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563RD RESCUE GROUP PERSONNEL RECOVERY SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT DAVIS-MONTHAN AIR FORCE BASE, ARIZONA

MARCH 2015

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563RD RESCUE GROUP PERSONNEL RECOVERY SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT DAVIS-MONTHAN AIR FORCE BASE, ARIZONA

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DRAFT
FINDING OF NO SIGNIFICANT IMPACT

1.0 NAME OF PROPOSED ACTION

The use of 20 Helicopter Landing Zone (HLZ) and Drop Zone (DZ) sites for the 563rd Rescue Group (563 RQG) Personnel Recovery Training Mission at Davis-Monthan Air Force Base (AFB), Arizona

2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

In 2002, an Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) were completed by the United States (U.S.) Department of the Air Force (Air Force), Headquarters Air Combat Command (ACC) for the West Coast Combat Search and Rescue (CSAR) Beddown at Davis-Monthan AFB, Arizona. Implementation of the Proposed Action resulted in the establishment of a Personnel Recovery organization composed of collocated HH-60 helicopters, HC-130 cargo aircraft, and Combat Rescue Officer (CRO)-led squadrons. The Beddown added a total of 12 HH-60 helicopters, 10 HC-130 fixed-wing cargo aircraft, and 1,059 personnel to Davis-Monthan AFB. Ground and parachute training for CSAR personnel within previously approved ranges, DZs, and LZs were also part of the Proposed Action for the CSAR Beddown EA. Since the completion of the CSAR Beddown, the 563 RQG has identified a need to increase the number of HLZs and DZs to be used for training in order to provide a more robust and realistic training scenario. This would ensure that an adequate number of HLZ/DZs are available in a variety of ecological conditions and elevations to simulate various rescue and recovery operations worldwide. This Supplemental EA (SEA) is tiered to the 2002 CSAR Beddown EA.

Two alternatives - the Proposed Action and the No Action Alternative - were analyzed in detail in the SEA. The Proposed Action and any alternatives were evaluated based on their potential to satisfy the purpose and need, specifically to provide realistic personnel search and rescue training for Air Force and other Department of Defense (DoD) units, ensure that an adequate number of HLZ/DZs are available during training events, and ensure that a wide variety of terrain types are available to provide realistic training.

Under the Proposed Action, the Air Force proposes to use an additional 20 identified sites in Arizona as HLZ/DZs during routine training events conducted by the 563 RQG. The HLZ/DZs are located throughout southern and central Arizona in a variety of settings and on state or Federal lands that have been previously disturbed. Not all HLZ/DZs will necessarily be used during each training event. A special-use permit would be required for use of the sites. The special-use permit would last for 2 years. Potential future sites, based on mission training requirements, could also be used through a special-use permit or lease. The 563 RQG is responsible for ensuring that the quantity of HLZ/DZ sites necessary is properly monitored. The number of potential future sites should be kept to a minimum, but should be sufficient to meet training requirements. The Air Force will perform appropriate environmental analyses on these future sites when, or if, they are identified. The currently identified and potential future sites would range from 0.3 to 2.7 acres. No construction or ground disturbance would be expected to occur at the identified or potential future sites. Some minor trimming of vegetation could occur along the perimeter of sites located within forested or scrub areas; this would be required for safety purposes to avoid contact with vegetation by helicopter blades. Approximately 23.5 acres were analyzed in the SEA for natural and cultural resources.

Each site would potentially be used between 24 and 250 times annually; however, training requirements would dictate the frequency of use for each site. The training events would include the use of the HC-130 cargo aircraft and HH-60 helicopters. During the training event, one to three helicopters would land and deploy search and rescue units or rescue participants who have been brought to the site. There would be no increase in sorties as analyzed in the 2002 CSAR EA. No live fire would occur during these training events outside of established DoD ranges, such as the Barry M. Goldwater Range (BMGR). Training missions would include nighttime flights; however, all activities would comply with the restrictions established by Davis-Monthan AFB. Detailed descriptions of how the training would be conducted are provided in the 2002 CSAR EA.

The No Action Alternative typically describes the baseline of current operations that will be compared against the Proposed Action. The No Action Alternative would not increase the number of sites available for training. Consequently, this alternative would not satisfy the purpose and need; however, it will be carried forward for analysis, as required by the Council on Environmental Quality (CEQ), and will form the basis for analysis of the other alternatives. For purposes of the SEA, the level of training missions to be assessed under the No Action Alternative would be that described as the Proposed Action in the 2002 CSAR EA.

3.0 SUMMARY OF ENVIRONMENTAL CONSEQUENCES

The SEA provides an analysis of potential environmental impacts of the Proposed Action and No Action Alternative within the region of influence (ROI), which includes Davis-Monthan AFB and Cochise, Gila, Graham, Pima, Pinal, and Santa Cruz counties. It was determined that, due to potential impacts, four HLZ/DZ sites including the Grapevine, Stronghold, Paige, and Pedro sites will be removed from the list of proposed HLZ/DZ sites and will not be used during routine training events conducted by the 563 RQG. Negligible or no impacts on airspace, geology, water resources, and environmental justice were identified. Minor, insignificant impacts would occur on land use, air quality, socioeconomics, biological resources, soils, hazardous materials and wastes, safety and occupational health, and cultural resources, as identified below. Moderate, insignificant impacts would occur on the noise environment. These impacts are identified below. The No Action Alternative would result in no change to existing conditions.

Airspace: There would be no significant impacts on airspace operations, airspace, or civilian aviation.

Land Use Resources: The use of the Grapevine and Stronghold HLZ/DZ sites would impact the land use and visual resources of the surrounding area due to noise and visual impacts. Due to these impacts, the Grapevine and Stronghold sites will be removed from the list of proposed HLZ/DZ sites and will not be used during routine training events conducted by the 563 RQG. The land use and visual resources impacts would be considered minor, and implementation of the Proposed Action would not have a significant impact.

Air Quality: Overall, the maximum net increases in air emissions would be minor and well below the *de minimis* thresholds; therefore, the direct and indirect impacts on air quality would not be significant.

Noise: The training activities would potentially create Sound Exposure Levels (SELs) in excess of 85 A-weighted decibels (dBA) on the Coronado National Forest near Jenna HLZ/DZ, residential receptors (campsites) near Grapevine HLZ/DZ, and residential receptors and Coronado National Forest adjacent to the Stronghold HLZ/DZ. Due to these impacts, the

Grapevine and Stronghold sites will be removed from the list of proposed HLZ/DZ sites and will not be used during routine training events conducted by the 563 RQG. During training use, low-flying flight patterns over the Coronado National Forest north of the Jenna HLZ/DZ will be avoided so that the 85 dBA threshold is not exceeded over the USFS lands. The training personnel will be advised of this requirement prior to each training mission using the Jenna HLZ/DZ. With these implementations, the noise impacts would be considered minor to moderate, and no significant impacts would occur.

Socioeconomics and Environmental Justice: Use of the Stronghold HLZ/DZ would have noise impacts on the residences in the area when flights occur. The increased noise levels may impact the ability of the U.S. Forest Service (USFS) to rent the "Rooms with a View" cabins located nearby, impacting use and revenues.

The Grapevine Group Campground would be impacted by noise when there are flights associated with the Personnel Recovery training. Substantial and frequent use of the site could cause campers to seek other locations instead of the Grapevine Campground, thereby impacting use and revenues.

Due to these impacts, the Grapevine and Stronghold sites will be removed from the list of proposed HLZ/DZ sites and will not be used during routine training events conducted by the 563 RQG. There are no socioeconomic impacts associated with the remaining HLZ/DZ sites and no significant impacts would occur.

There would be no disproportionately high or adverse impacts on minority or low-income populations or children.

Biological Resources: The Federally Endangered Pima pineapple cactus (*Coryphantha scheeri var. robustispina)* and Federally Endangered lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae)* food sources such as saguaro (*Carnegiea gigantean)* and Palmer's agave (*Agave palmeri*) were found at some of the HLZ/DZ sites and would be avoided during training events and use of the HLZ/DZ sites. The Air Force has determined that the Proposed Action may affect, but not likely to adversely affect the jaguar, ocelot, lesser long-nosed bat, and Pima pineapple cactus. The Proposed Action would not result in any significant impacts on protected species or designated Critical Habitats.

Water Resources: Since no construction activities would occur and only minimal ground-disturbing activities would take place during landing and takeoff, the training activities would have no appreciable effects on the groundwater or surface waters in the ROI. Impacts on surface waters and groundwater at the proposed HLZ/DZ sites would be considered insignificant. There would be no significant impacts on floodplains, wetlands, or waters of the U.S.

Hazardous Materials and Waste: All 20 currently identified HLZ/DZ sites were visually surveyed for evidence of soil staining, drums, or other material that might cause contamination issues, and no sites were noted to have any visible concerns. The likelihood for leaks or unscheduled maintenance of helicopters is minimal. Hazardous materials and waste impacts at the proposed HLZ/DZ sites would be insignificant.

Cultural Resources: Two new and previously unidentified archaeological sites were identified at the Pedro and Paige HLZ/DZ sites. Davis-Monthan AFB recommends both sites as eligible for the National Register of Historic Places (NRHP) under Criterion D for their research

potential. Both sites have been removed from the list of proposed HLZ/DZ training sites to prevent adverse effects on both properties by activities associated with the personnel recovery training. The results of the surveys showed that the remaining 18 of the 20 HLZs had no cultural resources within the HLZ/DZs. No adverse effects due to visual or noise intrusions from overflights would occur on NRHP-eligible or listed archaeological resources, architectural resources, or traditional cultural properties. The Arizona SHPO concurred with the finding of No Adverse Effect in a letter dated July 12, 2013 (Appendix A).

Earth Resources: There would be no impacts on geology or the topography of the project area. No construction or significant ground disturbance would be expected at the sites. The use of HH-60 helicopters would impact soils during takeoff and landing due to erosion from propeller wash and would potentially be a greater concern for HLZ/DZs sited near stream banks. However, the training events at these sites would be temporary and intermittent, and the soil disturbance would primarily occur in previously disturbed areas. Dust control methods could be utilized and impacts on soils would be minor.

Safety and Occupational Health: There would be no significant safety hazards or occupational health impacts associated with the Proposed Action.

4.0 CONCLUSION

Based on the analysis of the SEA conducted in accordance with the requirements of the National Environmental Policy Act (NEPA), the CEQ regulations, and Air Force Instruction (AFI) 32-7061, which is hereby incorporated by reference, and after careful review of the potential impacts, I conclude that the implementation of the Proposed Action would not result in significant impacts on the quality of the human or natural environments. Therefore, a FONSI is warranted, and an Environmental Impact Statement is not required for this action.

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JAMES P. MEGER, Colonel, USAF Date
Commander

Cover Sheet
563rd Rescue Group Personnel Recovery
Supplemental Environmental Assessment
Davis-Monthan Air Force Base, Arizona

a. *Responsible Agency:* United States Air Force (Air Force)

b. *Proposals and Actions*: Since the completion of the West Coast Combat Search and Rescue (CSAR) Beddown, the 563rd Rescue Group (563 RQG) has identified a need to increase the number of helicopter landing zones (HLZs) and drop zones (DZs) to provide a more robust and realistic training scenario and ensure that an adequate number of HLZ/DZs are available in a variety of ecological conditions and elevations. This Supplemental Environmental Assessment (SEA) is tiered to the 2002 CSAR Beddown EA. The Air Force proposes to use an additional 20 identified sites as HLZ/DZs during routine training events conducted by the 563 RQG. The sites are located throughout Arizona and range in size from 0.3 to 2.7 acres. A special-use permit would be required for use of the sites and would last for 2 years. No construction or ground disturbance would be expected at the sites. Each site would potentially be used between 24 and 250 times annually; however, training requirements would dictate the frequency of use for each site. The training events would include the use of the HC-130 cargo aircraft and HH-60 helicopters. One to three helicopters would land and deploy search and rescue units. There would be no increase in sorties as analyzed in the 2002 CSAR EA.

c. *For Additional Information:* Comments and request for additional information must be submitted in writing via e-mail to 355fw.pa.comment@us.af.mil, or by mail to: ATTN: Rescue SEA Comment, 355th Fighter Wing Public Affairs, 3405 S Fifth Street, Davis-Monthan AFB, Arizona 85707.

d. *Designation:* Draft Supplemental Environmental Assessment

e. *Abstract:* This SEA has been prepared in accordance with the National Environmental Policy Act and Air Force Instruction 32-7061. The EA focused the analysis on the natural and human environments. Negligible or no impacts on airspace, geology, water resources, and environmental justice were identified. Hazardous materials and waste, soils, air quality, and safety and occupational health impacts at the proposed HLZ/DZ sites would be insignificant.

The Federally Endangered Pima pineapple cactus (*Coryphantha scheeri var. robustispina)* and lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae)* food sources such as saguaro (*Carnegiea gigantean)* and Palmer's agave (*Agave palmeri*) were found at some of the HLZ/DZ sites and would be avoided during site use.

The Air Force has determined that the Proposed Action may affect, but is not likely to adversely affect, the jaguar, ocelot, lesser long-nosed bat, and Pima pineapple cactus. The Proposed Action would not result in any significant impacts on protected species or designated Critical Habitats.

The use of the Grapevine and Stronghold sites would impact the land use and visual resources, socioeconomics, and noise environment of the surrounding area. Also, the use of the Jenna HLZ/DZ site would have potential noise impacts on the Coronado National Forest. Due to these impacts, the Grapevine and Stronghold sites will be removed from the list of proposed HLZ/DZ sites and will not be used during routine training events conducted by the 563 RQG. During training use, low-flying flight patterns over the Coronado National Forest north of the Jenna HLZ/DZ will be avoided so that specific noise threshold is not exceeded over the USFS lands. The training personnel will be advised of this requirement prior to each training mission using the Jenna HLZ/DZ. With these implementations, the impacts would be minor to moderate, and no significant impacts would occur.

Two new and previously unidentified archaeological sites were identified at the Pedro and Paige HLZ/DZ sites. Davis-Monthan AFB recommends both sites as eligible for the National Register of Historic Places (NRHP) under Criterion D for their research potential. Both sites have been removed from the list of proposed HLZ/DZ training sites to prevent adverse effects on both properties by activities associated with the personnel recovery training. The results of the surveys showed that the remaining 18 of the 20 HLZs had no cultural resources within the HLZ/DZs. No adverse effects due to visual or noise intrusions from overflights would occur on NRHP-eligible or listed archaeological resources, architectural resources, or traditional cultural properties. The Arizona SHPO concurred with the finding of No Adverse Effect in a letter dated July 12, 2013 (Appendix A).

EXECUTIVE SUMMARY
563RD RESCUE GROUP PERSONNEL RECOVERY
SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT
DAVIS-MONTHAN AIR FORCE BASE, ARIZONA

Introduction: In accordance with the National Environmental Policy Act of 1969 (NEPA), the United States (U.S.) Air Force (Air Force), Air Combat Command (ACC), and the U.S. Army Corps of Engineers, Sacramento District, have prepared this Supplemental Environmental Assessment (SEA) to evaluate the proposed increase in the number of helicopter landing zones (HLZs) and drop zones (DZs) available for personnel recovery training use by the 563rd Rescue Group (563 RQG) at Davis-Monthan Air Force Base (AFB), Arizona. Since the completion of the West Coast Combat Search and Rescue (CSAR) Beddown in 2003, the 563 RQG has identified a need for additional HLZs and DZs to provide a more robust and realistic training scenario. This would ensure that an adequate number of HLZ/DZs are available in a variety of ecological conditions and elevations to simulate various rescue and recovery operations worldwide. The Air Force has proposed the use of an additional 20 identified sites in Arizona as HLZ/DZs during routine training events conducted by the 563 RQG. This SEA discusses the potential environmental effects of the proposed use of 20 additional identified sites in Arizona as HLZ/DZs during routine training events conducted by the 563 RQG.

Background/Setting: In 2002, an Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) were completed by the Air Force Headquarters ACC for the West Coast CSAR Beddown at Davis-Monthan AFB, Arizona. Implementation of the Proposed Action resulted in the establishment of a Personnel Recovery organization composed of collocated HH-60 helicopters, HC-130 cargo aircraft, and Combat Rescue Officer (CRO)-led squadrons, consisting of the 563 RQG, 943 RQG, 305th Rescue Squadron (305 RQS), 306 RQS, 55 RQS, 48 RQS, and 79 RQS. The Beddown added a total of 12 HH-60 helicopters, 10 HC-130 Fixed-wing cargo aircraft, and 1,059 personnel to Davis-Monthan AFB. Ground and parachute training for CSAR personnel within previously approved ranges, DZs, and LZs were also part of the Proposed Action for the CSAR Beddown EA.

The Personnel Recovery mission requires distinct tasks and skills that involve frequent, repetitive training to maintain combat proficiency. Numerous ongoing training operations and activities were originally anticipated and analyzed as part of the 2002 EA. Since the completion of the CSAR Beddown, the 563 RQG has identified a need to increase the number of HLZs and

DZs to be used for training in order to provide a more robust and realistic training scenario. This SEA is tiered to the 2002 CSAR Beddown EA.

Proposed Action: Under the Proposed Action, the Air Force would use an additional 20 identified sites in Arizona as HLZ/DZs during routine training events conducted by the 563 RQG. The HLZ/DZs are located throughout southern and central Arizona in a variety of settings and on state or Federal lands that have been previously disturbed, according to the State Land Department. Not all HLZ/DZs would necessarily be used during each training event. A special-use permit would be required from the affected land manager for use of the sites. The special-use permit would last for 2 years. Potential future sites, based on mission training requirements, could also be used through a special-use permit or lease. The 563 RQG is responsible for ensuring that the necessary quantity of HLZ/DZ sites is properly monitored. The number of potential future sites should be kept to a minimum, but should be sufficient to meet training requirements. The Air Force will perform appropriate environmental analyses on these future sites when, or if, they are identified. The currently identified and potential future sites would range from 0.3 to 2.7 acres. No construction or ground disturbance would be expected at the identified or potential future sites. Some minor trimming of vegetation could occur along the perimeter of sites located within forested or scrub areas; this would be required for safety purposes to avoid contact with vegetation by helicopter blades. Approximately 23.5 acres were analyzed in the SEA for natural and cultural materials.

Each site would potentially be used between 24 and 250 times annually; however, training requirements would dictate the frequency of use for each site. The training events would include the use of the HC-130 cargo aircraft and HH-60 helicopters. During the training event, one to three helicopters would land and deploy search and rescue units, or rescue participants who have been brought to the site. There would be no increase in sorties as analyzed in the 2002 CSAR EA. No live fire would occur during these training events outside of established Department of Defense (DoD) ranges, such as the Barry M. Goldwater Range (BMGR). Training missions would include nighttime flights; however, all activities would comply with the restrictions established by Davis-Monthan AFB. Detailed descriptions of how the training would be conducted are provided in the 2002 CSAR EA.

No Action Alternative: For purposes of the SEA, the level of training missions to be assessed under the No Action Alternative would be that described as the Proposed Action in the 2002

CSAR EA. The No Action Alternative would not increase the number of sites available for training.

Environmental Consequences: Negligible or no impacts were identified on airspace, geology, water resources, and environmental justice. Hazardous materials and waste, soils, air quality, and safety and occupational health impacts at the proposed HLZ/DZ sites would be considered minor.

The Federally Endangered Pima pineapple cactus (*Coryphantha scheeri var. robustispina)* and Federally Endangered lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae)* food sources such as saguaro (*Carnegiea gigantean)* and Palmer's agave (*Agave palmeri*) were found at some of the HLZ/DZ sites and would be avoided during training events and use of the HLZ/DZ sites. The Air Force has determined that the Proposed Action may affect, but is not likely to adversely affect, the jaguar, ocelot, lesser long-nosed bat, and Pima pineapple cactus. The Proposed Action would not result in any significant impacts on protected species or designated Critical Habitats.

The use of the Grapevine and Stronghold HLZ/DZ sites would impact the land use and visual resources, socioeconomics, and noise environment of the surrounding area. Also, the use of the Jenna HLZ/DZ site would have potential noise impacts on the Coronado National Forest. Due to these impacts, the Grapevine and Stronghold sites will be removed from the list of proposed HLZ/DZ sites and will not be used during routine training events conducted by the 563 RQG. During training use, low-flying flight patterns over the Coronado National Forest north of the Jenna HLZ/DZ will be avoided so that the 85 dBA threshold is not exceeded over the USFS lands. The training personnel will be advised of this requirement prior to each training mission using the Jenna HLZ/DZ. With these implementations, the land use and visual resources, socioeconomics, and noise impacts would be considered minor to moderate, and implementation of the Proposed Action would not have a significant impact.

Two new and previously unidentified archaeological sites were identified at the Pedro and Paige HLZ/DZ sites. Davis-Monthan AFB recommends both sites as eligible for the National Register of Historic Places (NRHP) under Criterion D for their research potential. Both sites have been removed from the list of proposed training sites to prevent adverse effects on both properties by activities associated with the personnel recovery training. The results of the surveys showed

that the remaining 18 of the 20 HLZs had no cultural resources within the HLZ/DZs. No adverse effects due to visual or noise intrusions from overflights would occur on NRHP-eligible or listed archaeological resources, architectural resources, or traditional cultural properties. The Arizona SHPO concurred with the finding of No Adverse Effect in a letter dated July 12, 2013 (Appendix A).

A summary of the alternatives and their anticipated effects is presented in Table ES-1.

Table ES-1. Summary of Impacts Associated with Each Alternative

Resource	Impacts	
	No Action Alternative	**Proposed Action**
Airspace	None	None
Land Use	None	Minor*
Air Quality	None	Minor*
Noise	None	Moderate*
Socioeconomics	None	Minor*
Environmental Justice	None	None
Biological Resources	None	Minor*
Water Resources	None	Negligible*
Hazardous Materials and Waste	None	Minor*
Cultural Resources	None	Minor*
Earth Resources	Minor*	Minor*
Safety and Occupational Health	None	Minor*

*Impacts are considered insignificant or would be mitigated to insignificance

Conclusion: The data presented in the SEA documents indicate that the proposed use of 16 of the 20 identified sites in Arizona as HLZ/DZs during routine training events conducted by the 563 RQG at Davis-Monthan AFB would result in insignificant adverse impacts on the area's human and natural environments. It was determined that, due to potential impacts, four HLZ/DZ sites including the Grapevine, Stronghold, Paige, and Pedro sites will be removed from the list of proposed HLZ/DZ sites and will not be used during routine training events conducted by the 563 RQG. Therefore, no additional environmental analysis (i.e., Environmental Impact Statement) is warranted.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF PHOTOGRAPHS

LIST OF APPENDICES

SECTION 1.0
INTRODUCTION

563rd Rescue Group Personnel Recovery
Supplemental Environmental Assessment
Davis-Monthan Air Force Base, Arizona

1.0 INTRODUCTION

1.1 Background

In 2002, an Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) were completed by the United States (U.S.) Department of the Air Force (Air Force), Headquarters Air Combat Command (ACC) for the West Coast Combat Search and Rescue (CSAR) Beddown at Davis-Monthan Air Force Base (AFB), Arizona (Figure 1-1) (Davis-Monthan AFB 2002). Implementation of the Proposed Action resulted in the establishment of a Personnel Recovery organization composed of collocated HH-60 helicopters, HC-130 cargo aircraft, and Combat Rescue Officer (CRO)-led squadrons, consisting of the 563 RQG, 943 RQG, 305th Rescue Squadron (305 RQS), 306 RQS, 55 RQS, 48 RQS, and 79 RQS. The Beddown added a total of 12 HH-60 helicopters, 10 HC-130 Fixed-wing cargo aircraft, and 1,059 personnel to Davis-Monthan AFB.

The Personnel Recovery mission requires distinct tasks and skills that involve frequent, repetitive training to maintain combat proficiency. Numerous ongoing training operations and activities were originally anticipated and analyzed as part of the 2002 EA, including:

1. Overwater training operations at an existing Water Training Area (WTA) off the coast of San Diego, California, utilizing sea dye markers, light sticks, and marine flares;
2. Sortie operations by HH-60 and HC-130 aircraft within the Sells Low Military Operations Area (MOA), Jackal Low MOA, 305 East and West Low Altitude Tactical Navigation (LATN) areas, portions of Barry M. Goldwater Range (BMGR) and associated Restricted Areas (R4) (R-2301E, R-2305, and R-2304), and the Yuma Tactical Aircrew Combat Training System (TACTS) Range (R-2301W);
3. Sortie operations within approved areas at BMGR and Yuma TACTS Range with chaff, self-protection flares, and illumination flares;
4. HH-60 weapons training operations within previously approved target areas at the BMGR (the northeastern corner of North Tactical [North TAC] Range of R-2301E and the East TAC Range of R-2304) involving M-18 smoke grenades and aircraft-mounted 7.62-millimeter and .50-caliber machine guns;
5. Aerial refueling operations between HH-60 and HC-130 aircraft in the Sells Low and Jackal Low MOAs; and

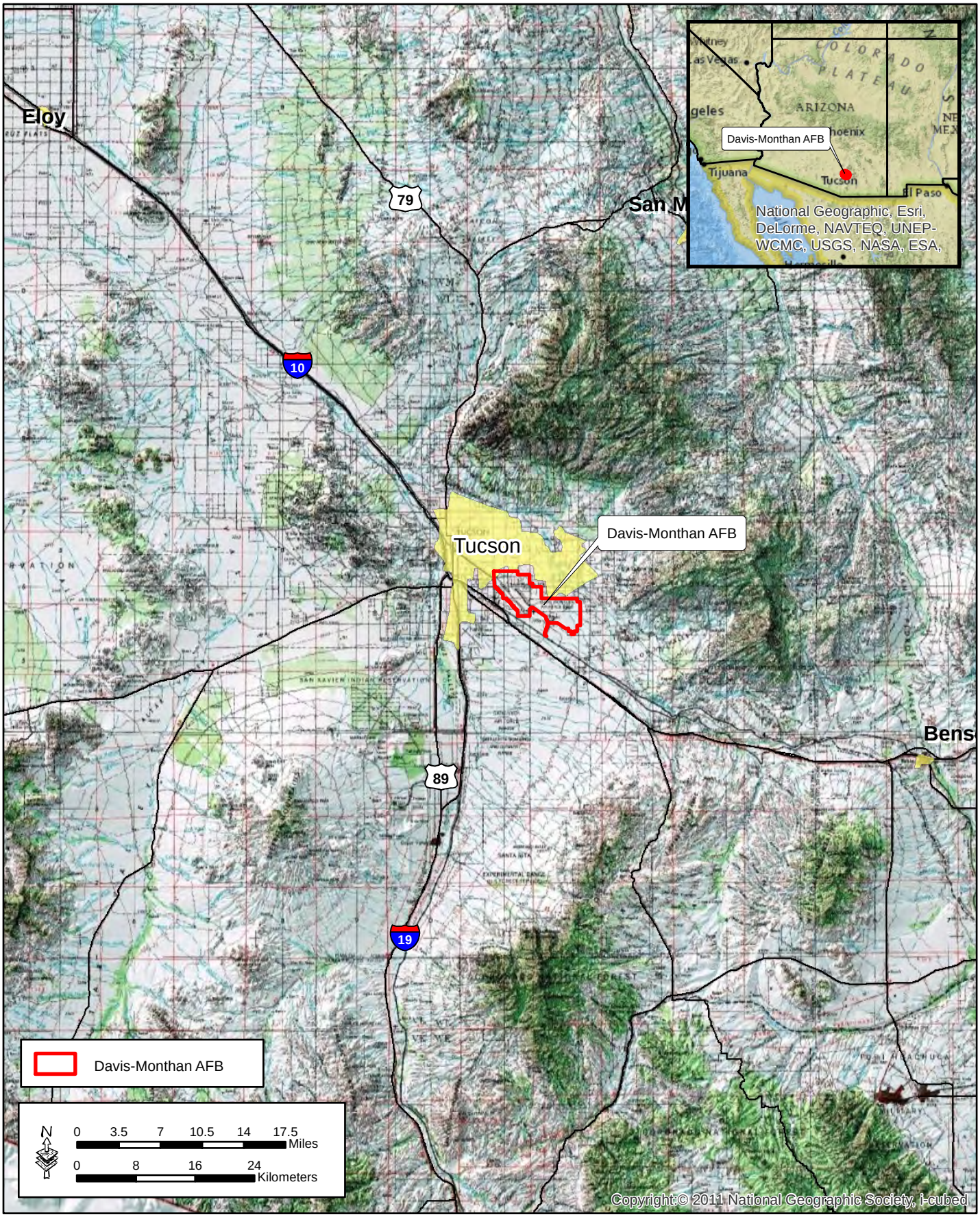

Figure 1-1. Project Vicinity Map

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July 2013

Ground and parachute training for CSAR personnel (i.e., Pararescue Jumpers [PJs]; CROs; and Survival, Evasion, Resistance, and Escape [SERE] specialists) within previously approved ranges, Drop Zones (DZs), Landing Zones (LZs), and Davis-Monthan AFB Combat Arms Training and Maintenance Support (CATMS) areas.

These ranges and airspace (except the WTA) are illustrated in Figure 1-2.

Since the completion of the CSAR Beddown in 2003, the 563 RQG has identified a need to increase the number of helicopter LZs (HLZs) and DZs to provide a more robust and realistic training scenario. This supplemental EA (SEA) will evaluate the potential environmental impacts of these proposed increases under various alternative scenarios. After analyzing the potential impacts, the Air Force will decide whether to implement the Proposed Action or to select the No Action Alternative. Approval of the Proposed Action would result in the lease and use of 20 additional non-Department of Defense (DoD) HLZ/DZs used by the 563 RQG. The SEA is tiered to the 2002 CSAR Beddown EA (Davis-Monthan AFB 2002). Details on the Proposed Action are presented in Section 2.0.

1.2 Purpose and Need

The purpose of the Proposed Action is to improve the personnel search and recovery training opportunities for the 563 RQG by increasing the number of HLZ/DZs available during a training event. The need is to ensure that an adequate number of HLZ/DZs are available in a variety of ecological conditions and elevations to simulate various rescue and recovery operations worldwide. Not all HLZ/DZs would necessarily be used during each training event.

1.3 Regulatory Framework

In December 1969, the U.S. Congress passed the National Environmental Policy Act (NEPA) (42 United States Code [U.S.C.] 4321 et seq.), which requires agencies of the Federal government to make information available on the environmental impacts of their proposed actions. These regulations are based on NEPA and Executive Orders (EO) 11514 and 11991, the Environmental Quality Improvement Act of 1970, as amended (42 U.S.C 4371 et seq.), and Section 309 of the Clean Air Act (CAA), as amended (42 U.S.C. 7609), which provide Presidential direction to Federal agencies to implement NEPA's regulations.

A decision on whether to proceed with the Proposed Action rests on numerous factors, such as mission requirements, schedule, availability of funding, and environmental considerations. In

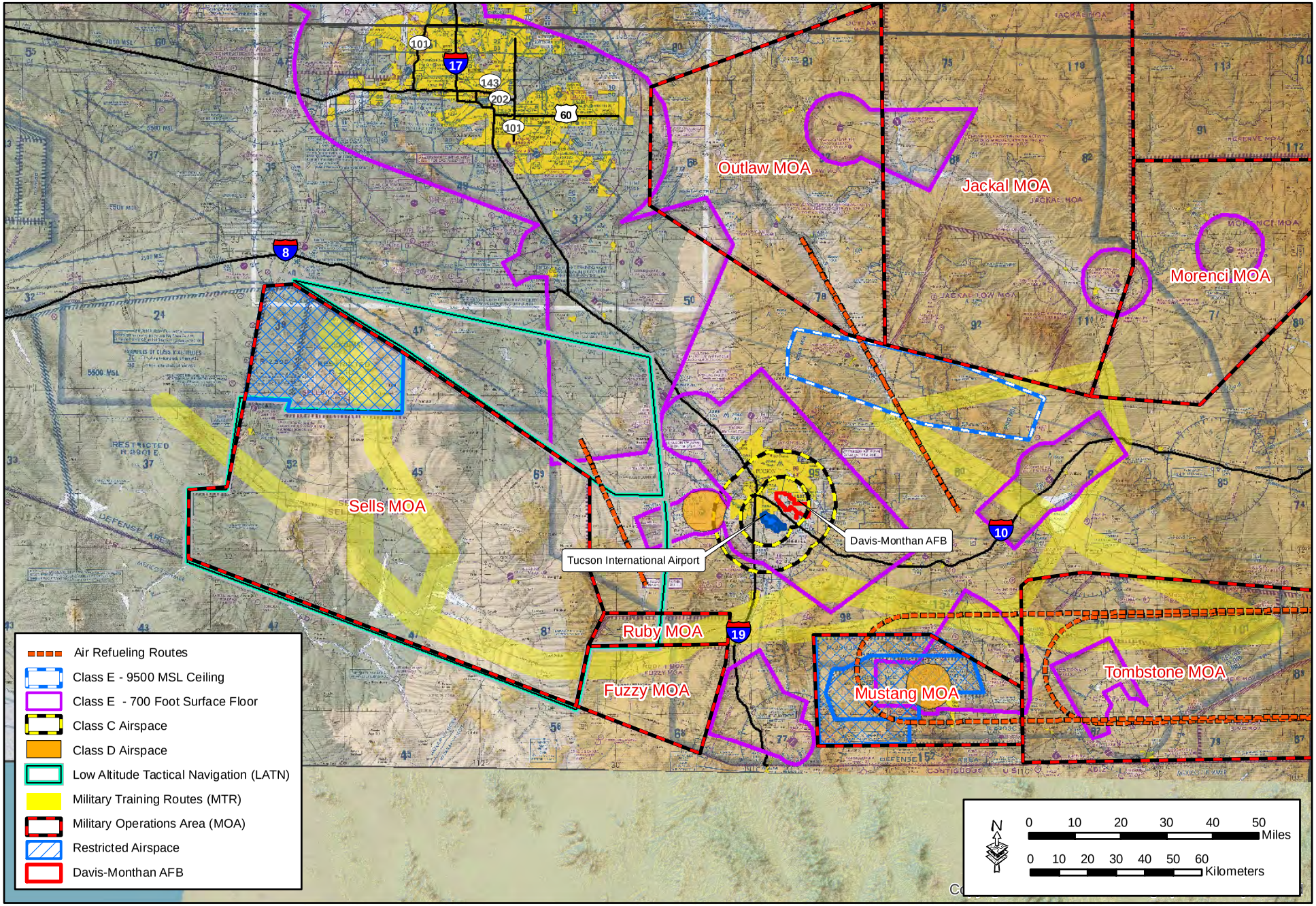

Figure 1-2. MTRs, ATCAAs, LATNs, and MOAs Used by Davis-Monthan AFB

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July 2013

addressing environmental considerations, the Air Force is guided by relevant statutes (and their implementing regulations) and EOs that establish standards and provide guidance on environmental and natural resources management and planning. This includes NEPA requirements, Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations [CFR] 1500-1508), and Air Force Instruction (AFI) 32-7061 codified in 32 CFR 989 (The Environmental Impact Analysis Process [EIAP]).

1.4 Public Involvement

The Air Force invites public participation in the NEPA process. Consideration of the views and information of all interested persons promotes open communication and enables better decision making. The Air Force set forth the Interagency/Intergovernmental Coordination for Environmental Planning (IICEP) as a scoping process that informs local, state, tribal, and Federal agencies of proposed projects. All agencies, organizations, and members of the public having a potential interest in the Proposed Action, including minority, low-income, disadvantaged, and Native American groups, are urged to participate in the decision-making process.

Public participation opportunities for the SEA and decision making on the Proposed Action are guided by 32 CFR Part 651. Upon completion, the SEA will be made available to the public for 30 days, along with a draft FONSI. At the end of the 30-day public review period, the Air Force will consider any comments submitted by individuals, agencies, or organizations on the SEA or the draft FONSI. Correspondence can be found in Appendix A. As appropriate, the Air Force may then execute the FONSI and proceed with implementation of the Proposed Action. If it is determined prior to issuance of a final FONSI that implementation of the Proposed Action would result in significant impacts, the Air Force will publish a Notice of Intent to prepare an Environmental Impact Statement (EIS) in the *Federal Register*, commit to mitigation actions sufficient to reduce impacts to less than significant levels, or not take the action.

Throughout this process, the public may obtain information on the status and progress of the Proposed Action and the SEA through the 355th Fighter Wing (355 FW), Public Affairs Office, by calling (520) 228-3398; written comments regarding the SEA must be sent in writing via e-mail to 355fw.pa.comment@us.af.mil, or by mail to: ATTN: Rescue SEA Comment, 355th Fighter Wing Public Affairs, 3405 S Fifth Street, Davis-Monthan AFB, Arizona 85707.

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SECTION 2.0
PROPOSED ACTION AND ALTERNATIVES

2.0 PROPOSED ACTION AND ALTERNATIVES

This section describes the Proposed Action and alternatives that will be carried forward for analysis in the SEA. The Proposed Action and any alternatives were evaluated based on their potential to satisfy the purpose and need, specifically to:

1. Provide realistic personnel search and rescue training for Air Force and other DoD units;
2. Ensure that an adequate number of HLZ/DZs are available during training events; and
3. Ensure that a wide variety of terrain types and elevations are available to provide realistic training.

The Proposed Action, which would completely satisfy the purpose and need, is discussed in Section 2.1. The No Action Alternative is described in Section 2.2, and although it would not satisfy the purpose and need, it will be carried forward for analysis as required by CEQ regulations.

2.1 Proposed Action

Under the Proposed Action, the Air Force would use an additional 20 identified sites in Arizona as HLZ/DZs during routine training events conducted by the 563 RQG (Figure 2-1 and Table 2-1). The existing HLZ/DZ sites currently used by Davis-Monthan AFB are also noted on Figure 2-1. The proposed sites are all located on Federal or state land and have been previously disturbed, according to the State Land Department. A special-use permit would be required from the affected land managers for use of the proposed sites, and would last for 2 years. Potential future sites, based on mission training requirements, could also be used through a special-use permit or lease. The 563 RQG is responsible for ensuring that the quantity of HLZ/DZ sites necessary is properly monitored. The number of potential future sites should be kept to a minimum, but should be sufficient to meet training requirements. The Air Force will perform appropriate environmental analyses on these future sites when, or if, they are identified.

The identified and potential future sites would range from 0.3 to 2.7 acres in size. No construction or ground disturbance would be expected at the identified or potential future sites. Some minor trimming of vegetation could occur along the perimeter of sites located within forested or scrub areas; this would be required for safety purposes to avoid contact with vegetation by helicopter blades.

