregrine falcon, *Falco peregrinus anatum*. The peregrine falcon was recently delisted (U.S. Fish and Wildlife Service 1999a), removing the section 7 consultation requirement. Although not considered in this opinion, the Service appreciates Fort Huachuca's continuing commitment to the conservation of this species, as demonstrated by planned conservation measures outlined in Appendix 1. Through a phone call between Jim Hessil of your staff and Jim Rorabaugh of my staff on April 1, 1998, the Fort also requested conferencing on Chiricahua dock, *Rumex orthoneurus*, proposed as threatened. The proposal to list the Chiricahua dock was withdrawn during the consultation (U.S. Fish and Wildlife Service 1999b); thus conferencing is no longer needed, and Chiricahua dock is not further addressed herein.

The Fort requested concurrence from the Service that the proposed action may affect, but is not likely to adversely affect, spikedace, *Meda fulgida*; loach minnow, *Tiaroga cobitis*; and Canelo Hills ladies' tresses, *Spiranthes delitescens*. The Service concurs with the Fort's determinations for these species. Rationale for our concurrences is detailed in the "CONCURRENCES" section. The Fort also requested concurrence on determinations that the action would not affect several other species. Service policy is that we do not comment on agency "no effect" determinations

unless we believe the action would adversely affect a listed species or its critical habitat, in which case the Service would request that the agency enter into formal consultation on species adversely affected [50 CFR 402.14(a)]. Information available to us does not warrant such a request in this instance. However, we recommend that the Fort maintain a complete administrative record documenting the decision process and supporting information for "no effect" determinations.

This biological opinion was prepared using information from the following sources: your March 30, 1998, request for consultation; the March 1998 biological assessment for the project [Science Applications International Corporation (SAIC) 1998a]; a Memorandum of Agreement between the Service and the Fort, numerous hydrological studies, discussion and correspondence with the United States Geological Survey (USGS); and our files. Literature cited in this biological opinion is not a complete bibliography of all literature available on the affected species, nor is it a complete review of the effects of military activities on these species. A complete administrative record of this consultation is on file in our office.

The Service finds that activities proposed by the Department of the Army at and near Fort Huachuca over the next 10 years are not likely to jeopardize the continued existence of the Huachuca water umbel, southwestern willow flycatcher, Mexican spotted owl, lesser long-nosed bat, or Sonora tiger salamander, and are not likely to result in adverse modification or destruction of critical habitat designated for the flycatcher and Huachuca water umbel. Incidental take statements are provided for all animal species except the southwestern willow flycatcher. Note that this opinion is intended to provide comprehensive compliance with section 7 of the Act for most or all Army activities at and near Fort Huachuca. However, aspects of the Fort's activities not described in the "Description of the Proposed Action" and not evaluated in the "Effects of the Proposed Action" herein are not covered by this opinion.

Because of the length and complexity of this opinion, a Table of Contents is included on the following pages. A summary of the biological opinion appears as Appendix 2.

APPENDIX B

ARMY REQUIREMENTS FROM CURRENT FORMAL CONSULTATION

Huachuca Water Umbel

1. The Fort shall construct rock barriers around Huachuca water umbel populations.

2. The Fort shall initiate prescribed fire and fuel management in the Huachuca Mountains.

3. The Fort shall close roads and fire breaks to vehicle travel in the immediate watersheds of water umbel populations in the Huachuca Mountains where vehicle travel is causing erosion, and where that erosion could result in scouring or sedimentation of downstream water umbel populations (the Fort will coordinate with the Service in identifying roads and fire breaks needing closure.

4. The Fort shall maintain the barrier to vehicle travel at Gate No. 7.

5. Beginning in 1999 and continuing through 2009, the Fort shall provide annual monitoring of Huachuca water umbel populations at Fort Huachuca and, in coordination with the BLM, throughout the SPRNCA. Monitoring protocols shall be coordinated with the Service.

6. Beginning with the date of this opinion, during fire suppression, prescribed fire, and managed natural fire activities in Garden, McClure, or Sawmill canyons, the following measures shall be implemented:

a. One of the objectives of fire activities shall be protection of Huachuca water umbel populations. This objective will not in any way constrain the fire boss from taking any action as needed to protect life or property.

b. A Resource Advisor(s) shall be on the fire during all activities. Resource Advisors shall be qualified biologists designated to coordinate Huachuca water umbel-related concerns and serve as an advisor to the fire boss. They shall also serve as field contact representatives responsible for coordination with the Service. They shall monitor fire activities to ensure the protective measures endorsed by the fire boss are implemented. Resource Advisors shall be on call 24 hours a day during the fire season.

c. Off-road vehicle activity shall be kept to a minimum. Vehicles shall be parked as close to roads as possible, and vehicles shall use wide spots in roads or disturbed areas to turn around. If off-road travel is necessary, local fire-fighting units should go off-road first because of their prior knowledge of the area.

d. Use of tracked vehicles shall be restricted to improving roads or constructing lines where a short distance of line might save a large area from fire.

e. The Fort shall, to the extent possible, obliterate vehicle tracks made during the fire, especially those of tracked vehicles.

f. Areas disturbed for crew camps, landing strips, staging areas, and any other new areas of disturbance created during the fire shall be kept to the minimum area possible and shall be located in previously disturbed sites whenever possible. No such areas shall be located at or immediately upstream of Huachuca water umbel sites.

g. A mitigation/monitoring plan shall be developed by the Fort in coordination with the Service for each prescribed fire, managed natural fire, or fuels treatment that may adversely affect the Huachuca water umbel. The mitigation/monitoring plan shall ensure that adverse effects to Huachuca water umbel and its habitat are minimized. The effects of prescribed fire and fuels treatment on the water umbel and its habitat shall also be monitored. Mitigation/monitoring plans shall be approved by the Service prior to implementing prescribed fire or fuels management. Mitigation and monitoring for managed natural fire that may adversely affect the Huachuca water umbel shall be coordinated with and approved by the Service as soon as possible after a decision is made to let a natural fire burn under controlled conditions.

7. The Fort shall fund water umbel habitat management or restoration where habitat has been degraded or lost, or where potential exists for creating water umbel habitat. Assistance shall take the form of funding and/or technical assistance. Projects funded should include both off-post and on-post projects. On-post activities could include restoration and protection of cienega conditions in Garden Canyon and other wetted sites. Off-post, the Fort could assist BLM, the Coronado National Forest, or other land owners/managers of water umbel habitat potentially affected by the proposed action. Off-post projects that the Fort should consider funding include cienega restoration or protection in Scotia Canyon or elsewhere in the Huachuca Mountains, if approved by and coordinated with the Coronado National Forest, and restoration or protection of cienega conditions on the San Pedro RNCA, if approved by and coordinated with the Bureau of Land Management. All plans and agreements for funded projects shall be coordinated with and approved by the Service.

Southwestern Willow Flycatcher

1. The Fort shall maintain existing fire breaks on the perimeter of Area ZULU and on the eastern boundary of the East Range.

2. The Fort shall vigorously suppress any fire on the eastern third of the East Range, except in the impact area, and implement all portions of the proposed action and proposed mitigation

measures relevant to fire suppression on the East Range.

3. If surveys confirm presence of southwestern willow flycatchers on Fort Huachuca, the Fort shall take action to ensure that fire ignited on the training ranges does not spread to flycatcher habitat and shall work with the Service to develop and implement a plan to prevent any take of flycatchers.

4. The Fort shall promptly assess habitat suitability for flycatchers at Research, Development, Testing, and Evaluation (RDTE) survey points along the San Pedro River or in other areas. If suitable habitat occurs during the life of the project within 300 feet of a RDTE survey point, or a fire ignited at a RDTE survey point could reasonably spread to suitable habitat of the flycatcher, the Fort shall take all precautions to prevent take as follows:

a. The Fort shall not authorize use of RDTE survey points located within 300 feet of suitable habitat of the southwestern willow flycatcher from April 1 to September 1 of each year.

b. If suitable habitat occurs adjacent to a RDTE survey point, but farther than 300 feet from it, the Fort shall ensure that all precautions are taken to ensure fire is not ignited by personnel or activities at the RDTE survey point which then spreads to flycatcher habitat. Such precautions shall include maintaining functional fire extinguishers with all vehicles and informing all personnel at RDTE survey points of the need to take action as necessary to prevent wildfire ignitions. Personnel should be especially careful with cigarettes.

5. Beginning in 2000 and continuing through 2009, the Fort shall fund comprehensive annual status surveys for southwestern willow flycatcher at all suitable habitats potentially affected by the proposed action. This includes habitat on Fort Huachuca, at the Babocomari Cienega, if permission is obtained, and throughout the SPRNCA in cooperation with the BLM. Surveys shall adhere to Service protocol (Sogge *et al.* 1997). Surveys shall include documenting flycatcher population size and distribution; identity of nesting birds (if banded); number of nesting attempts, clutch sizes, hatching success, fledgling success; causes of nest loss or failure; breeding season length; and habitat use.