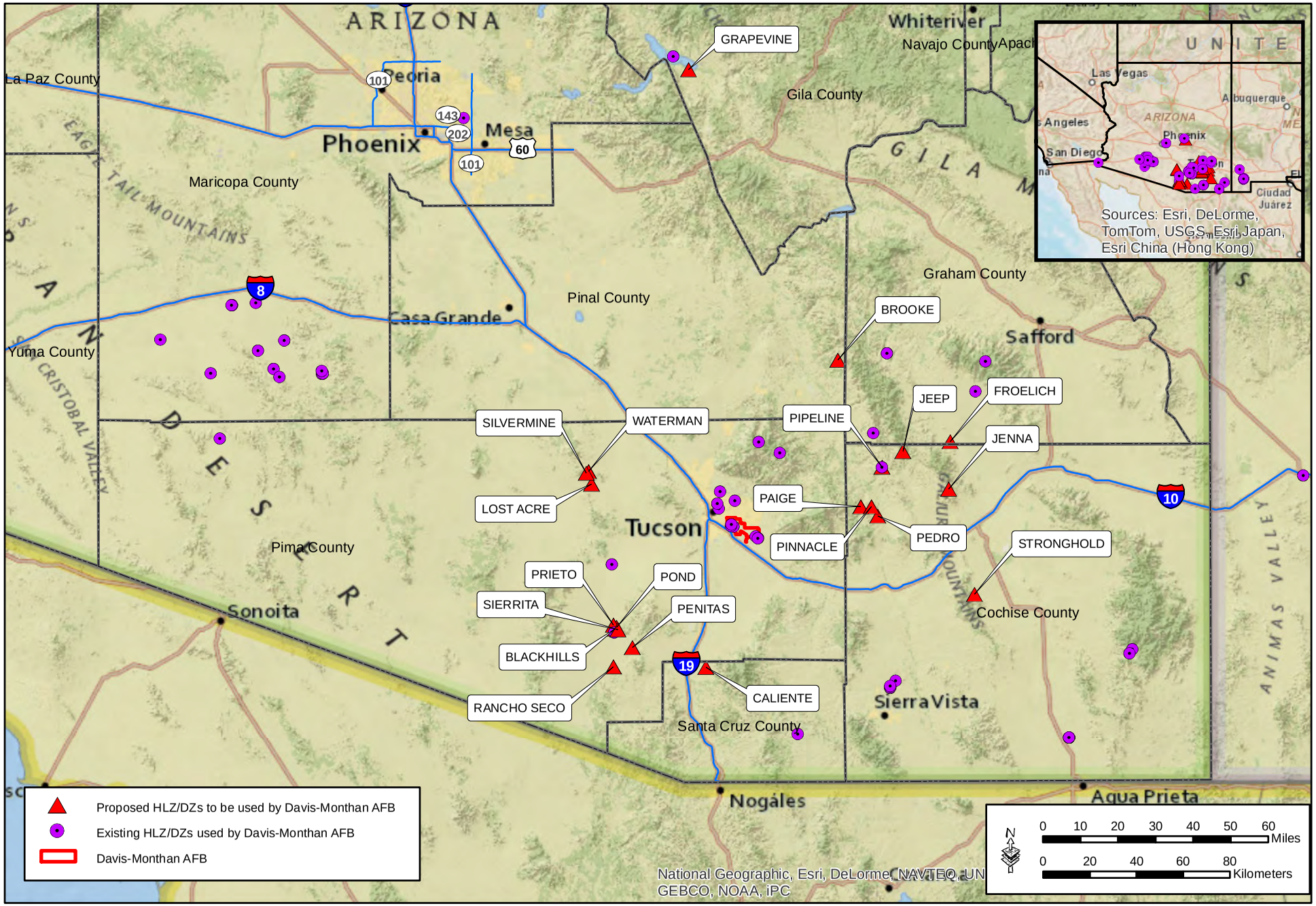

Figure 2-1. Location of HLZ/DZs

GSRC

July 2013

Table 2-1. Description of Proposed HLZ/DZ Sites

Name	Latitude	Longitude	County	Land Owner	Legal Description	UTM Coordinates	
						Easting	Northing
GRAPEVINE	33.646175	-111.057	Gila	U.S. Forest Service (Tonto National Forest)	Section 32, T4N, R13E	494716	3722927
BLACKHILLS	31.832697	-111.339	Pima	State of Arizona	Section 29, T18S, R10E	467889	3521942
BROOKE	32.707833	-110.483	Pinal	State of Arizona	Section 27, T8S, R18E	548439	3619016
CALIENTE	31.707727	-110.989	Santa Cruz	State of Arizona	Section 11, T20S, R13E	501034	3508040
FROELICH	32.443731	-110.05	Graham	State of Arizona	Section 25, T11S, R22E	589331	3590019
JEEP	32.411484	-110.232	Cochise	State of Arizona	Section 8, T12S, R21E	572222	3586307
JENNA	32.289333	-110.056	Cochise	State of Arizona	Section 24, T13S, R22E	588918	3572898
LOST ACRE	32.3055	-111.431	Pima	State of Arizona	Section 16, T13S, R9E	459472	3574380
PAIGE	32.2315	-110.395	Cochise	State of Arizona	Section 10, T14S, R19E	557046	3566257
PEDRO	32.202	-110.33	Cochise	State of Arizona	Section 20, T14S, R20E	563132	3563023
PENITAS	31.772718	-111.273	Pima	State of Arizona	Section 13, T19S, R10E	474150	3515276
PINNACLE	32.233221	-110.354	Cochise	State of Arizona	Section 12, T14S, R19E	560887	3566470
PIPELINE	32.360793	-110.314	Cochise	Bureau of Land Management	Section 28, T12S, R20E	564537	3580635
POND	31.838631	-111.334	Pima	State of Arizona	Section 29, T18S, R10E	468396	3522598
PRIETO	31.845048	-111.346	Pima	State of Arizona	Section 20, T18S, R10E	467284	3523312
RANCHO SECO	31.710028	-111.347	Pima	State of Arizona	Section 8, T20S, R10E	467143	3508348
SIERRITA	31.830667	-111.328	Pima	State of Arizona	Section 28, T18S, R10E	468946	3521714
SILVERMINE	32.341778	-111.451	Pima	State of Arizona	Section 32, T12S, R9E	457601	3578409
STRONGHOLD	31.946333	-109.956	Cochise	U.S. Forest Service (Coronado National Forest)	Section 24, T17S, R23E	598620	3534916
WATERMAN	32.34742	-111.442	Pima	State of Arizona	Section 32, T12S, R9E	458409	3579032

Each proposed HLZ/DZ site would potentially be used between 24 and 250 times annually; however, the training requirements would dictate the frequency of use for each site. The training events would include the use of the HC-130 cargo aircraft and HH-60 helicopters (Photographs 2-1 and 2-2). The HLZs would be used as a landing area for short field landing, hovering, and takeoff training for the HH-60 helicopters. During the

Photograph 2-1. HH-60 Pave Hawk Helicopter

training event, one to three helicopters would land and deploy search and rescue units or rescue participants who have been brought to the site. There would be no increase in sorties as analyzed in the 2002 CSAR EA; there would only be an increase in the number of HLZ/DZ sites available for use. No live fire would occur during these training events outside of established DoD ranges, such as the BMGR. Training missions would include nighttime flights; however, all activities would comply with the restrictions established by Davis-Monthan AFB. Detailed descriptions of how the training activities would be conducted are provided in the 2002 CSAR EA and are incorporated herein by reference.

Photograph 2-2. HC-130 Aircraft

The proposed HLZ/DZs are located throughout southern and central Arizona in a variety of settings and on state or Federal lands (see Figure 2-1 and Table 2-1). The sites range in size from 0.3 acre to 2.7 acres. The size and shape of each of the HLZ/DZs is largely contingent upon the landform and surrounding vegetation. The project site maps can be found in Appendix B. These maps provide an aerial photograph and the boundaries of the proposed HLZ/DZ sites. The plotted location of the Silvermine HLZ/DZ placed it in a steeply sloped and heavily vegetated area. A small, slightly sloping area devoid of vegetation that appears suitable for an HLZ/DZ was surveyed. However, several nearby locations that also have the likelihood to be used by a helicopter were surveyed as alternates (Appendix B, Figure 18). Approximately 23.5 acres were surveyed for natural and cultural resources as part of the EIAP.

2.1.1 Airspace

Numerous training airspaces, including RAs, MOAs, military training routes (MTR), and Air Traffic Control Assigned Airspace (ATCAA) are used by the 563 RQG throughout southern Arizona. The current training activities would not be increased and are within the capacity of existing airspace and ranges (see Figure 1-2), which have been previously assessed for environmental impacts. Only Class E and uncontrolled Class G airspace would be used along the flight path to access the Grapevine site.

Air traffic is coordinated with the Federal Aviation Administration (FAA), which maintains staff at Davis-Monthan AFB, and each MOA scheduling agency also has a separate Letter of Agreement with the Albuquerque Air Route Traffic Control Center (ARTCC). Aerial refueling routes typically used by Air Force units are VF-259, -260, -263, and -268/7/9. The Personnel Recovery aircraft would typically use the A-10 LATN area to transit to/from Davis-Monthan AFB and BMGR. All aircraft using this LATN must follow the rules described in Davis-Monthan AFB Base Instruction 11-250. Competition for this airspace is stringent, but because the airspace is so vast (1.05 million acres), scheduled flights are well below the capacity. Because of the frequent use of the BMGR for training that includes munitions delivery, scheduling range use could become a limiting factor in the future. Table 2-2 lists the airspace and altitude restrictions available for training operations at Davis-Monthan AFB.

Table 2-2. Annual Training Airspace Near Davis-Monthan AFB

Airspace Unit	Floor (feet)	Ceiling (feet)	Scheduling Office
Outlaw MOA/ATCAA	8,000 AMSL	FL510	162 FW (ANG)
Jackal MOA/ATCAA	11,000 AMSL	FL510	162 FW (ANG)
Jackal Low MOA	100 AGL	10,999 AMSL	162 FW (ANG)
Reserve MOA/ATCAA	5,000 AGL	FL510	162 FW (ANG)
Morenci MOA/ATCAA	1,500 AGL	FL510	162 FW (ANG)
Tombstone A MOA	500 AGL	14,499 AMSL	355 FW (Davis-Monthan AFB)
Tombstone B MOA	500 AGL	14,499 AMSL	355 FW (Davis-Monthan AFB)
Tombstone C MOA/ATCAA	14,500 AMSL	FL510	355 FW (Davis-Monthan AFB)
Mustang (R-2303B)	8,000 AMSL	FL300	Fort Huachuca
Ruby MOA/ATCAA	10,000 AMSL	FL510	162 FW (ANG)
Fuzzy MOA	100 AGL	9,999 AMSL	162 FW (ANG)
Sells Low MOA	3,000 AGL	9,999 AMSL	56 FW (Luke AFB)
Sells MOA/ATCAA	10,000 AMSL	FL510	56 FW (Luke AFB)
R-2301E (NTAC/STAC/A-A)	Surface	FL800	56 FW (Luke AFB)
R-2304 (ETAC)	Surface	FL240	56 FW (Luke AFB)
R-2305	Surface	FL240	56 FW (Luke AFB)
AR-613	16,000 AMSL	FL280	355 FW (Davis-Monthan AFB)
AR-639	16,000 AMSL	FL280	355 FW (Davis-Monthan AFB)
AR-639A	13,000 AMSL	FL280	355 FW (Davis-Monthan AFB)
AR-647	10,000 AMSL	FL290	56 FW (Luke AFB)

AGL=Above Ground Level, FL=Flight Level (altitude in 100 feet), AMSL=Above Mean Sea Level, ANG=Air National Guard
NTAC=North Tactical Range, STAC=South Tactical Range, ETAC=East Tactical Range

2.2 No Action Alternative

The No Action Alternative typically describes the baseline of current operations that will be compared against the Proposed Action. The No Action Alternative would not increase the number of sites available for training. Consequently, this alternative would not satisfy the purpose and need; however, it will be carried forward for analysis, as required by CEQ, and will form the basis for analysis of the other alternatives. For purposes of the SEA, the level of training missions to be assessed under the No Action Alternative would be that described as the Proposed Action in the 2002 CSAR EA.

2.3 Summary of Impacts

Potential environmental impacts of the Proposed Action would be those associated with the increase in the number of HLZ/DZs in order to provide a more robust and realistic training scenario. Specifically, an additional 20 identified sites in Arizona would be used as HLZ/DZs during routine training events conducted by the 563 RQG. Table 2-3 presents a summary of the impacts expected to occur under each alternative. These impacts are described in more detail in Section 4.0 of this SEA.

Table 2-3. Summary of Impacts

Resource	No Action Alternative	Proposed Action
Airspace	No additional impacts on airspace.	Impacts would be considered negligible, and there would be no significant impacts on airspace operations, airspace, or civilian aviation.
Land Use Resources	No additional impacts on land use resources.	The use of the Grapevine and Stronghold HLZ/DZ sites would impact the land use and visual resources of the surrounding area due to noise and visual impacts. Due to these impacts, the Grapevine and Stronghold sites will be removed from the list of proposed HLZ/DZ sites and will not be used during routine training events conducted by the 563 RQG. The land use and visual resources impacts would be considered minor, and implementation of the Proposed Action would not have a significant impact.
Air Quality	No additional impacts on air quality.	Overall, the maximum net increases in air emissions would be minor and well below the *de minimis* thresholds; therefore, the direct and indirect impacts on air quality would not be significant.
Noise	No additional increase in noise or noise impacts.	The training activities would potentially create Sound Exposure Levels (SELs) in excess of 85 A-weighted decibels (dBA) on the Coronado National Forest near Jenna HLZ/DZ, receptors (campsites) near Grapevine HLZ/DZ, and residential/recreational receptors and Coronado National Forest adjacent to the Stronghold HLZ/DZ. Due to these impacts, the Grapevine and Stronghold sites will be removed from the list of proposed HLZ/DZ sites and will not be used during routine training events conducted by the 563 RQG. During training use, low-flying flight patterns over the Coronado National Forest north of the Jenna HLZ/DZ will be avoided so that the 85 dBA threshold is not exceeded over the USFS lands. The training personnel will be advised of this requirement prior to each training mission using the Jenna HLZ/DZ. With these implementations, the noise impacts would be considered minor to moderate, and no significant impacts would occur.
Socioeconomics and Environmental Justice	No additional impacts on socioeconomics or environmental justice.	Use of the Stronghold HLZ/DZ would cause noise impacts on the residences in the area when flights occur. The increased noise levels would also impact the ability of the U.S. Forest Service (USFS) to rent the "Rooms with a View" cabins nearby. The Grapevine Group Campground would receive noise impacts during flights associated with personnel recovery training. Substantial and frequent use of the site could cause campers to seek other locations instead of the Grapevine site, thereby impacting use and revenues. Due to these impacts, the Grapevine and Stronghold sites will be removed from the list of proposed HLZ/DZ sites and will not be used during routine training events conducted by the 563 RQG. There are no socioeconomic impacts associated with the remaining HLZ/DZ sites and no significant impacts would occur. There would be no disproportionately adverse impacts on minority or low-income populations or children.
Biological Resources	No additional impacts on biological resources.	The Federally Endangered Pima pineapple cactus (*Coryphantha scheeri var. robustispina)* and Federally Endangered lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae)* food sources such as saguaro (*Carnegiea gigantean)* and Palmer's agave (*Agave palmeri*) were found at some of the HLZ/DZ sites and would be avoided during training events and use of the HLZ/DZ sites. The Air Force has determined that the Proposed Action may affect, but is not likely to adversely affect, the jaguar, ocelot, lesser long-nosed bat, and Pima pineapple cactus. The Proposed Action would not result in any significant impacts on protected species or designated Critical Habitats.

Table 2-3, continued

Resource	No Action Alternative	Proposed Action
Water Resources	No additional impacts on water resources.	Since no construction activities would occur and only minimal ground-disturbing activities would take place during landing and takeoff, the training activities would have no appreciable effects on the groundwater or surface waters in the region of influence. Impacts on surface waters and groundwater at the proposed HLZ/DZ sites would be considered insignificant. There would be no significant impacts on floodplains, wetlands, or waters of the U.S.
Hazardous Materials and Waste	No additional hazardous materials and waste impacts.	All 20 currently identified HLZ/DZ sites were visually surveyed for evidence of soil staining, drums, or other material that might cause contamination issues and no sites were noted to have any visible concerns. The likelihood for leaks or unscheduled maintenance of helicopters is minimal. Hazardous materials and waste impacts at the proposed HLZ/DZ sites would be insignificant.
Cultural Resources	No additional impacts on cultural resources.	Two new and previously unidentified archaeological sites were identified at the Pedro and Paige HLZ/DZ sites. Davis-Monthan AFB recommends both sites as eligible for the National Register of Historic Places (NRHP) under Criterion D for their research potential. Both sites have been removed from the list of proposed HLZ/DZ training sites to prevent adverse effects on both properties by activities associated with the personnel recovery training. The results of the surveys showed that the remaining 18 of the 20 HLZs had no cultural resources within the HLZ/DZs. No adverse effects due to visual or noise intrusions from overflights would occur on NRHP-eligible or listed archaeological resources, architectural resources, or traditional cultural properties. The Arizona SHPO concurred with the finding of No Adverse Effect in a letter dated July 12, 2013 (Appendix A).
Earth Resources	Minor impacts on soils due to increased use of existing HLZ/DZ sites.	There would be no impacts on geology or the topography of the project area. No construction or significant ground disturbance would be expected at the sites. The use of HH-60 helicopters would impact soils during takeoff and landing due to erosion from propeller wash and would potentially be a greater concern for HLZ/DZs sited near stream banks. However, the training events at these sites would be temporary and intermittent, and the soil disturbance would primarily occur in previously disturbed areas. Dust control methods could be utilized and impacts on soils would be considered minor.
Safety and Occupational Health	No additional increase in safety hazards or occupational health would be expected.	There would be no significant safety hazards or occupational health impacts associated with the Proposed Action.

SECTION 3.0
AFFECTED ENVIRONMENT

3.0 AFFECTED ENVIRONMENT

This section presents information on environmental conditions for resources potentially affected by the Proposed Action and alternatives described in Chapter 2.0. Under NEPA, the analysis of environmental conditions should address only those areas and environmental resources with the potential to be affected by the proposed alternatives; locations and resources with no potential to be affected are not required to be analyzed. The environment includes the natural environment, as well as the socioeconomic, cultural, and physical resources associated with the human environment.

In the EIAP, the resources analyzed are identified and the expected geographic scope of potential impacts, known as the region of influence (ROI), is defined. For the implementation of the proposed Personnel Recovery training sites, the ROI is the area immediately surrounding Davis-Monthan AFB and Cochise, Gila, Graham, Pima, Pinal, and Santa Cruz counties.

3.1 Airspace

The ROI for the Proposed Action and alternatives includes airspace in and around Davis-Monthan AFB, Arizona, including MOAs and restricted areas reserved for military aircraft operations around Tucson, Arizona. The FAA is responsible for managing airspace through a system of flight rules and regulations, airspace management actions, and Air Traffic Control (ATC) procedures. The FAA accomplishes this through close coordination with state aviation and airport planners, military airspace managers, and other entities to determine how airspace can be used most effectively to serve all interests. All aircraft are subject to Federal Aviation Regulations (FARs).

The FAA has designated four types of airspace above the U.S.: controlled, uncontrolled, special-use, and other. The categories and types of airspace are dictated by the complexity or density of aircraft movements, the nature of the operations conducted within the airspace, the level of safety required, and National and public interest in the airspace. The ROI for the preferred alternative includes controlled airspace (Davis-Monthan AFB), special-use airspace used for military aircrew training (e.g., MOAs), and other (e.g., controlled and uncontrolled airspace represented by LATN areas). A description of the types of airspace designated by the FAA can be found in Appendix C. The location of the proposed HLZ/DZ sites within airspace used by Davis-Monthan AFB can be found on Figure 3-1.

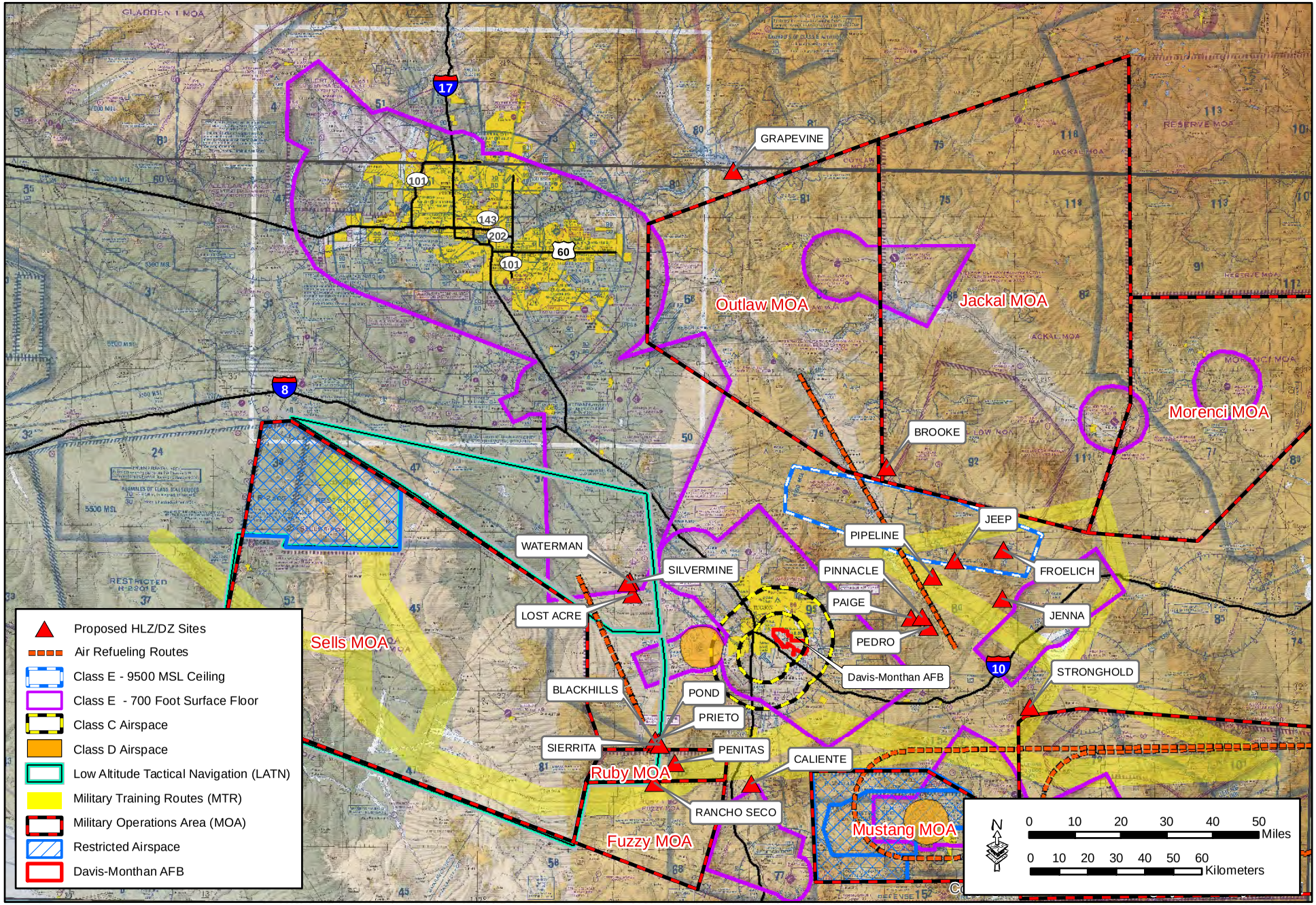

Figure 3-1. Location of the Proposed HLZ/DZ Sites within the Airspace used by Davis-Monthan AFB

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July 2013

The airspace surrounding Davis-Monthan AFB was previously described in the 2002 EA for the CSAR Beddown, and that description and discussion is incorporated here by reference (Davis-Monthan AFB 2002).

3.2 Land Use Resources

Generally land use refers to how land is or may be utilized or developed, whether for commercial, industrial, residential, agricultural, or recreational purposes, or as open space. Land ownership is land categorization according to the type of owner. Some major land ownership categories include Federal, state, American Indian, and private. Under this section of the SEA, land use, visual resources, and transportation would be evaluated; however, as transportation for the Proposed Action deals primarily with HC-130 cargo aircraft and HH-60 helicopter use, aerial transportation will be discussed under Airspace (Section 3.1) and the noise associated with the aerial use will be discussed under Noise (Section 3.4). As such, transportation will not be further discussed in this section of the SEA.

3.2.1 Land Use

The 20 proposed HLZ/DZ sites are all located on Federal or state land and have been previously disturbed. The project areas for the Proposed Action consist of public lands in Santa Cruz, Pima, Pinal, Gila, Graham, and Cochise counties (see Table 2-1). The Federal and state lands would be leased by the Air Force for personnel recovery training use.

Davis-Monthan AFB is located at the southeastern edge of Tucson in Pima County, Arizona, and occupies approximately 10,633 acres. The areas north, south, and west of the base are urbanized; the areas to the east and southeast are more sparsely developed. Davis-Monthan AFB is primarily within the boundaries of the City of Tucson except for areas to the south that border unincorporated areas within Pima County. Approximately half of the proposed HLZ/DZ sites are situated northeast and southeast of Davis-Monthan AFB and half are found northwest and southwest of the base (see Figure 2-1). One site, Grapevine, is located north of Davis-Monthan AFB. The proposed HLZ/DZ sites and any potential future sites would range in size from 0.3 to 2.7 acres.

Seventeen of the 20 proposed HLZ/DZ sites are located in lands owned by the State of Arizona. All State of Arizona lands have been used historically as rangeland for cattle. One site, Pipeline, is located on lands owned by the Bureau of Land Management (BLM) and two sites

(Grapevine and Stronghold) are located within U.S. Forest Service (USFS) lands. All actions at sites located within the U.S. Department of the Interior lands must conform to an existing land use plan, and the 563 RQG is required to have special-use permits for the three sites located on USFS land and BLM land. All state lands also require a special-use permit.

The two sites located on USFS lands (Grapevine and Stronghold) are located within publicly used recreational areas as described below.

Stronghold HLZ/DZ

The Stronghold HLZ/DZ is located in Cochise County within the USFS Coronado National Forest in an area that is used for recreation and also contains a number of private homes. The site is located at a helispot that is currently used by the USFS for search and rescue in the Cochise-Stronghold Canyon. The helispot was moved to this location between 2008 and 2009 on land that had recently been donated to the Coronado National Forest. The helispot was located in a pasture adjacent to the recently donated house, which, along with a second house approximately 1 mile to the south, is part of the "Rooms with a View" cabin rental program (USFS 2013b). These cabins provide income to the USFS that is used for upkeep and maintenance. One of the cabins, known as the Half Moon Ranch cabin, is within 200 feet of the proposed Stronghold HLZ/DZ. A bat conservation group and the USFS recently invested in the construction of a new wildlife pond, and as a result of this permanent water source, Half Moon Ranch has become more popular with bird watchers (USFS 2013a).

The other cabin, known as the Shaw House, has been determined eligible for the National Register of Historic Places (NRHP). Funds from its rental are used for required maintenance and preservation. Both cabins have corrals and allow visitors to have up to six horses or mules. The trailhead for an equestrian trail is located between the two cabins (USFS 2013b).

Several private homes are also located within 1 mile south of the proposed HLZ/DZ off West Ironwood Road and West Hunt Road. At least four homes are occupied year-round, and at least two additional homes are weekend/holiday residences (USFS 2013b).

Other recreation-related uses near the site include the Broken Arrow Baptist Church Camp, associated with Broken Arrow Baptist Church in Pearce, Arizona, which is located approximately 0.75 mile north of the Stronghold HLZ/DZ, and the Cochise Stronghold

Campground, operated by the Coronado National Forest, which is located approximately 2,000 feet south of the site. The campground is closed annually from June 1st through September 1st. There is also dispersed camping throughout the area. The USFS noted that West Ironwood Road, which runs along the side of the Stronghold site, is the only entrance and exit to the Cochise Stronghold Canyon (USFS 2013b). In addition, USFS has issued special-use permits to 99 groups. Seventy permit holders are classified as Outfitter and Guides [hiking, bird watching, rock climbing, eco-tours, etc.], 22 are researchers [non-disturbing], and 7 are archaeological companies (USFS 2013c).

Grapevine HLZ/DZ

The Grapevine HLZ/DZ is located in Gila County in the Tonto National Forest just south of the Theodore Roosevelt Lake near an area that is used for recreation. A group campground, a public boat launch, and an airstrip used by aviators' clubs in the region are located within 1 mile of the proposed site.

The Grapevine Group Campground is located approximately 3,000 feet from the proposed HLZ/DZ. The Grapevine Group Campground offers year-round camping, including utility hookups, grills, and covered picnic areas, at each of the 10 group units. The busy season is October through April, with October and April being the busiest months. Use of the campsites from May through September is sporadic due to high temperatures (USFS 2013d).

The Grapevine public boat launch is located approximately 0.5 mile from the Grapevine site and receives regular public use throughout the year (USFS 2013d).

The Grapevine air strip is located south of and connects to the Grapevine HLZ/DZ. The aviators' clubs use the strip regularly, maintain the airstrip, and have recently discussed resurfacing parts of the strip. They hold "Fly-ins," which are well-organized events and occur the third weekend of every month between October and May, arriving on Thursdays and staying through the weekend. The "Fly-ins" are not held during the summer (June through September) (USFS 2013d).

3.2.2 Visual Resources

Visual resources are the natural and man-made features that form the aesthetic qualities of an area. These features form the overall impression that an observer receives of an area or its

landscape character. The project areas are visited for their natural setting and aesthetic values and include the Tonto and Coronado National Forests.

The terrain in and around the 20 proposed sites varies from flat to sloping with alluvial washes typical of Sonoran desert topography. Some sites are located on nearby hills and mountainous foothills. Scenic mountain ranges are interspersed and visible from many of the 20 proposed sites. The San Pedro and Santa Cruz river valleys are prized for their natural beauty and are used by recreationists for many activities including birding, camping, and hiking. Many areas around the proposed sites are open to the public for recreational purposes, and access is authorized by permit on a near-continuous basis.

The proposed Grapevine site is within the Tonto National Forest. It is approximately 0.5 mile south of Theodore Roosevelt Lake and approximately 3.5 miles north of the Superstition Wilderness Area within the Tonto National Forest. The Tonto National Forest is the fifth largest forest in the U.S. and is one of the most visited “urban” forests (USFS 2013e). The Tonto National Forest covers rugged and unique areas, ranging from cactus-studded desert to pine-forested mountains (USFS 2013e).

The proposed Stronghold site is within the Coronado National Forest in the northeastern portion of the Dragoon Mountains. The Coronado National Forest “Rooms with a View” Half Moon Ranch is located less than 200 feet from the northeastern portion of the Stronghold site. The Coronado National Forest offers visitors hiking, scenic driving, fishing, and wildlife viewing opportunities. The Coronado National Forest also offers scenic alpine and sub-alpine forests and several peaks over 7,000 feet AMSL, including the Dragoon Mountains, one of the isolated “sky island” ranges in the area, which offer visitors sweeping views of the Sonoran Desert and foothills below.

3.3 Air Quality

The U.S. Environmental Protection Agency (USEPA) established National Ambient Air Quality Standards (NAAQS) for specific pollutants determined to be of concern with respect to the health and welfare of the general public. Ambient air quality standards are classified as either "primary" or "secondary." The major pollutants of concern, or criteria pollutants, are carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), ozone (O_3), particulate matter less than 10 microns (PM-10), particulate matter less than 2.5 microns (PM-2.5), and lead. NAAQS

represent the maximum levels of background pollution that are considered safe, with an adequate margin of safety, to protect the public health and welfare. The NAAQS are included in Table 3-1.

Table 3-1. National Ambient Air Quality Standards

Pollutant	Primary Standards		Secondary Standards	
	Level	Averaging Time	Level	Averaging Times
Carbon Monoxide	9 ppm (10 mg/m^3)	8-hour [1]	None	
	35 ppm (40 mg/m^3)	1-hour [1]		
Lead	0.15 µg/m^3 [2]	Rolling 3-Month Average	Same as Primary	
	1.5 µg/m^3	Quarterly Average	Same as Primary	
Nitrogen Dioxide	53 ppb [3]	Annual (Arithmetic Average)	Same as Primary	
	100 ppb	1-hour [4]	None	
Particulate Matter (PM-10)	150 µg/m^3	24-hour [5]	Same as Primary	
Particulate Matter (PM-2.5)	15.0 µg/m^3	Annual [6] (Arithmetic Average)	Same as Primary	
	35 µg/m^3	24-hour [7]	Same as Primary	
Ozone	0.075 ppm (2008 std)	8-hour [8]	Same as Primary	
	0.08 ppm (1997 std)	8-hour [9]	Same as Primary	
	0.12 ppm	1-hour [10]	Same as Primary	
Sulfur Dioxide	0.03 ppm	Annual (Arithmetic Average)	0.5 ppm	3-hour [1]
	0.14 ppm	24-hour [1]		
	75 ppb [11]	1-hour	None	

Source: USEPA 2013a at http://www.epa.gov/air/criteria.html

Units of measure for the standards are parts per million (ppm) by volume, parts per billion (ppb - 1 part in 1,000,000,000) by volume, milligrams per cubic meter of air (mg/m^3), and micrograms per cubic meter of air (µg/m^3).

[1] Not to be exceeded more than once per year.

[2] Final rule signed October 15, 2008.

[3] The official level of the annual NO_2 standard is 0.053 ppm, equal to 53 ppb, which is shown here for the purpose of clearer comparison to the 1-hour standard

[4] To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 100 ppb (effective January 22, 2010).

[5] Not to be exceeded more than once per year on average over 3 years.

[6] To attain this standard, the 3-year average of the weighted annual mean PM-2.5 concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m3.

[7] To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/m3 (effective December 17, 2006).

[8] To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average O_3 concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm (effective May 27, 2008).

[9] (a) To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average O_3 concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.

(b) The 1997 standard—and the implementation rules for that standard—will remain in place for implementation purposes as USEPA undertakes rulemaking to address the transition from the 1997 O_3 standard to the 2008 O_3 standard.

(c)USEPA is in the process of reconsidering these standards (set in March 2008).

[10] (a)USEPA revoked the 1-hour O_3 standard in all areas, although some areas have continuing obligations under that standard ("anti-backsliding").

(b) The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is $\leq$ 1.

[11] (a) Final rule signed June 2, 2010. To attain this standard, the 3-year average of the 99th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 75 ppb.

Counties that do not meet these NAAQS standards are called non-attainment areas; counties that meet both primary and secondary standards are known as attainment areas. The Federal Conformity Final Rule (40 CFR Parts 51 and 93) specifies criteria and requirements for conformity determinations for Federal projects. The Federal Conformity Rule was first promulgated in 1993 by the USEPA, following the passage of Amendments to the CAA in 1990. The rule mandates that a conformity analysis be performed when a Federal action generates air pollutants in a region that has been designated a non-attainment or maintenance area for one or more NAAQS.

A conformity analysis is the process used to determine whether a Federal action meets the requirements of the General Conformity Rule. It requires the responsible Federal agency to evaluate the nature of a proposed action and associated air pollutant emissions and calculate emissions that may result from the implementation of the Proposed Action. If the emissions exceed established limits, known as *de minimis* thresholds, the proponent is required to perform a conformity determination and implement appropriate mitigation measures to reduce air emissions.

The USEPA and Arizona Department of Environmental Quality (ADEQ) monitor air emissions by county. The HLZ/DZ sites are located in six counties in Arizona. Table 3-2 presents the attainment status of each of the six counties. Nine of the 20 HLZ/DZs are located in Pima County, seven are located in Cochise County, and one each in Gila, Pinal, Santa Cruz, and Graham counties.

Table 3-2. Proposed Personnel Recovery HLZ/DZ Sites and County Attainment Status

County	Attainment Status in County
Cochise	Non-attainment for PM-10, Moderate
Gila	Non-attainment for PM-10, Moderate
Graham	In attainment for all NAAQS
Pinal	Non-attainment for 8-hour O_3, SO_2, PM-2.5, PM-10, Moderate
Pima	Non-attainment for PM-10, Moderate
Santa Cruz	Non-attainment for PM-10 and PM-2.5, Moderate

Source: USEPA 2013b.

Greenhouse Gases and Climate Change

Global climate change refers to a change in the average weather on the earth. Greenhouse gases (GHGs) are gases that trap heat in the atmosphere. The GHGs covered by EO 13514 are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbon (HFC), perfluorocarbons, and sulfur hexafluoride. These GHGs have varying heat-trapping abilities and atmospheric lifetimes. CO_2 equivalency (CO_2e) is a measuring methodology used to compare the heat-trapping impact from various GHGs relative to CO_2. Some gases have a greater global warming potential than others. Nitrogen oxides (NO_x), for instance, have a global warming potential that is 310 times greater than an equivalent amount of CO_2, and CH_4 is 21 times greater than CO_{2e}.

GHG Threshold of Significance

The CEQ drafted guidelines for determining meaningful GHG decision-making analysis. The CEQ guidance states that if the project would be reasonably anticipated to cause direct GHG emissions of 25,000 metric tons (27,557 U.S. tons) or more of CO_2 on an annual basis, agencies should consider this a threshold for decision makers and the public. CEQ does not propose this as an indicator of a threshold of significant effects, but rather as an indicator of a minimum level of GHG emissions that may warrant some description in the appropriate NEPA analysis for agency actions involving direct emissions of GHG (CEQ 2010).

3.4 Noise

Noise is generally described as unwanted sound, which can be based either on objective effects (i.e., hearing loss, damage to structures) or subjective judgments (e.g., community annoyance). Human response to noise can vary according to the type and characteristic of the noise source, the distance between the noise source and the receptor, the sensitivity of the receptor, and the time of day. Sound is usually represented on a logarithmic scale with a unit called the decibel (dB). Thus, a 10 dB increase in noise corresponds to a 100 percent increase in the perceived sound. Under most conditions, a 5 dB change is necessary for noise increase to be noticeable. The threshold of human hearing is approximately 0 dB, and the threshold of discomfort or pain is around 120 dB (USEPA 1972).

Noise levels are computed over a 24-hour period and represented as day-night average sound level (DNL). The DNL noise metric incorporates a “penalty” for nighttime noise events occurring between the hours of 10:00 p.m. and 7:00 a.m. to account for increased annoyance. DNL is the

community noise metric recommended by the USEPA and has been adopted by most Federal agencies (USEPA 1974). Examples of public responses (i.e., annoyance) to various noise levels are presented in Figure 3-2. A DNL of 65 dBA (A-weighted decibels) is the level most commonly used for noise planning purposes and represents a compromise between community impact and the need for activities like construction. Areas exposed to a DNL above 65 dBA are generally not considered suitable for residential use. A DNL of 55 dBA was identified by USEPA as a level below which there is no adverse impact (USEPA 1974).

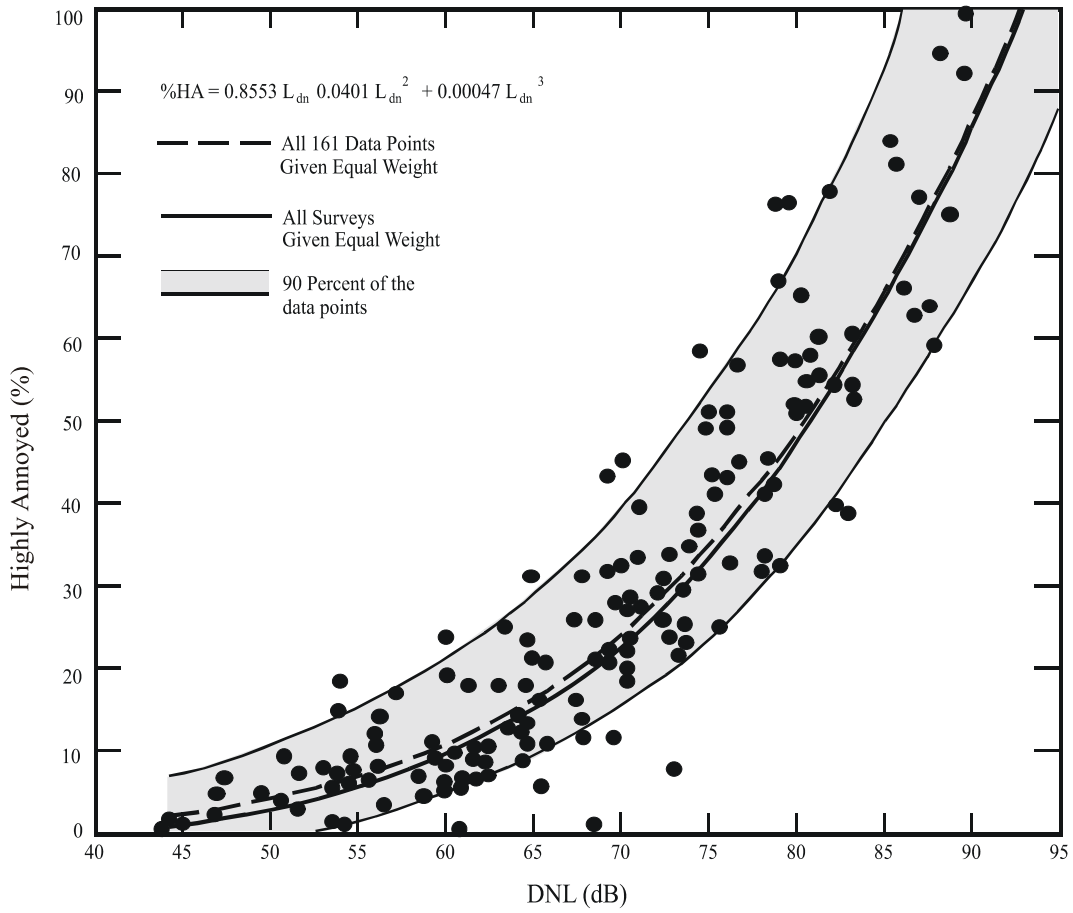

Figure 3-2. Public Annoyance from Noise Exposure (from Shultz 1978)

The Air Force adopted noise policy to promote the health, safety, and welfare of persons in the vicinity of installations affected by long-term aircraft noise (DoD Instruction [DoDI] 2011a). The regulation provides the managers of the installations with guidelines regarding land use compatibility. Residential land uses are discouraged within the 65 to 69 dBA DNL noise contour and strongly discouraged in 70 to 74 dBA DNL noise contour. Table 3-3 presents the guidance policy for a variety of land uses found near Davis-Monthan AFB.

Table 3-3. Air Force Noise Policy (DoDI 4165.57)
Noise DNL and Land Use Compatibility

Land Use	Noise Zones (dBA DNL)			
	65-69	70-74	75-79	80-84
Residential: single units, condos, apartments	No[1]	No[1]	No	No
Educational Services (schools)	No	No	No	No
Nature Exhibits	Yes*	No	No	No
Parks	Yes	No	No	No
Agriculture	Yes*	Yes*	No	No
Livestock farming	Yes*	Yes*	No	No
Forestry	Yes*	Yes*	Yes*	Yes

Source: DoDI 2011a.
Key:
Yes - Land use and related structures are compatible without restriction.
No - Land use and related structures are not compatible and should be prohibited.
***** - Land use is generally compatible with some restrictions.
[1] - Land use is generally not compatible, but can be mitigated.

The DNLs produced by the proposed training aircraft at various altitudes are presented in Table 3-4. The managers of air installations are encouraged to work with local governments to discourage residential developments within the 65 to 69 DNL noise contours, and strongly discourage such developments within the 70 to 74 DNL noise contours.

Table 3-4. Maximum DNLs under the Flight Track at Various Altitudes

Aircraft	Airspeed (mph)	DNL and Altitude (feet) AGL*				
		500	1,000	2,000	5,000	10,000
HH-60	70	49	44	39	30	22
HC-130	170	62	56	50	40	31

Source: SELCalc2 Flyover Noise Model. mph = miles per hour
*Includes three daytime and one night takeoff and landing in 24-hour period.

A single-event noise, such as an overflight, is described by the sound exposure level (SEL). The SELs produced by the proposed training aircraft at various altitudes are presented in Table 3-5. These levels could produce hearing loss if a person were exposed to such noise for long durations (e.g., constant levels over several hours). Other physiological issues, including stress, could also occur if persons or wildlife were constantly exposed to levels this high or for long periods. Of course, many variables can affect SEL, including atmospheric conditions, power settings, aircraft airspeed, and attitude of the aircraft, and the engine fan speed and turbine inlet temperature.

Table 3-5. Maximum SELs under the Flight Track at Various Altitudes

Aircraft	Airspeed (mph)	SEL and Altitude (feet) AGL*				
		500	1,000	2,000	5,000	10,000
HH-60	70	90	82	78	68	60
HC-130	170	95	90	84	75	68

Source: SELCalc2 Flyover Noise Model.

Affected Environment

Most of the new HLZ/DZs are located in remote, rural areas far from sensitive noise receptors (greater than 1 mile). Exceptions include the Jenna, Grapevine, and Stronghold HLZs.