6. The Fort shall monitor habitat conditions in the SPRNCA and any habitats acquired or for which easements/permission to enter are obtained. Aerial photos (1"=500 feet shall be taken of the riparian corridor in 2000 , 2004, and 2008 and vegetation maps constructed from each photo series within one year of obtaining the photographs. Resolution of the mapping effort shall be sufficient to map vegetation patches as small as 10 acres. Vegetation typing shall be by plant species composition and vertical structure/foliage density. Sufficient ground-truthing shall be conducted to assure reasonable accuracy of the mapping effort. Vegetation mapping in 2004 and 2008 shall be accompanied by a trend analysis to determine gains or losses in flycatcher habitat. If loss of flycatcher habitat occurs between surveys, the loss is attributable to activities of the Fort (including groundwater pumping), the Fort shall reinitiate consultation.

7. The Fort shall assist BLM or other land owners/managers of habitat on the Upper San Pedro River with flycatcher habitat management, or restoration on retired agricultural lands, grazed areas, and in other areas where flycatcher habitat has been degraded or lost. Assistance shall take the form of funding and/or technical assistance. Projects could include, but are not limited to, working with the BLM and others to restore hydrology and riparian woodlands on retired agricultural or other previously disturbed lands in the floodplain; restoration of watershed condition by improved grazing management, removal of cattle, erosion control, or other measures in uplands adjacent to the San Pedro River; cowbird trapping and control; and protection of existing flycatcher habitat from fire or recreational impacts. All plans and agreements for projects funded shall be coordinated with and approved by the Service.

Peregrine Falcon

The peregrine falcon was delisted during formal consultation; therefore, all reasonable and prudent measures and terms and conditions are no longer required. However, Fort Huachuca plans to continue implementing agreed upon measures to assist recovery efforts for the falcon.

1. The Fort shall provide environmental awareness training to personnel. Personnel training in the Huachuca Mountains shall, through the environmental awareness training, be made aware of the protected status of the peregrine falcon and these terms and conditions, but specific locations of peregrine falcon eyries shall not be revealed unless absolutely necessary to protect the species.

2. Fort Huachuca shall, in accordance with survey protocol (Ward 1994), conduct annual monitoring of potential peregrine falcon nest sites at Fort Huachuca early in the breeding season so that training and other activities can be designed or revised, as needed, to avoid or minimize adverse effects.

3. Within canyons containing active peregrine falcon eyries, the Fort shall minimize low-level helicopter flights within 1.0 mile of active eyries. Helicopter flights closer than 0.5 mile to active eyries shall be prohibited.

4. If peregrine falcons are found nesting in Garden Canyon within 0.25 mile of the rappelling cliffs, rappelling shall be halted or moved at least one mile from the nest until the nestlings fledge.

5. The Fort shall establish a schedule and implement as soon as possible prescribed burns and/or fuels management to reduce fuel loading in Fort Huachuca woodlands, thereby reducing the potential for stand-replacing wildfires in peregrine falcon foraging and nesting habitat.

6. One of the objectives of fire suppression activities in the Huachuca Mountains shall be protection of peregrine falcon nesting and foraging habitats. This objective will not in any way constrain the fire boss from taking any action as needed to protect life or property.

7. A Resource Advisor(s) shall be on the fire during all suppression, prescribed fire, or managed natural fire activities in the Huachuca Mountains. Resource Advisors shall be qualified biologists designated to coordinate peregrine falcon concerns and serve as an advisor to the fire boss. They shall also serve as field contact representatives responsible for coordination with the Service. They shall monitor fire suppression activities to ensure protective measures endorsed by the fire boss are implemented. Resource Advisors shall be on call 24 hours.

8. Areas of significant human activity during fire suppression operations, prescribed fire, or managed natural fire in the Huachuca Mountains, including fire crew camps, landing strips, and equipment staging areas, shall not be located within 1.0 mile of active peregrine falcon eyries, and areas disturbed during the fire shall be kept to the minimum area possible and shall be located in previously disturbed sites whenever possible.

9. Off-road vehicle activity during fire activities in the Huachuca Mountains shall be kept to a minimum. Vehicles shall be parked as close to roads as possible, and vehicles shall use wide spots in roads or disturbed areas to turn around. If off-road travel is necessary, local fire-fighting units should go off-road first because of their prior knowledge of the area.

10. Use of tracked vehicles during fire activities in the Huachuca Mountains shall be restricted to improving roads or constructing lines where a short distance of line might save a large area from fire.

11. The Fort shall, to the extent possible, obliterate vehicle tracks made during fires in the Huachuca Mountains, especially those of tracked vehicles.

12. Patches of unburned vegetation within burned areas in the Huachuca Mountains shall not be burned out as a fire suppression measure, except as needed to secure the fire perimeter or provide for fire fighter safety.

13. A mitigation/monitoring plan shall be developed by the Fort in coordination with the Service for each prescribed fire, managed natural fire, or fuels treatment that may adversely affect the peregrine falcon. The mitigation/monitoring plan shall ensure that adverse effects to peregrine falcons and their habitat are minimized. The effects of fire activities and fuels treatment on the peregrine falcon and its habitat shall also be monitored. The Service shall approve mitigation/monitoring plans. Mitigation and monitoring for managed natural fire that may adversely affect the peregrine falcon shall be coordinated with and approved by the Service as soon as possible after a decision is made to let a natural fire burn under controlled conditions.