- **Jenna HLZ/DZ** is located 2,400 feet south of the Coronado National Forest. There are no residential receptors near the HLZ.
- **Grapevine HLZ/DZ** is located approximately 3,000 feet west of a residential receptor (campsite - Grapevine Group Campground). It is also connected to an airstrip.
- **Stronghold HLZ/DZ** is located in the Coronado National Forest and there are several receptors located within a 1-mile radius of the HLZ/DZ including cabins (Half Moon Ranch and Shaw House), campsites (Cochise Stronghold Campground and Broken Arrow Baptist Church Camp, and six residential homes. The closest cabin (Half Moon Ranch) to the Stronghold HLZ/DZ is 200 feet, the Cochise Stronghold Campground site is approximately 2,000 feet southwest of the site, and the closest residential home is 2,300 feet from the Stronghold HLZ/DZ.

3.5 Socioeconomics and Environmental Justice

3.5.1 Socioeconomics

Socioeconomics comprise the basic attributes of population and economic activity within a particular area or ROI and typically include population, employment, income, and industrial/commercial growth.

This section describes the existing conditions in the areas where socioeconomic impacts could occur. Socioeconomic resources are present at only two of the proposed sites: Stronghold and Grapevine. As a result, this section presents the most current information available for the areas near these two sites.

STRONGHOLD HLZ/DZ

The Stronghold HLZ/DZ site is located in one of five Coronado National Forest districts, the Douglas Ranger District, and is the site of existing helicopter use for the USFS during fire and

emergency events. It is located within 200 feet of the Half Moon Ranch cabin. The other cabin, known as the Shaw House, has been determined eligible for the NRHP. The USFS reports that the cabins are used year-round; however, they are used somewhat less during the hot summer months (USFS 2013a). Funds from their rental are used for required maintenance and preservation of the cabins. Table 3-6 shows the usage and revenue data for the cabins.

Table 3-6. Occupancy and Collections for USFS Rental Cabins near Stronghold

Fiscal Year	Half Moon Ranch (Days Occupied)	Half Moon Ranch (Revenues Collected)	Shaw House (Days Occupied)	Shaw House (Revenues Collected)	Total (Days Occupied)	Total (Revenues Collected)
2010	68	$10,200	97	$14,600	165	$24,800
2011	50	$ 7, 500	26	$ 4,000	76	$11,500
2012	40*	$ 4,000	83	$12,500	123	$16,500
2013 (Oct–May)	33	$ 4,800	47	$ 7,000	80	$11,800

*In 2012, Half Moon was closed for 4 months for maintenance
Source: USFS 2013a

Less than 1 mile from the site and to the north is a church camp called Broken Arrow. Several private homes are also located within 1 mile south of the proposed HLZ/DZ off West Ironwood Road and West Hunt Road. At least four homes are occupied year-round, and at least two additional homes are weekend/holiday residences.

Area Demographics for Stronghold HLZ/DZ

The Stronghold HLZ/DZ is in Census Tract 4, Cochise County, Arizona. The 2010 U.S. Census reports that the population of Census Tract 4 was 2,206, as shown in Table 3-7. There was almost no change in population in the census track from 2000 to 2010, compared with population growth rates of 11.5 percent for Cochise County and almost 25 percent for the State of Arizona.

Table 3-7. Stronghold HLZ/DZ – Population

Year	Census Tract 4		Cochise County		Arizona	
	Population	Growth Rate (2000 to 2010)	Population	Growth Rate (2000 to 2010)	Population	Growth Rate (2000 to 2010)
2010	2,206	0.3%	131,346	11.5%	6,392,017	24.6
2000	2,200		117,755		5,130,632	

Source: U.S. Census Bureau 2000 and 2010

The 2011 per capita personal income for Cochise County ($35,738) was slightly greater than for Arizona ($35,062); however, both Arizona and Cochise County are well below the U.S. average per capita income of $41,560, as shown in Table 3-8. Median household income for Census Tract 4 was $27,120, which is extremely low compared with the U.S ($52,762), Arizona ($50,752), and Cochise County ($45,906).

Table 3-8. Stronghold HLZ/DZ – Income and Poverty

	Census Tract 4	Cochise County	Arizona	U.S.
Per capita personal income (dollars), 2011	NA	$35,738	$35,062	$41,560
Per capita income as a percent of U.S., 2011	NA	86.0%	84.4%	100%
Median Household Income (2007-2011)	$27,120	$45,906	$50,752	$52,762
Persons of all ages below poverty level, percent, 2007-2011	23.4%	16.2%	16.2%	14.3%

Sources: U.S. Census Bureau 2011 and U.S. Bureau of Economic Analysis (BEA) 2011, NA – Not available

GRAPEVINE HLZ/DZ

The Grapevine HLZ/DZ is located in Gila County in the Tonto National Forest just south of the Theodore Roosevelt Lake near an area that is used for recreation. There are no permanent residences within 1 mile of the proposed Grapevine HLZ/DZ; however, a group campground, a public boat launch, and an air strip used by aviators' clubs in the region are located within 1 mile of the proposed site.

Area Demographics for Grapevine HLZ/DZ

The Grapevine HLZ/DZ is in Census Tract 8, Gila County, Arizona. The 2010 U.S. Census reports that the population of Census Tract 8 was 1,281, as shown in Table 3-9. The 2010 population showed a 16 percent decrease from the 2000 population of 1,528, compared with population growth rates of 4.4 percent for Gila County and almost 25 percent for the State of Arizona.

Table 3-9. Grapevine HLZ/DZ – Population

Year	Census Tract 8		Gila County		Arizona	
	Population	Growth Rate (2000 to 2010)	Population	Growth Rate (2000 to 2010)	Population	Growth Rate (2000 to 2010)
2010	1,281	-16.2%	53,597	4.4%	6,392,017	24.6%
2000	1,528		51,335		5,130,632	

Source: U.S. Census Bureau 2000 and 2010

The per capita personal income for Gila County ($31,846) was below the State of Arizona's per capita income of $35,062 and below the U.S. average per capita income of $41,560, as shown in Table 3-10. Median household income for Census Tract 8 (Gila County) was $26,131, which is extremely low compared with the U.S ($52,762), Arizona ($50,752), and Gila County ($37,905).

Table 3-10. Grapevine HLZ/DZ – Income and Poverty

	Census Tract 8	Gila County	Arizona	U.S.
Per capita personal income (dollars), 2011	NA	$31,846	$35,062	$41,560
Per capita income as a percent of U.S., 2011	NA	76.6	84.4%	100%
Median Household Income (2007-2011)	$26,131	$37,905	$50,752	$52,762
Persons of all ages below poverty level, percent, 2007-2011	10.9%	20.9%	16.2%	14.3%

Sources: U.S. Census Bureau 2011 and BEA 2011
NA – Not available

3.5.2 Environmental Justice

EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, was issued by President Clinton on February 11, 1994. It was intended to ensure that proposed Federal actions do not have disproportionately high and adverse human health and environmental effects on minority and low-income populations and to ensure greater public participation by minority and low-income populations. It requires each agency to develop an agency-wide environmental justice strategy. A Presidential Transmittal Memorandum issued with the EO states that "each Federal agency shall analyze the environmental effects, including human health, economic and social effects, of Federal actions, including effects on minority communities and low-income communities, when such analysis is required by NEPA (42 USC section 4321, et. seq)."

EO 12898 does not provide guidelines as to how to determine concentrations of minority or low-income populations. However, in 1997, the Department of the Air Force issued a *Guide for Environmental Justice Analysis with the Environmental Impact Analysis Process (EIAP)* that provided guidelines for analyzing demographic data on race and ethnicity and poverty to provide information on minority and low-income populations that could be affected by a Proposed Action. The Air Force guidelines also provide details on selecting a Community of Comparison (COC), which it defines as the smallest governmental or geopolitical unit that encompasses the

impact footprint. The COC for the Stronghold HLZ/DZ is Cochise County and the COC for the Grapevine HLZ/DZ is Gila County.

The 2010 Census reports numbers of minority individuals and the American Community Survey (ACS) provides the most recent poverty estimates available. Minority populations are those persons who identify themselves as Black, Hispanic, Asian American, American Indian/Alaskan Native, Pacific Islander, or Other. Poverty status is used to define low-income and is defined as the number of people with income below poverty level, which was $23,021for a family of four in 2011, according to the U.S. Census Bureau. Tables 3-11 and 3-12 provide data on minority population and poverty for the Stronghold and Grapevine areas.

Table 3-11. Stronghold HLZ/DZ Minority and Poverty Data

Location	Minority Population (Percent)	All Ages in Poverty (Percent)
Census Tract 4	19.5	23.4
Cochise County (COC)	41.5	16.2
Arizona	42.2	16.2

Source: U.S. Census Bureau 2010 and 2011

Table 3-12. Grapevine HLZ/DZ Minority and Poverty Data

Location	Minority Population (Percent)	All Ages in Poverty (Percent)
Census Tract 8	36.4	10.9
Gila County (COC)	34.1	20.9
Arizona	42.2	16.2

Source: U.S. Census Bureau 2010 and 2011

The 2010 Census shows that Cochise County Census Tract 4 has a minority population of 19.5 percent, which is well below the percentage minority for Cochise County (41.5 percent) and the State of Arizona (42.2 percent). However, Census Tract 4 has a higher percentage of its population living in poverty (23.4 percent) than the 16.2 percent for Cochise County and the State of Arizona.

The 2010 Census shows that Gila County Census Tract 8 has a substantially lower percentage of its population living in poverty (10.9 percent) than the 20.9 percent for Gila County and 16.2 percent for the State of Arizona. Census Tract 8 has a minority population of 36.4 percent,

which is slightly greater than the percentage minority for Gila County (34.1 percent), but substantially below the State of Arizona (42.2 percent). While the Grapevine HLZ/DZ is within Census Tract 8, it should be noted that there are no permanent residences near the Grapevine site.

EO 13045, Protection of Children

EO 13045 requires that each Federal Agency "identify and assess environmental health risks and safety risks that may disproportionately affect children," and "ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks." This EO was prompted by the recognition that children, still undergoing physiological growth and development, are more sensitive to adverse environmental health and safety risks than adults. The potential for impacts on the health and safety of children is greater where projects are located near residential areas.

3.6 Biological Resources

The 2002 CSAR EA (Davis-Monthan AFB 2002) defines biological resources as including all living, native, or naturalized flora and fauna, as well as the associated habitats in which they occur. This definition is herein incorporated by reference. The 2002 CSAR EA also separates biological resources into three categories: vegetation, wildlife, and special-status species. This division is used below when describing the biological resources at the proposed HLZ/DZ locations.

The U.S. Fish and Wildlife Service (USFWS), under the Endangered Species Act (ESA) of 1973, lists various species as Threatened, Endangered, or Candidate species. Additionally, the State of Arizona uses the designation *Wildlife of Special Concern* to denote those species whose occurrence in Arizona is or may be in jeopardy, or that have known threats or population declines. Those species afforded additional protection under the ESA are further discussed in Section 3.6.3.

The proposed HLZ/DZs are located in the Basin and Range Physiographic Province of southern Arizona (Hendricks 1985), which is characterized by northwest to southeast trending fault block mountain ranges punctuated by broad flat alluvial valleys. The proposed locations are located in a variety of environments and range from the Altar Valley, Avra Valley, the Waterman

Mountains, the Santa Cruz and San Pedro river valleys, the Dragoon Mountains, the Galiuro Mountains, the Winchester Mountains, and the Tonto Basin.

The elevations of the proposed HLZ/DZ locations range from 2,240 feet at the lowest to 6,230 feet at the highest. The HLZ/DZs are, therefore, located within several biotic communities of southern Arizona, including the Arizona Upland Subdivision of the Sonoran Desertscrub, Chihuhuan Desertscrub, Semidesert Grassland, Interior Chaparral, and Madrean Evergreen Woodland (Brown 1994). Flora and fauna surrounding the various HLZ/DZs is highly variable based on geographic location and elevation.

A biological resources survey was conducted at each of the proposed HLZ/DZ sites. Refer to Appendix B for project area aerial maps that show the survey boundaries for each of the proposed HLZ/DZ sites. Pedestrian surveys consisted of a series of parallel transects that provided 100 percent visual coverage at each location. The biologists searched for listed and sensitive species, signs of their presence, and unique biological features (e.g., rocky outcrops, burrows, rock shelters, bird nests) at and within the vicinity of each of the proposed HLZ/DZ sites. Observations of vegetative habitat and floral communities were recorded, along with species diversity and any wildlife species or signs of wildlife observed. Frequent pauses were made during the survey to watch and listen for wildlife. Locations of sensitive natural resources were recorded using a Trimble Geo XT Global Positioning System unit with sub-meter accuracy.

3.6.1 Vegetation

Perennial vegetation common to the low-lying regions includes creosotebush (*Larrea tridentata*), bursage (*Ambrosia* spp.), burroweed (*Isocoma tenuisceta*), catclaw acacia (*Acacia greggii*), desert broom (*Baccharis sarothroides*), whitethorn acacia (*Acacia constricta*), white brittlebush (*Encelia farinosa*), fourwing saltbush (*Atriplex canescens*), and ocotillo (*Fouquieria splendens*). Paloverde (*Cercidium microphyllum*), elephant tree (*Bursera microphylla*), and ironwood (*Parkinsonia microphylla*) are the most common tree species. Some examples of common cacti include several varieties of cholla (*Cylindropuntia* spp.) and prickly pear (*Opuntia* spp.). Additional cactus varieties include saguaro (*Carnegiea gigantea*), barrel (*Ferocactus wislizeni*), and hedgehog (*Echinocereus* sp.). An example of a typical annual is tansy mustard (*Descurainia pinnata*).

Vegetation within the middle and upper elevations are dominated by common woody-perennial vegetation, such as Emory oak (*Quercus emoryi*), grey oak (Q. *grisea)*, Mexican blue oak (Q. *oblongifolia*), alligator juniper (*Juniperus deppeana*), one-seed juniper (J. *monosperma*), velvet mesquite (*Prosopis velutina*), point-leaf manzanita (*Arctostaphylos pungens*), wait-a-minute bush (*Mimosa aculeatacarpa*), and sotol (*Dasylirion wheeleri*). Other types of vegetation include shindagger agave (*Agave schottii*), Palmer's agave (*Agave palmeri*), Parry's agave (*Agave parryi*), desert spoon (*Daslyirion wheeleri*), and beargrass (*Nolina microcarpa*). Numerous annual and perennial grasses are also abundant.

3.6.2 Wildlife

A variety of fauna may be expected at the proposed HLZ/DZ locations due to varying environments and elevations. Desert tortoises (*Gopherus agassizii*) are known to inhabit lower elevations, as are various common lizard species, such as chuckwalla (*Sauromalus obesus*). Common mammals native to the area include several varieties of bats, squirrels, mice, and rats. Black-tailed jackrabbit (*Lepus californicus*), desert cottontail (*Sylvilagus audubonii*), and coyote (*Canis latrans*) are frequently observed. Mule deer (*Odocoileus hemionus crooki*), white-tailed deer (*Odocoileus virginianus*), bighorn sheep (*Ovis canadensis mexicana*), and javelina (*Dicotyles tajacu*) are known inhabitants of the general region as well.

The Migratory Bird Treaty Act of 1918 (16 U.S.C. 703-712) prohibits at any time, or in any manner, the pursuit, hunt, take, kill, possession, sale, purchase, delivery for shipment, or export of, as well as attempt to take, capture, or kill, and offer for sale or purchase, any migratory bird, bird part, nest or egg, unless permitted by USFWS or other regulations. Over 1,000 species of bird are protected by the Migratory Bird Treaty Act in the U.S., Canada, Mexico, Japan, United Kingdom, and Russia. For this project, many of the common bird species, both resident and migratory, within the project areas are protected by the Migratory Bird Treaty Act and must be protected. Some of the more common bird species present at the HLZ/DZ locations include black vulture (*Coragyps atratus*), turkey vulture (*Cathartes aura*), Cooper's hawk (*Accipiter cooperii*), red-tailed hawk (*Buteo jamaicensis*), Gambel's quail (*Lophortyx gambeli*), mourning dove (*Zenaida macroura*), raven (*Corvus* spp.), and greater roadrunner (*Geococcyx californianus*).

3.6.3 Species of Special Concern

The USFWS is the Federal agency responsible for implementing the ESA for terrestrial and aquatic species. The responsibilities of the USFWS under the ESA include: 1) identification of threatened and endangered species; 2) identification of designated Critical Habitats for listed species; 3) implementation of research on, and recovery efforts for, these species; and 4) consultation with other Federal agencies concerning measures to avoid harm to listed species.

There are 37 threatened and endangered species, one proposed endangered species, 11 candidate species, conservation agreements established for four species, and one species that was delisted but is currently being petitioned for relisting that are known to occur within the six counties (Pinal, Pima, Santa Cruz, Gila, Graham, and Cochise) where the proposed HLZ/DZs are located. A complete list of all Federal threatened and endangered species by county and all state-listed species by county can be found in Appendix D.

Species occurring or with the potential to occur at the proposed HLZ/DZs are presented in Table 3-13. This list includes those species observed during surveys of the HLZ/DZs as well as those with potentially suitable habitat in the area of the proposed HLZ/DZs.

Table 3-13. Federal and State-Listed Threatened and Endangered Species Potentially Occurring within the Proposed HLZ/DZ Project Sites

Scientific Name	Common Name	Federal Status	State Status	Observed During Surveys?
Coryphantha scheeri var. robustispina	Pima Pineapple Cactus	Endangered	Highly Safeguarded	Yes
Leptonycteris curasoae yerbabuenae	Lesser Long-nosed Bat	Endangered	Wildlife of Special Concern	No
Panthera onca	Jaguar	Endangered	Wildlife of Special Concern	No
Leopardus pardalis	Ocelot	Endangered	Wildlife of Special Concern	No
Gopherus morafkai	Sonoran Desert Tortoise	Candidate	Wildlife of Special Concern	No
Strix occidentalis lucida	Mexican Spotted Owl	Threatened	Wildlife of Special Concern	No
Empidonax traillii extimus	Southwestern Willow Flycatcher	Threatened	Wildlife of Special Concern	No

USFWS 2013, Arizona Game and Fish Department 2013

Designated Critical Habitat is described as a specific geographic area essential for the conservation of a threatened and endangered species and may require special management

and protection. Table 3-14 lists those species whose designated Critical Habitats exists within 5 miles of the proposed HLZ/DZ location. It should be noted, however, that none of the proposed HLZ/DZ locations were identified as occurring within any species' designated Critical Habitat.

Table 3-14. Species with designated Critical Habitat within 5 Miles of Proposed HLZ/DZ Locations

Scientific Name	Common Name	Proposed HLZ/DZ	Distance and Direction of Critical Habitat from HLZ/DZ
Strix occidentalis lucida	Mexican Spotted Owl	Caliente	3.7 miles east
		Jenna	4.0 miles north
		Froelich	2.1 miles south
		Jeep	3.0 miles north
		Paige	4.2 miles west
Empidonax traillii extimus	Southwestern Willow Flycatcher	Grapevine	3.3 miles east
		Pedro	0.4 mile east
		Pinnacle	1.1 miles east
		Paige	3.4 miles west
Gila intermedia	Gila Chub	Jeep	2.3 miles south
Meda fulgida	Spikedace	Jeep	2.3 miles south
Tiaroga cobitis	Loach Minnow	Jeep	2.3 miles south

USFWS 2013

Wildlife of Special Concern in Arizona are described as those species whose occurrence in Arizona is or may be in jeopardy, or with known or perceived threats or population declines, as described by the Arizona Game and Fish Department's listing of Wildlife of Special Concern in Arizona. The highly safeguarded status means that no collection of species is allowed. The salvage restricted status means that collection is only allowed with a permit.

3.7 Water Resources

This section describes surface and groundwater resources, floodplains, wetlands and Waters of the U.S. within the ROI.

3.7.1 Surface Water

Water resources include both surface and subsurface water. Surface water includes all lakes, ponds, rivers, streams, impoundments, and wetlands within a defined area or watershed. A watershed is the area or region drained by a river, rivers system, or body of water. Surface water functions as an ecological resource that provides habitat and transportation. The proposed HLZ/DZ sites lie within several different watershed basins. Table 3-15 describes the

watershed basin in which each of the proposed HLZ/DZ is located and any major rivers or tributaries and surface water located near the proposed HLZ/DZ sites.

Table 3-15. Watershed Basins and Surface Water near Proposed HLZ/DZ Locations

Proposed HLZ/DZ	Watershed Basin	Distance to Nearest Surface Water
Prieto	Upper Santa Cruz	Within 0.5 mile of Cerro Prieto Wash; within 100 feet of small intermittent stream; few small washes located within the HLZ/DZ
Blackhills	Upper Santa Cruz	Within 0.5 mile of Cerro Prieto Wash; several small intermittent streams nearby but not within HLZ/DZ
Pond	Upper Santa Cruz	Within a freshwater pond (livestock tank); adjacent to Cerro Prieto Wash
Sierrita	Upper Santa Cruz	Within 0.10 mile of San Juan Wash
Brooke	San Pedro	Within 1 mile of North Fork Clark Wash
Caliente	Upper Santa Cruz	Within 3 miles of Santa Cruz River; within 0.10 mile of Agua Caliente Canyon intermittent stream and another unnamed intermittent stream; adjacent to abandoned, naturalized livestock tank
Froelich	Willcox Playa	Within 1 mile of Reiley Creek
Grapevine	Upper Salt	Within 0.5 mile of Roosevelt Lake; within 0.5 mile of Schoolhouse Wash and Salt River
Jeep	San Pedro	Within 0.5 mile of wash within Redus Canyon; within 1,500 feet of small freshwater pond
Pipeline	San Pedro	Within 0.10 mile of small, unnamed wash; within 0.5 mile of wash within Poor Corral Canyon
Jenna	Willcox Playa	Within 1 mile of wash within Ash Creek Canyon
Paige	San Pedro	Within 250 feet of Paige Creek (major tributary to San Pedro River); within 500 feet of small, intermittent stream
Pinnacle	San Pedro	Within 1 mile of San Pedro River; within 0.5 mile of several intermittent streams
Pedro	San Pedro	Within 0.75 mile of San Pedro River; within 0.10 mile of several intermittent streams
Rancho Seco	Upper Santa Cruz	Located within flat, alluvial bajada; within 0.10 mile of several unnamed washes; within 250 feet of freshwater pond (Rancho Seco Tank)
Penitas	Upper Santa Cruz	Within 0.5 mile of Penitas Wash
Silvermine	Upper Santa Cruz	Within 0.5 mile of unnamed intermittent stream
Waterman	Upper Santa Cruz	Within 200 feet of intermittent stream; adjacent to freshwater pond (livestock tank)
Lost Acre	Upper Santa Cruz	Within 0.10 mile of unnamed wash
Stronghold	Willcox Playa	Within 0.10 mile of Stronghold Canyon East intermittent stream and Carlink Canyon intermittent stream.

Most of the rivers, streams, and washes in the ROI are ephemeral and only flow in response to local rainfall.

3.7.2 Groundwater

Subsurface water, commonly referred to as groundwater, is typically found in certain areas known as aquifers. A groundwater basin is an underground reserve of water which may take the form of a single aquifer or a group of linked aquifers. Groundwater is an essential resource used for drinking, irrigation, and industrial purposes. There are several groundwater basins located within Arizona and the ROI area. Table 3-16 describes which groundwater basin each of the proposed HLZ/DZ sites fall within.

Table 3-16. Groundwater Basins within Proposed HLZ/DZ Locations

Proposed HLZ/DZ	Groundwater Basin
Prieto	Tucson AMA
Blackhills	Tucson AMA
Pond	Tucson AMA
Sierrita	Tucson AMA
Brooke	Lower San Pedro
Caliente	Santa Cruz AMA
Froelich	Willcox
Grapevine	Salt River
Jeep	Upper San Pedro
Pipeline	Lower San Pedro
Jenna	Lower San Pedro
Paige	Lower San Pedro
Pinnacle	Lower San Pedro
Pedro	Lower San Pedro
Rancho Seco	Tucson AMA
Penitas	Tucson AMA
Silvermine	Tucson AMA
Waterman	Tucson AMA
Lost Acre	Tucson AMA
Stronghold	Willcox

Source: Arizona Department of Water Resources (ADWR) 2010
AMA = Active Management Area

Groundwater enters the Tucson AMA from north from the Santa Cruz AMA and from bordering mountains and then flows to the north-northwest. Natural recharge also occurs along stream channels (primarily the Santa Cruz River). About 84 percent of the total net natural recharge in the basin is estimated to occur within the Upper Santa Cruz Valley Sub-basin. Groundwater

storage in the AMA during predevelopment times is estimated to have ranged from 68 million acre-feet to 76 million acre-feet to a depth of 1,000 feet (ADWR 2013a).

For the Upper and Lower San Pedro Basins, the San Pedro River is the major surface-water drainage. Groundwater movement in the basins is from the higher elevations in the mountains toward the valley and then northwest along the riverbed. The total amount of groundwater in storage in the Upper San Pedro basin is estimated to be 59 million acre-feet (ADWR 2013b). The total amount of groundwater in storage in the Lower San Pedro basin is estimated to be 25.6 million acre-feet (ADWR 2013c).

The Santa Cruz AMA covers 716 square miles in the Upper Santa Cruz Valley River Basin and is principally concentrated around a 45-mile reach of the Santa Cruz River. Groundwater flow is to the north, toward and along the Santa Cruz River drainage and is stored in smaller, fault delimited micro-basins. Natural recharge in the Santa Cruz AMA is estimated at 61,050 acre-feet per year. Sources of natural recharge include infiltration from the Santa Cruz River, mountainfront recharge, and groundwater inflow from the south (ADWR 2013d and 2013e).

The Willcox groundwater basin is a closed basin and covers approximately 1,911 square miles in the northern part of Sulphur Springs Valley. Perennial flow occurs in upper Grant Creek and in other small streams in the Pinaleno Mountains. Remaining streams in the basin are ephemeral and only flow in response to precipitation. All drainage flows to the Willcox Playa in the south-central part of the basin. In 1989, an estimated 45.3 million acre-feet of groundwater were in storage to a depth of 1,200 feet. Natural recharge in the Willcox basin has been estimated to be approximately 15,000 acre-feet per year (ADWR 2013f).

The Salt River Basin is bounded on the west and southwest by the Sierra Ancha and Superstition Mountains, on the south by the Natanes Plateau, and on the east by the White Mountains. Groundwater recharge is estimated at 178,000 acre-feet per year. In the northern part of the basin, groundwater flow is from north to south. Groundwater flow has not been characterized in the rest of the basin. The only estimate of groundwater in storage is 8.7 million acre-feet or more to a depth of 1,200 feet (ADWR 2013g).

3.7.3 Floodplains

Flood hazards are associated with the 100-year floodplain, which is defined as the lowland and relatively flat areas adjoining inland and coastal waters, including flood-prone areas of offshore islands as well as, at a minimum, that area subject to a 1 percent or greater chance of flooding in any given year (USEPA 2003). EO 11988, *Floodplains Management*, requires Federal agencies to avoid direct or indirect support of development within the 100-year floodplain wherever there is a practicable alternative. If construction is unavoidable, then the agencies must ensure the action conforms to applicable floodplain protection standards, and that accepted flood-proofing and other flood protection measures are applied to the construction. None of the proposed HLZ/DZ sites are within a known 100-year floodplain.

3.7.4 Wetlands or Waters of the U.S.

The Clean Water Act (CWA) and the Safe Drinking Water Act (SDWA) are the primary Federal laws that protect the nation's waters, including lakes, rivers, aquifers, and coastal areas. The primary objective of the CWA is to restore and maintain the integrity of the nation's navigable waters. The CWA also sets the basic structure for regulating discharges of pollutants to U.S. waters. The SDWA is focused on the quality and safety of public water systems from both surface and groundwater supplies. Wetlands are considered sensitive habitats and are subject to Federal regulatory authority under Section 404 of the CWA and EO 11990, *Protection of Wetlands*. Jurisdictional wetlands are defined by the U.S. Army Corps of Engineers (USACE) as those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions (Environmental Laboratory 1987). Waters of the U.S. are those waters used in interstate or foreign commerce, subject to ebb and flow of tide, and all interstate waters including interstate wetlands. Waters of the U.S. are further defined and may include all other waters such as intrastate lakes, rivers, streams, mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, natural ponds, or impoundments of waters, tributaries of waters, and territorial seas. There were no wetlands found at any of the proposed HLZ/DZ sites. The livestock tank within the Pond HLZ/DZ is not considered wetlands because it is ephemerally flooded and lacks hydric soils and hydrophytic vegetation. However, the Pond HLZ/DZ could potentially be considered a waters of the U.S. because of its location adjacent to a wash.

3.8 Hazardous Materials and Waste

A discussion of the hazardous materials and waste and the non-hazardous materials at each of the proposed area sites would normally include analysis of hazardous materials, hazardous wastes, any Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) or Resource Conservation and Recovery Act (RCRA) sites, asbestos-containing materials, lead-based paint, and solid waste and debris. However, the Proposed Action presented in this SEA does not involve any construction or significant ground disturbance, and further, the sites are all located on offsite public lands; therefore, asbestos-containing materials, lead-based paint, and Environmental Restoration Program sites are not addressed in this document as these materials would not be affected by the Proposed Action. Petroleum, oil, and lubricants (POL) and debris may potentially be issues at the 20 proposed sites and as such will be addressed in this section.

To satisfy the requirements of applicable Federal and state regulations concerning hazardous materials and waste management, Davis-Monthan AFB has developed and implemented base wide Spill Prevention Control and Countermeasure Plans (SPCCP), Pollution Prevention Plans, and Hazardous Waste Management Plans and as such these would be applicable at the 20 Proposed Action sites (Davis-Monthan AFB 2002). At Davis-Monthan AFB, all non-hazardous solid waste is collected on-base and transported by a licensed contractor to either the City of Tucson landfill or the Pima County landfill (Davis-Monthan AFB 2002).

No Superfund or RCRA sites are within 5 miles of any of the 20 proposed sites (USEPA 2013c). The Pipeline site which is on BLM land is located over a subsurface El Paso Natural Gas (EPNG) high-pressure gas transmission line. Releases of natural gas from gas transmission pipelines pose primarily an acute hazard. Should an ignition source exist, a release or leak of natural gas could result in an immediate fire or explosion near the point of the release. The hazard is reduced over a relatively short period after the release ends as the gas disperses (U.S. Department of Transportation 2010).

All 20 currently HLZ/DZ sites were visually surveyed for evidence of soil staining, drums, or other material that might cause contamination issues. No sites were noted to have any visible concerns except for the Pipeline site. Should any future sites be proposed, each site will have a preliminary site reconnaissance to ascertain if there are any visible hazardous and non-hazardous wastes and materials issues.

3.9 Cultural Resources

3.9.1 Cultural Background

Cultural resources are regulated per the National Historic Preservation Act (NHPA) of 1966, the Native American Graves Protection and Repatriation Act (NAGPRA) of 1990, the Archaeological Resources Protection Act (ARPA) of 1979, and other statutes. Cultural resources are important because of their association or linkage to past events, historically important persons, design and construction values, and for their ability to yield important information about history. The term 'cultural resource' refers to any prehistoric or historic resource such as prehistoric settlement sites, historic archaeological sites, and other evidence of our cultural heritage. The term 'historic property' refers specifically to a cultural resource eligible for inclusion in the National Register of Historic Places (NRHP). Five classes of historic properties are defined that are eligible for listing in the NRHP: buildings, sites, districts, structures, or objects (36 CFR 60.3). Under Section 106 of the NHPA of 1966, as amended, the Federal agency (Air Force) is required to assess the effects of undertakings prior to their initiation to ensure that there will be no adverse effects on historic properties (36 CFR 800). Only significant cultural resources, known or unknown, warrant consideration with regard to potentially adverse impacts resulting from a proposed action. The NHPA establishes the NRHP, and Title 36 CFR Section 60.4 defines the criteria used to establish significance and eligibility to the NRHP. To be considered significant, archaeological or architectural resources must meet one or more criteria, as defined in 36 CFR 60.4, for inclusion in the NRHP.

The *Final Cultural Resources Survey in Support of Personnel Recovery Activities, 563rd Rescue Group, Davis-Monthan Air Force Base, Tucson, Arizona* (Davis-Monthan AFB 2013a) describes in detail the cultural history and setting of the area. The report was submitted to the Arizona State Historic Preservation Office (SHPO) and is summarized in the following sections. Resources addressed at each of the HLZ/DZ locations include archaeological, architectural, and traditional cultural resources. This SEA examines those resources potentially subject to ground-disturbing activities at each of the proposed HLZ/DZ locations, including NRHP listed or eligible archaeological and architectural resources (e.g., historic structures). The ROI for cultural resources includes the HLZ/DZ locations and immediate areas. Cultural resources at the affected ranges and beneath affected airspace were analyzed in the 2002 CSAR EA (Davis-Monthan AFB 2002).

3.9.2 Previous Investigations and Cultural Resource Surveys

A Class III cultural resources survey of the 20 HLZ/DZs across southern Arizona was conducted in compliance with Section 106 of the NHPA (Davis-Monthan AFB 2013a). The archaeological investigations were conducted under Arizona Antiquities Act Blanket Permit No. 2012-053bl and 2013-10bl; Arizona State Museum (ASM) Accession Number 2012-0654; and BLM Safford Field Office (BLM Permit Number AZ-000524, Fieldwork Authorization AZ-040-13-04). Each of the HLZ/DZs were surveyed by an archaeologist, except for the two locations (Grapevine and Stronghold), which are located on USFS land and were surveyed previously. The HLZ/DZ sites ranged in size from 0.3 to 2.7 acres. The size and shape of each of the HLZ/DZs is largely contingent upon the landform and surrounding vegetation. Approximately 23.5 acres were inspected for cultural materials. Refer to Appendix B for project area aerial maps that show the survey boundaries for each of the proposed HLZ/DZ sites.

As part of the investigation, a records search and literature review was conducted for each proposed HLZ/DZ location, including a 1-mile radius around each location. General Land Office (GLO) plat maps and land patents, existing records from AZSITE, the BLM Safford Field Office, Tonto National Forest, and Coronado National Forest were consulted. The review of GLO records revealed that no significant historic properties were located within any of the HLZ/DZs or within the viewshed of the HLZ/DZs, nor were significant persons associated with the locations of the HLZ/DZs. The review of existing records from AZSITE, the BLM Safford Field Office, Tonto National Forest, and Coronado National Forest resulted in the identification of 66 previous investigations within a 1-mile radius of the HLZ/DZs. Several of the HLZ/DZ locations were previously surveyed, including Grapevine (Hutira 1990), Stronghold (Makansi 2009), and Pipeline (Batcho 1985). The previous investigations resulted in the identification of 52 recorded archaeological sites, though only a small number of sites are located near the actual HLZ/DZ and none are within several hundred yards.

3.10 Earth Resources

Earth resources are generally defined as the geology, topography, and soils of a given area. The project area for the Proposed Action consists of public lands in Santa Cruz, Pima, Pinal, Gila, Graham, and Cochise counties where HLZ/DZs would be located.

3.10.1 Geology and Topography

The proposed HLZ/DZs are located in the Basin and Range Physiographic Province of southern Arizona (Hendricks 1985), which is characterized by northwest to southeast trending fault block mountain ranges punctuated by broad flat alluvial valleys. The proposed locations are located in a variety of environments and range from the Altar Valley, Avra Valley, the Waterman Mountains, the Santa Cruz and San Pedro river valleys, the Dragoon Mountains, the Galiuro Mountains, the Winchester Mountains, and the Tonto Basin. The project area maps can be found in Appendix B. The elevations of the proposed HLZ/DZs range from 2,240 feet at the lowest to 6,230 feet at the highest.

The varied geographical and topographical setting of the 20 HLZ/DZs has resulted in varied geological settings as well. HLZ/DZs northwest of Tucson are primarily within igneous and metamorphic settings, which include Quaternary basalt, Quaternary and Tertiary volcanic rocks, and Precambrian and Tertiary Granite (Chronic 1983). HLZ/DZs south and southwest of Tucson are a mix of Tertiary granite, Paleozoic and Mesozoic sedimentary formations, and intrusive volcanic rocks, as well as Mesozoic volcanic and sedimentary rocks (Chronic 1983). The area surrounding Lake Roosevelt consists of Tertiary sediments. The remaining HLZ/DZs along the San Pedro River, Sulphur Springs Valley, and Galiuro Mountains consist of a mix of Quaternary and Tertiary sand and gravel, Paleozoic sedimentary rocks, and Precambrian Granite (Chronic 1983).

3.10.2 Soils

The soils at the proposed HLZ/DZ sites are generally considered to be desert topsoils characteristic of alluvial fan deposits. In general, the topsoils are loamy soils that may be sandy and gravelly and are low in fertility and potentially erodible by wind and water forces. Soils and select soil characteristics of each site are shown in Table 3-17. Project sites Brooke, Froelich, Jeep, Jenna, Pinnacle, and Silvermine are hilly and mountainous with rocky outcrops. Each of the 20 sites has a depth to water table of more than 80 inches. Most of the sites have soils that are well drained except for three sites: the Paige site is considered somewhat excessively well drained; the Pedro site is considered well drained to excessively drained; and the Pipeline site is considered well drained, and somewhat excessively drained for Tombstone soils (U.S. Department of Agriculture [USDA] Natural Resources Conservation Service [NRCS] 2013). Soil data is not available for USFS sites. None of the soils found at the proposed HLZ/DZ sites are classified as Prime Farmland or hydric soils.

Table 3-17. Soil Characteristics of the Proposed HLZ/DZ Sites

Name	Soils	Slopes (percent)	Permeability
Blackhills Sierrita Rancho Seco	Nolam-Tombstone complex, slopes	8 to 30	moderate to high
Brooke	Collarbutton-Rock outcrop-Cherrycow complex	10 to 60	very low to low
Caliente	Hathaway soils	1 to 40, eroded	moderate to high
Froelich	Beaumain-Cherrycow-Rock outcrop complex	5 to 60	very low to low
Jeep	Kuykendall-Cherrycow-Rock outcrop complex	5 to 60	very low to low
Jenna	Magoffin-Budlamp-Rock outcrop complex	5 to 70	very low to low
Lost Acre	Sahuarita soils, mohave soils and urban land	1 to 5	moderate to high
Paige	Tombstone-Stronghold complex	5 to 30	high
Pedro	Calcigypsids-Contention-Redo complex, chihuahuan	5 to 45	high
Penitas	White House-Caralampi complex	5 to 25	low to moderate
Pinnacle	Mabray-Rock outcrop complex	5 to 70	very low to moderately low
Pond	Keysto extremely gravelly fine sandy loam	2 to 8	moderately high to high
Prieto	Pinaleno-Stagecoach complex	5 to 16	moderately high to high
Waterman	Cave soils and urban land	0 to 8	very low
Pipeline	Pedregosa-Tombstone complex	5 to 45	very low to moderately low (Pedregosa), high (Tombstone)
Silvermine	Saguaro-Rock outcrop complex	15 to 45	very low to low

Source: USDA NRCS 2013

3.11 Safety and Occupational Health

The primary safety risks considered in this SEA are associated with military flight operations, including aircraft mishaps and bird/wildlife aircraft strike hazard (BASH) potential, materials used during the training exercises, and potential fuel spills resulting from in-flight refueling operations. The ROI for safety includes the HLZ/DZ sites and the area defined by airfield approach and departure paths. Safety topics include fire and crash response, flight risks associated with bird-aircraft strikes, and aircraft mishaps.

Operational risk management is implemented and integrated into all Air Force operations and missions. Rules, criteria, procedures, Occupational Safety and Health Administration (OSHA) standards, Air Force Occupational and Environmental Safety, Fire Protection, and Health (AFOSH) standards, explosive safety standards, or other safety standards are identified that help eliminate unsafe acts or conditions that could cause mishaps. Detailed standard operating procedures (SOP) have been established to fulfill many health and safety requirements. Personnel involved with different test equipment are instructed on the use of the equipment and personal protective equipment (PPE). In addition, daily operations and maintenance activities

are performed in accordance with applicable Air Force safety regulations, published Air Force Technical Orders, and standards prescribed by AFOSH requirements.

Aircraft Mishaps

The Air Force has identified categories of aircraft mishaps. Class A mishaps are those that result in a human fatality or permanent total disability, the destruction of an aircraft, or a total cost in excess of $2 million for injury, occupational illness, or destruction of an aircraft. Class B mishaps are those that result in a permanent partial disability, inpatient hospitalization of three or more personnel, or a total cost in excess of $50,000 but less than $2 million for injury, occupational illness, or property damage. Class C mishaps are those that result in total damage in excess of $50,000 but less than $500,000; an injury resulting in a lost workday (i.e., duration of absence is at least 8 hours beyond the day or shift during which the mishap occurred); or occupational illness that causes loss of time from work at any time. High Accident Potential mishaps represent minor incidents not meeting any of the criteria for Classes A, B, or C; they involve minor damage, minor injuries, and little or no property or public interactions (DoDI 2011b). AFI 91-202, *U.S. Air Force Mishap Prevention Program*, implements the Air Force Policy Directive 91-2, Safety Programs. It also establishes mishap prevention program requirements, responsible organizations, and general information including the BASH program.

Based on historical data of mishaps at all installations, and under all conditions of flight, the military services calculate a Class A mishap rate for each type of aircraft in the inventory. The lifetime Class A mishap rates for the HH-60 and EC-130 aircraft are 2.85 and 0.73 mishaps per 100,000 flying hours, respectively. No Class A mishaps have occurred involving HH-60 helicopters or HC-130 aircraft from Davis-Monthan AFB.

BASH

BASH constitutes another safety concern because of the potential for damage to aircraft or local populations if an aircraft crash should occur in a populated area. Aircraft occasionally encounter birds at altitudes of 30,000 feet AGL or higher; however, most birds fly closer to the ground. Over 97 percent of reported bird strikes occur between the ground to 4,000 feet AGL (Air Force Safety Center [AFSEC] 2013). Approximately 30 percent of bird strikes happen in the airport environment, and almost 78 percent occur during climbing and low-altitude flight (AFSEC 2013). The potential for bird-aircraft strikes is greatest in bird migration corridors or where birds congregate for foraging or resting (e.g., open water bodies, rivers, and wetlands). Davis-

Monthan AFB and the HLZ/DZ sites lie under the extreme eastern edge of the Pacific Migratory Flyway, which contains large seasonal influxes of waterfowl. Migratory waterfowl *(*e.g., ducks, geese, and swans) are the most hazardous birds to low-flying aircraft because of their size and their propensity for migrating in large flocks at a variety of elevations and times of day, although raptors and vultures and ravens also pose a strike hazard. Mourning doves (*Zenaida macroura*) provide the largest threat to flight operation in the airfield area (Davis-Monthan AFB 2013b).

Two systems currently being used for estimating wildlife strike hazard are the Air Forces' Bird Avoidance Model (BAM), and the Avian Research Laboratory's Avian Hazard Advisory System (AHAS). These systems are based on geographic information system (GIS) and remote sensing and provide information regarding bird strike risk to allow pilots to make informed decisions about their routes with regard to wildlife strike risk (AFSEC 2013). Based on the BAM, three BASH levels have been identified: low, moderate, and severe. HH-60 and HC-130 aircraft commonly train at lower altitudes, which make them more likely to experience bird-aircraft strikes (AFSEC 2013). For airspace used by Davis-Monthan AFB aircrews, the risk of bird-aircraft strikes varies throughout the year. As a result, pilots and safety officers continually evaluate BASH potential (Davis-Monthan AFB 2002).

In-Flight Refueling

In-flight refueling is not considered to be a high-risk flying activity. In-flight refueling activities and associated flight risks would primarily be associated with two or more aircraft flying in proximity to each other. There are minimum separation requirements for flying under visual flight rules (VFR) in uncontrolled airspace. Fuel spills can potentially occur during in-flight refueling. Such an event could affect public safety if large enough amounts of fuel reached the ground. The Air Force has conducted in-flight refueling of helicopters for many years, and no documented fuel spills have occurred. Currently all HH-60 and HC-130 aircrews follow all established procedures for in-flight refueling operations, and separation is maintained between aircraft to minimize flight risks. In addition, the number of HH-60 and HC-130 refueling operations is minimal, with associated low safety risks resulting from fuel spills (Davis-Monthan AFB 2002).

Fire and Crash Safety

Air Force standards specify fire and crash emergency service requirements for the amount and type of fire and crash equipment and for the number of personnel necessary to handle an

aircraft mishap. These standards are based on the number and type of aircraft, type of flying missions, and size of the buildings at the installation. Davis-Monthan AFB's fire and crash emergency services meet current Air Force standards. In addition, the base fire department has mutual support agreements with nearby communities in case an exceptionally severe aircraft mishap occurs.

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SECTION 4.0
ENVIRONMENTAL CONSEQUENCES

4.0 ENVIRONMENTAL CONSEQUENCES

Impacts (consequence or effect) can be either beneficial or adverse, and can be either directly related to the action or indirectly caused by the action. Direct impacts are those effects that are caused by the action and occur at the same time and place (40 CFR 1508.8[a]). Indirect impacts are those effects that are caused by the action and are later in time or further removed in distance, but are still reasonably foreseeable (40 CFR 1508.8[b]). As discussed in this section, the No Action and Proposed Action Alternatives may create temporary (lasting the duration of training events), short-term (up to 3 years), long-term (greater than 3 years), or permanent impacts or effects.

Impacts on each resource can vary in degree or magnitude from a slightly noticeable change to a total change in the environment. For the purpose of this analysis, the intensity of impacts will be classified as negligible, minor, moderate, or major. The intensity thresholds are defined as follows:

- **Negligible**: A resource would not be affected or the effects would be at or below the level of detection, and changes would not result in any measurable or perceptible consequences.
- **Minor or Minimal**: Effects on a resource would be detectable, although the effects would be localized, small, and of little consequence to the sustainability of the resource. Mitigation measures, if needed to offset adverse effects, would be simple and achievable.
- **Moderate**: Effects on a resource would be readily detectable, long-term, localized, and measurable. Mitigation measures, if needed to offset adverse effects, would be extensive and likely achievable.
- **Major**: Effects on a resource would be obvious, long-term, and would have substantial consequences on a regional scale. Extensive mitigation measures to offset the adverse effects would be required and success of the mitigation measures would not be guaranteed.

In accordance with NEPA and the CEQ regulations implementing NEPA, the analysis of environmental conditions only addresses those areas and environmental resources with the potential to be affected by either of the alternatives, the No Action Alternative and Proposed Action Alternative. More specifically, this SEA examines the potential for direct, indirect, adverse, or beneficial impacts. This SEA also assesses whether such impacts are likely to be long-term, short-term, permanent, or cumulative.

4.1 Airspace

Impacts would occur if implementation of the Proposed Action affects the movement of other air traffic in the area, ATC systems or facilities, or accident potential for mid-air collisions between military and non-participating civilian operations. Potential impacts were assessed to determine if proposed changes in aircraft operations would impact existing relationships with Federal airways and airport-related air traffic operations.

The ROI for the Proposed Action includes uncontrolled airspace, controlled airspace (Davis-Monthan AFB), and special-use airspace (MOAs) proposed for use under the Proposed Action. For the purpose of this SEA, a detailed analysis of potential impacts of the proposed aircraft operations within LATN areas is not presented, since there is no proposed increase in annual sortie-operations, the large area that the LATNs encompass and the relative randomness of aircraft operations within this large airspace makes it difficult to determine impacts on specific resource areas, and all military aircraft operations would be similar to civilian and commercial aircraft operating within the LATN under VFR.

4.1.1 No Action Alternative

Under the No Action Alternative, the proposed additional HLZ/DZ training missions would not occur, and baseline conditions as described in the 2002 CSAR EA would remain unchanged. Implementation of the No Action Alternative would not change current training mission activities at Davis-Monthan AFB; therefore, there would be no additional impacts on airspace.

4.1.2 Proposed Action

Under the Proposed Action, no changes to the airspace structure associated with Davis-Monthan AFB or to the ATC procedures for its management would occur. Davis-Monthan AFB aircraft would continue to follow existing approach and departure routes and procedures, and would operate within the same airspace as they do under baseline conditions.

With implementation of the Proposed Action, annual aircraft sorties and airfield operations at Davis-Monthan AFB would not increase. Sortie routes from Davis-Monthan AFB to the new HLZ/DZs would differ slightly from those currently used, but no changes to ATC existing departure and approach procedures would occur. There would be no significant impacts on ATC operations at Davis-Monthan AFB under the Proposed Action.

Under the Proposed Action, training operations by HH-60 aircraft would occur in uncontrolled and controlled airspace over lands owned by the State of Arizona and the Federal Government. Only three of the proposed HLZ/DZ sites are located within established MOAs (Penitas, Rancho Seco, and Brooke). Under the Proposed Action, the use of the existing MOAs under the Proposed Action would not affect general aviation in the region. There would be no need for new military special-use airspace. Existing see-and-avoid procedures and avoidance measures for VFR civil aviation aircraft would remain unchanged. The scheduling, coordination, processes, and procedures currently used to manage MOAs are well established and would need no modification to support implementation of the Proposed Action. Nonparticipating instrument flight rules (IFR) military and civilian aircraft would continue to be directed above or around the MOA to avoid conflicts with the scheduled use of the MOAs. None of the currently proposed HLZ/DZ sites are located within Class C or D airspace. Therefore, no significant impacts on MOA airspace or civilian aviation would occur under the Proposed Action.

4.2 Land Use Resources

4.2.1 No Action Alternative

Under the No Action Alternative, the use of the proposed additional HLZ/DZ training sites would not occur, and baseline conditions as described in the 2002 CSAR EA would remain unchanged. Implementation of the No Action Alternative would not change current training mission activities at Davis-Monthan AFB; therefore, there would be no additional impacts on land resources or visual resources.

4.2.2 Proposed Action

4.2.2.1 Land Use

This section focuses on the impacts of the Proposed Action on land ownership or land status, general land use patterns, and land management. The primary effect of HH-60 and HC-130 missions relative to land use is noise generated by aircraft overflights. Discussions of noise characteristics and estimated noise levels are presented in Section 4.4.

Under the Proposed Action, aircraft operations within the affected airspace of the 20 proposed HLZ/DZ sites would not adversely affect land use, with the exception of the Grapevine and Stronghold sites. The use of the Grapevine and Stronghold sites would impact the land use of the surrounding area mainly due to noise impacts. Due to these impacts, the Grapevine and Stronghold sites will be removed from the list of proposed HLZ/DZ sites and will not be used

during routine training events conducted by the 563 RQG. Therefore, the land use impacts would be considered minor, and implementation of the Proposed Action would not have a significant impact.

4.2.2.2 Visual Resources

Impacts of aircraft drops and helicopter deployment on the visual environment of an area are difficult to quantify due to the inability to separate such impacts from the noise of the aircrafts. Generally, aircraft overflights are not noticed because of visual prompts, but instead are noticed after being heard. The nature of the impact depends on the sensitivity of the resource affected, the distance from which it is viewed, and the length of time it is visible. Additionally, aircraft altitude and visual screening relative to the viewer, such as mountains and hills, play an important role in determining impacts from aircraft overflights.

Based upon projected noise levels (see Section 4.4, Noise), it would be unlikely that visitors to recreation areas near most of the 20 identified sites would be able to distinguish these changes in noise levels from the ambient noise environment. Exceptions to this are the Stronghold and Grapevine sites. The Stronghold site is approximately 200 feet from a Coronado National Forest recreational cabin rental and also located near other cabins, campgrounds, and residential homes. The Grapevine site is near a campground and lake with recreational users and also near an airstrip that is used regularly for “fly-ins”. The cabin renters and recreational users of these sites would have a much higher chance of being impacted by noise, which would have a greater impact on the underlying visual resources. These recreational users would also be visually impacted by the training activities associated with the CSAR mission at the Stronghold and Grapevine HLZ/DZ sites. The training activities would increase the impacts on the Grapevine Group Campground and recreational users in the area that are already occurring from the regular “fly-ins”. Aircraft operating in existing airspace associated with the Proposed Action are required to follow restrictions specifically designed to minimize disturbance to recreation users. Due to these impacts, the Grapevine and Stronghold sites will be removed from the list of proposed HLZ/DZ sites and will not be used during routine training events conducted by the 563 RQG.

Debris would detract from the visual qualities of these public lands and would further degrade the natural quality of habitat in southern Arizona. As a result of the training missions within the proposed HLZ/DZs, flares and light sticks would be generated as debris. However, light sticks

would be retrieved as much as practicable and the use of these materials are infrequent and intermittent (Davis-Monthan AFB 2002).

Potential visual impacts from HH-60 helicopters and HC-130 cargo aircraft and CSAR training activities would be considered minor and would not have a significant adverse effect on the character of the underlying visual resources.

4.3 Air Quality

4.3.1 No Action Alternative

Under the No Action Alternative, the use of the proposed additional HLZ/DZ training sites would not occur, and baseline conditions as described in the 2002 CSAR EA would remain unchanged. Implementation of the No Action Alternative would not change current training mission activities at Davis-Monthan AFB; therefore, there would be no additional impacts on air quality.

4.3.2 Proposed Action

Combustion air emissions from the HC-130 aircraft and HH-60 helicopter HLZ/DZ training were calculated using the FAA Emission and Dispersion Modeling System (EDMS) 5.1 air quality model (FAA 2008). The aircraft combustion emissions that occur during takeoff and landing at the airport are not included in the calculations because these emissions have already been described in the 2002 CSAR EA (Davis-Monthan AFB 2002). The combustion and fugitive dust emissions that occur remotely during the training missions after the HH-60 helicopters and HC-130 aircraft have left the region of the base airport were calculated.

Increases in fugitive dust (PM-10 and PM-2.5) air pollution would occur from the rotor wash of HH-60 helicopters during landing training maneuvers. Fugitive dust emissions for desert environments were calculated using emission factors developed for DoD by Gillies et al. (2007) who estimated that 1.1 pounds of PM-10 and PM-2.5 were produced during takeoff and 2.25 pounds of PM-10 and PM-2.5 were produced during landing.

The EDMS 5.1 model was used to estimate the total annual combustion emissions associated with training activities at each site. Each site can be expected to be used for an average of 150 times annually for HH-60 training missions and 48 times annually for C-130 aircraft training missions. A HH-60 training mission includes two helicopters performing takeoff and landing

maneuvers. Each helicopter may perform an average of 5 takeoff and landing maneuvers during each mission. An HC-130 aircraft training mission involves one aircraft performing up to 5 dropdown maneuvers (below 3,000 feet AGL) per mission. The assumptions for each training activities at each HLZ/DZ are presented below:

- Each HLZ/DZ site would be used for an average of 150 HH-60 helicopter training missions annually.
- Two HH-60 helicopters would visit the HLZ/DZ site during each training mission (2 x 150 = 300 helicopter visits per site annually)
- Each helicopter performs up to 5 takeoff and landings during each HH-60 helicopter mission visit (300 x 5 = 1,500 takeoff and landings at each site annually)
- Each HLZ/DZ site would be used for an average of 48 HC-130 aircraft training missions with up to 5 dropdowns during each training mission visit (48 x 5 = 240 dropdowns at each site annually)

The USEPA and ADEQ assess air quality impacts by county. The following air emission calculations estimates air quality impacts from use of the proposed HLZ/DZ sites by HH-60 helicopter training missions and HC-130 aircraft training missions for each county. The estimates include combustion emissions and fugitive dust (rotor wash) emissions. The compiled results for each county are summarized in Table 4-1 through 4-3 and presented in detail in Appendix E.

Table 4-1. Annual Air Emissions (tons/year) Produced by the Use of Nine Proposed HLZ/DZ Training Sites in Pima County

Pollutant	Total	*De minimis* Thresholds
CO	47.91	100
VOCs	3.98	100
NO_x	27.51	100
PM-10	22.61	100
PM-2.5	2.26	100
SO_2	6.25	100
CO_2 and CO_2 equivalents	15,271.42	27,557

Source: 40 CFR 51.853 and EDMS 5.1 model projections.
Pima County is in moderate non-attainment for PM-10 (USEPA 2013b).

Table 4-2. Annual Air Emissions (tons/year) Produced by the Use of Seven Proposed HLZ/DZ Training Sites in Cochise County

Pollutant	Total	*De minimis* Thresholds
CO	15.24	100
VOCs	1.65	100
NO_x	11.761	100
PM-10	17.59	100
PM-2.5	1.76	100
SO_2	2.46	100
CO_2 and CO_2 equivalents	6,003.21	27,557

Source: 40 CFR 51.853 and EDMS 5.1 model projections.
Cochise County is in moderate non-attainment for PM-10 (USEPA 2013b).

Table 4-3. Annual Air Emissions (tons/year) Produced by the Use of One Proposed HLZ/DZ Training Site in Each of Gila, Pinal, Santa Cruz, and Graham Counties

Pollutant	Total	*De minimis* Thresholds
CO	6.79	100
VOCs	1.82	100
NO_x	7.82	100
PM-10	2.51	100
PM-2.5	0.25	100
SO_2	1.09	100
CO_2 and CO_2 equivalents	2,652.32	27,557

Source: 40 CFR 51.853 and EDMS 5.1 model projections.
Pinal County is in moderate non-attainment for 8-hour O_3, SO_2, PM-2.5, and PM-10; Santa Cruz County is in moderate non-attainment for PM-10 and PM-2.5; Gila County is in moderate non-attainment for PM-10; and Graham County is in attainment for all NAAQS (USEPA 2013b).

Please note that the total combustion air emissions were compiled by county for all the HLZ/DZ remote training operations considered in this EA. The total combustion and fugitive dust emissions do not exceed the *de minimis* thresholds in any of the Cochise, Gila, Graham, Pima, Pinal, and Santa Cruz counties where training missions occur. Overall, the maximum net increases in 8-hour O_3, SO_2, PM-2.5, and PM-10 air emissions would be minor and well below the *de minimis* thresholds; therefore, the direct and indirect impacts on air quality would not be significant.

4.4 Noise

4.4.1 No Action Alternative

Under the No Action Alternative, the use of the proposed additional HLZ/DZ training sites would not occur, and baseline conditions as described in the 2002 CSAR EA would remain unchanged. Implementation of the No Action Alternative would not change current training mission activities at Davis-Monthan AFB; therefore, there would be no additional impacts on the noise environment.

4.4.2 Proposed Action

There would be no change in the number of flights or a change in flight patterns near airports, and there would be no change to the noise environment near airports or in the City of Tucson. The Air Force Noise Model SELCalc2 and satellite imagery were used to assess the noise exposure SELs and DNLs associated with the HLZ/DZs. Satellite imagery was used to locate the distance to the sensitive noise receptors adjacent to the HLZ/DZs (1-mile perimeter). No sensitive noise receptors were found at any of the proposed HLZ/DZ sites except for Jenna, Grapevine, and Stronghold, which are described below. SELs and DNLs were calculated for HH-60s for the following four scenarios at the Jenna, Grapevine, and Stronghold HLZ/DZ sites:

1. A fully loaded landing at the HLZ/DZ site.
2. A fully loaded takeoff at the HLZ/DZ site.
3. A flyover of the USFS lands at 500 feet AGL.
4. A single-event flyover of USFS lands at 3,500 feet AGL.

4.4.2.1 Noise Exposure at the Jenna, Grapevine, and Stronghold HLZ/DZs

The SELCalc2 model was used to estimate the noise impact (SELs and DNLs) during landing, takeoff, and flyover and a cumulative (DNL) exposure produced by HH-60 helicopters, fully loaded with cargo, on the sensitive noise receptors near the Jenna, Grapevine, and Stronghold HLZ/DZ sites. The SELs and DNLs were modeled at a point located near the southern border of the Coronado National Forest (2,400 feet south of the park) which is the closest point to Jenna HLZ/DZ; at the Grapevine Group Campground located 3,000 feet east of the Grapevine HLZ/DZ; and at the Half Moon Ranch cabin located 200 feet from the Stronghold HLZ/DZ, Cochise Stronghold campsite located approximately 2,000 feet away, Coronado National Forest, and the closest residential home located 2,300 feet from the Stronghold HLZ/DZ site. A summary of modeled results is presented in Table 4-4.

Table 4-4. Summary of SEL and DNL Noise Exposure from HH-60 on Sensitive Noise Receptors near Jenna, Grapevine, and Stronghold HLZ/DZ Sites

Sensitive Noise Receptors	Operation							
	Takeoff		Landing		Flyover 500 feet		Flyover 3,500 feet	
	SEL (dBA)	DNL (dBA)	SEL (dBA)	DNL (dBA)	SEL (dBA)	DNL (dBA)	SEL (dBA)	DNL (dBA)
Jenna HLZ/DZ:								
– **Coronado National Forest**	66	28	69	31	90	52	75	36
Grapevine HLZ/DZ:								
– **Grapevine Group Campground**	62	24	65	27	90	52	75	36
Stronghold HLZ/DZ:								
– **Half Moon Ranch Cabin**	92	54	95	57	90	52	75	36
– **Coronado** – **National Forest**	89	51	93	55	90	52	75	36
– **Campsite**	70	32	73	35	90	52	75	36
– **Residence**	67	29	70	32	90	52	75	36

Source: SELCalc model estimates.
*Includes three daytime and one night takeoff and landing in 24-hour period.

Although the DNL noise impacts presented above are below the land use compatibility thresholds described in Table 3-3 *Air Force Noise Policy Noise DNL and Land Use Compatibility* (DoDI 2011a), the training activities associated with the Proposed Action could potentially create SELs in excess of 85 dBA on the Coronado National Forest near Jenna HLZ/DZ, recreational receptors (campsites) near Grapevine HLZ/DZ, and residential and recreational receptors and Coronado National Forest adjacent to the Stronghold HLZ/DZ. Due to these impacts, the Grapevine and Stronghold sites will be removed from the list of proposed HLZ/DZ sites and will not be used during routine training events conducted by the 563 RQG. During training use, low-flying flight patterns over the Coronado National Forest north of the Jenna HLZ/DZ will be avoided so that the 85 dBA threshold is not exceeded over the USFS lands. The training personnel will be advised of this requirement prior to each training mission using the Jenna HLZ/DZ. With these implementations, the noise impacts would be considered minor to moderate, and no significant impacts would occur.

4.5 Socioeconomics and Environmental Justice

4.5.1 No Action Alternative

Under the No Action Alternative, the use of the proposed additional HLZ/DZ training sites would not occur, and baseline conditions as described in the 2002 CSAR EA would remain

unchanged. Implementation of the No Action Alternative would not change current training mission activities at Davis-Monthan AFB; therefore, there would be no additional impacts on socioeconomics and environmental justice.

4.5.2 Proposed Action

4.5.2.1 Socioeconomics

Additional use of the Stronghold HLZ/DZ would increase the frequency of noise from helicopter landings around the homes, rental cabins, campgrounds, dispersed camping areas, and equestrian trail in the area. While the DNL noise impacts are below the land use compatibility thresholds described in Table 3-3 *Air Force Noise Policy Noise DNL and Land Use Compatibility* (DoDI 2011a), the training activities associated with Proposed Action could potentially create SELs in excess of 85 dBA on the residential receptors and Coronado National Forest adjacent to the Stronghold HLZ/DZ. Residents of the private homes, located within 1 mile of the proposed HLZ/DZ off West Ironwood Road and West Hunt Road, would be expected to receive noise impacts if flights occur at low altitudes directly over the homes. At least four homes are occupied year-round, and at least two additional homes are weekend/holiday residences (USFS 2013b).

The two USFS cabins, rented as part of the "Rooms with a View" cabin rental program, would be impacted visually and by noise from additional flights to the Stronghold site. The use of the Stronghold site would also be expected to impact the ability of the USFS to rent the "Rooms with a View" cabins nearby, as renters in the area are typically seeking a quiet place to vacation. These visual and noise impacts on the cabin rentals would potentially impact revenues that are used for cabin maintenance.

There are no permanent residences in the area around the Grapevine HLZ/DZ. However, the Grapevine Group Campground and recreational users in the area would receive noise and visual impacts when there are flights associated with personnel recovery training. The training activities would increase the impacts on the Grapevine Group Campground and recreational users that are already occurring from the regular "fly-ins". Substantial and frequent use of the site could cause campers to seek other locations instead of the Grapevine site, thereby impacting use and revenues.

Due to these impacts, the Grapevine and Stronghold sites will be removed from the list of proposed HLZ/DZ sites and will not be used during routine training events conducted by the 563 RQG. There are no socioeconomic impacts associated with the remaining HLZ/DZ sites and no significant impacts would occur.

4.5.2.2 Environmental Justice

There are approximately four permanent residences in the area around the Stronghold site, with no children in the households (USFS 2013b). There are no permanent residences in the area around the Grapevine HLZ/DZ, so there would be no disproportionately high or adverse impacts on minority or low-income populations or children with the implementation of the Proposed Action.

4.6 Biological Resources

4.6.1 No Action Alternative

Under the No Action Alternative, the use of the proposed additional HLZ/DZ training sites would not occur, and baseline conditions as described in the 2002 CSAR EA would remain unchanged. Implementation of the No Action Alternative would not change current training mission activities at Davis-Monthan AFB; therefore, there would be no additional impacts on any biological resources in the areas of the proposed HLZ/DZs.

4.6.2 Proposed Action

Under the Proposed Action, minor, temporary impacts on plants and wildlife could occur during training use at the proposed HLZ/DZs. Wildlife species most directly impacted would be small mammal, reptile, and amphibian species. The majority of mobile animals, including birds, would generally escape to areas of similar habitat when disturbances occur. In general, vegetation at the sites would incur minor disturbances when training is occurring at the proposed HLZ/DZs.

Designated Critical habitat for Mexican spotted owl, a Federally threatened species and state-listed Wildlife of Special Concern species, exists within 5 miles of five of the proposed HLZ/DZ locations (see Table 3-14). Similarly, designated Critical Habitats for the southwestern willow flycatcher, a Federally threatened species and state-listed Wildlife of Special Concern species, exists within 5 miles of four of the proposed HLZ/DZ locations (see Table 3-14). While none of the HLZ/DZ locations are within designated Critical Habitat for these species, it is discussed due to proximity and migratory habits of these two species. However, because the sites do not

support preferred habitat for either of these species, it is highly unlikely that any disturbance to these species would occur. In addition to these bird species, three fish species (Gila chub, spikedace, and loach minnow) have designated Critical Habitat designations within 5 miles of the proposed Jeep HLZ/DZ. Because no waterways are located in or immediately adjacent to this site, no impacts would occur in regards to these three species, and no decreases in overall water quality of aquatic habitats away from any of the proposed HLZ/DZ locations are expected.

Although potential habitat for the jaguar, ocelot, and lesser long-nosed bat exists in the vicinity of the proposed HLZ/DZ sites, none of these species have been observed at or near the sites. The HLZ/DZs are located at sites that have been previously disturbed and no further ground disturbance is expected to occur with the Proposed Action. In addition, the training is anticipated to be temporary and sporadic.

Mine adits are sometimes used as roosting sites by the lesser long-nosed bat, a Federally endangered species and state-listed Wildlife of Special Concern species. These mine adits were found in the vicinity of, but not within, the Silvermine HLZ/DZ and alternate sites. SOPs will be established and properly implemented to ensure that these mine adits will be avoided, if the Proposed Action is implemented. If surveys or other observations reveal that the lesser long-nosed bats are roosting at the Silvermine HLZ/DZ and alternate sites, training will cease at the site until consultation with USFWS is accomplished.

Table 4-5 lists the protected, threatened, or endangered plant species that were found at the proposed HLZ/DZ sites.

Table 4-5. Threatened and Endangered and Protected Plant Species found at the Proposed HLZ/DZ sites

Proposed HLZ/DZ Site	Plant Species Found Within Site	Plants Species Found Immediately Adjacent to Site	Importance
Brooke	13 Palmer's Agave	Palmer's Agave	Palmer's agave is a primary food source for lesser long-nosed bat.
Caliente	Two Pima Pineapple Cactus	None	Pima pineapple cactus is a Federally endangered species and Highly Safeguarded in Arizona.
Jenna	None	Palmer's Agave	Palmer's agave is a primary food source for lesser long-nosed bat.
Paige	One Saguaro	None	Saguaro is Highly Safeguarded in Arizona and a primary food source for the lesser long-nosed bat.

Table 4-5, continued

Proposed HLZ/DZ Site	Plant Species Found Within Site	Plants Species Found Immediately Adjacent to Site	Importance
Pinnacle	One Palmer's Agave	None	Palmer's agave is a primary food source for lesser long-nosed bat.
Silvermine	One Saguaro within Silvermine Alternate Site	None	Saguaro is Highly Safeguarded in Arizona and a primary food source for the lesser long-nosed bat.

Figures 4-1 through 4-6 depict the location of these plants within the respective HLZ/DZ sites. The saguaro is not Federal or state-listed but is regarded as highly safeguarded in the State of Arizona and is a primary food source for the lesser-long nosed bat, which is considered Federally endangered and Wildlife of Special Concern in the State of Arizona. The saguaro within the Paige and Silvermine alternate HLZ/DZs are located on the very outer edge along the eastern borders of each site. The Palmer's agave is not Federal or state-listed but is a primary food source for the Federally endangered lesser-long nosed bat. There is one Palmer's agave located with the Pinnacle HLZ/DZ and several located with the Brooke HLZ/DZ. The two Pima Pineapple Cactus, which are considered Federally endangered, are located on the western edge of the Caliente HLZ/DZ site. These plant species will be avoided during training events and would not be impacted during the use of the HLZ/DZ sites. SOPs will be established to instruct the training personnel of this requirement, what plants to avoid, and where the plants are located at a specific site prior to each training mission.

The Air Force has determined that the Proposed Action may affect, but is not likely to adversely affect the jaguar, ocelot, lesser long-nosed bat, and Pima pineapple cactus. The Proposed Action would not result in any significant impacts on protected species or designated Critical Habitats.

4.7 Water Resources

Potential impacts on water resources are associated with construction of new facilities, renovation of existing facilities, aircraft maintenance activities, and increased personnel. Since no construction would occur at any of the HLZ/DZ sites or beneath any airspace unit proposed for use, the only potential impacts on water resources are associated with ground disturbance due to aircraft landings or drops.

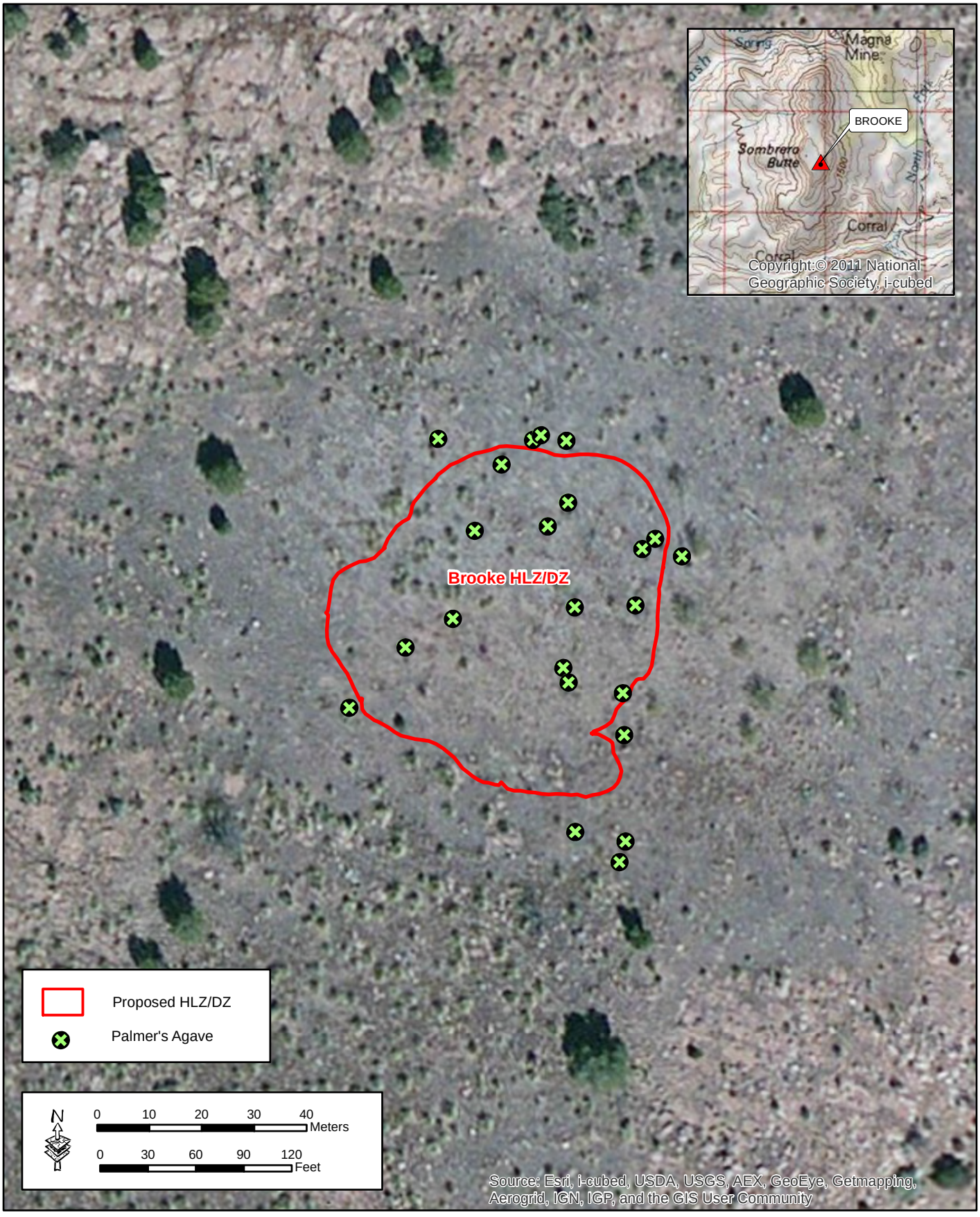

Figure 4-1. Sensitive Plant Species Located Within or Adjacent to Brooke HLZ/DZ

GSRC

July 2013

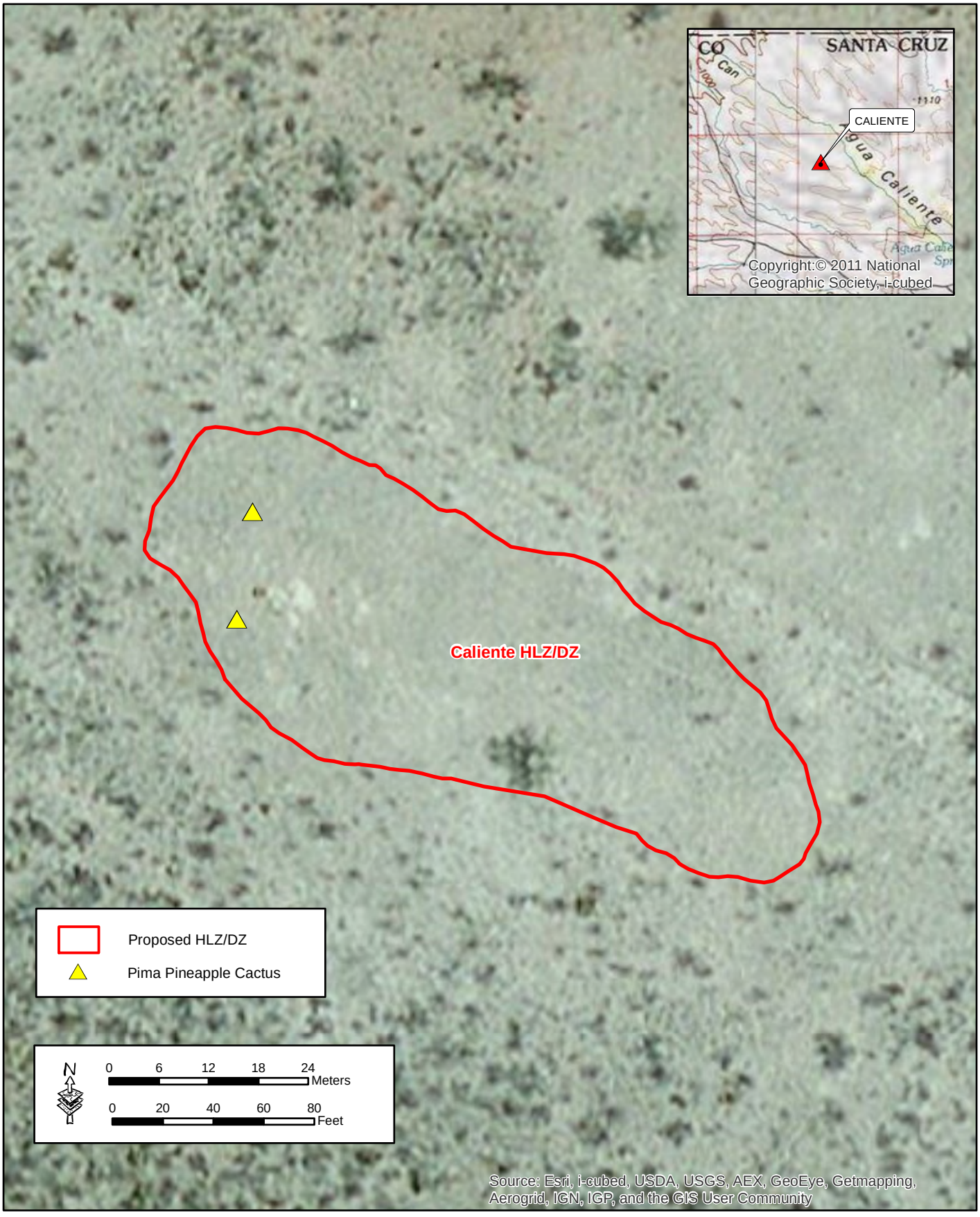

Figure 4-2. Sensitive Plant Species Located Within or Adjacent to Caliente HLZ/DZ

GSRC

July 2013

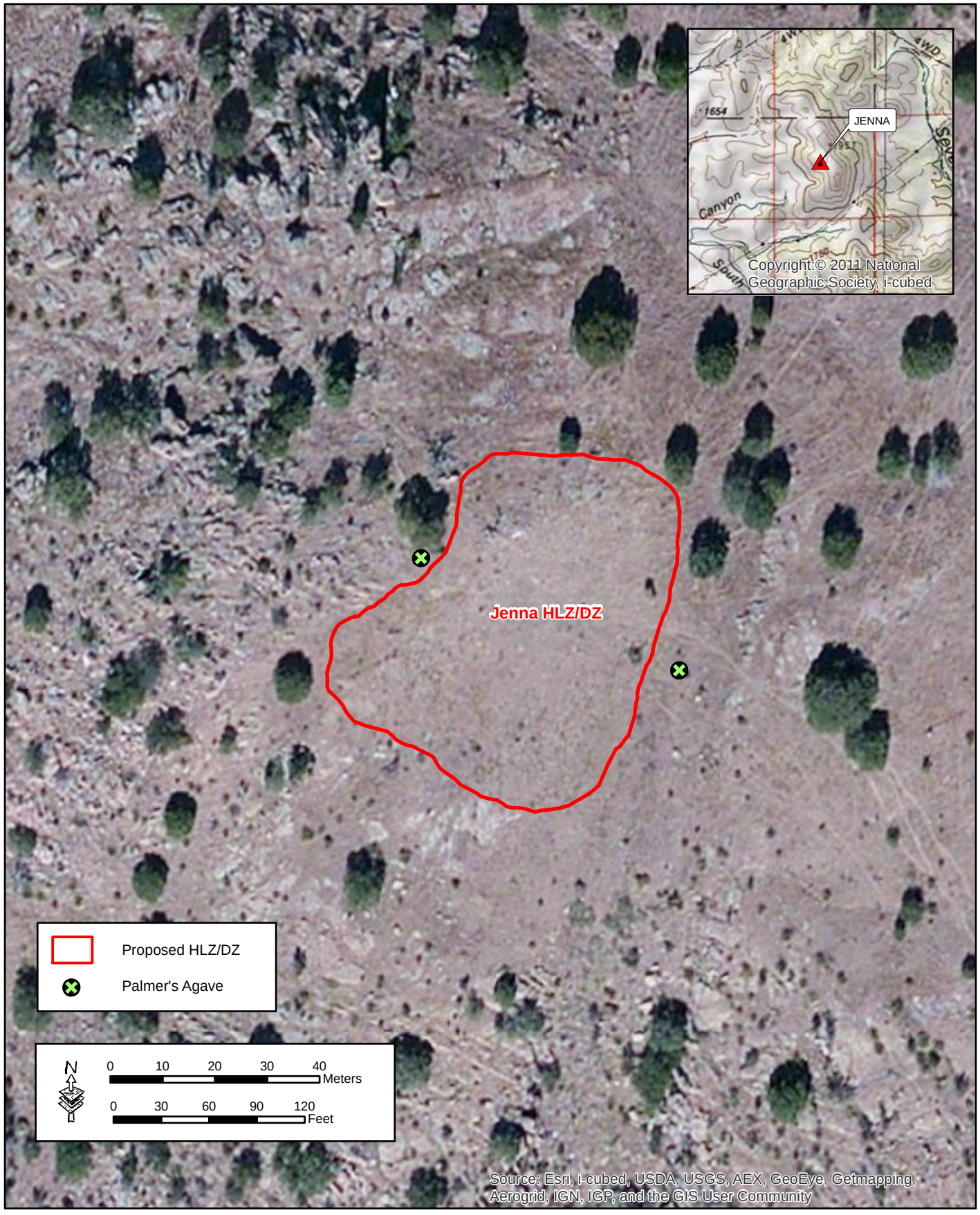

Figure 4-3. Sensitive Plant Species Located Within or Adjacent to Jenna HLZ/DZ

GSRC

July 2013

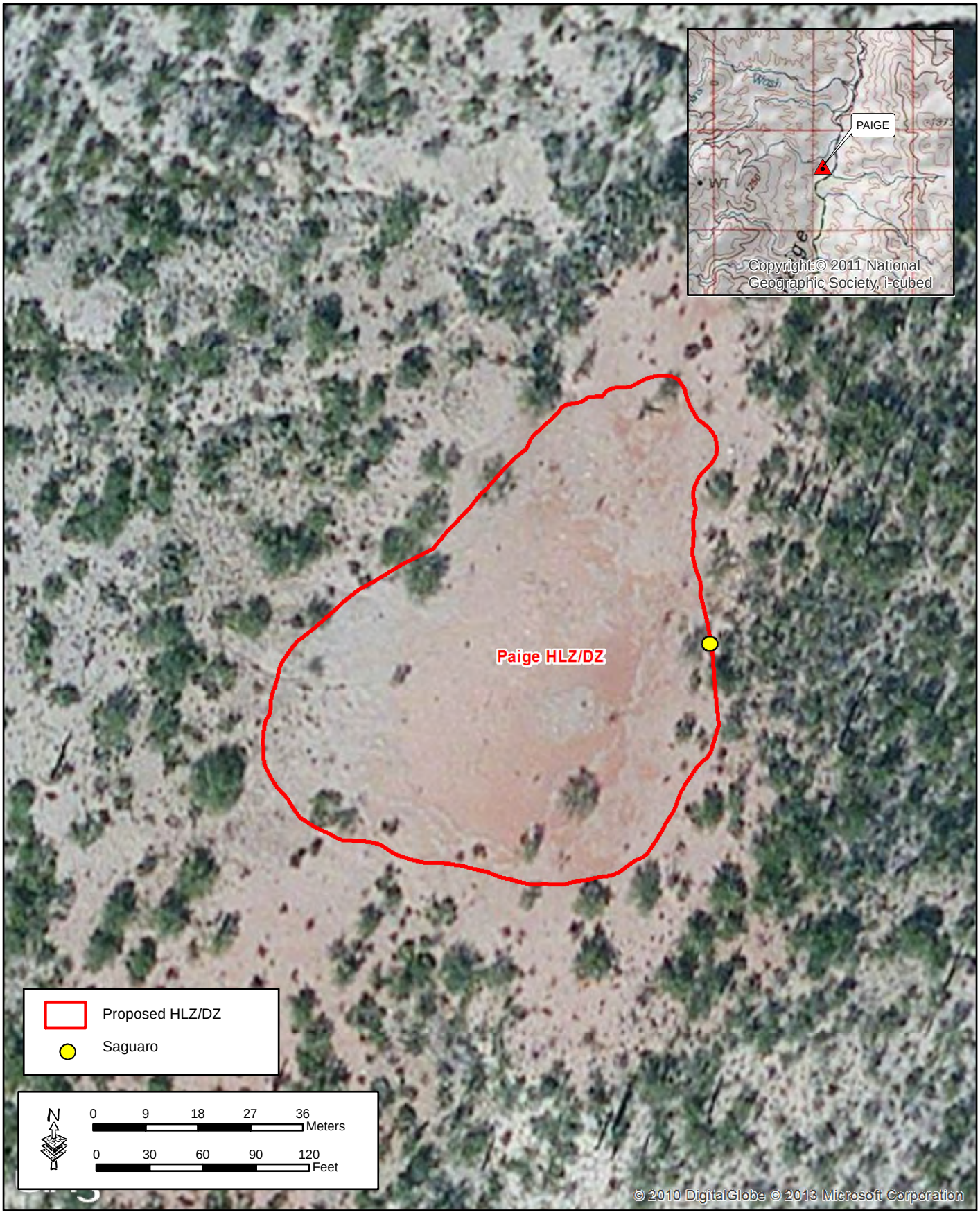

Figure 4-4. Sensitive Plant Species Located Within or Adjacent to Paige HLZ/DZ

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July 2013

Figure 4-5. Sensitive Plant Species Located Within or Adjacent to Pinnacle HLZ/DZ