14. The Fort shall monitor take of peregrine falcons and document any disturbance of nest sites. The results of monitoring specified here and elsewhere in this section will be reported to the Service pursuant to the "reporting requirements" below.

Mexican Spotted Owl

1. The Fort shall provide environmental awareness training to personnel. The environmental awareness training shall include instructional/educational materials that will describe the protected status and sensitive nature of the Mexican spotted owl (MSO). Personnel training in the Huachuca Mountains shall, through the environmental awareness training, be made aware of the protected status of the MSO and these mitigation measures, but specific locations of owl nests or Protected Activity Centers (PACs) shall not be revealed unless absolutely necessary to protect the species.

2. Fort Huachuca shall conduct annual monitoring of currently known PACs and surveys of potential MSO habitat at Fort Huachuca in accordance with Service survey protocol.

3. The Fort shall develop, within two years of the date of this opinion, a species-specific management plan for the MSO that conforms to and complements the MSO Recovery Plan.

4. Areas within PACs treated to reduce occurrence of wildfire, prescribed fire or fuels management shall be monitored, as described in the Recovery Plan, to determine effects of the treatment on known owl habitat components. If adverse effects are detected, treatments shall be modified to reduce those effects as much as possible while still reducing the risk of wildfire.

5. Within canyons containing active MSO nests, or in canyons where occupancy or reproductive status is unknown, the Fort shall minimize low-level helicopter flights within 1.0 mile of the nest, or the site of the last previously known nest. Helicopter flights closer than 0.25 mile to active nests shall be prohibited from March 1-August 31.

6. One of the objectives of fire suppression activities in the Huachuca Mountains shall be protection of MSO PACs. This objective will not in any way constrain the fire boss from taking any action as needed to protect life or property.

7. A Resource Advisor(s) shall be on the fire during all suppression, prescribed fire, or managed natural fire activities in the Huachuca Mountains. Resource Advisors shall be qualified biologists with knowledge of the MSO and its habitat. The Resource Advisor shall possess maps of all PACs and all potential nest/roost habitats in the project area and vicinity. Resource Advisor(s) shall coordinate MSO concerns and serve as an advisor to the fire boss. They shall also serve as field contact representatives responsible for coordination with the Service. They shall monitor fire suppression activities to ensure protective measures endorsed by the fire boss are implemented. Resource Advisors shall be on call 24 hours.

8. If a MSO is encountered during the fire, the Resource Advisor shall be advised immediately. The Resource Advisor shall assess potential harm to the owl and advise the fire boss of methods to prevent harm. The Resource Advisor shall maintain a record of any Mexican spotted owls

encountered during suppression activities. The information shall include for each owl the location, date, and time of observation and the general condition of the owl, and response to the fire and fire activities.

9. Areas of significant human activity during fire suppression operations, prescribed fire, or managed natural fire in the Huachuca Mountains, such as fire crew camps, landing strips, and equipment staging areas, shall be located outside of PACs. Areas disturbed during fire suppression activities in the Huachuca Mountains, such as fire lines, crew camps, and staging areas shall be rehabilitated, including the obliteration of fire lines to prevent their use by vehicles or hikers.

10. All fire suppression actions in PACs will occur, to the maximum extent possible, using "light on the land" methods, including not removing trees over 9 inches diameter at breast height (dbh) unless it is deemed necessary by the fire boss to prevent the fire from effecting additional PAC acres, or to protect life or property.

11. Patches of unburned vegetation within burned areas in the Huachuca Mountains shall not be burned out as a fire suppression measure, except as needed to secure the fire perimeter or provide for fire fighter safety.

12. Off-road vehicle activity shall be kept to a minimum during fire activities in the Huachuca Mountains. Vehicles shall be parked as close to roads as possible, and vehicles shall use wide spots in roads or disturbed areas to turn around. If off-road travel is necessary, local fire-fighting units should go off-road first because of their prior knowledge of the area.

13. Use of tracked vehicles during fire activities in the Huachuca Mountains shall be restricted to improving roads or constructing lines where a short distance of line might save a large area from fire.

14. The Fort shall, to the extent possible, obliterate vehicle tracks made during the fire activities in the Huachuca Mountains, especially those of tracked vehicles.