GSRC

July 2013

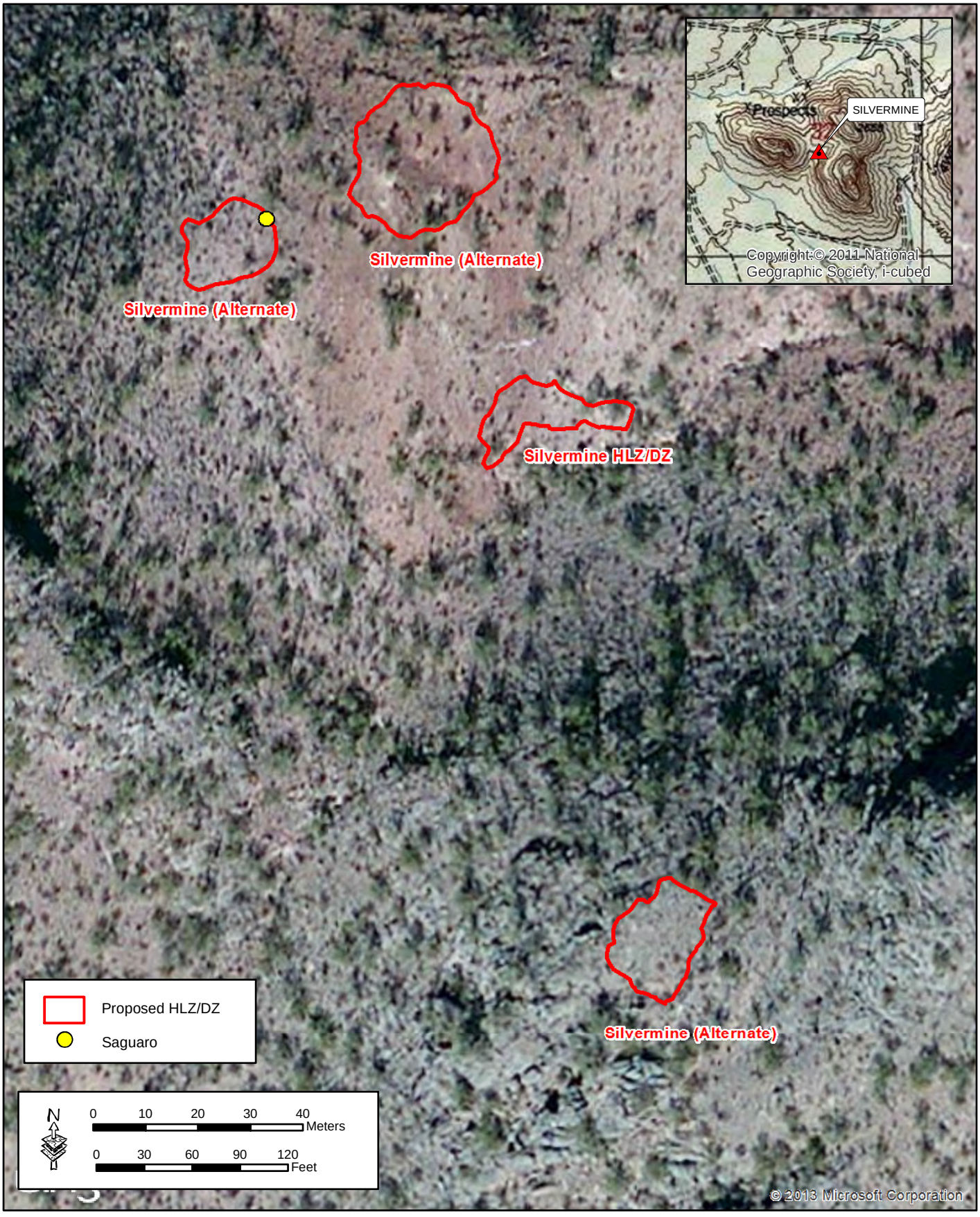

Figure 4-6. Sensitive Plant Species Located Within or Adjacent to Silvermine HLZ/DZ

GSRC

July 2013

4.7.1 No Action Alternative

Under the No Action Alternative, the use of the proposed additional HLZ/DZ training sites would not occur, and baseline conditions as described in the 2002 CSAR EA would remain unchanged. Implementation of the No Action Alternative would not change current training mission activities at Davis-Monthan AFB; therefore, there would be no additional impacts on any water resources in the areas of the proposed HLZ/DZs.

4.7.2 Proposed Action

4.7.2.1 Surface Water

Under the Proposed Action, no construction activities would occur. Only minimal ground-disturbing activities would take place during landing and takeoff. The low precipitation in the region results in little surface water runoff. The training activities would have no appreciable effects on the surface waters in the ROI including perennial or ephemeral streams and washes, natural lakes, or other open bodies of water. The Pond HLZ/DZ is typically dry during most of the year but holds water during the wet months (July through August) and training use of this site would be avoided when the pond is holding water. Impacts on surface waters at the proposed HLZ/DZ sites would be considered negligible; therefore, there would be no significant impacts with implementation of the Proposed Action.

4.7.2.2 Groundwater

There would be no construction or impervious surfaces associated with the Proposed Action; therefore, no effects on groundwater resources are expected. Ground disturbance associated with the personnel recovery training exercises would not reach depths that would affect groundwater resources. Impacts on groundwater at the proposed HLZ/DZ sites would be considered negligible; therefore, no significant impacts would occur.

4.7.2.3 Floodplains

None of the proposed HLZ/DZ sites are within a known 100-year floodplain. Therefore, no significant impacts on floodplains would occur as a result of implementation of the Proposed Action.

4.7.2.4 Wetlands or Waters of the U.S.

There were no wetlands found at any of the proposed HLZ/DZ sites during the biological survey. The Pond HLZ/DZ could potentially be considered a waters of the U.S. because of its location

adjacent to a wash; however, there would be no adverse impacts on the waters of the U.S. because no construction would take place and no dredged or fill material would be placed within the site. Therefore, there would be no significant impacts on wetlands or waters of the U.S. with implementation of the Proposed Action.

4.8 Hazardous Materials and Waste

Typically, aircraft that would operate in the airspace above the proposed sites would not generate or dispose of hazardous wastes in the airspace. Therefore, no further analysis of hazardous materials and wastes in the affected airspace is provided. The potential exists that the HH-60 helicopters used while deploying search and rescue training units could develop leaks or require unscheduled maintenance and, therefore, the need for the use of POL exists. Any spill of petroleum liquids (e.g., fuel) or material listed in 40 CFR 302 Table 302.4 (List of Hazardous Substances and Reportable Quantities) of a reportable quantity must be cleaned up and reported to the appropriate Federal and state agencies. Reportable quantities of those substances listed on 40 CFR 302 Table 302.4 would be included as part of the Davis-Monthan AFB base-wide SPCCP.

4.8.1 No Action Alternative

Under the No Action Alternative, the use of the proposed additional HLZ/DZ training sites would not occur, and baseline conditions as described in the 2002 CSAR EA would remain unchanged. Implementation of the No Action Alternative would not change current training mission activities at Davis-Monthan AFB; therefore, there would be no impacts associated with hazardous and non-hazardous materials and their management.

4.8.2 Proposed Action

Under the Proposed Action, the likelihood for leaks or unscheduled maintenance of helicopters is minimal. Should an accidental release or spill of hazardous substances or POL occur, the Davis-Monthan AFB base-wide SPCCP would be implemented.

The Pipeline site is located over an EPNG high-pressure gas transmission line. Releases of natural gas from gas transmission pipelines pose a primarily acute hazard. Should an ignition source exist, a release or leak of natural gas can result in an immediate fire or explosion near the point of the release. The hazard is reduced over a relatively short period after the release ends as the gas disperses (U.S. Department of Transportation 2010). Utilizing nationwide

incident data from 2005 to 2009 to aid in determining relative risks, the rate of serious incidents per 1,000 miles per year for gas transmission pipelines (on-shore) is 0.020 (U.S. Department of Transportation 2010). No excavations of any kind are proposed at the Pipeline site, so the potential for a release or leak of natural gas is extremely low, and the risk is, therefore, considered insignificant.

Debris would detract from the visual qualities of these public lands and would further degrade the natural quality of habitat in southern Arizona. As a result of the training missions within the proposed HLZ/DZs, light sticks would be generated as debris. However, light sticks will be retrieved as much as practicable, and the use of these materials per the Proposed Action are infrequent and intermittent (Davis-Monthan AFB 2002). SOPs will be established and properly implemented to ensure that any debris generated by the training missions of the Proposed Action, including dropped material from the HC-130 cargo aircraft, will be gathered at the end of the training mission, brought back to Davis-Monthan AFB, and subsequently transported by a licensed contractor to one of the municipal city or county landfills. Therefore, impacts due to debris would be insignificant.

Hazardous materials and waste impacts at the proposed HLZ/DZ sites would be considered minor; therefore, there would be no significant impacts with implementation of the Proposed Action.

4.9 Cultural Resources

Procedures for identifying, evaluating, and mitigating impacts on cultural resources have been established through Federal laws and regulations including the NHPA, ARPA, NAGPRA, and the American Indian Religious Freedom Act. An undertaking affects a significant resource when it alters the property's characteristics, including relevant features of its environment or use that qualify it as significant according to NRHP criteria. Effects may include physical destruction, damage, or alteration of all or part of the resource; alteration of the character of the surrounding environment that contributes to the resource's qualifications for the NRHP; introduction of visual, audible, or atmospheric elements out of character with the resource or its setting; or neglect of the resource resulting in its deterioration or destruction.

Potential impacts are assessed by 1) identifying project activities that could directly or indirectly affect a significant resource; 2) identifying the known or expected significant resources in areas

of potential impact; and 3) determining whether a project activity would have no effect, no adverse effect, or an adverse effect on significant resources (36 CFR 800.9). Impacts on cultural resources may occur from changes in the setting caused by visual or audible intrusions or ground-disturbing activities.

4.9.1 No Action Alternative

Under the No Action Alternative, the use of the proposed additional HLZ/DZ training sites would not occur, and baseline conditions as described in the 2002 CSAR EA would remain unchanged. Implementation of the No Action Alternative would not change current training mission activities at Davis-Monthan AFB; therefore, there would be no additional impacts on cultural resources.

4.9.2 Proposed Action

A pedestrian archaeological survey was performed on the HLZ/DZ locations across southern Arizona (Davis-Monthan AFB 2013a). The pedestrian survey of the HLZ/DZs resulted in the identification of two new and previously unidentified archaeological sites. AZ BB:15:92(ASM) is a prehistoric habitation site that encompasses the Paige HLZ/DZ, and AZ BB:15:93(ASM) is a prehistoric habitation site that encompasses the Pedro HLZ/DZ. Both sites have a large number and diversity of artifacts and features, and a high potential for buried cultural materials. Davis-Monthan AFB recommends both sites as eligible for the NRHP under Criterion D for their research potential. Both sites have been removed from the list of proposed HLZ/DZ training sites to prevent adverse effects on both properties by activities associated with the personnel recovery training. The results of the surveys showed that the remaining 18 of the 20 HLZs had no cultural resources within the HLZ/DZs. The Arizona SHPO concurred with the finding of No Adverse Effect in a letter dated July 12, 2013 (Appendix A).

Visual intrusions under the Proposed Action would be minimal and would not represent an increase over baseline conditions sufficient to cause adverse effects on the settings of cultural resources. The Proposed Action would not increase the annual sorties conducted by personnel recovery aircraft that were already analyzed in the 2002 CSAR EA. The Proposed Action only increases the number of HLZ/DZ locations available for training use. Due to the high altitude (3,500 feet) of the overflights and relatively small size of the helicopters, the aircraft would not be readily visible to observers on the ground. Visual screening relative to the viewer, such as mountains and hills, play an important role in minimizing impacts from aircraft overflights. Chaff

and flares would not be expected to be deployed from the aircraft during overflights or at any of the proposed HLZ/DZ sites and would not pose a visual intrusion.

Sources of potential noise effects include intrusions on settings of cultural resources from subsonic and supersonic noise, and overpressures (vibration) resulting from sonic booms associated with supersonic flight. Proposed training activities would use existing aircraft, which include the HC-130 cargo aircraft and HH-60 helicopters. These aircraft do not fly faster than the speed of sound, so there would be no supersonic noise and thus no potential impacts on cultural resources associated with the Proposed Action. All aircraft would operate within existing MOAs, overlying ATCAA, restricted airspace, and ranges, performing similar types of combat training missions currently conducted in these airspace units. Past and current military actions that utilize the same airspace proposed for personnel recovery activities have occurred. Beddown of the F-35A aircraft at Luke AFB in Phoenix and Tucson International Airport (TIA) has been assessed in an EIS. The EIS evaluated the replacement of F-16 aircraft with F-35A, as well as the required formal training support for the F-35A aircrew force. The same airspace utilized for this project is proposed for use for the current personnel recovery activities (ACC 2012). The Arizona SHPO concurred in 2012 that this undertaking would have no adverse effect on cultural resources. The proposed personnel recovery activities would use much quieter aircraft (HC-130 cargo aircraft and HH-60 helicopters) than the F-35A.

The noise analysis accounts for subsonic noise, which is quantified by DNL. The analysis demonstrated that subsonic noise would not exceed DNL 65 dB at any location under the airspace during overflights, and would not change perceptibly from current conditions. This is based on a worst case scenario of three flights per day and one flight per night. Since observers would not notice any change and less than DNL 65 dB is compatible with DoD criteria for residences, lodging, and medical facilities, it can be presumed that subsonic noise associated with overflights would not intrude on or adversely affect the setting of any cultural resources.

No adverse effects due to visual or noise intrusions from overflights would result on NRHP-eligible or listed archaeological resources, architectural resources, or traditional cultural properties. No supersonic flights or sonic booms would occur; therefore, there would be no vibrational damage to historic structures.

4.10 Earth Resources

4.10.1 No Action Alternative

Under the No Action Alternative, the use of the proposed additional HLZ/DZ training sites would not occur, and baseline conditions as described in the 2002 CSAR EA would remain unchanged. However, if the proposed HLZ/DZ sites are not used there is a possibility that the existing HLZ/DZ sites could be used more frequently causing a higher potential for soil erosion around the existing sites due to propeller/rotor wash. Therefore, implementation of the No Action Alternative would have minor impacts on soils specifically, or earth resources in general.

4.10.2 Proposed Action

The Proposed Action would not affect the geology or the topography of the project area. The Proposed Action sites are all located on Federal or state land and most have been previously disturbed. No construction or significant ground disturbance would be expected at the identified or potential future sites. The use of HH-60 helicopters for deployment of search and rescue units would impact soils during takeoff and landing due to erosion from propeller wash and would potentially be a greater concern should HLZ/DZs be sited near stream banks. However, the training events at these sites would be temporary and intermittent, and the soil disturbance would primarily occur in previously disturbed areas. The impacts would be greater at the sites that are used more frequently (up to 260 times per year) but would still be considered minor. For sites that are located near stream banks, dust control methods could be utilized (USFS 1998). The use of a rock circle is one possible method for minimizing the movement of soil into streams and would also serve to further demarcate the landing area and keep the helicopter deployment within a site as far as possible from any adjacent stream bank areas. Another dust control method could be the use of a dust suppressant, such as water, to wet the area. The use of dust control methods near stream banks would reduce the potential for soil to travel into streams. The potential impacts on soils would be minor, and no significant impacts on soils would occur as a result of implementation of the Proposed Action.

4.11 Safety and Occupational Health

4.11.1 No Action Alternative

Under the No Action Alternative, the use of the proposed additional HLZ/DZ training sites would not occur, and baseline conditions as described in the 2002 CSAR EA would remain unchanged. Implementation of the No Action Alternative would not change current training

mission activities at Davis-Monthan AFB; therefore, there would be no additional safety and occupational health impacts.

4.11.2 Proposed Action

There would be no significant increase in safety hazards or occupational health hazards associated with the Proposed Action. Detailed SOPs have been established to fulfill many health and safety requirements. Personnel involved with different equipment, including aircraft, would be instructed on the use of the equipment and PPE. Hazardous materials associated with the aircraft are minor. Light sticks would be used during training exercises but would not represent a safety risk, because they are not considered to be toxic.

Aircraft Mishaps

Under the Proposed Action, sortie operations would not increase from the baseline activities described in the 2002 CSAR EA, and there should not be an increase in potential for a Class A mishap. Based on the total flying hours proposed for aircraft operations within affected airspace, there would be an HH-60 Class A mishap every 29 years and an HC-130 Class A mishap every 231 years. These mishap rates are extremely low and would not result in significant impacts on safety. Health and safety risks due to the potential for aircraft mishaps are reduced at Davis-Monthan AFB through safety practices including the use of airspace southeast of the base for airfield departures and arrivals, to the maximum extent possible and consistent with established safety procedures; traffic patterns are flown to minimize overflights of populated areas; and operational areas for aircraft are sparsely populated areas.

BASH

Under the Proposed Action, there would not be an increase in the amount of bird-aircraft strikes. The Proposed Action would not create or enhance locales attractive to concentrations of birds, nor would the current flight tracks at the base change. The Davis-Monthan AFB BASH plan (Davis-Monthan AFB 2013b) establishes procedures to minimize aircraft exposure to potentially hazardous bird/wildlife strikes where Davis-Monthan AFB units conduct flying operations. The BASH plan is based on hazards from indigenous bird populations, seasonal bird migration, and any other wildlife. While low-level flying activities are associated with personnel recovery activities, all initiatives affecting bird populations are already closely coordinated to minimize BASH. Local flying procedures avoid direct overflight of areas where migratory birds are predominantly located, and the AHAS and BAM help predict where birds would be located in the

operations area. Therefore, no significant impacts on bird-strike hazards would occur with implementation of the Proposed Action.

In-Flight Refueling

In-flight refueling would take place in authorized air refueling areas within existing MOAs under the Proposed Action or along published Air Refueling tracks. In-flight refueling is not considered to be a high-risk flying activity, even though fuel spills can potentially occur during in-flight refueling. Air refueling that would be accomplished under the proposal between HH-60 and HC-130 aircraft would follow all established procedures for in-flight refueling operations, and required separation would be maintained between aircraft to minimize flight risks. In addition, the number of HH-60 and HC-130 wet-refueling operations is minimal (approximately 1 of every 5 practice refuelings), with associated low safety risks resulting from fuel spills. There would be no significant impacts due to air refueling under the Proposed Action.

Fire and Crash Safety

Davis-Monthan AFB meets Air Force requirements for the amount and type of fire and crash equipment, as well as for the number of personnel necessary to handle an aircraft mishap. Therefore, no significant impacts on fire and crash safety would occur with implementation of the Proposed Action.

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SECTION 5.0
CUMULATIVE IMPACTS AND OTHER ENVIRONMENTAL CONSIDERATIONS

5.0 CUMULATIVE IMPACTS AND OTHER ENVIRONMENTAL CONSIDERATIONS

This section of the SEA addresses the potential cumulative impacts associated with the implementation of the alternatives and other projects/programs that are planned for the region. The CEQ defines cumulative impacts as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions" (40 CFR 1508.7). This section continues, "Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."

USEPA suggests that analysis of cumulative impacts should focus on specific resources and ecological components that can be affected by the incremental effects of the proposed actions and other actions in the same geographic area. This can be determined by considering:

- Whether the resource is especially vulnerable to incremental effects;
- Whether the proposed action is one of several similar actions in the same geographic area;
- Whether other activities in the area have similar effects on the resource;
- Whether these effects have been historically significant for this resource; and
- Whether other analyses in the area have identified cumulative effects.

Additionally, the analysis should consider whether geographic and time boundaries large enough to include all potentially significant effects on the resources of concern have been identified. Geographic boundaries should be delineated and include natural ecological boundaries and the time period of the project's effects. The adequacy of the cumulative impact analysis depends upon how well the analysis considers impacts that are due to past, present, and reasonably foreseeable actions. This can be best evaluated by considering whether the environment has been degraded (to what extent); whether ongoing activities in the area are causing impacts; and the trend for activities and impacts in the area. The ROI for cumulative impacts analysis includes Davis-Monthan AFB, the restricted airspace surrounding the base, and Cochise, Gila, Graham, Pima, Pinal, and Santa Cruz counties. Specific projects that have occurred, those currently taking place, and those projected for the future are identified in subsequent subsections.

As an active military installation, Davis-Monthan AFB experiences changes in mission and training requirements in response to defense policies, current threats, and tactical and technological advances. As a result, the base requires new construction, facility improvements, infrastructure upgrades, and maintenance and repairs on an ongoing basis. Although such known construction and upgrades are a part of the analysis contained in this SEA, some future requirements cannot be predicted. As those requirements surface, future NEPA analysis will be conducted, as necessary.

5.1 Past and Present Activities at or near Davis-Monthan AFB

5.1.1 Military Projects

Numerous changes have recently occurred or are being planned in around Davis-Monthan AFB. Other recent or ongoing actions at Davis-Monthan AFB proper are summarized below. Other military actions surrounding Davis-Monthan AFB that could contribute to the cumulative impacts are discussed in the subsequent paragraphs.

- Total Force Training (TFT), formerly known as Operation Snowbird, is a year-round training mission designed to build and maintain the readiness of active, reserve, and guard units, as well as foreign ally units, all of which increasingly require greater interoperability during overseas deployments. The TFT program is managed by ANG's 162d Wing (162 WG), Detachment 1, and is managed separately from the 162 WG activities that are operated out of DMAFB. Operation Snowbird was established in 1975 and was designed and implemented to allow ANG units from bases located in northern latitudes (or "northern tier") to train in optimal weather conditions and vast airspace over southern Arizona, primarily during the winter months. A Draft EA assessing current and proposed flight activities under the TFT mission at DMAFB has been recently released to the public and is currently (2015) being finalized.
- Angel Thunder is a joint-services exercise conducted at Davis-Monthan AFB. It generally occurs every 18 months and focuses on search and rescue training missions. This exercise has included use of the same airspace that TFT and Davis-Monthan AFB typically use, including the BMGR. The exercise also involves ground ranges at BMGR. A variety of aircraft, including helicopters, may use restricted and military airspace during such an exercise. These areas and activities would overlap with areas identified for Personnel Recovery training for the Proposed Action at Davis-Monthan AFB. However, the timing would likely not overlap, to avoid conflicts with available airspace.
- Beddown of the F-35A aircraft at Luke AFB in Phoenix has been assessed in an EIS. The Final EIS and signed Record of Decision were released in June 2013. The proposal evaluated the replacement of F-16 aircraft with F-35A and the required formal training support for the F-35A aircrew force. The Air Force will bed down an additional 72 F-35A training aircraft at Luke AFB for a total of 144 F-35A aircraft (U.S. Air Force 2013).
- Several Capital Improvement Projects are being considered at Davis-Monthan AFB; these projects include military construction of housing, recreation, and administration facilities. All projects would be constructed within previously disturbed areas.

- The 162 FW plans to construct and demolish facilities to improve current base layout, relocate an entry gate, relocate a munitions storage area, and provide new facilities, renovation, and a holding apron. This project includes acquisition of 22.7-acre, 5.4-acre, and 7.4-acre parcels for redevelopment plans, and will disturb about 7 acres from short- to long-range time frame.
- The United Arab Emirates (UAE) left Tucson AGS in December 2010 with 13 Block 60 F-16 aircraft. UAE had trained with the 162 FW since June 2004. However, the Royal Netherlands Air Force has announced that it will train with the 162 FW at TIA and will bring 12 F-16s. The total program will provide 3,000 flying hours per year. The transition from the UAE to Dutch training programs offset each other.
- The F-16 Block 25 aircraft currently assigned to 162 FW are coming to the end of their operational lifespan. ANG proposes to replace the Block 25 aircraft with Block 32 aircraft in a one-for-one exchange. The F-16 Block 32 aircraft would operate at TIA and in the airspace in the same manner that the F-16 Block 25 aircraft do currently.
- Luke AFB prepared an EIS to address several range projects that add new target areas for air-to-ground missiles, mobile vehicle targets, reconfiguration of existing range for helicopter training, new sensor training area, improvements of ground training exercises, infrastructure and road improvements, lowering of operational airspace floor to 500 feet AGL over Cabeza Prieta National Wildlife Refuge, and a new taxiway and air traffic control tower at Gila Bend Air Force Auxiliary Field.

In addition to these training missions and military construction projects, the 355 FW manages and supports flight operations at Davis-Monthan AFB that include daily training sorties. A-10 pilots are trained in providing close air support, forward air control, and CSAR. Some of these activities require pilots to perform flying operations at and within the airspace surrounding Davis-Monthan AFB. Other Air Force units, such as the 55th Electronic Combat Group, also use Davis-Monthan AFB runways and airspace on a daily basis. Davis-Monthan AFB total about 218 flight operations on an average busy day.

5.1.2 Other Federal, State, and Local Actions Surrounding Davis-Monthan AFB

Other past, current, and future Federal actions in the area could also contribute to cumulative effects of the Proposed Action (or alternatives). Federal agencies with jurisdiction within the ROI include the FAA, Federal Highway Administration (FHWA), and U.S. Customs and Border Protection (CBP). Potential actions within the area and occurring in the same time frame or in the same general area of Davis-Monthan AFB were identified and considered in preparation of this Draft SEA. CBP recently constructed a U.S. Border Patrol (USBP) station and sector headquarters adjacent to Davis-Monthan AFB at the intersection of Golf Links Road and Swan Road. In addition, CBP recently constructed an evidentiary vault in the northwestern part of the base, near the east side of the runway. CBP and USBP routinely use Davis-Monthan AFB

runways and airspace for patrol and evidentiary transport missions. The FHWA, in cooperation with the Arizona Department of Transportation (ADOT) recently completed major improvements to Interstate 10. The FAA and TIA recently completed improvements to the runways at TIA. The BLM prepared an EIS to address the proposed SunZia Southwest Transmission Project which plans to construct and operate two 500-kilovolt transmission lines originating at a new substation in Lincoln County in the vicinity of Corona, New Mexico, and terminating at the Pinal Central Substation in Pinal County, Arizona. Approximately 185 miles would be located on Federally administrated lands in New Mexico and Arizona.

5.1.3 Non-Federal Actions Near Davis-Monthan AFB

Non-Federal actions include State of Arizona, county, and private projects. General ongoing state activities include oil, gas, and grazing leases on state trust lands, land exchanges, road projects, and improvements to state parks and monuments. The primary actions that have recently occurred, or that are being planned, include surface road improvements.

5.2 Cumulative Effects Analysis

Other military actions in the region overlap in space or time with the Proposed Action, particularly within the airspace above the BMGR; however, these overlaps have historically been handled through intense, coordinated scheduling. This scheduling has not resulted in major cumulative impacts. There is potential interaction with some ongoing and recent projects, described above, to have the potential to either increase or offset possible environmental consequences. The following sections describe what these potential outcomes may be.

5.2.1 Airspace, Noise, and Safety

Airspace management and air safety are vulnerable to incremental effects, and if the cumulative actions were to overload the capacity of the airspace or the controller's ability to manage flight activity, then cumulative impacts would be considered significant. Several actions have taken place at Davis-Monthan AFB over the last decade that have increased or decreased operations and changed aircraft type, number of operations, and support staff. As a result, airspace demand, safety issues, and noise levels at the airfield and surrounding areas have also varied. Davis-Monthan AFB has historically experienced noise levels much higher than would be expected under the Proposed Action. Most other actions at or surrounding Davis-Monthan AFB may produce localized noise increases, primarily from ground activities (such as weapons firing ranges, field training exercises or military construction projects), so cumulative noise impacts

would be localized and primarily on Federally owned land. Since there would be no additional sorties over those analyzed in the 2002 EA, the noise emissions from the HH-60 and HC-130 aircraft would be insignificant compared to existing operations at Davis-Monthan AFB, and this would not result in a significant cumulative impact on ambient noise levels.

Cumulative effects on regional airspace would occur where the airspace is used and controlled by FAA and DoD, requiring more coordination between airspace managers and users to satisfy their respective missions. However, Personnel Recovery training flights would be scheduled to ensure that the airspace is safely allocated and no conflicts with other training occur.

The cumulative impacts identified for airspace, ranges, noise, or safety would not be significant, but will likely require more coordination between Albuquerque ARTCC, the FAA Central Service Region, and military airspace managers, especially during other training missions and exercises such as OSB and Angel Thunder. In addition, more coordination between airspace managers and users to satisfy their respective missions would be required, as completion of the F-35A beddown comes to fruition, the level of use of restricted airspace in southern Arizona would increase (if it occurs at Luke AFB or TIA).

5.2.2 Air Quality

The potential cumulative air quality impacts would result from operations occurring below 3,000 feet AGL and during takeoff and landings. Emissions created by aircraft training activities were addressed in Section 4.3 and, as noted, would be well below *de minimis* threshold levels. Cochise, Gila, Pinal, Pima, and Santa Cruz counties are considered in moderate non-attainment for PM-10, and Pinal and Santa Cruz counties are considered in moderate non-attainment for PM-2.5. The Proposed Action would not be expected to contribute to cumulative effects of PM-10 or PM-2.5, since there would be no ground disturbances such as construction. Other Federal and non-Federal construction projects could contribute to cumulative increases in PM-10; the magnitude of these effects would depend on climatic conditions, size of the areas disturbed, timing and location of the construction in relation to other projects, and implementation of best management practices, such as watering to control fugitive dust, revegetation of disturbed sites, and use of pavement or soil binders on unimproved roads and parking lots. Personnel Recovery training missions would contribute to an increase in CO emissions and fugitive dust; however, there would not be additional sorties associated with the Proposed Action. And as noted previously, these emissions would be well below *de minimis*

thresholds. Consequently, Personnel Recovery training activities, in combination with other Federal and non-Federal activities including the proposed F-35A Beddown, would not create major increases in CO emissions. No other adverse cumulative impacts on the region's airshed are anticipated as a result of the Proposed Action or other ongoing or proposed actions in the region.

U.S. military aircraft used approximately 0.5 percent of the aviation fuel consumed in 2000. Historically, the aviation sector has been estimated to emit about 2.6 percent of the Nation's GHG emissions; thus, U.S. military aircraft contribute a very small portion of these gases (U.S. General Accounting Office [GAO] 2000). Currently, no universal standard has been accepted to determine the significance of cumulative impacts of GHG emissions. In the absence of any controlling standard, the emissions associated with the Personnel Recovery operations would not be expected to significantly contribute to climate change on a cumulative basis and would not significantly add to the GHG emissions occurring nationwide or globally.

5.2.3 Socioeconomics and Environmental Justice

The balance of ongoing and anticipated military actions is likely to have a long-term, strong positive effect on regional economy, even though there may be local differences in effects. The Proposed Action would not cause any significant cumulative impacts on the regional economy or cumulative disproportionate impacts on minorities and low-income populations relative to the COC. The incremental effects of the proposed training missions and training exercises, in combination with potential impacts associated with the past and reasonably foreseeable future actions described in this section, would not be expected to have any major adverse cumulative effects on minority or low-income populations or on children.

5.2.4 Biological Resources

Cumulative impacts on native flora and fauna have and do occur on surrounding public and private lands due to grazing, off-road traffic, recreational vehicles, introduction of non-native species, and development. These activities, especially ground-disturbing activities, could result in cumulative impacts on wildlife and their habitats. However, the Proposed Action would not cause any significant impacts on biological resources because the sites would be used sporadically and for short durations and no significant ground-disturbing activities would occur; therefore, the Proposed Action would not significantly contribute to those cumulative impacts.

5.2.5 Land Use, Earth, and Water Resources

The effects on land use, earth (i.e., soil, topography), and water resources associated with the Proposed Action are negligible to minor, and most occur in fairly remote areas that do not coincide with areas where other ground-disturbing activities occur or may increase in the region. Most of the land use within the project area is for cattle grazing. No construction or ground-disturbing activities would occur with the Proposed Action; thus, no significant cumulative impacts on land use, earth, and water resources are anticipated. No other major ground-disturbing activities have been identified that could result in cumulative impacts on soils and water resources.

5.2.6 Hazardous Materials and Waste

Significant cumulative impacts would occur if an action created a public hazard, the site was considered a hazardous waste site that poses health risks, or the action would impair the implementation of an adopted emergency response or evacuation plan. All past, present, and future projects incorporate measures to limit or control hazardous materials and waste into the design and operation plan of the facility. Therefore, the effects of the Proposed Action, when combined with other ongoing and proposed projects within the project area, would not be considered a significant cumulative impact.

5.2.7 Cultural Resources

Any Federal project in the region that includes ground-disturbing activities has the potential to adversely affect cultural resources and is subject to NEPA compliance and Section 106 consultation. Such projects include construction, oil and gas development, off-road tracked vehicle training, pipelines or other facilities, highway work, or any other ground-disturbing undertaking that affects public land. However, appropriate coordination would be conducted to avoid or mitigate any adverse impacts should any buried resources be discovered during any type of ground-disturbing activities. Consequently, no significant cumulative impact on historic properties is expected as a result of the Proposed Action.

5.3 Other Environmental Considerations

5.3.1 Relationship between Short-Term Uses and Long-Term Productivity

CEQ regulations (Section 1502.16) specify that environmental analysis must address "…the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity." Special attention should be given to impacts that

narrow the range of beneficial uses of the environment in the long-term or pose a long-term risk to human health or safety. This section evaluates the short-term benefits of the proposed alternatives compared to the long-term productivity derived from not pursuing the proposed alternatives.

A short-term use of the environment is generally defined as a direct temporary consequence of a project in its immediate vicinity. Short-term effects could include localized disruptions and higher noise levels. Under the Proposed Action, short-term uses of the environment would result in noise from aircraft operations. Noise generated by Personnel Recovery training would be temporary and sporadic, and would not be expected to result in long-term adverse effects on noise-sensitive receptors, wildlife, or livestock. The long-term impacts of the Personnel Recovery training missions would primarily involve additional use of airspace. These changes in airspace use would not impact the long-term productivity of the land and natural resources.

5.3.2 Irreversible and Irretrievable Commitment of Resources

NEPA CEQ regulations require environmental analyses to identify "...any irreversible and irretrievable commitments of resources which would be involved in the Proposed Action should it be implemented" (40 CFR Section 1502.16). Primary irreversible effects result from permanent use of a nonrenewable resource (e.g., minerals or energy). Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the action (e.g., disturbance of a cultural site) or consumption of renewable resources that are not permanently lost (e.g., old growth forests). Secondary impacts could result from environmental accidents, such as explosive fires. Natural resources include minerals, energy, land, water, forestry, and biota. Nonrenewable resources are those resources that cannot be replenished by natural means, including oil, natural gas, and iron ore. Renewable natural resources are those resources that can be replenished by natural means, including water, lumber, and soil.

No irretrievable commitment of natural or cultural resources is expected as a result of the implementation of the Proposed Action. Military training necessarily involves consumption of nonrenewable resources, such as gasoline for vehicles/aircraft and jet fuel for aircraft.

Secondary impacts on natural resources could occur in the unlikely event of an accidental fire, such as one caused by an aircraft mishap. However, while any fire can affect agricultural

resources, wildlife, and habitat, the increased risk of fire hazard due to operations under the Proposed Action is extremely low.

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SECTION 6.0
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6.0 REFERENCES

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SECTION 7.0
LIST OF PREPARERS

7.0 LIST OF PREPARERS

The following people were primarily responsible for preparing this SEA.

Name	Agency/ Organization	Discipline/ Expertise	Experience	Role in Preparing EA
Chris Ingram	Gulf South Research Corporation	Biology/Ecology	33 years of EA/EIS studies	Project Manager and Technical Review
Nicole Forsyth	Gulf South Research Corporation	Environmental Engineering	12 years of NEPA studies	Project Manager
Stephen Oivanki	Gulf South Research Corporation	Geology	20 years of natural resources and NEPA studies	Airspace
Ann Guissinger	Gulf South Research Corporation	Economics	30 years of NEPA and socioeconomic studies	Socioeconomics and Environmental Justice
Steve Kolian	Gulf South Research Corporation	Environmental Science	14 years of natural resources	Air Quality and Noise
Sharon Newman	Gulf South Research Corporation	GIS/graphics	20 years of GIS/graphics experience	GIS/graphics
Denise Rousseau Ford	Gulf South Research Corporation	Environmental Engineering	19 years of environmental science and NEPA studies	Land Use Resources, Hazardous Materials and Waste, Earth Resources
Kreg Ellzey	Gulf South Research Corporation	Ecology/Archaeology	8 years of natural and cultural resources	Biological Resources
Dave Hart	Gulf South Research Corporation	Archaeology	18 years of cultural resources management and Section 106 compliance	Cultural Resources
Rob Nixon	Gulf South Research Corporation	Biology/Ecology	17 years of natural resources	Biological Resources
John Ginter	Gulf South Research Corporation	Biology/Ecology	25 years of natural resources	Biological Resources

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SECTION 8.0
LIST OF ACRONYMS AND ABBREVIATIONS

8.0 LIST OF ACRONYMS AND ABBREVIATIONS

162 FW	162nd Fighter Wing
355 FW	355th Fighter Wing
563 RQG	563rd Rescue Group
943 RQG	943rd Rescue Group
48 RQS	48th Rescue Squadron
55 RQS	55th Rescue Squadron
79 RQS	79th Rescue Squadron
305 RQS	305th Rescue Squadron
306 RQS	306th Rescue Squadron
$\mu g/m^3$	micrograms per cubic meter
ACC	Air Combat Command
ACS	American Community Survey
ADEQ	Arizona Department of Environmental Quality
ADOT	Arizona Department of Transportation
ADWR	Arizona Department of Water Resources
AFB	Air Force Base
AFI	Air Force Instruction
AFOSH	Air Force Occupational and Environmental Safety, Fire Protection and Health
AFSEC	Air Force Safety Center
AGL	Above Ground Level
AGS	Air Guard Station
AHAS	Avian Hazard Advisory System
Air Force	United States Air Force
AMA	Active Management Area
AMSL	Above Mean Sea Level
ANG	Air National Guard
ARPA	Archaeological Resources Protection Act
ARTCC	Air Route Traffic Control Center
ASM	Arizona State Museum
ATC	Air Traffic Control
ATCAA	Air Traffic Control Assigned Airspace
BAM	Bird Avoidance Model
BASH	Bird/Wildlife Aircraft Strike Hazard
BEA	U.S. Bureau of Economic Analysis
BLM	Bureau of Land Management
BMGR	Barry M. Goldwater Range
CAA	Clean Air Act
CATMS	Combat Arms Training and Maintenance Support
CBP	U.S. Customs and Border Protection
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CH_4	Methane
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO_2e	CO_2 equivalency
COC	Community of Comparison
CRO	Combat Rescue Officer
CSAR	Combat Search and Rescue

CWA	Clean Water Act
dB	decibel
dBA	A-weighted Decibels
DNL	Day-Night Average Sound Level
DoD	Department of Defense
DoDI	Department of Defense Instruction
DZ	Drop Zone
EA	Environmental Assessment
EDMS	Emission and Dispersion Modeling System
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
EO	Executive Order
EPNG	El Paso Natural Gas
ESA	Endangered Species Act
ETAC	East Tactical Range
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulations
FHWA	Federal Highway Administration
FL	Flight Level
FONSI	Finding of No Significant Impact
FW	Fighter Wing
GAO	General Accounting Office
GHG	Greenhouse Gases
GIS	Geographic Information System
GLO	General Land Office
GSRC	Gulf South Research Corporation
HFC	Hydrofluorocarbon
HLZ	Helicopter Landing Zone
IFR	Instrument Flight Rules
IICEP	Interagency/Intergovernmental Coordination for Environmental Planning
LATN	Low Altitude Tactical Navigation
LZ	Landing Zone
mg/m^3	milligrams per cubic meter
MOA	Military Operations Area
mph	miles per hour
MTR	Military Training Route
N_2O	Nitrous Oxide
NA	Not Available
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NTAC	North Tactical Range
O_3	Ozone
OSB	Operation Snowbird
OSHA	Occupational Safety and Health Administration
PJ	Pararescue Jumpers

PM-2.5	Particulate Matter Less Than 2.5 Microns
PM-10	Particulate Matter Less Than 10 Microns
POL	Petroleum, Oil, and Lubricants
ppb	parts per billion
ppm	parts per million
PPE	Personal Protective Equipment
RA	Restricted Areas
RCRA	Resource Conservation and Recovery Act
ROI	Region of Influence
RQG	Rescue Group
RQS	Rescue Squadron
SDWA	Safe Drinking Water Act
SEA	Supplemental Environmental Assessment
SEL	Sound Exposure Level
SERE	Survival, Evasion, Resistance, and Escape
SHPO	State Historic Preservation Office
SO_2	Sulfur Dioxide
SOP	Standard Operating Procedures
SPCCP	Spill Prevention Control and Countermeasure Plans
STAC	South Tactical Range
TACTS	Tactical Aircrew Combat Training System
TIA	Tucson International Airport
UAE	United Arab Emirates
U.S.	United States
U.S.C.	United States Code
USACE	United States Army Corps of Engineers
USBP	U.S. Border Patrol
USDA	U.S. Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USFS	United States Forest Service
VFR	Visual Flight Rules
WTA	Water Training Area

APPENDIX A
CONSULTATION LETTERS

DOE/NAE

Arizona State Parks
AZStateParks.com

July 12, 2013

Mr. Kevin Wakefield
Base Cultural Resource Manager
Department of the Air Force
355th Civil Engineer Squadron
Davis-Monthan Air Force Base
Davis-Monthan AFB, AZ 85707-4927

RE: Project; Location; Agency; **SHPO-2013-0702 (113064);**

Dear Mr. Wakefield:

Thank you for consulting with our office regarding the above referenced project. Pursuant to 36 C.F.R. Part 800, the implementing regulation for Section 106 of the National Historic Preservation Act, we have reviewed the documentation submitted and have the following comments:

1. It is our understanding that the proposed project is an update to the 2002 563 RQG Personnel Recovery EA. Apparently, it is necessary to increase the number of helicopter landing zones (HLZ). The proposed project involves the addition of 20 new HZLs.