15. The Fort in coordination with the Service shall develop a mitigation/monitoring plan for each prescribed fire, managed natural fire, or fuels treatment that may adversely affect the MSO. Prescribed fire and fuels treatment shall be designed to protect MSOs and their habitat. The mitigation/monitoring plan shall contain the following, at a minimum:

a. Treatments/prescribed fire shall not occur within a 100 acre area around spotted owl nest sites. This 100 area shall include habitat that resembles the structural and floristic characteristics of the nest site. The 100 acre area will be protected by using topographic and other barriers, or through line construction. All line construction in PACs will occur outside the MSO breeding season, will not remove any trees larger than 9 inches dbh unless they pose a threat to the safety of fire fighters, and will only occur with a wildlife biologist from the Fort on-site.

b. Treatments shall enhance or retain owl habitat components, such as downed large logs greater than 12 inches in midpoint diameter, hardwoods, grasses, forbs, and shrubs, while still reducing the chance of wildfire. In regard to downed logs, this shall be achieved by protecting 80-90 percent of the downed logs 12 inches diameter and greater, and hand-lining snags 18 inches dbh and greater for all managed natural fire actions within PACs.

c. Treatments shall produce a mosaic of habitat components within PACs.

d. Prescribed or managed natural fire shall be introduced in PACs in blocks of 100-acres or less, and only between September 1 and February 28, outside the MSO breeding season.

e. Prescribed or managed natural fire shall be introduced into potential MSO nest/roost habitat only if at least two years of surveys, in accordance with Service protocol has been conducted, and for which one year of follow-up survey (four visits) has been conducted, if more than one breeding season has elapsed since the last survey to protocol and the action. Furthermore, introduction of fire into PACs shall only occur if the nest/roost site is known the year of the action, or for which nest/roost site information is less than three years old. If nest/roost information for a PAC is three years old or more, a 200-acre nest buffer shall be deferred from treatment until such a time, as the nest/roost can be located again.

f. All prescribed or managed natural fire shall be suppressed if it is anticipated that the fire may burn out of prescription in the following 24 hours. The Fort may choose to suppress actions prior to this.

g. For prescribed or managed natural fire, the Fort shall ensure that no more than 10 percent of the canopy of each PAC will be effected by gaps created by single or groups of trees crowning. Groups of trees that "crown out" shall not exceed two acres in size.

h. The Fort shall ensure that no more than two PACs per year on Fort Huachuca are affected by prescribed or managed natural fire. A PAC is considered affected if one or more acres of the PAC are burned to any degree. If prescribed or managed natural fires in one year are located in PAC(s) outside of the nest buffer, and are 1-10 acres in size, the Fort will discuss with the Service the option of allowing prescribed or managed natural fire to occur in one additional (or the same) PAC.

i. The effects of prescribed fire, managed natural fire, and fuels treatment on the owl and its habitat shall be monitored. Such monitoring shall include quantifying acres of 100-acre activity centers, PACs, and potential habitat affected by these activities.

j. The Service shall approve Mitigation/monitoring plans. Such plans shall be developed prior to implementation of prescribed fire. Mitigation and monitoring for managed natural fire that may adversely affect the MSO shall be coordinated with and approved by the Service as soon

as possible after a decision is made to let a natural fire burn under controlled conditions.

16. If MSOs are found nesting in Garden Canyon within 0.25 mile of the rappelling cliffs, rappelling shall be halted or moved at least 0.25 mile from the active nest from March 1 through August 31, or until nestlings fledge.

17. The Fort shall post, by October 31, 1999, a permanent all-weather sign near the Scheelite Canyon trailhead (but not visible from the Garden Canyon Road) that, at a minimum, informs visitors of the following:

a. The Canyon is home to sensitive species.
b. Visitors should stay on the trail and be as quiet and unobtrusive as possible.
c. Groups of visitors are limited to 12 or less.
d. Calling, hooting, or playing of taped recordings to elicit responses from or to locate owls is prohibited in Scheelite Canyon without special permit from the U.S. Fish and Wildlife Service.
e. Smoking is prohibited.

18. The Fort shall monitor take of MSOs and document any disturbance of owls or owl habitat. This and other monitoring required here will be reported to the Service pursuant to the "reporting requirements" described below.

Lesser Long-nosed Bat

1. The Fort shall ensure that construction, upgrading, or maintenance of roads does not increase or facilitate public access to Manila Mine, Pyeatt Cave, or other day roosts identified during the life of the project.

2. In coordination with the Service, the Fort shall consider installing bat gates with lockable human access doors at Manila Mine, Pyeatt Cave, and other day roosts that may be identified during the life of the project. Decisions to install gates and the design of the gates shall be approved by the Service.

3. If bat gates are not installed, then from at least July 1 to October 31 the Fort shall ensure that the alarm system is functional; access routes to day roosts are closed; access routes at the closures and the mine/cave sites are posted with the following information: no vehicle access, no entry into mines or caves, explanations that the closures are needed to protect sensitive species, and warnings that entry into the mines/caves could represent a violation of the Endangered Species Act.

4. If an annual increase in illegal entry into day roosts is noted, the Fort shall take action to correct the problem. Corrective action could include bat gates.

5. The Fort shall prohibit low-level helicopter flights within 350 feet of Pyeatt Cave, Manila Mine, or other day roosts identified during the life of the project from July 1 to October 31.

6. Prior to construction activities, pre-construction surveys shall be conducted for paniculate agaves that may be directly affected by construction activities. If agaves are found during pre-construction surveys, the following measures shall be implemented:

a. Disturbance shall be limited to the smallest area practicable, damage to agaves shall be avoided where possible, and projects shall be located in previously disturbed areas whenever possible.

b. Vehicle use shall be limited to existing routes and areas of disturbance except as necessary to access or define boundaries for new areas of construction or operation.

c. All workers shall strictly limit their activities and vehicles to designated areas. Construction workers shall be informed of these terms and conditions.

7. No seeding/planting of nonnative grasses or other plants shall occur at Fort Huachuca that may alter fire frequencies in wildland areas.

8. Prescribed fire and managed natural fire shall be planned to minimize adverse effects to lesser long-nosed bat forage plants and roosts. Measures shall be developed to ensure the following:

a. The fire kills no more than 20 percent of agaves that are burned during prescribed fire or managed natural fire.

b. Fires in agave management areas shall be actively suppressed unless the area is approaching its natural fire return interval of 10 years.

c. Prescribed fire shall be prohibited in agave management areas where greater than half of those agaves are young age classes (agaves with four or fewer spiral courses of leaves).

d. A mitigation plan shall be developed by the Fort in coordination with the Service for each prescribed or managed natural fire within 0.5 mile of a lesser long-nosed bat roost or in areas that support paniculate agaves. The mitigation plan shall ensure those effects to lesser long-nosed bat roosts and forage plants are minimized and shall include monitoring of effects to forage plants. The Service shall approve the plan. Mitigation and monitoring for managed natural fire shall be coordinated with and approved by the Service as soon as possible after a decision is made to let a natural fire burn under controlled conditions.

e. A schedule for prescribed burns shall be established and followed to reduce fuel loading in Fort Huachuca grasslands and woodlands, thereby reducing the potential for major wildfires in

lesser long-nosed bat foraging and roosting habitat. This schedule shall be coordinated and approved by the Service.

f. In regard to fire suppression, prescribed fire, or managed natural fire activities on the West or South Ranges, the following measures shall be implemented:

(1) The Fort shall continue the mutual aid agreements with local governments and the Memorandum of Understanding with the Coronado National Forest to provide assistance in fire suppression, if participating entities agree.

(2) One of the objectives of fire suppression, prescribed fire, and managed natural fire activities shall be protection of lesser long-nosed bat foraging and roosting habitats. This objective will not in any way constrain the fire boss from taking any action as needed to protect life or property.

(3) A Resource Advisor(s) shall be on the fire during all suppression, prescribed fire, or managed natural fire activities. Resource Advisors shall be qualified biologists designated to coordinate lesser long-nosed bat concerns and serve as an advisor to the fire boss. They shall also serve as field contact representatives responsible for coordination with the Service. They shall monitor fire activities to ensure protective measures endorsed by the fire boss are implemented. Resource Advisors shall be on call 24 hours.

(4) Areas of significant human activity during fire suppression operations, such as fire crew camps, landing strips, and equipment staging areas, shall not be located from July 1 through October 31 within 0.25 mile of Manila Mine, Pyeatt Cave, Wren Bridge, or other roosts identified during the life of the project. Such areas shall also be kept to the minimum area possible and shall be located in previously disturbed sites whenever possible.

(5) Off-road vehicle activity during fire activities shall be kept to a minimum. Vehicles shall be parked as close to roads as possible, and vehicles shall use wide spots in roads or disturbed areas to turn around. If off-road travel is necessary, local fire-fighting units should go off-road first because of their prior knowledge of the area.

(6) Use of tracked vehicles during fire activities shall be restricted to improving roads or constructing lines where a short distance of line might save a large area from fire.

(7) The Fort shall, to the extent possible, obliterate vehicle tracks made during fires in the Huachuca Mountains, especially those of tracked vehicles.

(8) Patches of unburned vegetation within burned areas in the Huachuca Mountains shall not be burned out as a fire suppression measure, except as needed to secure the fire perimeter or provide for fire fighter safety.

9. Night-time training shall not occur in agave management areas from July 1 through October 31.

10. No nighttime use and no tracer fire shall occur on live fire ranges 2, 3, and 4 from July 1 through October 31.

11. From July 1 - October 31, all nocturnal UAV operations at the Rugge-Hamilton and Pioneer sites will be above 500 feet above ground level, except for take-off and landings. Take-off and landing approaches at Rugge-Hamilton will be confined to the east and north and approaches at Pioneer will be confined to the north and west, away from agave management areas. Nocturnal rocket-assisted take-offs of UAVs from the Black Tower site shall only occur from November through June. Rocket-assisted take-offs shall be attended by fire crews due to the high probability of fire and potential adverse effects to agave communities.