2. The cultural resources inventory report identified two newly recorded sites [AZ BB:15:92(ASM) and AZ BB:15:93(ASM)] and six isolated occurrences. The two newly recorded sites are located on lands managed by ASLD. Davis-Monthan AFB has determined these sites to be eligible for listing on the NRHP. In discussions with the ASLD archaeologist, we concur with your determination of eligibility for these sites.

   It is our understanding that the two HZLs, which include the newly identified sites, will be removed from the list of potential HZLs to prevent adverse effects to the site.

3. Davis-Monthan AFB has proposed a finding of No Adverse Effect to historic properties. We concur with your finding of No Adverse Effect so long as the two potential HZLs with the historic properties are removed from further consideration.

4. We understand that you have initiated your Native American consultation. Please keep us informed on any correspondence that you may receive regarding this project.

5. We have reviewed the cultural resource report entitled, *Cultural Resources Survey in Support of Personnel Recovery Activities, 563rd Rescue Group, Davis-Monthan Air Force Base, Tucson, Arizona* and have the following comments:

    a. There appears to be several previous investigations maps for several HZLs that are missing from the report. These include Pentias, Rancho Seco, Paige, Pinnacle, Jeep, Froelich, and Jenna. Please ensure that all project areas have maps documenting the class I data.

    b. In the future, please be sure that all previously recorded surveys and sites are shown on the topographic maps, not just the information obtained from AZSITE. In this specific instance, the USFS has several previously surveyed areas that are not shown on the map.

    c. The eligibility of isolated occurrences needs to be specifically discussed in the report. Please make this modification to the report.

    d. The site descriptions include quantities of artifacts noted at each site. Please add to the survey methodology your site recordation procedures so that we can understand how quantities were obtained.

    e. For sketch maps of sites, please include elevation lines and topographic elements as well as a site datum. Also, please include feature numbers on the features.

    f. For descriptions of ground stone, please specify whether the ground stone were one-handed manos, two handed-manos, basin metates or slab metates.

As always, we appreciate your continued cooperation with this office in complying with the historic preservation requirements for federal undertakings. If you have any questions or concerns, then please do not hesitate to contact me via e-mail, kdobschuetz@azstateparks.gov, or by phone, 602-542-7141.

Sincerely,

Kris Dobschuetz, RPA
Compliance Specialist/Archaeologist
Arizona State Historic Preservation Office

United States Department of the Interior

Fish and Wildlife Service
Arizona Ecological Services Office
2321 West Royal Palm Road, Suite 103
Phoenix, Arizona 85021-4951
Telephone: (602) 242-0210 Fax: (602) 242-2513

AESO/SE
02EAAZ00-2014-I-0188
2-21-02-I-0521
2-21-95-F-114-R2
2-21-96-F-094-R1

November 21, 2014

Mr. James B. Barker, P.E.
3775 South Fifth Street
Davis-Monthan Air Force Base, Arizona 85707-3012

Dear Mr. Barker:

Thank you for your correspondence of March 7, 2014, received in our office on March 7, 2014. This letter documents our review of the proposed increase in the number of helicopter landing zone and drop zone sites throughout southern Arizona available for personnel recovery training use by the 563rd Rescue Group at Davis-Monthan Air Force Base (AFB), Pima County, Arizona, in compliance with section 7 of the Endangered Species Act of 1973 (ESA), as amended (16 U.S.C. 1531 et seq.). We note that the current proposed action is in addition to prior activities addressed in our evaluation of effects of the 2002 West Coast Combat Search and Rescue Beddown at Davis-Monthan AFB. The U.S. Air Force Air Combat Command requested concurrence with a no effect determination for Sonoran pronghorn for the original 2002 project. Although concurrence for a no effect determination is not required under the ESA, we provided concurrence at the request of Davis-Monthan AFB in a letter dated October 17, 2002 (File number 2-21-02-I-052).

In your March 7, 2014 letter, you concluded that the proposed action will have no effect to the threatened Mexican spotted owl (*Strix occidentalis lucida*) and its critical habitat, the endangered southwestern willow flycatcher (*Empidonax traillii extimus*) and its critical habitat, endangered Gila chub (*Gila intermedia*) and its critical habitat, endangered spikedace (*Meda fulgida*) and its critical habitat, and endangered loach minnow (*Tiaroga cobitis*) and its critical habitat. Species and critical habitats with no effect determinations do not require written concurrence from the U.S. Fish and Wildlife Service (FWS). However, we recommend that you maintain a complete administrative record documenting your decision process and supporting information for your "no effect" determinations.

Your letter also concluded that the proposed action may affect, but is not likely to adversely affect, the endangered Pima pineapple cactus (*Coryphantha sheeri* var. *robustispina*), the endangered lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae)*, the endangered ocelot (*Leopardus pardalis),* and the endangered jaguar (*Panthera onca*). We concur with your determinations for these species for the reasons discussed below.

Description of the Proposed Action

With your letter of March 7, 2014, you submitted a draft supplemental environmental assessment (SEA) that evaluates the potential environmental impacts associated with the current proposed action in accordance with the National Environmental Policy Act of 1969 (NEPA). Highlights of the proposed action are as follows:

1. In 2002, U.S. Air Force West Coast Combat Search and Rescue (CSAR) initiated a beddown of 7 combat rescue officer-led squadrons at Davis-Monthan AFB that added 12 HH-60 helicopters, 10 HC-130 cargo aircraft, and 1,059 personnel to the base that currently use approximately 40 drop zones and landing zones during day and night routine training events in Arizona. CSAR training in Arizona occurs along Military Training Routes (MTR), in Low Altitude Tactical Navigation (LATN) areas, East Tactical (TAC) Range of the Barry M. Goldwater Range (BMGR), northern areas of North TAC, Yuma Tactical Air Crew Combat Training Systems (TACTS) Range, Jackal Low Military Operations Area (MOA), Sells Low MOA.

2. The U.S. Air Force CSAR now proposes to use an additional 20 sites in Arizona as helicopter landing zones and drop zones for routine training use by the 563rd Rescue Recovery Group at Davis-Monthan AFB. For various reasons described in the SEA, four of these sites were removed from consideration. All additional sites are on previously disturbed Federal and State lands. Davis-Monthan AFB must obtain a special use permit for each site from the corresponding landowner that must be renewed every two years. Each site would be used from 0 – 150 times annually (average per site is 25.5 times annually) by HC-130 and HH-60 aircraft during both day and night training activities with one to three HH-60s landing and deploying personnel during a training event. No changes in current airspace structure or management are proposed, although sortie routes to the 20 new sites would differ slightly from those already used. There would be no increase in total sorties identified in the 2002 CSAR EA.

3. Aircraft will normally fly < 3,000 feet above ground level (AGL). Sound exposure levels for aircraft flying at an altitude of 500 feet above ground level can reach 90dBA for the HH-60 and 95 dBA for the HC-130. Two LATNs are designated for HH-60s with flying altitudes ranging from 100-1,500 feet AGL and the MOAs have minimum flight floors down to100-ft AGL. Effects of CSAR training missions (ie. insertions, extractions, cross country patrols) at the landing and drop zones are described in the SEA as only resulting

in minor trimming or other minor disturbances to vegetation. There will be no live fire nor expenditures of ammunition at any of the sites.

4. Each visit to each site will have a duration of 30 minutes or less. There will be little to no personnel use on the ground and, if it does occur, it will only be in the immediate vicinity of the landing zone (personnel may momentarily step off the helicopter). Personnel will not be performing any operations or exercises outside of the immediate area of the landing zone.

5. Although not noted in the 2014 SEA, CSAR operations on East TAC and northern areas of North TAC of BMGR, and Yuma TACTS Range are covered by the following current biological opinions: Reinitiation of Formal Section 7 Consultation on Military Training on the Barry M. Goldwater Range East (USFWS 2010a; 22410-1996-F-0094-R003) and West Coast Basing and operations of the F-35B Joint Strike Fighter 2 and Reinitiation of Formal Section 7 Consultation on Ongoing Activities at the Barry M. Goldwater Range by the Marine Corps Air Station (USFWS 2010b; 22410-1995-F-0114-R006). These biological opinions address effects to Sonoran pronghorn (*Antilocapra americana sonoriensis*) and lesser long-nosed bat, and include conservation measures for these two species that must be followed by CSAR when training in these areas.

Conclusions

Pima pineapple cactus

According to the SEA, the Pima pineapple cactus is known at the proposed Caliente site (Gulf South Research Corporation [GSRC] 2014). Davis-Monthan AFB natural resource staff of 355 CES/CEAN will develop standard operating procedures to instruct 563rd Rescue Group personnel how to identify and avoid Pima pineapple cactus during training events so that effects to existing plants from the proposed action will be minimized. However, ground-based activities at the Caliente site could potentially degrade habitat for the Pima pineapple cactus. This degradation is likely to be insignificant due to the fact that most of this site is devoid of vegetation and has been previously disturbed as described in the SEA. We recommend that the standard operating procedures for this site include permanently marking or caging the existing Pima pineapple cacti so that the occupied area can be avoided during operations. We ask that, when these standard operating procedures are finalized, a copy be provided to our Tucson Arizona Ecological Services suboffice as part of the record for this consultation.

Lesser long-nosed bat

According to the SEA, no lesser long-nosed bats have been detected at any of the proposed new sites (GSRC 2014). Mine adits that could be used for roosting by the lesser long-nosed bat were found within the vicinity of the Silvermine site. Our review of the proposed locations for the landing and drop zones indicates that, while there are known lesser long-nosed bat roosts in the

vicinity of the Pipeline and Jeep sites, as well as the Caliente site, these proposed sites are greater than one mile from the roost sites. Consequently, disturbance effects from the proposed action are discountable. Davis-Monthan AFB natural resource staff of 355 CES/CEAN will establish standard operating procedures that the 563rd Rescue Group will properly implement to ensure mine adits will be avoided during training activities identified in the proposed action. If surveys or other observation reveal that lesser long-nosed bats are roosting at the Silvermine or alternate sites, training will cease at the site until reinitiation of consultation with the FWS is completed.

Primary foraging plants for the lesser long-nosed bat occur at 4 proposed sites including Brooke, Paige, Pinnacle, and Silvermine, as well as just outside of Jenna (GSRC 2014). Davis-Monthan AFB natural resource staff of 355 CES/CEAN will develop standard operating procedures to instruct 563rd Rescue Group personnel how to identify and avoid primary foraging plants of the bat including Palmer's agave (*Agave palmeri*) and saguaro (*Carnegiea gigantea*) during training events so that these plants will not be impacted by the proposed action. Additionally, we recommend that the standard operating procedures for these sites include permanently marking or caging the existing agaves and saguaros found at the four sites identified in Table 4-5 of the SEA. This is so that the occupied area can be avoided during operations. We ask that, when these standard operating procedures are finalized, including the efforts to monitor mine adits and avoid lesser long-nosed bat forage resources, a copy be provided to our Tucson Arizona Ecological Services suboffice as part of the record for this consultation. Use of the outlined standard operating procedures will result in effects that are insignificant and discountable.

Ocelot

According to the SEA, no ocelots have been detected at any of the proposed new sites, although search methods for this species were not described (GSRC 2014). Since 2009, ocelots have been detected in the Whetstone, Huachuca, and Santa Rita mountains, as well as near Globe Arizona (USWFS files). Ocelots are generally active for more than half of each 24-hour period and are typically most active at night and during crepuscular periods with more limited diurnal activity (Ludlow and Sunquist 1987, Crawshaw and Quigley 1989, Fernandez 2002, Avila-Villegas and Lamberton-Moreno 2013). Ocelots are also secretive animals that generally avoid areas of high human use and associated noise, infrastructure, and lights. Based on recent and limited records in Arizona, ocelots appear to be associated with Madrean evergreen woodland (Avila-Villegas and Lamberton-Moreno 2012), Madrean lower montane pine-oak forest and woodland (Tim Snow, AGFD, March 13, 2013, electronic mail), and semi-desert grasslands. Five of the proposed new sites fall within these habitat types (Pipeline, Brooke, Jeep, Stronghold, and Jenna). Additionally, two existing sites near Pipeline also fall within these habitat types. Disturbance to ocelots could potentially occur at these seven sites from both auditory and visual stimulus arising from human presence (both pedestrians and aircraft), lights, and noise associated with ground and air-based training operations, especially at night. However, none of the proposed drop and landing sites are in areas where ocelots have been documented. In addition, DMAFB provided additional information in a October 21, 2014 letter that characterizes the drop zones within the range of the ocelot as lacking dense cover, water, and other habitat elements that support ocelots.

Therefore, it is highly unlikely that an ocelot will occur at any of these sites. Additionally, because training is expected to be temporary and sporadic at each site (an average of 25.5 visits annually, lasting 30 minutes or less), and because there is such a low potential for ocelots to occur in proximity to the proposed drop and landing sites, we find that the potential effects to ocelot are discountable and that effects to ocelot habitat are insignificant due to the existing disturbed nature of the proposed sites.

Jaguar

According to the SEA, no jaguars have been detected at any of the proposed new sites, although search methods for this species were not described (GSRC 2014). From 1996 through 2013, several individual adult jaguars have been documented within Arizona and New Mexico. Jaguars have large home ranges and are known from a variety of vegetation communities (Brown and López-González 2001, Seymour 1989).Two jaguars were documented in three different mountain range complexes in southeastern Arizona, over an area extending from the U.S./Mexico international border north 66 km (47 mi) and 63 km (39 mi) east to west (McCain and Childs 2008). Furthermore, they were found using areas from rugged mountains at 1,577 m (5,174 ft) to flat lowland desert floor at 877 m (2,877 ft) (McCain and Childs 2008). We designated critical habitat for the jaguar on March 14, 2014 (79 FR 12571). None of the new or existing sites fall within critical habitat for the jaguar, although two are immediately adjacent to critical habitat (Caliente and existing site in Santa Cruz County). Disturbance to jaguars could potentially occur at these two sites from both auditory and visual stimulus arising from human presence (both pedestrians and aircraft), lights, and noise associated with ground and air-based training operations, especially at night. Although jaguars may occur outside of proposed jaguar critical habitat, we anticipate impacts from low altitude overflights and any ground-based training included in the proposed action in jaguar critical habitat would have the most significant effects to jaguars. However, none of the proposed drop and landing sites are in areas where jaguars have been documented. In addition, DMAFB provided additional information in a October 21, 2014 letter that characterizes the drop zones within the range of the jaguar as lacking dense cover, water, and other habitat elements that support jaguars. Therefore, it is highly unlikely that a jaguar will occur at any of these sites. Additionally, because training is expected to be temporary and sporadic at each site (an average of 25.5 times annually, with a duration of 30 minutes or less), and because there is such a low potential for jaguars to occur in proximity to the proposed drop and landing sites, we find that the potential effects to jaguar are discountable and that effects to jaguar habitat are insignificant due to the existing disturbed nature of the proposed sites

Thank you for your coordination and efforts to avoid and minimize effects to proposed, threatened, and endangered species protected under the ESA. We look forward to receiving copies of your final standard operating procedures as discussed above. Should project plans change, or if information on the distribution or abundance of listed species or critical habitat becomes available, this determination may need to be reconsidered. In all future correspondence on this matter, please refer to consultation numbers 02EAAZ00-2014-I-0188 and 2-21-02-I-0521.

We also encourage you to coordinate the review of this project with the Tohono O'odham Nation, Coronado National Forest, and Arizona Game and Fish Department.

Should you require further assistance, or if you have any questions, please contact Cat Crawford at (520) 670-6150 (x232) or Scott Richardson at (x242).

Sincerely,

Steven L. Spangle
Field Supervisor

cc (hard copy):
Field Supervisor, Fish and Wildlife Service, Phoenix, AZ (2 copies)
Jean Calhoun, Assistant Field Supervisor, Fish and Wildlife Service, Tucson, AZ

cc (electronic copy):
Karen Howe, Tribal Ecologist, Tohono O'odham Nation, Sells, AZ
Josh Taiz, Acting Wildlife, Fish, & Rare Plant Program Manager, Coronado National Forest, Tucson, AZ
pep@azgfd.gov, Habitat Program Manager, Arizona Game & Fish Department, Phoenix, AZ
Stephen Williams, Natural Resources Div., Arizona State Land Department, Phoenix, AZ

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APPENDIX B
PROJECT AREA MAPS

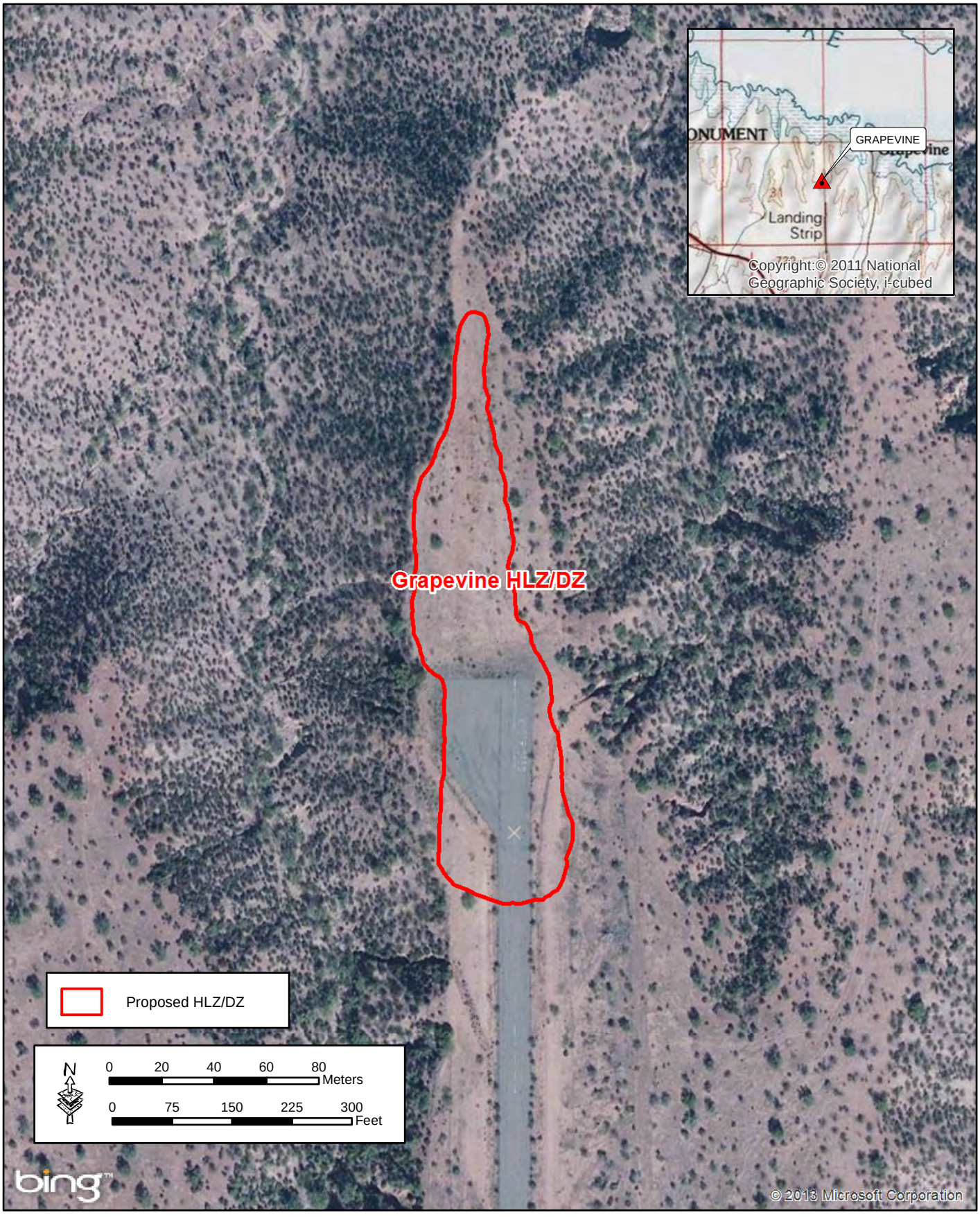

Figure 1. Aerial map of Grapevine HLZ/DZ

GSRC

July 2013

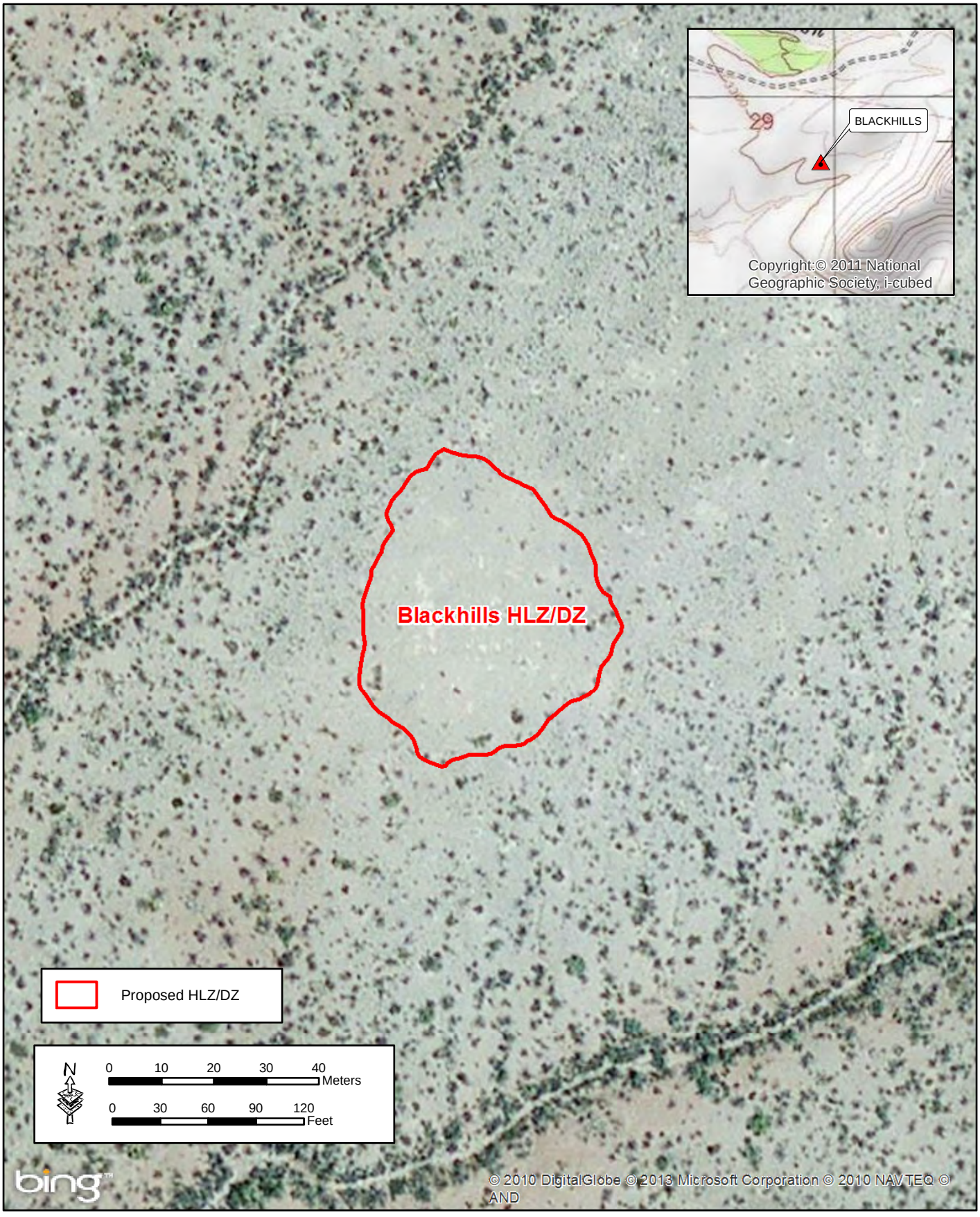

Figure 2. Aerial map of Blackhills HLZ/DZ

GSRC

July 2013

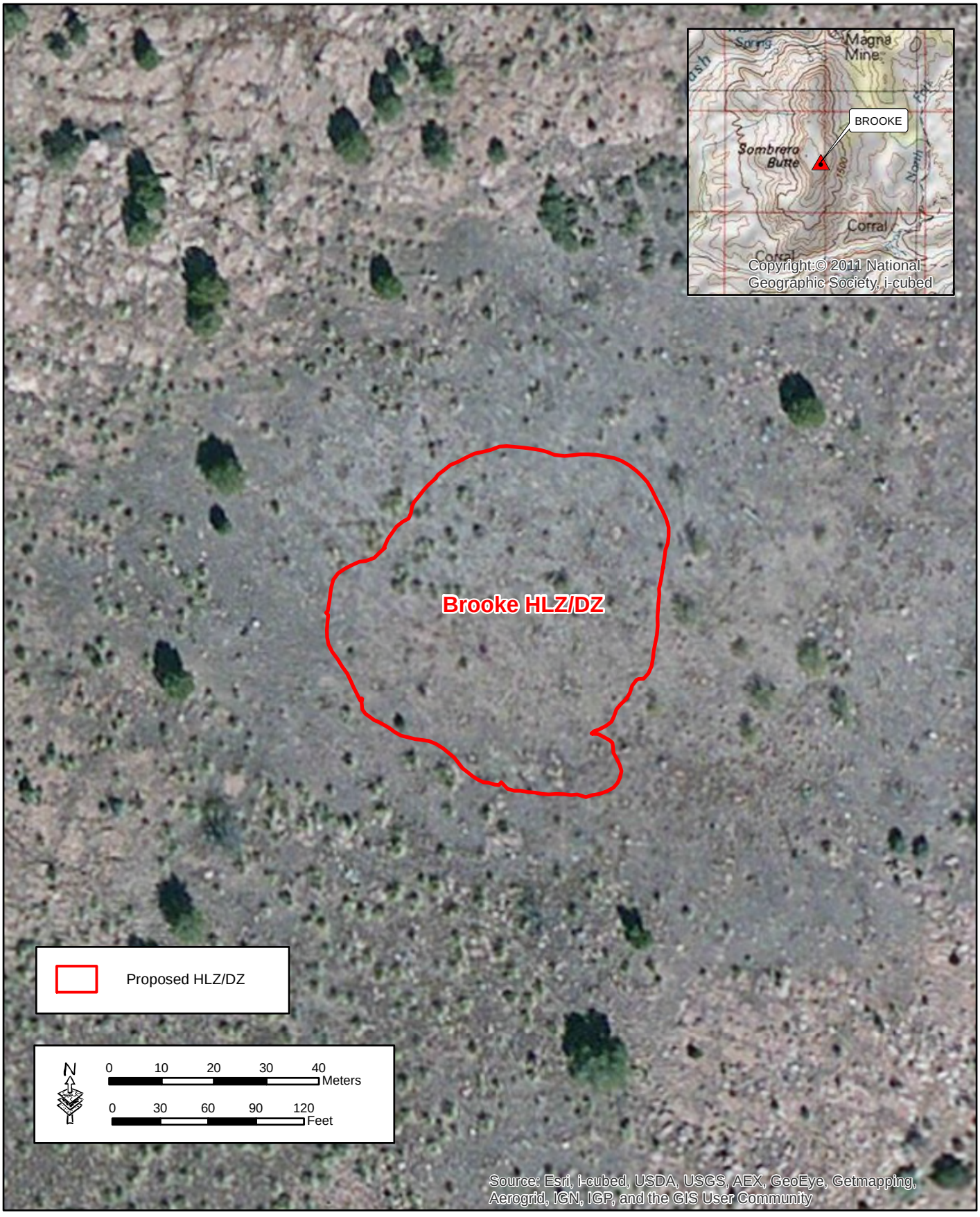

Figure 3. Aerial map of Brooke HLZ/DZ

GSRC

July 2013

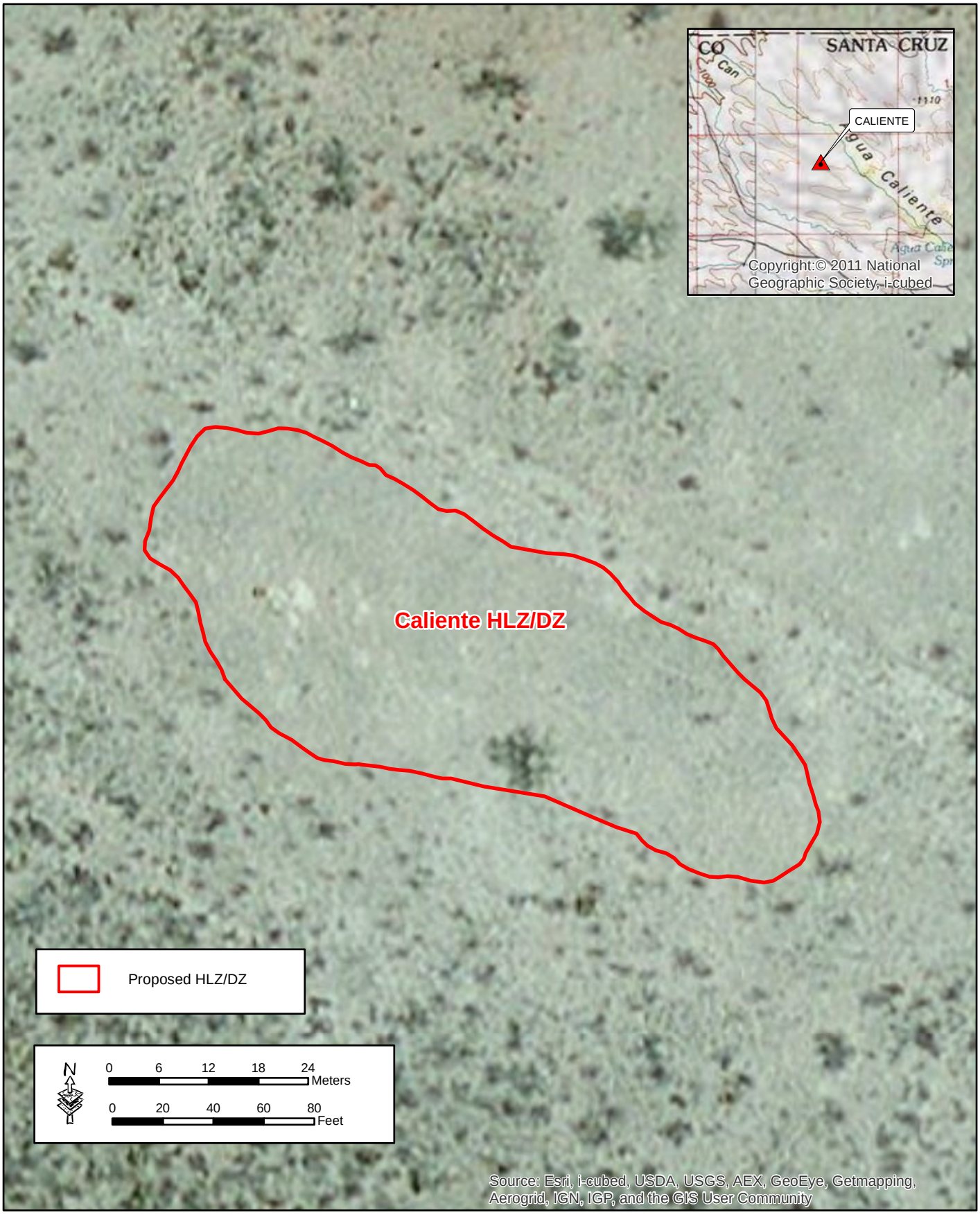

Figure 4. Aerial map of Caliente HLZ/DZ

GSRC

July 2013

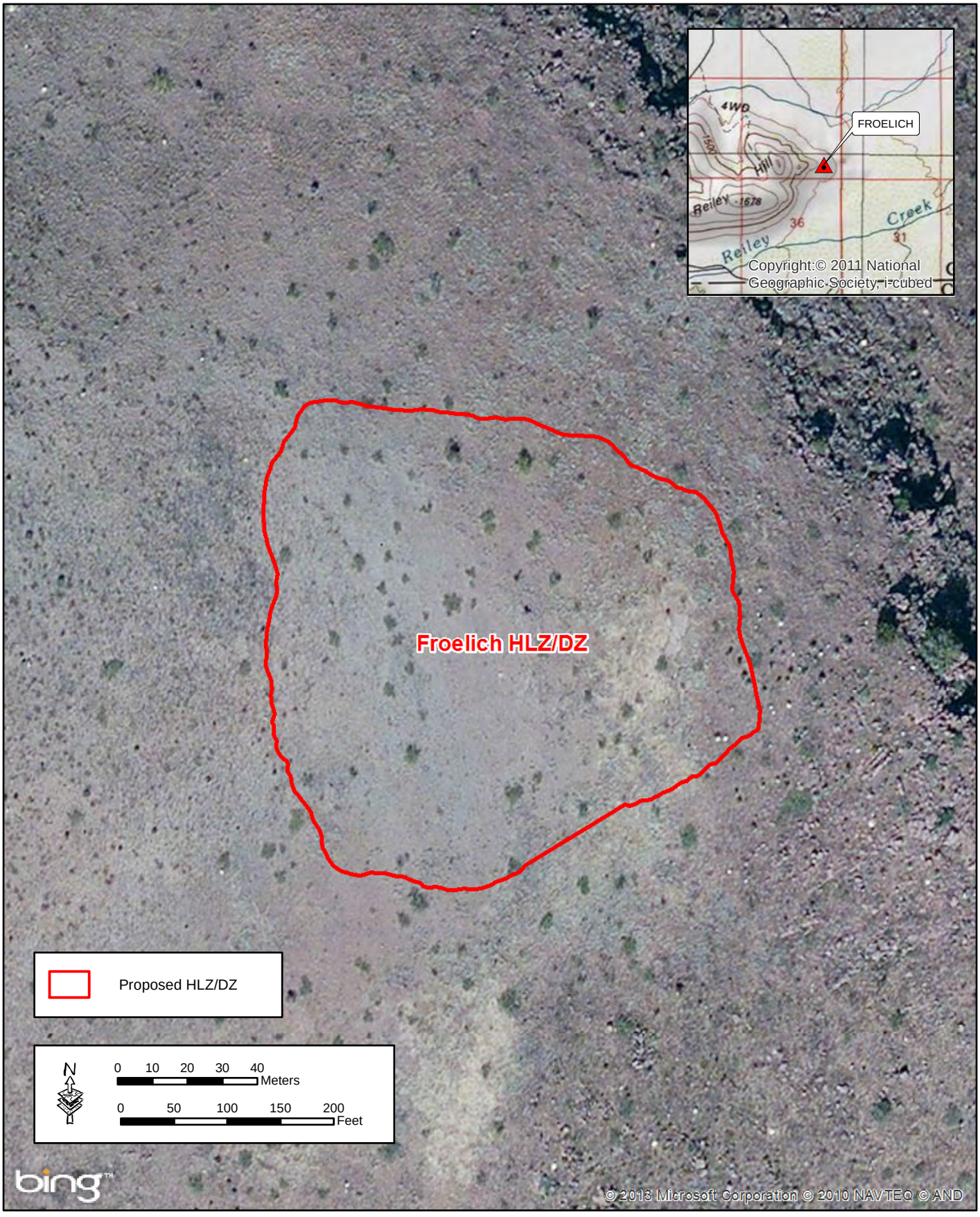

Figure 5. Aerial map of Froelich HLZ/DZ

GSRC

July 2013

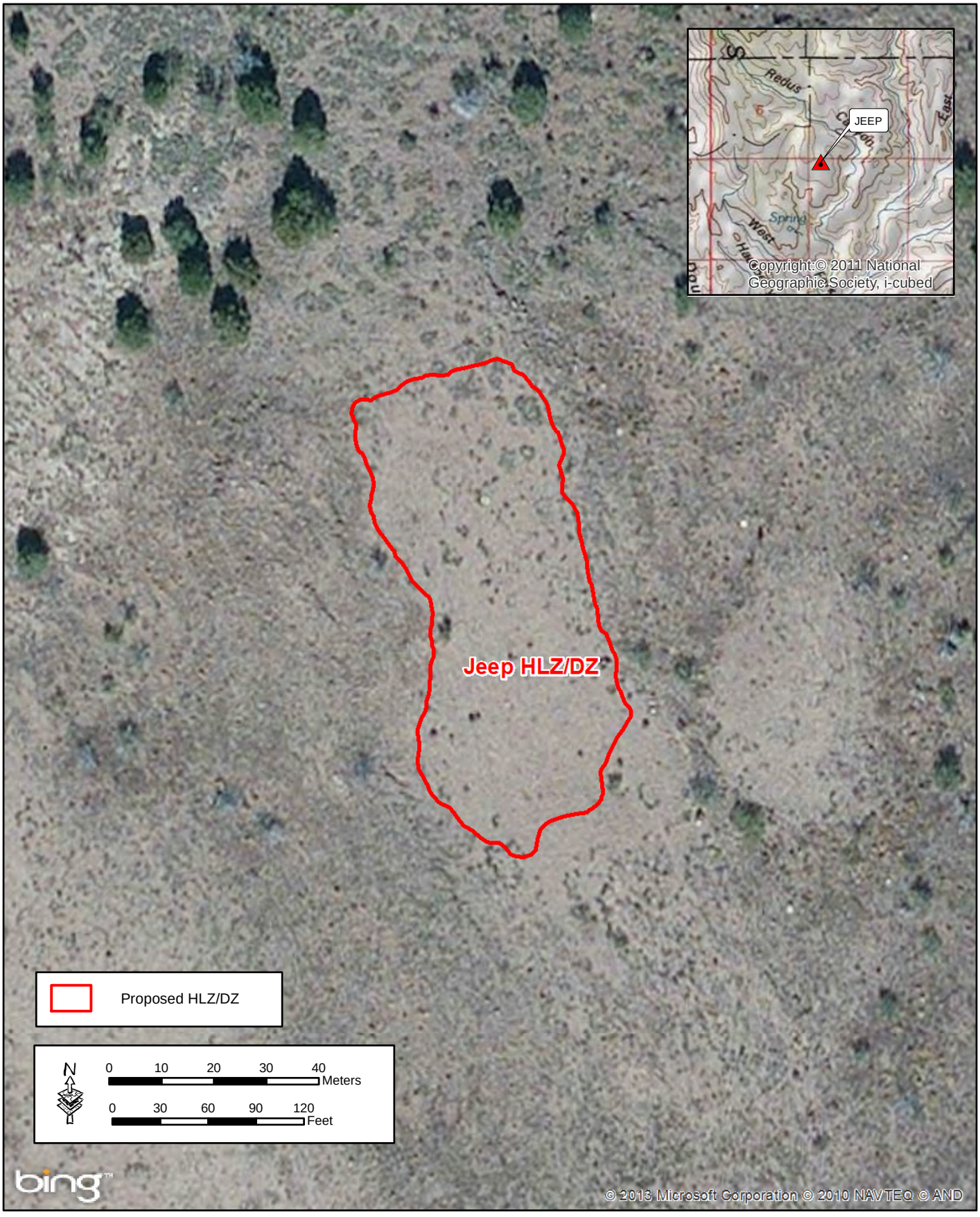

Figure 6. Aerial map of Jeep HLZ/DZ

GSRC

July 2013

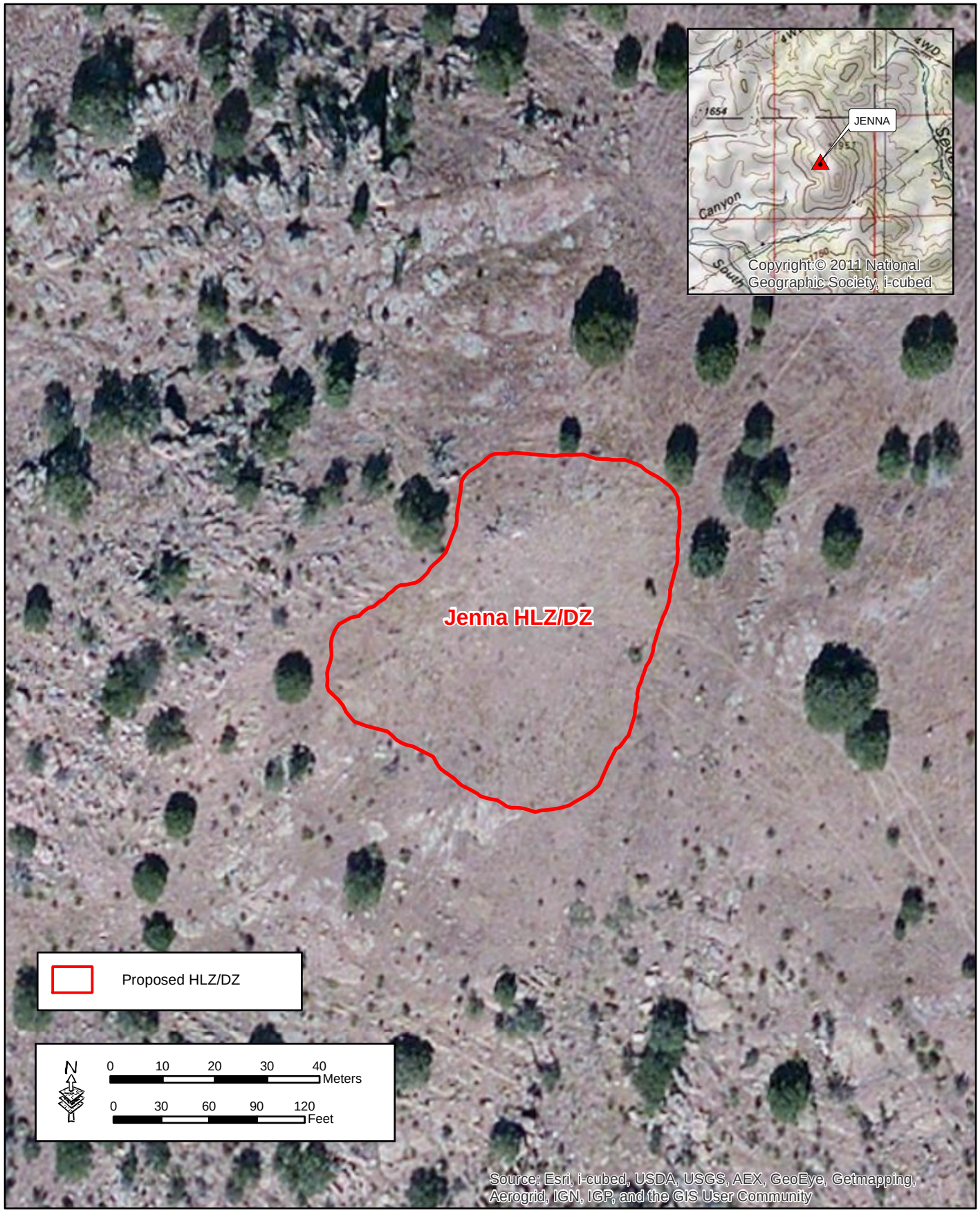

Figure 7. Aerial map of Jenna HLZ/DZ

GSRC

July 2013

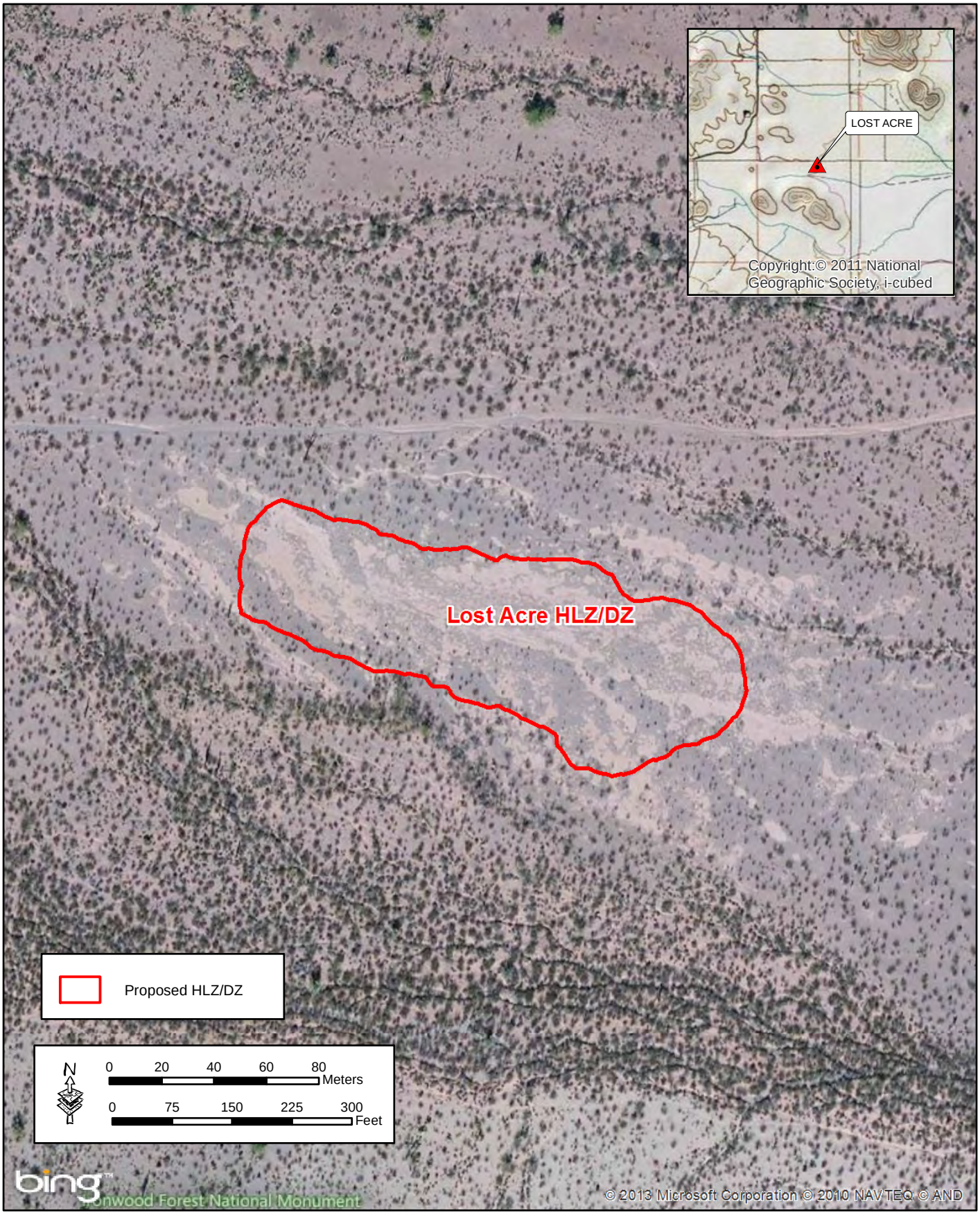

Figure 8. Aerial map of Lost Acre HLZ/DZ

GSRC

July 2013

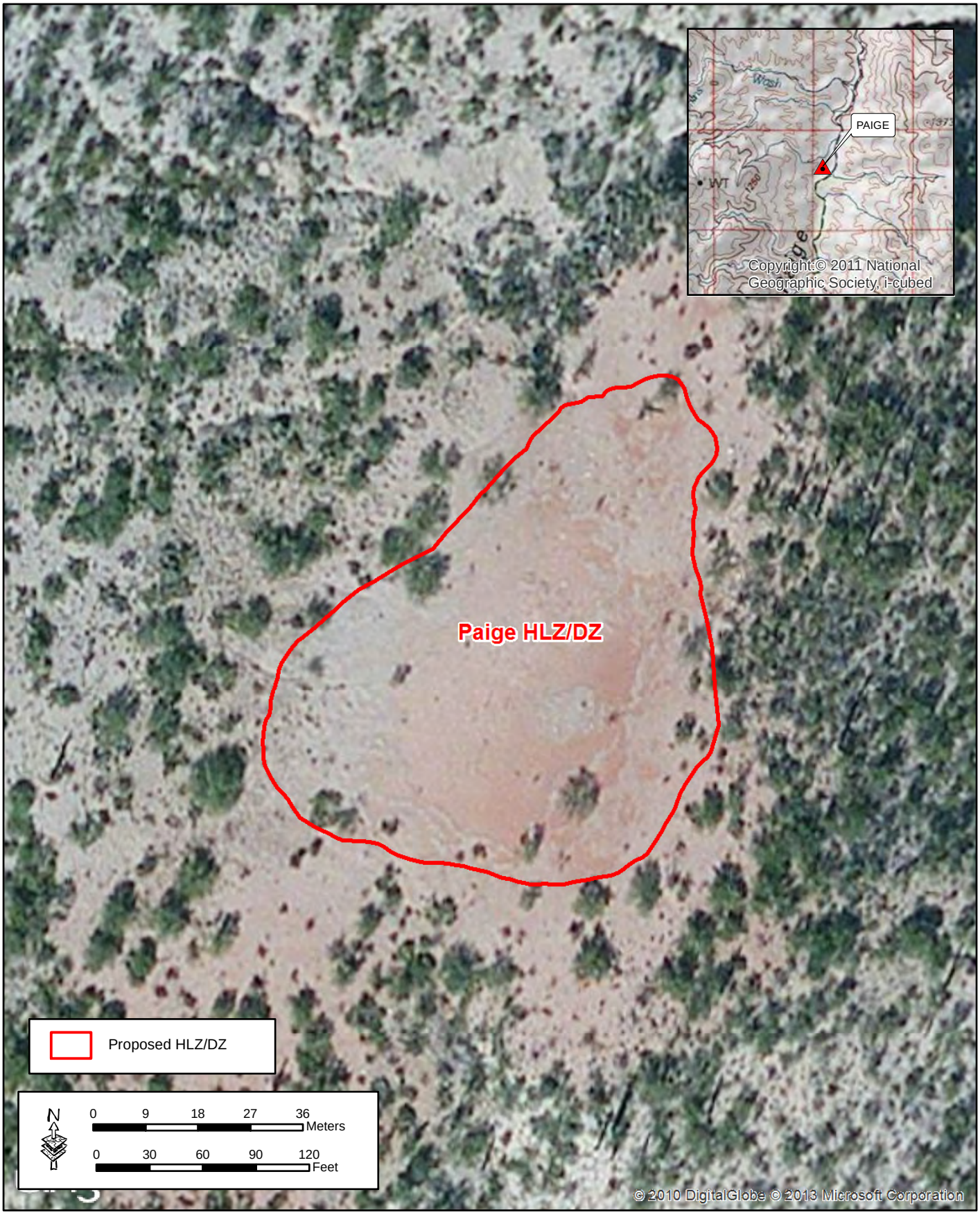

Figure 9. Aerial map of Paige HLZ/DZ

GSRC

July 2013

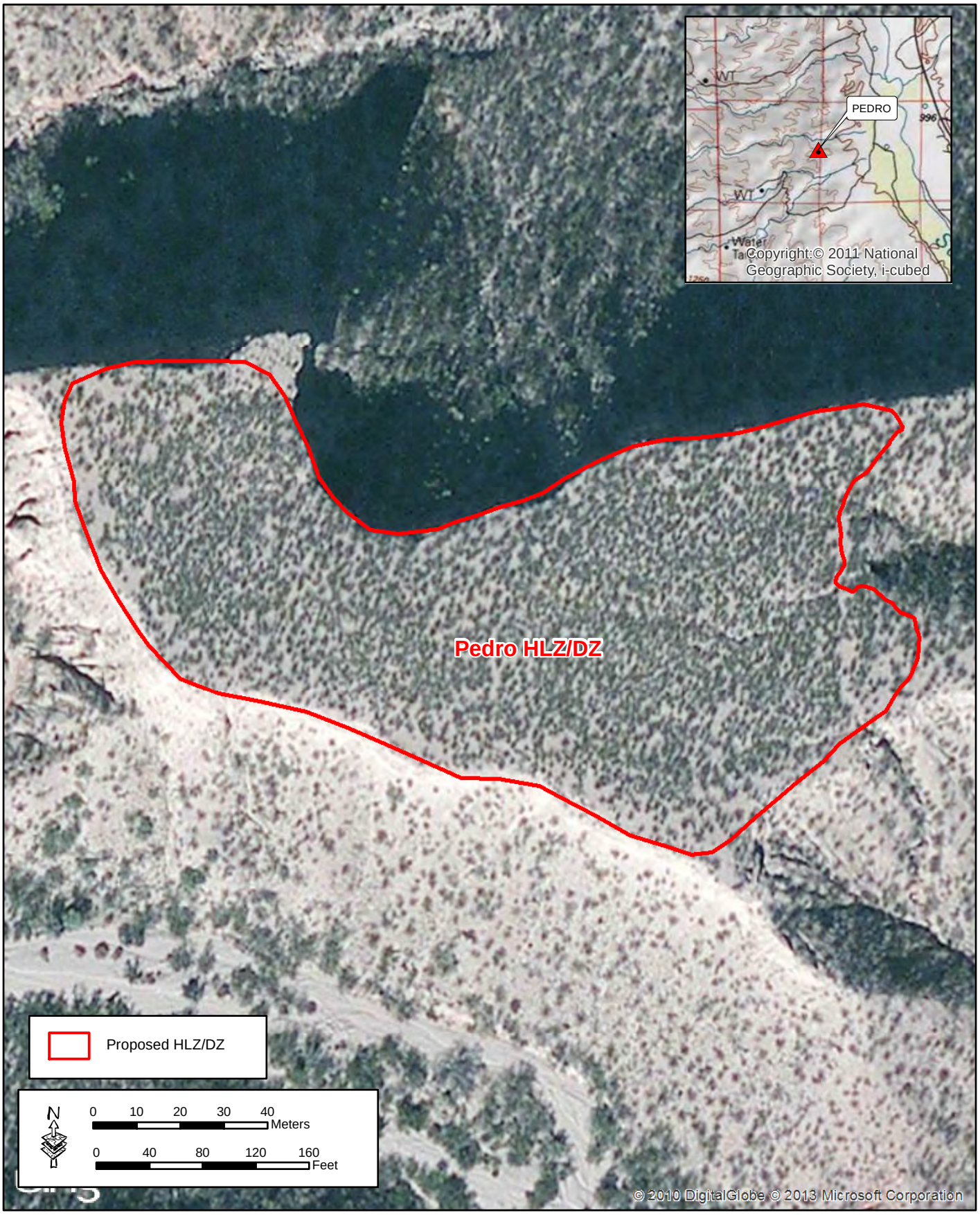

Figure 10. Aerial map of Pedro HLZ/DZ

GSRC

July 2013

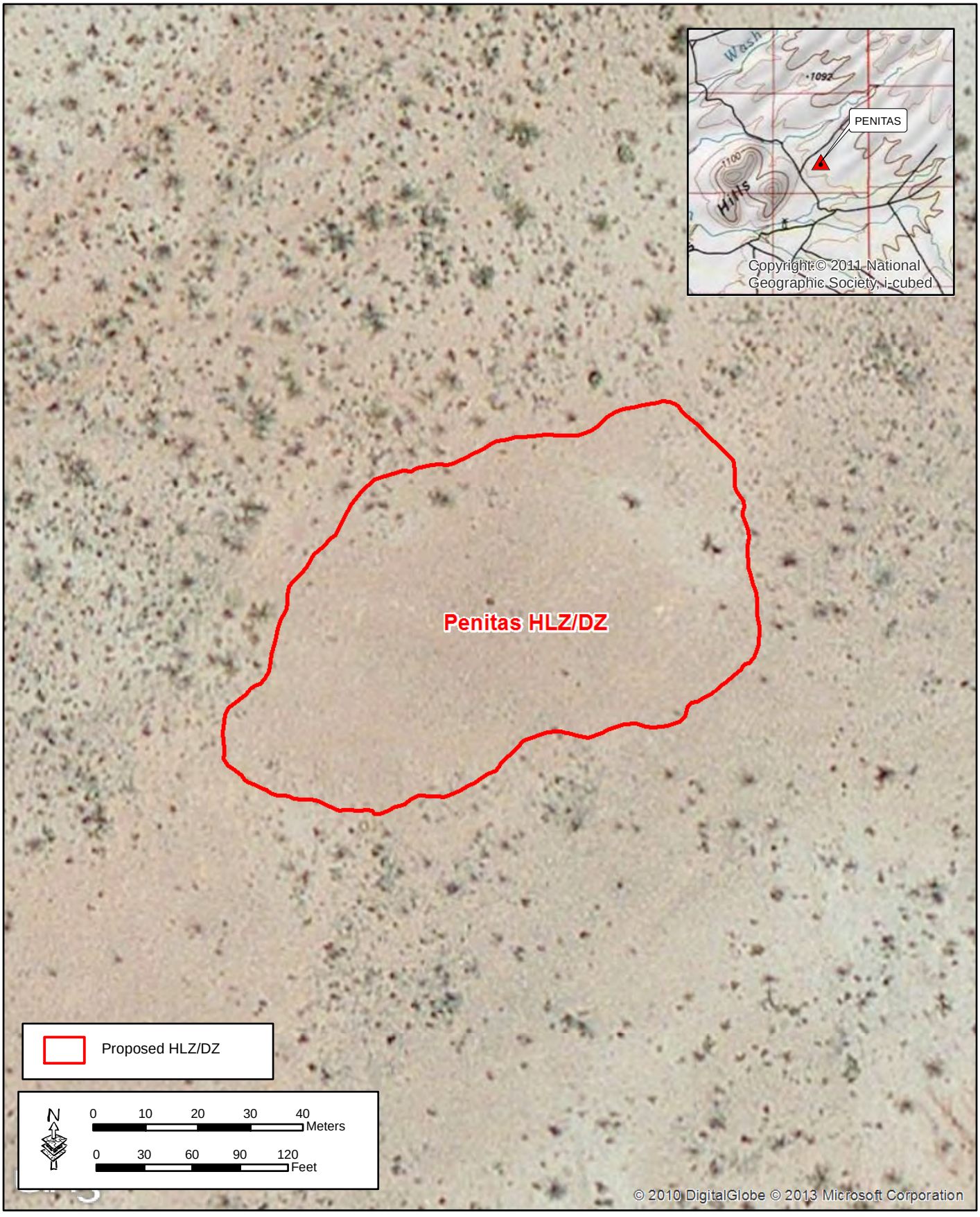

Figure 11. Aerial map of Penitas HLZ/DZ

GSRC

July 2013

Figure 12. Aerial map of Pinnacle HLZ/DZ

GSRC

July 2013

Figure 13. Aerial map of Pipeline HLZ/DZ

GSRC

July 2013

Figure 14. Aerial map of Pond HLZ/DZ

GSRC

July 2013

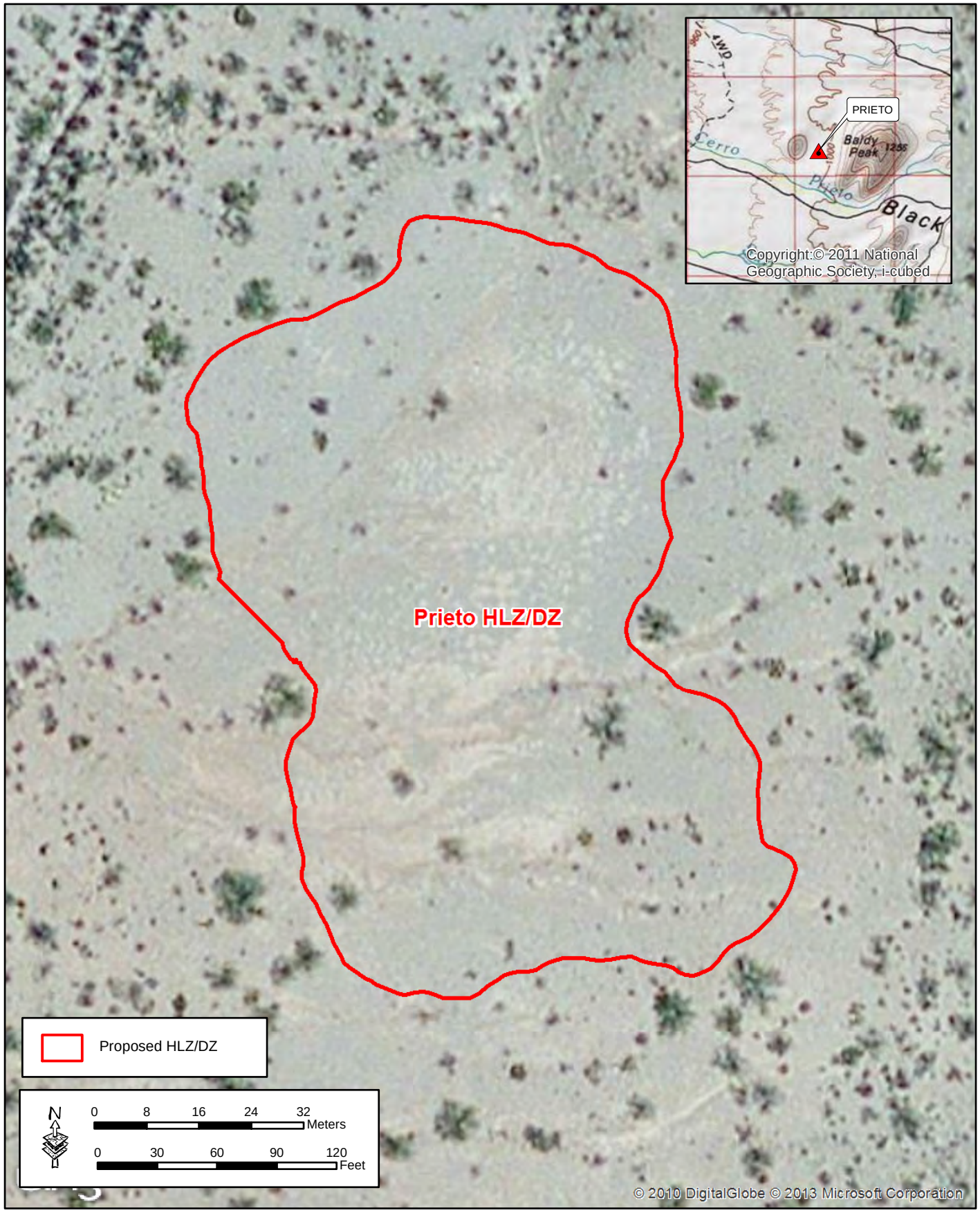

Figure 15. Aerial map of Prieto HLZ/DZ

GSRC

July 2013

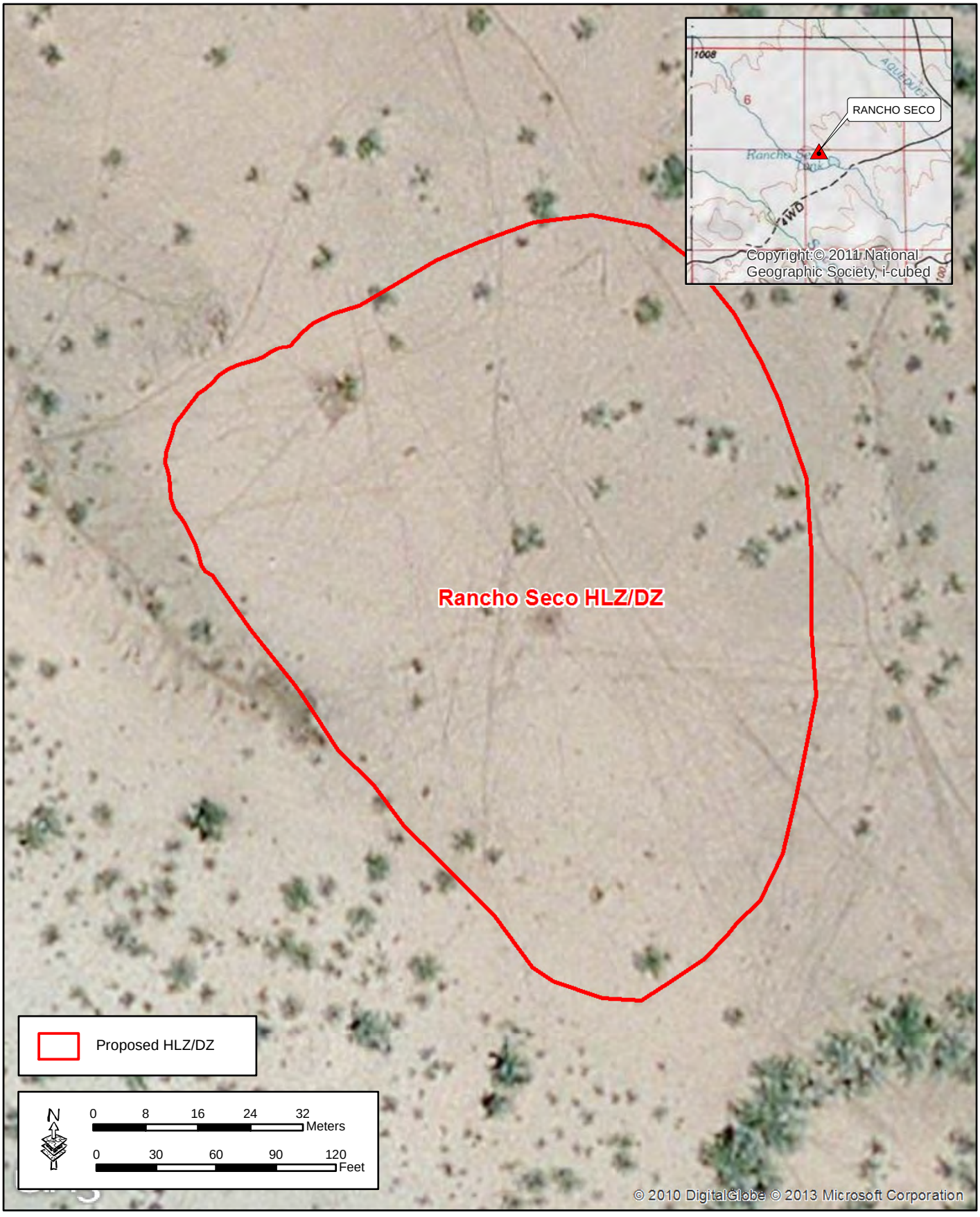

Figure 16. Aerial map of Rancho Seco HLZ/DZ

GSRC

July 2013

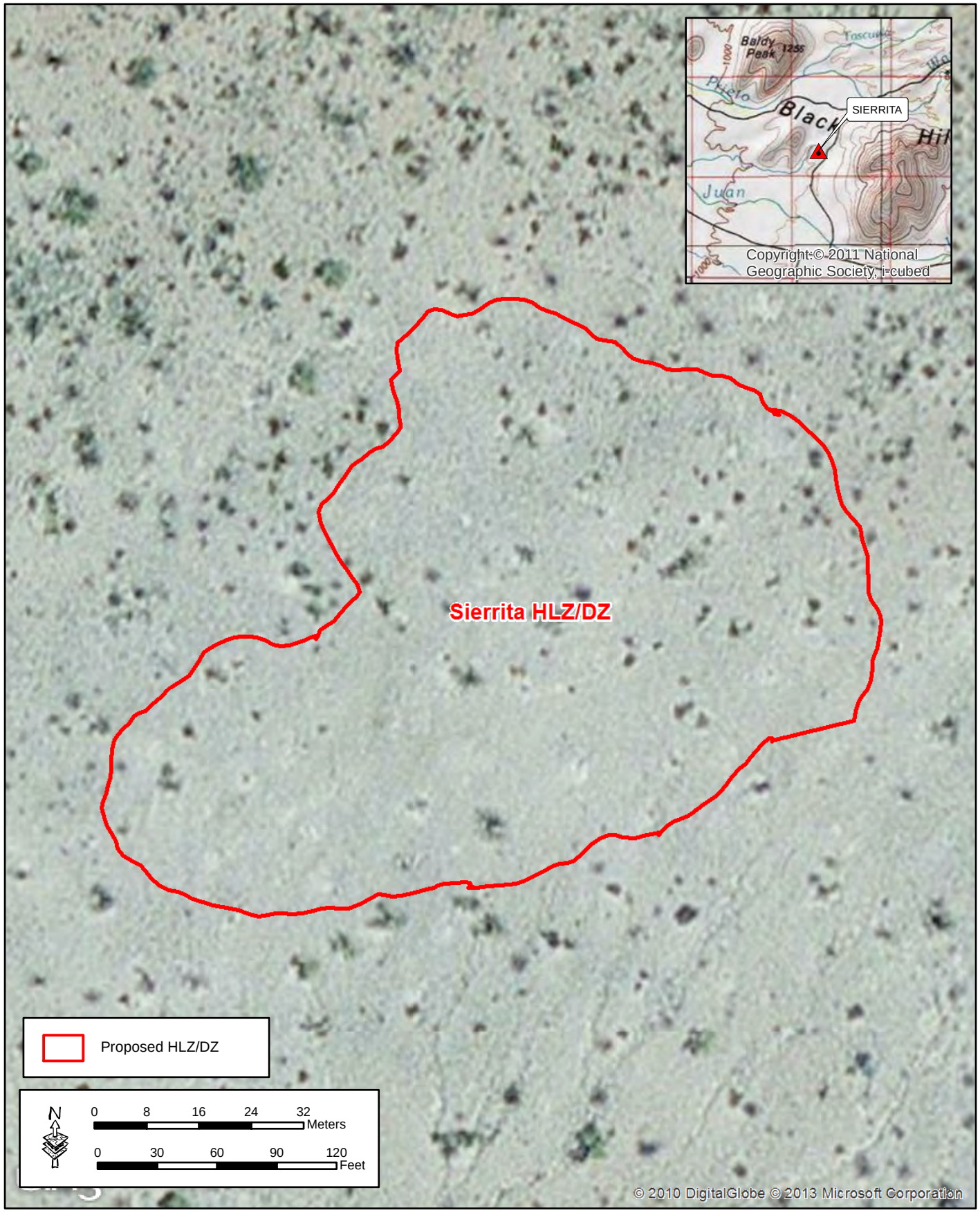

Figure 17. Aerial map of Sierrita HLZ/DZ

GSRC

July 2013

Figure 18. Aerial map of Silvermine HLZ/DZ

GSRC

July 2013

Figure 19. Aerial map of Stronghold HLZ/DZ

GSRC

July 2013

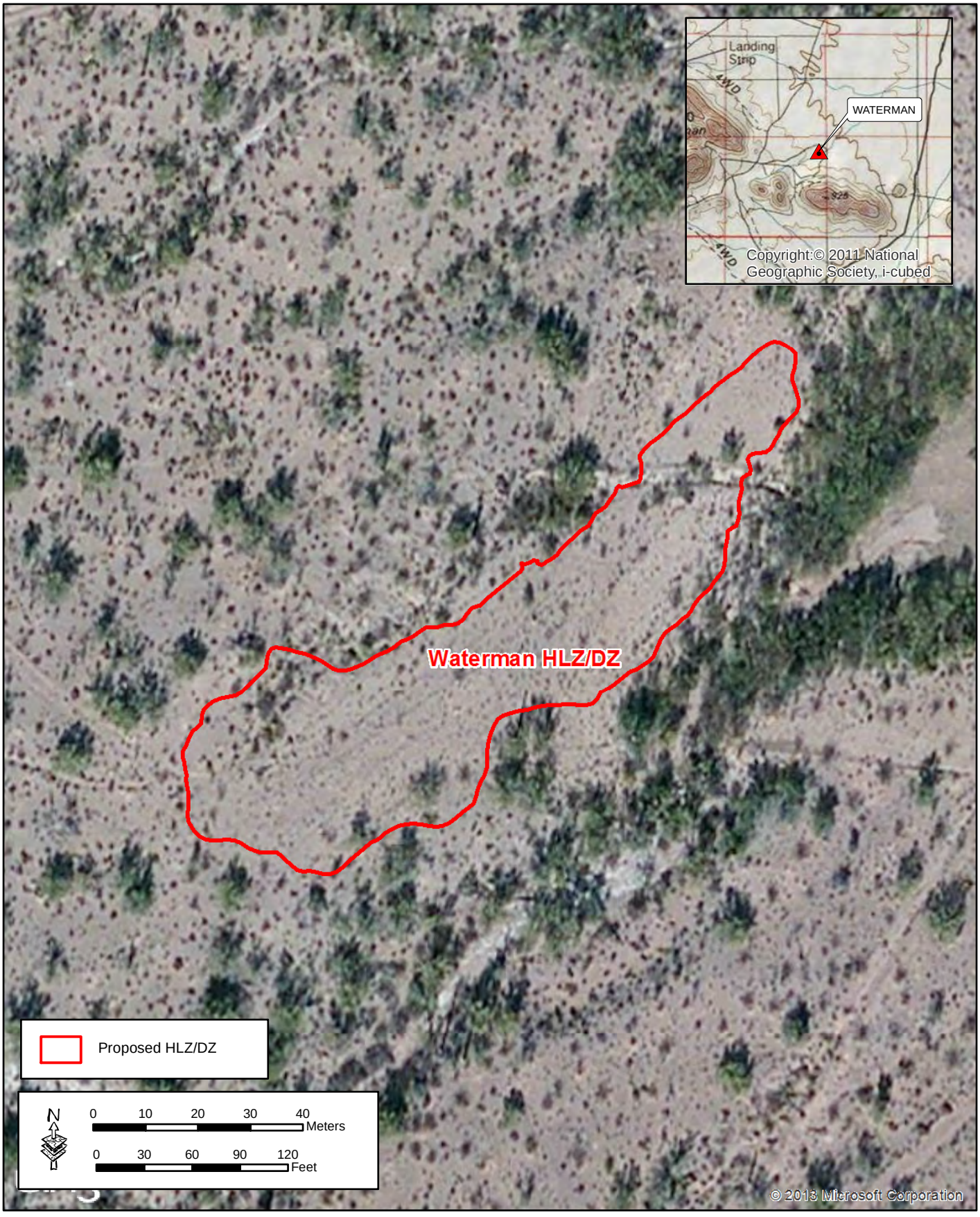

Figure 20. Aerial map of Waterman HLZ/DZ

GSRC

July 2013

APPENDIX C
AIRSPACE DESCRIPTIONS

Airspace Descriptions

Controlled Airspace

Controlled airspace is a generic term that encompasses the different classifications of airspace (Class A, B, C, D, and E) and defines dimensions within which air traffic control (ATC) service is provided for instrument flight rules (IFR) and visual flight rules (VFR) conditions. VFR air traffic flies below 18,000 feet mean sea level (MSL) using visual references such as towns and highways as a means of navigation. VFR aircraft may also follow Federal airways at altitudes not used by aircraft on instrument flight. VFR conditions rely heavily on "see and avoid" procedures that require pilots to be visually alert for and maintain safe distances from other aircraft, populated areas, obstacles, or clouds. Most other air traffic (including air passenger carriers, business aircraft, and military aircraft) operate under IFR conditions that require pilots to be trained and appropriately certified in instrument navigational procedures. The respective procedures established under VFR and IFR for airspace use and flight operations help segregate aircraft operating under each set of rules. Military pilots are trained for and use both VFR and IFR conditions. Refer to Figure 1 for a depiction of the various classes of airspace discussed below.

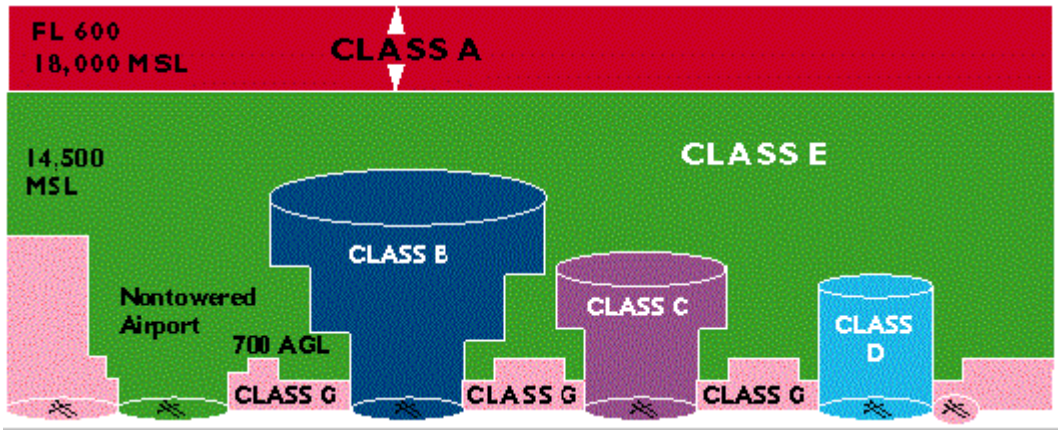

Figure 1. Depiction of Various Classes of Airspace

Class A Airspace. Class A airspace includes all flight levels or operating altitudes from 18,000 to 60,000 feet MSL.

Class B Airspace. Class B airspace typically includes that airspace from the surface to 10,000 feet MSL surrounding the Nation's busiest airports. Class B airspace is typically associated with major metropolitan airports such as the Phoenix Sky Harbor in Phoenix, Arizona.

Class C Airspace. Class C airspace can generally be described as controlled airspace that extends from the surface up to 4,000 feet above ground level (AGL) to provide additional control into and out of primary airports that occasionally experience a large number of aircraft operations. Class C airspace is associated with city airports such as Tucson International Airport, Arizona.

Class D Airspace. Class D airspace is the area within 5 nautical miles (NM) from an operating ATC-controlled airport, extending from the surface to 2,500 feet AGL or higher. The airspace in the immediate vicinity of Ernest A. Love Airport, Prescott, Arizona, is an example of Class D airspace.

Class E Airspace. Class E airspace is controlled airspace that is not designated as Class A, B, C, or D. It includes designated Federal airways consisting of low-altitude V or "Victor" routes. The majority of Class E airspace is located where more stringent airspace controls have not been established and are associated with smaller airports such as Pinal Airpark and Marana Northwest Regional Airport, Arizona.

Uncontrolled Airspace

Class G Airspace. Uncontrolled airspace, Class G, is not subject to the restrictions that apply to controlled airspace. Limits of uncontrolled airspace typically extend from the ground surface to 700 feet AGL, but can extend above these altitudes to as high as 14,500 feet MSL if the Federal Aviation Administration (FAA) has designated no other types of controlled airspace. Primary users of uncontrolled airspace are general aviation aircraft operating in accordance with VFR.

Special-Use Airspace

Special-use airspace (SUA) consists of airspace within which specific activities must be confined, or where limitations are imposed on aircraft not participating in those activities. With the exception of Controlled Firing Areas, special use airspace is depicted on sectional aeronautical charts. These charts include hours of operation, altitudes, and the agency controlling the airspace.

MOAs. MOAs are non-regulatory special use airspace areas with defined vertical and lateral limits. MOAs are designed to increase safety for IFR and VFR traffic. When an MOA is active (in use), all IFR traffic is re-routed around the area. Non-participating VFR traffic may enter the active MOA, but see and avoid procedures must be used.

Refueling Tracks/Anchors (ARs). AR tracks are published routes where fuel transfer between military aircraft can take place.

Restricted Area. Airspace within which flight of aircraft, while not wholly prohibited, is subject to restriction. This airspace is used to contain hazardous military activity. The term "hazardous" implies, but is not limited to, live firing of weapons, ordnance delivery, and/or aircraft testing.

Range. A range is any land mass or water body, with the associated SUA. A range is a designated area established to conduct military operations, training, research and development, and test or evaluation of military hardware, personnel, tactics, munitions, explosives, and/or EC systems. Range capabilities and services vary, and are dependent upon the test and training requirements delineated by the military. Ranges can accommodate ground activity, ground-to-air activity, and/or air-to-ground activity. Both ground-to-air and air-to ground activity requires SUA above range parameters.

Other

LATN Area. Airspace associated with low-speed and low-altitude training conducted by military aircrews is commonly identified as a LATN area. LATN areas generally have an altitude structure between 100 and 1,500 feet AGL and an airspeed restriction not to exceed 250 knots indicated airspeed (KIAS). A LATN area covers large areas of uncontrolled airspace and facilitates operational flexibility (e.g., flight patterns are not confined to narrow flight corridors and the direction of flight is not restricted). The purpose of LATN areas is to conduct random

VFR low-altitude navigation training in an area that is defined by local military operations. Military aircraft are required to follow all existing FARs while flying within a LATN area. Other nonparticipating civil and military aircraft may fly within a designated LATN area but are required to maintain visual separation from other aircraft in visual meteorological conditions. Military and civilian pilots are responsible to "see and avoid" each other while operating in an LATN area. Since the FAA does not consider a LATN area special use airspace, formal airspace designation is not required. For the same reason, LATN areas are not included on FAA charts or publications.

Landing Zone (LZ). A landing area that has been identified for short field landing, hovering, and takeoff training for aircraft and helicopters. LZs can be established at local public-use airports, military airfields, or other areas that have prior approval for activity.