12. Off-road vehicle travel shall not occur in protected agave management areas or any other part of the West Range or South Range.

13. Pyrotechnics shall not be used within 0.25 miles of protected agave management areas.

14. The Fort shall fully implement as soon as possible the Agave Management Plan (Howell and Robinett 1996), with the exception of the recommendation to limit prescribed fire to the cool season (November through March). Alternatively, the Fort could rewrite the Agave Management Plan and implement that revised plan, if approved by the Service. In either case, the Agave Management Plan should evolve with monitoring data and research results. Any changes in future agave management shall be reviewed and approved by the Service.

15. The Fort shall (if funding is available) continue implementation of Integrated Training Area Management (ITAM), or shall otherwise provide environmental awareness training to all military personnel that work in the field on the West or South Range. Environmental awareness training shall include information on the status of the lesser long-nosed bat and these terms and conditions. The Fort shall continue to implement Fort Huachuca Regulation 385-8, Range and Training Area Operations, to specify the completion of environmental awareness training (including protected resource identification) prior to the initiation of training or testing; and the responsibility of the unit commander to become familiarized with environmental policies and operational requirements.

16. The Fort shall designate a point of contact at Range Control that will ensure that training activities comply with mitigation requirements.

17. The Fort shall develop, as soon as possible, a species-specific management plan for the lesser long-nosed bat.

18. The Fort shall conduct annual monitoring of known or potential lesser long-nosed bat roosts

at Fort Huachuca so that training and other activities can be designed or revised, as needed, to avoid or minimize adverse effects.

19. The Fort shall conduct monitoring of Palmer's agave populations on the West and South Ranges every five years. The objective of the monitoring shall be to establish trends in bat forage resources.

20. The Fort shall monitor take of lesser long-nosed bats, document any disturbance of roost sites, and document acres burned on the West or South ranges and whether such fire burned in agave management areas. The results of this monitoring shall be reported to the Service pursuant to the "reporting requirements" below.

Sonora Tiger Salamander

1. The Fort shall provide environmental awareness training to personnel. Environmental training of personnel working in upper Garden Canyon shall include instructional/educational materials that will describe the protected status and sensitive nature of the Sonora tiger salamander and prohibitions on transport and release of live fish and salamanders, collection of Sonora tiger salamanders, and off-road vehicle activity.

2. The Fort shall continue the mutual aid agreements with local governments and the Memorandum of Understanding with the Coronado National Forest to provide assistance in fire suppression, if participating entities agree.

3. Fort Huachuca shall conduct annual monitoring of the upper Garden Canyon pond in June or early July (pre-monsoon) of each year to determine condition of the habitat and presence of aquatic salamanders according to protocol approved by the Service.

4. The Fort shall develop, as soon as possible, a species-specific management plan for the Sonora tiger salamander.

5. The Fort shall establish a schedule and implement as soon as possible prescribed burns and/or fuels management to reduce fuel loading in Fort Huachuca woodlands.

6. Exclosure fences or other barriers, such as boulders placed around the pond's perimeter, shall be constructed, as soon as possible, but before September 30 1999, at upper Garden Canyon Pond to prevent vehicles from driving through the habitat.

7. A closure to vehicle travel shall be maintained for the life of the project at Gate No. 7.

8. The Fort shall amend part 4.i. of the "Fishing Facts" handed out to anglers to read: "i. Live fish and salamanders may not be transported or used as bait on Fort Huachuca. Capture,

transport, or release of salamanders is strictly prohibited." This shall appear in bold. The "Fishing Facts" shall be amended as described by October 31, 1999 and shall be supplied to all persons obtaining fishing permits at Fort Huachuca.

9. By October 31, 1999, a permanent all-weather sign shall be posted at upper Garden Canyon pond. The sign shall contain the following information at a minimum: 1. Fishing, use of nets, and capture or release of salamanders or fish is prohibited, and 2. Off-road vehicle use is prohibited.

10. One of the objectives of fire suppression activities shall be protection of salamanders and the aquatic habitat at upper Garden Canyon pond, in Scotia Canyon, or other salamander localities possibly affected by fire at Fort Huachuca. This objective will not in any way constrain the fire boss from taking any action as needed to protect life or property.

11. A Resource Advisor(s) shall be on the fire during all suppression, prescribed fire, or managed natural fire activities in the Huachuca Mountains. Resource Advisors shall be qualified biologists designated to coordinate Sonora tiger salamander concerns and serve as an advisor to the fire boss. They shall also serve as field contact representatives responsible for coordination with the Service. They shall monitor fire activities to ensure protective measures endorsed by the fire boss are implemented. Resource Advisors shall be on call 24 hours.

12. Areas of significant human activity during fire suppression operations, such as fire crew camps, landing strips, and equipment staging areas, shall not be located on or adjacent to salamander breeding sites in Garden Canyon or at other sites identified during the life of the project. Such areas of human activities shall also be kept to the minimum area possible and shall be located in previously disturbed sites whenever possible.

13. Off-road vehicle activity during fire activities in the Huachuca Mountains shall be kept to a minimum. Vehicles shall be parked as close to roads as possible, and vehicles shall use wide spots in roads or disturbed areas to turn around. If off-road travel is necessary, local fire-fighting units should go off-road first because of their prior knowledge of the area.

14. Use of tracked vehicles during fire activities in the Huachuca Mountains shall be restricted to improving roads or constructing lines where a short distance of line might save a large area from fire.

15. The Fort shall, to the extent possible, obliterate vehicle tracks made during fires in the Huachuca Mountains, especially those of tracked vehicles.

16. Patches of unburned vegetation within burned areas in the Huachuca Mountains shall not be burned out as a fire suppression measure, except as needed to secure the fire perimeter or provide for fire fighter safety.

17. A mitigation/monitoring plan shall be developed by the Fort in coordination with the Service for each prescribed fire, managed natural fire, or fuels treatment that may adversely affect the Sonora tiger salamander or its habitat on or off-post. Fire activities and fuels treatment shall be designed to protect Sonora tiger salamanders and their habitat. The effects fire activities and fuels treatment on the Sonora tiger salamander and its habitat shall be monitored. Mitigation/monitoring plans shall be approved by the Service. Mitigation and monitoring for managed natural fire that may adversely affect the Sonora tiger salamander shall be coordinated with and approved by the Service as soon as possible after a decision is made to let a natural fire burn under controlled conditions.

18. The Fort shall monitor take of Sonora tiger salamanders and document any disturbance of salamanders or salamander habitat. Results of this and other monitoring required herein shall be reported to the Service pursuant to the "reporting requirements" below.

Reporting Requirements

For ten years from the date of this opinion, the Fort shall prepare and deliver to the Service annual reports documenting progress/results in implementation of these mitigation measures, including actions taken, problems encountered, any take of listed species documented, copies of reports and data sheets for habitat monitoring and species surveys, effectiveness of the mitigation measures, and recommendations on how to modify the measures to enhance protection of listed species or reduce needless hardship on the Fort or its contractors. Reports shall be due January 31 of each year from 2000-2009. The final report shall be due 60 days after the date of this opinion in 2009.

General Mitigation Measures the Army Proposes to Reduce Adverse Effects to Listed Species and Their Habitats

1. The Fort shall continue the mutual aid agreements with local governments and the Memorandum of Understanding with the Coronado National Forest to provide assistance in fire suppression, if participating entities agree.

2. The Fort shall continue to implement Fort Huachuca Regulation 385-8, Range and Training Area Operations, to specify the completion of environmental awareness training (including protected resource identification) prior to the initiation of training or testing; and the responsibility of the unit commander to become familiarized with environmental policies and operational requirements. Personnel training in the Huachuca Mountains shall, through the environmental awareness training, be made aware of the protected status of listed species and these terms and conditions, but specific locations of listed species shall not be revealed unless absolutely necessary to protect the species.

3. The Fort shall develop, as soon as possible, species-specific management plans for all listed species that occur at Fort Huachuca.

4. The Fort shall develop and implement a Fire Management Plan to address suppression and prescribed fire. As part of this planning effort, the Fort shall establish a schedule and implement as soon as possible prescribed burns and/or fuels management to reduce fuel loading in Fort Huachuca woodlands, thereby reducing the potential for stand-replacing wildfires.

5. The Fort shall designate a contact at Range Control to ensure all military training is conducted in compliance with environmental requirements. This would include reviewing training forms and inspecting training and testing units and the use of training areas.

6. The Fort shall implement the East Range Watershed Improvement Plan to improve watershed management on the East Range.

7. The Fort shall continue to periodically monitor and survey for candidate species on Fort Huachuca.

8. The Fort shall revise Fort Huachuca Regulation 385-8, Range and Training Area Operations, to specify environmental policies and operational requirements (i.e. prohibit vehicle entry into agave management areas, etc.).

9. The Fort shall improve recreational management. This includes revising the off-highway vehicle policy and developing a recreational regulation.

10. An Integrated Natural Resources Management Plan will be developed and implemented for Fort Huachuca, as required by the Sikes Improvement Act of 1997 (16 USC 670 *et seq*).