DAVIS-MONTHAN AFB, RANGES, AND AIRSPACE

Davis-Monthan AFB and Vicinity

DMAFB is located approximately 6 miles southeast of downtown Tucson, Arizona. DMAFB has one northwest and southeast oriented runway (RWY 12/30) that is 13,643 feet long by 200 feet wide. RWY 12 is the primary runway for noise abatement. Tucson Terminal Radar Approach Control (TRACON) controls IFR traffic within approximately 40 NM of DMAFB below 17,000 feet MSL. DMAFB and Tucson International Airport (5 NM to the west) are designated Class C airspace that overlaps and encircles both Tucson International Airport and DMAFB from the surface to 6,600 feet MSL and from 5 NM to 10 NM from 4,200 feet MSL to 6,600 feet MSL. The DMAFB tower is responsible for all air traffic northeast of Interstate 10 within 5 NM of the airport from the surface up to 5,500 feet MSL. DMAFB has three published instrument approaches and three published departures for RWY 12/30. DMAFB supports both VFR and IFR flight operations. There are 33 public use civil airports (including 6 charted private airfields) within 100 NM of DMAFB. The largest of these airports, Phoenix Sky Harbor International Airport, has designated Class B airspace. There are numerous airports within the local flying area that contain Class C and D airspace.

Currently there are approximately 77,000 annual airfield operations conducted at DMAFB. These airfield operations reflect a mixture of aircraft, primarily A/OA-10, EC-130, with F-16, F-15, FA- 18, F-14 AV-8, KC-135, KC-10, B-1, C-17, C-5, C-141 aircraft, and multiple types of helicopter and general aviation aircraft also using the airfield.

Ranges and Airspace

Albuquerque Air Route Traffic Control Center (ARTCC) controls airspace in the ROI. HH-60 and HC-130 aircraft will normally fly below 3,000 feet AGL on training flights. There are low-altitude Victor Routes that serve general and commercial aviation below 18,000 feet MSL. The low-altitude system is defined by the same radio navigation aids that establish the jet route system above 18,000 feet. The individual routes are 8 NM wide. The floors of these routes vary from segment to segment depending on the altitudes necessary to provide clear reception of the navigation signals and safe overflight clearance above the underlying terrain. Low altitude Victor Routes do not penetrate restricted airspace and generally do not penetrate MOAs. Those that do pass through MOAs cannot carry IFR traffic when the MOA is active. There are 15 Victor Routes within 100 NM of DMAFB.

There are 11 low-level military training visual routes (VRs) that transit the DMAFB airspace: VRs 223, 239, 241, 242, 244, 259, 260, 263, 267, 268, and 269. These VRs are primarily used for flight training and entry into the many MOAs in the region, including Ruby 1, Fuzzy, Sells 1,

Sells Low, Jackal 1, Jackal Low, Outlaw, Morenci, Reserve, and Tombstone and Restricted Areas R-2301E/W, R-2305, R-2304, R-2310A/B/C, and R-2312. Figure 1-2 depicts those airspace units proposed for use under the Proposed Action. There are no Instrument Routes (IRs) or Slow Routes (SRs) within 100 NM of DMAFB.

There are 2 LATN areas to the northwest and southwest of the base defined from 100 feet AGL to 3,000 feet AGL (to 1,000 feet AGL in the northwestern part of the LATN that falls under Sells MOA) for A/OA-10 aircraft assigned to DMAFB. The 305 RQS has also established 2 LATN areas designated for HH-60 helicopters to the west (which overlaps the A/OA-10 LATN areas) and east of the base from 100 feet AGL to 1,500 feet AGL.

Currently, the 305 RQS uses the BMGR, primarily R-2304 and R-2305, and Sells MOA for HH-60 training. The BMGR (including the Marine Corps Air Station [MCAS] Yuma portion or R-2301W) contains 56 areas of Special Use Airspace and ATCAAs, where 72,870 aircraft sorties were flown by 44 different aircraft types (Air Force 1999). Within the 305 RQS LATN areas and the BMGR, there are 19 identified LZs for HH-60 helicopters. HH-60 air refueling training is accomplished in the MOAs and the 305 West and East LATN areas. The Tucson Medical Center Heliport is also used by the HH-60's for local support and flight training with flight procedures established in the 305 RQS Inflight Guide.

APPENDIX D
THREATENED AND ENDANGERED SPECIES LIST

COUNTY	TAXON	SCIENTIFIC NAME	COMMON NAME	ESA	BLM	CRIT HAB	USFS	NESL	MEXFED	STATE	ELCODE	S RANK	G RANK
Apache	PLANT	Stellaria porsildii	Porsild's Starwort				S				PDCAR0X160	S1	G1
Apache	PLANT	Streptopus amplexifolius	White Mandarin Twisted Stalk							SR	PMLIL1X010	S2S3	G5
Apache	PLANT	Talinum gooddingii	Goodding's Flameflower								PDPOR08090	S1	G1Q
Apache	PLANT	Thalictrum dasycarpum	Purple Meadow Rue								PDRAN0M060	S2	G5
Apache	PLANT	Trifolium neurophyllum	White Mountains Clover	SC			S				PDFAB401N0	S2	G2
Apache	PLANT	Zigadenus vaginatus	Sheathed Deathcamas					3			PMLIL280C0	S1	G2
Apache	PLANT	Zigadenus virescens	Green Death Camas							SR	PMLIL280E0	S4	G4
Apache	REPTILE	Chrysemys picta bellii	Western Painted Turtle						A		ARAAD01011	S1SE2	G5T5
Apache	REPTILE	Coluber constrictor	Racer						A		ARADB07010	S1	G5
Apache	REPTILE	Crotalus viridis	Prairie Rattlesnake						PR		ARADE02120	S1	G5
Apache	REPTILE	Lampropeltis triangulum taylori	Utah Milksnake					4			ARADB19058	S2	G5T4Q
Apache	REPTILE	Phrynosoma hernandesi	Greater Short-horned Lizard								ARACF12080	S4	G5
Apache	REPTILE	Plestiodon multivirgatus epipleurotus	Variable Skink						PR		ARACH01091	S3S4	G5T5
Apache	REPTILE	Thamnophis eques megalops	Northern Mexican Gartersnake	C*			S		A	WSC	ARADB36061	S1	G5T5
Apache	REPTILE	Thamnophis rufipunctatus	Narrow-headed Gartersnake	SC			S			WSC	ARADB36110	S1	G3G4
Cochise	AMPHIBIAN	Ambystoma mavortium stebbinsi	Sonora Tiger Salamander	LE						WSC	AAAAA01145	S1	G5T1T2
Cochise	AMPHIBIAN	Anaxyrus debilis insidior	Western Green Toad						PR		AAABB01062	S3	G5T5
Cochise	AMPHIBIAN	Craugastor augusti cactorum	Western Barking Frog				S			WSC	AAABD04171	S2	G5T5
Cochise	AMPHIBIAN	Hyla wrightorum (Huachuca/Canelo Pop.)	Arizona Treefrog (Huachuca/Canelo DPS)	C,DPS							AAABC02082	S1	G4T2
Cochise	AMPHIBIAN	Lithobates chiricahuensis	Chiricahua Leopard Frog	LT		Y			A	WSC	AAABH01080	S2	G3
Cochise	AMPHIBIAN	Rana blairi	Plains Leopard Frog		S		S			WSC	AAABH01040	S1	G5
Cochise	AMPHIBIAN	Rana yavapaiensis	Lowland Leopard Frog	SC	S		S		PR	WSC	AAABH01250	S3	G4
Cochise	AMPHIBIAN	Spea bombifrons	Plains Spadefoot								AAABF02010	S4	G5
Cochise	BIRD	Accipiter gentilis	Northern Goshawk	SC	S		S	4	A	WSC	ABNKC12060	S3B	G5
Cochise	BIRD	Amazilia beryllina	Berylline Hummingbird								ABNUC29080	S1	G4

COUNTY	TAXON	SCIENTIFIC NAME	COMMON NAME	ESA	BLM	CRIT HAB	USFS	NESL	MEXFED	STATE	ELCODE	S RANK	G RANK
Cochise	BIRD	Amazilia violiceps	Violet-crowned Hummingbird				S			WSC	ABNUC29150	S3	G5
Cochise	BIRD	Ammodramus bairdii	Baird's Sparrow	SC			S			WSC	ABPBXA0010	S2N	G4
Cochise	BIRD	Ammodramus savannarum ammolegus	Arizona grasshopper sparrow		S		S				ABPBXA0021	S1S2	G5TU
Cochise	BIRD	Anas platyrhynchos diazi	Mexican Duck						A		ABNJB10062	S4	G5T5
Cochise	BIRD	Anthus spragueii	Sprague's Pipit	C*						WSC	ABPBM02060	S2N	G4
Cochise	BIRD	Antrostomus ridgwayi	Buff-collared Nightjar				S				ABNTA07060	S2S3	G5
Cochise	BIRD	Aquila chrysaetos	Golden Eagle		S			3	A		ABNKC22010	S4	G5
Cochise	BIRD	Ardea herodias	Great Blue Heron						|		ABNGA04010	S5	G5
Cochise	BIRD	Athene cunicularia hypugaea	Western Burrowing Owl	SC	S		S	4	PR		ABNSB10012	S3	G4T4
Cochise	BIRD	Basileuterus rufifrons	Rufous-capped Warbler								ABPBX21020	SAB	G4G5
Cochise	BIRD	Buteo albonotatus	Zone-tailed Hawk				S		PR		ABNKC19090	S4	G4
Cochise	BIRD	Buteo plagiatus	Gray Hawk	SC			S			WSC	ABNKC19150	S3	G5
Cochise	BIRD	Buteo swainsoni	Swainson's Hawk				S		PR		ABNKC19070	S3	G5
Cochise	BIRD	Buteogallus anthracinus	Common Black-Hawk				S		PR	WSC	ABNKC15010	S3	G4G5
Cochise	BIRD	Calothorax lucifer	Lucifer Hummingbird				S				ABNUC44010	S2	G4G5
Cochise	BIRD	Camptostoma imberbe	Northern Beardless-Tyrannulet				S				ABPAE04010	S4	G5
Cochise	BIRD	Catharus ustulatus	Swainson's Thrush								ABPBJ18100	S1	G5
Cochise	BIRD	Chloroceryle americana	Green Kingfisher								ABNXD02020	S2	G5
Cochise	BIRD	Coccothraustes vespertinus	Evening Grosbeak								ABPBY09020	S3	G5
Cochise	BIRD	Coccyzus americanus	Yellow-billed Cuckoo (Western U.S. DPS)	PS:C*			S	2		WSC	ABNRB02020	S3	G5
Cochise	BIRD	Dendrocygna autumnalis	Black-bellied Whistling-Duck							WSC	ABNJB01040	S3	G5
Cochise	BIRD	Dumetella carolinensis	Gray Catbird				S			WSC	ABPBK01010	S1	G5
Cochise	BIRD	Elanus leucurus	White-tailed Kite								ABNKC06010	S2B,S2S3N	G5
Cochise	BIRD	Empidonax fulvifrons pygmaeus	Northern Buff-breasted Flycatcher	SC			S			WSC	ABPAE33141	S1	G5T5
Cochise	BIRD	Empidonax traillii extimus	Southwestern Willow Flycatcher	LE		Y		2	E	WSC	ABPAE33043	S1	G5T1T2

COUNTY	TAXON	SCIENTIFIC NAME	COMMON NAME	ESA	BLM	CRIT HAB	USFS	NESL	MEXFED	STATE	ELCODE	S RANK	G RANK
Cochise	BIRD	Euptilotis neoxenus	Eared Quetzal				S		A		ABNWA03010	SAB,S1N	G3
Cochise	BIRD	Falco peregrinus anatum	American Peregrine Falcon	SC	S		S	4	PR	WSC	ABNKD06071	S4	G4T4
Cochise	BIRD	Haliaeetus leucocephalus (wintering pop.)	Bald Eagle - Winter Population	SC	S		S	2	P	WSC	ABNKC10015	S4N	G5TNR
Cochise	BIRD	Himantopus mexicanus	Black-necked Stilt								ABNND01010	S2	G5
Cochise	BIRD	Icterus bullockii	Bullock's Oriole								ABPBXB9220	S4BS1N	G5
Cochise	BIRD	Ictinia mississippiensis	Mississippi Kite						PR	WSC	ABNKC09010	S3	G5
Cochise	BIRD	Lampornis clemenciae	Blue-throated Hummingbird								ABNUC34040	S4	G5
Cochise	BIRD	Peucaea carpalis	Rufous-winged Sparrow								ABPBX91080	S3	G4
Cochise	BIRD	Plegadis chihi	White-faced Ibis	SC			S				ABNGE02020	S?B,S2S3N	G5
Cochise	BIRD	Polioptila nigriceps	Black-capped Gnatcatcher							WSC	ABPBJ08040	S1	G5
Cochise	BIRD	Recurvirostra americana	American Avocet								ABNND02010	S2	G5
Cochise	BIRD	Sialia sialis fulva	Azure Bluebird								ABPBJ15012	S3	G5TU
Cochise	BIRD	Spinus tristis	American Goldfinch								ABPBY06110	S1B,S5N	G5
Cochise	BIRD	Strix occidentalis lucida	Mexican Spotted Owl	LT		Y		3	A	WSC	ABNSB12012	S3S4	G3T3
Cochise	BIRD	Tachybaptus dominicus	Least Grebe						PR		ABNCA01010	SAB	G5
Cochise	BIRD	Trogon elegans	Elegant Trogon							WSC	ABNWA02070	S3	G5
Cochise	BIRD	Tyrannus crassirostris	Thick-billed Kingbird				S			WSC	ABPAE52040	S2	G5
Cochise	BIRD	Tyrannus melancholicus	Tropical Kingbird							WSC	ABPAE52010	S3	G5
Cochise	FISH	Agosia chrysogaster chrysogaster	Gila Longfin Dace	SC	S		S		A		AFCJB37151	S3S4	G4T3T4
Cochise	FISH	Agosia chrysogaster ssp. 1	Yaqui Longfin Dace	SC	S		S		A		AFCJB37152	S1	G4T1
Cochise	FISH	Campostoma ornatum	Mexican Stoneroller	SC			S			WSC	AFCJB03030	S1	G3
Cochise	FISH	Catostomus clarkii	Desert Sucker	SC	S		S				AFCJC02040	S3S4	G3G4
Cochise	FISH	Catostomus insignis	Sonora Sucker	SC	S		S		P		AFCJC02100	S3	G3
Cochise	FISH	Cyprinella formosa	Beautiful Shiner	LT		Y			A	WSC	AFCJB49080	S1	G2
Cochise	FISH	Cyprinodon macularius	Desert Pupfish	LE		Y			P	WSC	AFCNB02060	S1	G1

COUNTY	TAXON	SCIENTIFIC NAME	COMMON NAME	ESA	BLM	CRIT HAB	USFS	NESL	MEXFED	STATE	ELCODE	S RANK	G RANK
Cochise	FISH	Gila intermedia	Gila Chub	LE		Y			P	WSC	AFCJB13160	S2	G2
Cochise	FISH	Gila purpurea	Yaqui Chub	LE		Y			P	WSC	AFCJB13140	S1	G1
Cochise	FISH	Ictalurus pricei	Yaqui Catfish	LT		Y			A	WSC	AFCKA01090	S1	G2
Cochise	FISH	Meda fulgida	Spikedace	LE		Y				WSC	AFCJB22010	S1	G2
Cochise	FISH	Poeciliopsis occidentalis sonoriensis	Yaqui Topminnow	LE					A	WSC	AFCNC05022	S1	G3
Cochise	FISH	Rhinichthys osculus	Speckled Dace	SC	S				E		AFCJB37050	S3S4	G5
Cochise	INVERTEBRATE	Agathymus aryxna	Arizona Giant Skipper								IILEP87080	S5	G4G5
Cochise	INVERTEBRATE	Agathymus evansi	Huachuca Giant-skipper				S				IILEP87110	S3	G2G3
Cochise	INVERTEBRATE	Agathymus neumoegeni	Neumogen's Giant Skipper								IILEP87010	S3	G4G5
Cochise	INVERTEBRATE	Anthocharis cethura	Desert Orangetip								IILEPA6010	S4	G4G5
Cochise	INVERTEBRATE	Cicindela oregona maricopa	Maricopa Tiger Beetle	SC							IICOL02362	S3	G5T3
Cochise	INVERTEBRATE	Discus shimekii	Striate Disc	SC							IMGAS54120	S2?	G5
Cochise	INVERTEBRATE	Ellipsoptera nevadica citata	Chiricahua Tiger Beetle								IICOL02175	S1	G5T3
Cochise	INVERTEBRATE	Erynnis scudderi	Scudder's Dusky Wing								IILEP37070	S1S2	G4G5
Cochise	INVERTEBRATE	Eumorsea balli	Ball's Monkey Grasshopper								IIORT14020	S1	G2G4
Cochise	INVERTEBRATE	Neophasia terlooii	Chiricahua Pine White								IILEP99020	S4	G3G4
Cochise	INVERTEBRATE	Psephenus arizonensis	Arizona Water Penny Beetle	SC							IICOL63010	S2?	G2?
Cochise	INVERTEBRATE	Pyrgulopsis bernardina	San Bernardino Springsnail	LT	S	Y					IMGASJ0950	S1	G1
Cochise	INVERTEBRATE	Pyrgulopsis thompsoni	Huachuca Springsnail	C	S		S				IMGASJ0230	S2	G2
Cochise	INVERTEBRATE	Sonorella neglecta	Portal Talussnail								IMGASC9440	SH	G1
Cochise	INVERTEBRATE	Sphingicampa raspa	A Royal Moth								IILEW0H080	S1	G1G2
Cochise	INVERTEBRATE	Stygobromus arizonensis	Arizona Cave Amphipod	SC	S						ICMAL05360	S1?	G1
Cochise	INVERTEBRATE	Sympetrum signiferum	Spot-winged Meadowhawk								IIODO61150	S2	G2G3
Cochise	MAMMAL	Antrozous pallidus	Pallid Bat								AMACC10010	S4	G5
Cochise	MAMMAL	Baiomys taylori	Northern Pygmy Mouse				S				AMAFF05010	S3	G4G5

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Cochise	MAMMAL	Bat Colony									OBATCOLONY	SU	GNR
Cochise	MAMMAL	Bat Foraging Area	High Netting Concentration								OBATFORAG1	SU	GNR
Cochise	MAMMAL	Choeronycteris mexicana	Mexican Long-tongued Bat	SC	S		S		A	WSC	AMACB02010	S3	G4
Cochise	MAMMAL	Corynorhinus townsendii pallescens	Pale Townsend's Big-eared Bat	SC	S		S	4			AMACC08014	S3S4	G3G4T3T4
Cochise	MAMMAL	Didelphis virginiana californica	Mexican Opossum								AMAAA01011	S3	G5TNR
Cochise	MAMMAL	Eptesicus fuscus	Big Brown Bat								AMACC04010	S4S5	G5
Cochise	MAMMAL	Eumops perotis californicus	Greater Western Bonneted Bat	SC	S		S				AMACD02011	S3	G5T4
Cochise	MAMMAL	Idionycteris phyllotis	Allen's Lappet-browed Bat	SC	S		S				AMACC09010	S2S3	G3G4
Cochise	MAMMAL	Lasionycteris noctivagans	Silver-haired Bat						PR		AMACC02010	S3S4	G5
Cochise	MAMMAL	Lasiurus blossevillii	Western Red Bat				S			WSC	AMACC05060	S3	G5
Cochise	MAMMAL	Lasiurus cinereus	Hoary Bat	No Status							AMACC05030	S4	G5
Cochise	MAMMAL	Lasiurus xanthinus	Western Yellow Bat				S			WSC	AMACC05070	S2S3	G5
Cochise	MAMMAL	Leopardus pardalis	Ocelot	LE					P	WSC	AMAJH05010	S1	G4
Cochise	MAMMAL	Leptonycteris curasoae yerbabuenae	Lesser Long-nosed Bat	LE					A	WSC	AMACB03030	S2S3	G4
Cochise	MAMMAL	Mustela frenata	Long-tailed Weasel								AMAJF02030	S4	G5
Cochise	MAMMAL	Myotis auriculus	Southwestern Myotis								AMACC01080	S3	G5
Cochise	MAMMAL	Myotis californicus	California Myotis								AMACC01120	S4	G5
Cochise	MAMMAL	Myotis ciliolabrum	Western Small-footed Myotis	SC							AMACC01140	S3S4	G5
Cochise	MAMMAL	Myotis occultus	Arizona Myotis	SC	S						AMACC01160	S3	G3G4
Cochise	MAMMAL	Myotis thysanodes	Fringed Myotis	SC							AMACC01090	S3S4	G4
Cochise	MAMMAL	Myotis velifer	Cave Myotis	SC	S						AMACC01050	S3S4	G5
Cochise	MAMMAL	Myotis volans	Long-legged Myotis	SC							AMACC01110	S3S4	G5
Cochise	MAMMAL	Neotoma mexicana	Mexican Woodrat								AMAFF08070	S5	G5
Cochise	MAMMAL	Notiosorex cockrumi	Cockrum's Desert Shrew				S				AMABA05020	S1	GNR
Cochise	MAMMAL	Nyctinomops femorosaccus	Pocketed Free-tailed Bat				S				AMACD04010	S3	G4

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Cochise	MAMMAL	Nyctinomops macrotis	Big Free-tailed Bat	SC							AMACD04020	S3	G5
Cochise	MAMMAL	Panthera onca	Jaguar	LE		P			P	WSC	AMAJH02010	S1	G3
Cochise	MAMMAL	Reithrodontomys fulvescens	Fulvous Harvest Mouse				S				AMAFF02050	S4	G5
Cochise	MAMMAL	Reithrodontomys montanus	Plains Harvest Mouse				S				AMAFF02010	S3	G5
Cochise	MAMMAL	Sciurus nayaritensis chiricahuae	Chiricahua Fox Squirrel	SC			S				AMAFB07051	S2	G5T2
Cochise	MAMMAL	Sigmodon ochrognathus	Yellow-nosed Cotton Rat	SC			S				AMAFF07040	S4	G4G5
Cochise	MAMMAL	Sorex arizonae	Arizona Shrew	SC			S		P	WSC	AMABA01240	S2	G3
Cochise	MAMMAL	Tadarida brasiliensis	Brazilian Free-tailed Bat								AMACD01010	S3S4	G5
Cochise	MAMMAL	Thomomys bottae	Botta's Pocket Gopher								AMAFC01020	S5	G5
Cochise	MAMMAL	Thomomys bottae mearnsi	Mearns' Southern Pocket Gopher	SC			PS				AMAFC0102G	S5	G5T5
Cochise	PLANT	Adiantum pedatum	American Maidenhair								PPADI030B0	S5	G5
Cochise	PLANT	Aeschynomene villosa	Sensitive Joint Vetch								PDFAB04070	S2?	G4
Cochise	PLANT	Ageratina lemmonii	Lemmon's Thorough-wort								PDASTBX0L0	S1	G3?
Cochise	PLANT	Allium glandulosum	Gland Onion							SR	PMLIL02110	S1	G4
Cochise	PLANT	Allium plummerae	Plummer Onion							SR	PMLIL021V0	S3	G4
Cochise	PLANT	Allium rhizomatum	Redflower Onion							SR	PMLIL02320	S1	G3?Q
Cochise	PLANT	Ammocodon chenopodioides	Goosefoot Moonpod								PDNYC04010	S1	G5
Cochise	PLANT	Apacheria chiricahuensis	Chiricahua Rock Flower							SR	PDCRO01010	S2	G2
Cochise	PLANT	Arabis tricornuta	Chiricahua Rock Cress				S				PDBRA06200	S1	G1
Cochise	PLANT	Arceuthobium blumeri	Blumer Dwarf Mistletoe								PDVIS03040	S1?	G3?
Cochise	PLANT	Asclepias lemmonii	Lemmon Milkweed				S				PDASC020Z0	S2	G4?
Cochise	PLANT	Asclepias quinquedentata	Tooth Hood Milkweed								PDASC021L0	S2	G4
Cochise	PLANT	Asclepias uncialis	Greene Milkweed	SC			S				PDASC02220	S1?	G3G4
Cochise	PLANT	Asplenium dalhousiae	Dalhouse Spleenwort		S						PPASP020A0	S1	GNR
Cochise	PLANT	Asplenium exiguum	Sonoran Spleenwort								PPASP020D0	S1	GU

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Cochise	PLANT	Aster pauciflorus	Marsh Alkali Aster								PDASTEL010	S1	G4
Cochise	PLANT	Aster potosinus	Lemmon's Aster								PDASTE8160	S1	G2
Cochise	PLANT	Astragalus cobrensis var. maguirei	Coppermine Milk-vetch	SC			S			SR	PDFAB0F262	S1	G4T2
Cochise	PLANT	Astragalus hypoxylus	Huachuca Milkvetch	SC	S		S			SR	PDFAB0F470	S1	G1
Cochise	PLANT	Atriplex griffithsii	Griffith Saltbush								PDCHE040S0	S2S3	G2G3
Cochise	PLANT	Bouchea prismatica	Prism Bouchea								PDVER04020	S4	G4G5
Cochise	PLANT	Carex chihuahuensis	Chihuahuan Sedge				S				PMCYP032T0	S2S3	G3G4
Cochise	PLANT	Carex meadii	Mead Sedge								PMCYP03870	S3?	G4G5
Cochise	PLANT	Carex ultra	Arizona Giant Sedge		S		S				PMCYP03E50	S2	G3?
Cochise	PLANT	Castilleja lanata	White-woolly Indian-paintbrush								PDSCR0D1L0	S4	G5
Cochise	PLANT	Castilleja nervata	Trans-pecos Indian-paintbrush				S				PDSCR0D270	S1	G3Q
Cochise	PLANT	Castilleja patriotica	Tricolor Indian Paintbrush								PDSCR0D2F0	S3S4	G4
Cochise	PLANT	Centaurea rothrockii	Knap Thistle								PDAST1Y0P0	S3	G4
Cochise	PLANT	Cheilanthes arizonica	Arizona Lip Fern								PPADI09030	S2	G4
Cochise	PLANT	Cleome multicaulis	Playa Spider Plant	SC						SR	PDCPP03080	S1	G2G3
Cochise	PLANT	Coryphantha robbinsorum	Cochise Pincushion Cactus	LT						HS	PDCAC0X0C0	S1	G1
Cochise	PLANT	Coryphantha scheeri var. valida	Slender Needle Corycactus							SR	PDCAC040C4	S3?	G4T4
Cochise	PLANT	Coryphantha sneedii	Carpet Foxtail Cactus							SR	PDCAC0X0E0	S1	G2
Cochise	PLANT	Coursetia glabella	Smooth Baby-bonnets	SC			S				PDFAB140B0	S1	G3?
Cochise	PLANT	Croton fruticulosus	Encinillas								PDEUP0H0F0	S1	G5
Cochise	PLANT	Desmodium metcalfei	Metcalfe's Tick-trefoil				S				PDFAB1D0V0	S2	G3G4
Cochise	PLANT	Dichondra argentea	Silver Pony Foot								PDCON08010	S1	G4
Cochise	PLANT	Draba standleyi	Standley Whitlow-grass	SC							PDBRA112G0	S2S3	G2G3
Cochise	PLANT	Echinocereus ledingii	Pinaleno Hedgehog Cactus							SR	PDCAC06066	S4	G4G5T4
Cochise	PLANT	Echinocereus pseudopectinatus	Devil-thorn							SR	PDCAC060P0	S1	G4

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Cochise	PLANT	Echinomastus erectocentrus var. erectocentrus	Needle-spined Pineapple Cactus	SC						SR	PDCAC0J0E2	S3	G3T3Q
Cochise	PLANT	Epithelantha micromeris	Button Cactus						PR	SR	PDCAC07020	S1	G4
Cochise	PLANT	Eragrostis obtusiflora	Alkali Lovegrass								PMPOA2K150	S3	G5
Cochise	PLANT	Erigeron arisolius	Arid Throne Fleabane				S				PDAST3M510	S2	G2
Cochise	PLANT	Erigeron arizonicus	Arizona Fleabane								PDAST3M0B0	S3	G3?
Cochise	PLANT	Erigeron kuschei	Chiricahua Fleabane	SC			S			SR	PDAST3M240	S1	G1
Cochise	PLANT	Erigeron lemmonii	Lemmon Fleabane	SC						HS	PDAST3M2A0	S1	G1
Cochise	PLANT	Erigeron pringlei	Pringle's Fleabane								PDAST3M3C0	S2	G2
Cochise	PLANT	Erigeron sceptrifer	Scepterbearing Fleabane								PDAST3M520	S1	GNR
Cochise	PLANT	Erigeron scopulinus	Winn Falls Fleabane								PDAST3M4E0	S1	G3?
Cochise	PLANT	Eriogonum capillare	San Carlos Wild-buckwheat	SC						SR	PDPGN08100	S4	G4
Cochise	PLANT	Eriogonum terrenatum	San Pedro River Wild Buckwheat		S						PDPGN08760	S1	G1
Cochise	PLANT	Eryngium lemmonii	Lemmon Button Snakeroot								PDAPI0Z0J0	S3	G4
Cochise	PLANT	Eryngium sparganophyllum	Ribbonleaf Button Snakeroot								PDAPI0Z0T0	S1	G2
Cochise	PLANT	Euphorbia macropus	Woodland Spurge	SC						SR	PDEUP0Q2U0	S2	G4
Cochise	PLANT	Euphorbia trachysperma	Roughseed Spurge								PDEUP0D2E0	S4	G4
Cochise	PLANT	Fraxinus gooddingii	Goodding Ash								PDOLE04080	S3	G3
Cochise	PLANT	Gentianella wislizeni	Wislizeni Gentian	SC			S			SR	PDGEN07090	S1	G2
Cochise	PLANT	Gentianopsis macrantha	Mexican Fringed Gentian								PDGEN08060	S1S2	G4
Cochise	PLANT	Graptopetalum bartramii	Bartram Stonecrop	SC	S		S			SR	PDCRA06010	S3	G3
Cochise	PLANT	Gutierrezia wrightii	Wright's Snakeweed								PDAST4B0C0	S2S3	G4?
Cochise	PLANT	Hedeoma costatum	Chiricahua Mock Pennyroyal								PDLAM0M0L0	S1	G5
Cochise	PLANT	Hedeoma dentatum	Mock-pennyroyal								PDLAM0M0M0	S3	G3
Cochise	PLANT	Hermannia pauciflora	Sparseleaf Hermannia								PDSTE06010	S1	G2?
Cochise	PLANT	Heteranthera limosa	Mud Plantain								PMPON03030	S1	G5

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Cochise	PLANT	Heterotheca rutteri	Huachuca Golden Aster	SC	S		S				PDAST4V0J0	S2	G2
Cochise	PLANT	Heuchera glomerulata	Arizona Alum Root				S				PDSAX0E0F0	S3	G3
Cochise	PLANT	Hexalectris arizonica	Arizona Crested coral-root				S			SR	PMORC1C041	S1S2	G5T2T4
Cochise	PLANT	Hexalectris colemanii	Coleman's coral-root				S				PMORC1C060	S1S2	G1G2
Cochise	PLANT	Hexalectris warnockii	Texas Purple Spike	SC	S		S			HS	PMORC1C050	S1	G2G3
Cochise	PLANT	Hieracium pringlei	Pringle Hawkweed	SC							PDAST4W170	S1	G2Q
Cochise	PLANT	Hieracium rusbyi	Rusby Hawkweed				S				PDAST4W1A0	S1	G2?
Cochise	PLANT	Hymenoxys ambigens var. floribunda	A Daisy								PDAST530T2	S2	G3?T2
Cochise	PLANT	Hymenoxys quinquesquamata	Five Scale Bitterweed								PDAST530F0	S3	G3
Cochise	PLANT	Hypoxis mexicana	Yellow Star Grass								PMLIL16030	S1	G5
Cochise	PLANT	Ibervillea tenuisecta	Texas Globe Berry								PDCUC0F020	S1	G4
Cochise	PLANT	Ipomoea plummerae var. cuneifolia	Huachuca Morning Glory								PDCON0A141	S3	G4T3
Cochise	PLANT	Ipomoea tenuiloba	Trumpet Morning-glory								PDCON0A1H0	S4	G4
Cochise	PLANT	Ipomoea thurberi	Thurber's Morning-glory								PDCON0A1K0	S1	G3
Cochise	PLANT	Justicia sonorae	Palm Canyon Justicia								PDACA0E0K0	SE	G4
Cochise	PLANT	Laennecia eriophylla	Woolly Fleabane								PDASTDL020	S2	G3
Cochise	PLANT	Leibnitzia lyrata	Woodland Sunbonnets								PDASTDM010	S4	G5
Cochise	PLANT	Lilaeopsis schaffneriana ssp. recurva	Huachuca Water-umbel	LE		Y				HS	PDAPI19051	S2	G4T2
Cochise	PLANT	Lilium parryi	Lemmon Lily	SC			S			SR	PMLIL1A0J0	S2	G3
Cochise	PLANT	Lithospermum viride	Green Puccoon								PDBOR0L0G0	S1	G4
Cochise	PLANT	Lobelia fenestralis	Leafy Lobelia							SR	PDCAM0E0H0	S1	G4
Cochise	PLANT	Lupinus huachucanus	Huachuca Mountain Lupine				S				PDFAB2B210	S2	G2
Cochise	PLANT	Lupinus lemmonii	Lemmon's Lupine				S				PDFAB2B2A0	S1Q	G1Q
Cochise	PLANT	Machaeranthera riparia	Chiricahua Mountain Tansy-aster								PDAST641B0	S1	G4
Cochise	PLANT	Malaxis corymbosa	Madrean Adders Mouth							SR	PMORC1R020	S3S4	G4

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Cochise	PLANT	Malaxis porphyrea	Purple Adder's Mouth							SR	PMORC1R0Q0	S2	G4
Cochise	PLANT	Malaxis tenuis	Slender Adders Mouth							SR	PMORC1R090	S1	G4
Cochise	PLANT	Mammillaria heyderi var. bullingtoniana	Cream Cactus							SR	PDCAC0A035	S1S2	G4?T2T4
Cochise	PLANT	Mammillaria viridiflora	Varied Fishhook Cactus							SR	PDCAC0A0D0	S4	G4
Cochise	PLANT	Mammillaria wrightii var. wilcoxii	Wilcox Fishhook Cactus							SR	PDCAC0A0E1	S4	G4T4
Cochise	PLANT	Mentzelia lindheimeri	Lindheimer Stickleaf								PDLOA030U0	S1	G4
Cochise	PLANT	Mentzelia oligosperma	Sparseseed Stickleaf								PDLOA03170	S1	G4
Cochise	PLANT	Metastelma mexicanum	Wiggins Milkweed Vine	SC			S				PDASC050P0	S1S2	G3G4
Cochise	PLANT	Microchloa kunthii	Kunth Grass								PMPOA40010	S1	G5
Cochise	PLANT	Muhlenbergia dubioides	Box Canyon Muhly				S				PMPOA480G0	S1	G1Q
Cochise	PLANT	Nemastylis tenuis	Slender Shell Flower								PMIRI0B040	S1	G5
Cochise	PLANT	Nissolia wislizeni	Arizona Nissolia								PDFAB2Q030	S1	G2G4
Cochise	PLANT	Notholaena aschenborniana	Aschenborn Cloak Fern								PPADI0G020	S1	G4
Cochise	PLANT	Notholaena neglecta	Neglected Cloak Fern								PPADI0G0F0	S1	G4
Cochise	PLANT	Oenothera havardii	Havard Primrose								PDONA0C0K0	S1	G4
Cochise	PLANT	Ophioglossum engelmannii	Engelmann Adders Tongue								PPOPH02040	S1	G5
Cochise	PLANT	Opuntia x martiniana	Seashore Cactus							SR	PDCAC0D2E0	SHYB	G1
Cochise	PLANT	Pectis imberbis	Beardless Chinch Weed	SC			S				PDAST6W0A0	S1	G3
Cochise	PLANT	Pediomelum pentaphyllum	Small Indian Breadroot	SC	S		S				PDFAB5L070	S1	G1
Cochise	PLANT	Pellaea ternifolia	Ternate Cliffbrake								PPADI0H0B0	S2	G5
Cochise	PLANT	Peniocereus greggii var. greggii	Night-blooming Cereus	SC					PR	SR	PDCAC0V011	S1	G3G4T2
Cochise	PLANT	Penstemon discolor	Catalina Beardtongue				S			HS	PDSCR1L210	S2	G2
Cochise	PLANT	Penstemon pinifolius	Pineleaf Beardtongue								PDSCR1L500	S3	G3G4
Cochise	PLANT	Penstemon ramosus	Branching Penstemon								PDSCR1L7L0	S1	G3G4Q
Cochise	PLANT	Penstemon stenophyllus	Narrowleaf Beardtongue								PDSCR1L5V0	S3	G4?

COUNTY	TAXON	SCIENTIFIC NAME	COMMON NAME	ESA	BLM	CRIT HAB	USFS	NESL	MEXFED	STATE	ELCODE	S RANK	G RANK
Cochise	PLANT	Penstemon superbus	Superb Beardtongue								PDSCR1L630	S2?	G3?
Cochise	PLANT	Perityle cochisensis	Chiricahua Rock Daisy				S			SR	PDAST70080	S1	G1
Cochise	PLANT	Phyllanthus polygonoides	Knotleaf Flower								PDEUP130E0	S2	G5
Cochise	PLANT	Physalis latiphysa	Broad-leaf Ground-cherry				S				PDSOL0S0H0	S1	G1
Cochise	PLANT	Physocarpus monogynus	Mountain Ninebark								PDROS19040	S4	G4
Cochise	PLANT	Pinaropappus roseus	Rock Lettuce								PDAST78020	S2	G5
Cochise	PLANT	Platanthera limosa	Thurber's Bog Orchid							SR	PMORC1Y0G0	S4	G4
Cochise	PLANT	Polemonium flavum	Pinaleno Jacobs Ladder								PDPLM0E0B2	S2	G5T3?
Cochise	PLANT	Polemonium pauciflorum ssp. hinckleyi	Hinckley's Ladder	SC			S				PDPLM0E0G1	S1	G3G5T2Q
Cochise	PLANT	Polygala glochidiata	Spiny Milkwort								PDPGL020J0	S2	G5
Cochise	PLANT	Potentilla albiflora	White-flowered Cinquefoil				S				PDROS1B010	S1S2	G1G2
Cochise	PLANT	Potentilla rhyolitica var. chiricahuensis	Chiricahua Cinquefoil				S				PDROS132X1	S1	G1G2T1T2
Cochise	PLANT	Potentilla rhyolitica var. rhyolitica	Huachuca Cinquefoil				S				PDROS132X2	S1S2	G1G2T1T2
Cochise	PLANT	Psacalium decompositum	Sonoran Indian-plantain								PDASTDS010	S2	G4?
Cochise	PLANT	Psilactis gentryi	Mexican Bare-ray-aster				S				PDASTE7010	S1	G3
Cochise	PLANT	Psorothamnus scoparius	Broom Dalea								PDFAB3C070	S1	G4
Cochise	PLANT	Pyrrhopappus rothrockii	False Dandelion								PDAST7V050	S3	G4
Cochise	PLANT	Ranunculus arizonicus	Arizona Buttercup								PDRAN0L0B0	S3	G4
Cochise	PLANT	Rhamnus serrata	Serrate Buckbrush								PDRHA0C0D0	S1	G4G5
Cochise	PLANT	Rumex orthoneurus	Blumer's Dock	SC			S			HS	PDPGN0P0Z0	S3	G3
Cochise	PLANT	Sagittaria montevidensis	Long-lobed Arrow-head								PMALI040K0	S1	G4G5
Cochise	PLANT	Salvia amissa	Aravaipa Sage	SC	S		S				PDLAM1S020	S2	G2
Cochise	PLANT	Samolus vagans	Chiricahua Mountain Brookweed				S				PDPRI09040	S2	G2?
Cochise	PLANT	Schiedeella arizonica	Fallen Ladies'-tresses							SR	PMORC67020	S4	GNR
Cochise	PLANT	Senecio carlomasonii	Seemann Groundsel								PDAST8H3W0	S2S3	G4?Q

COUNTY	TAXON	SCIENTIFIC NAME	COMMON NAME	ESA	BLM	CRIT HAB	USFS	NESL	MEXFED	STATE	ELCODE	S RANK	G RANK
Cochise	PLANT	Senecio multidentatus var. huachucanus	Huachuca Groundsel				S			HS	PDAST8H411	S2	G2G4T2
Cochise	PLANT	Senecio neomexicanus var. toumeyi	Toumey Groundsel				S				PDAST8H274	S2	G5T2Q
Cochise	PLANT	Senecio parryi	Mountain Groundsel								PDAST8H2B0	S4	G4
Cochise	PLANT	Seymeria bipinnatisecta	Sierra Madre Seymeria								PDSCR1T060	S1	G4G5
Cochise	PLANT	Sisyrinchium cernuum	Nodding Blue-eyed Grass				S				PMIRI0D0B0	S2	G5
Cochise	PLANT	Solanum heterodoxum	Melonleaf Nightshade								PDSOL0Z0X0	S4	G4G5
Cochise	PLANT	Sophora arizonica	Arizona Necklace								PDFAB3N020	S3	G3
Cochise	PLANT	Spiranthes delitescens	Canelo Hills Ladies'-tresses	LE						HS	PMORC2B140	S1	G1
Cochise	PLANT	Stellaria porsildii	Porsild's Starwort				S				PDCAR0X160	S1	G1
Cochise	PLANT	Stenorrhynchos michuacanum	Michoacan Ladies'-tresses							SR	PMORC2B0L0	S3	G4
Cochise	PLANT	Streptanthus carinatus	Lyre-leaved Twistflower								PDBRA2G0C0	S3S4	G4
Cochise	PLANT	Talinum angustissimum	Yellow Flame Flower								PDPOR08010	S2	G4
Cochise	PLANT	Talinum marginatum	Tepic Flame Flower	SC			S			SR	PDPOR080N0	S1	G2
Cochise	PLANT	Tephrosia thurberi	Thurber Hoary Pea								PDFAB3X0M0	S3	G4G5
Cochise	PLANT	Tillandsia recurvata	Ball Moss								PMBRO090E0	S2	G5
Cochise	PLANT	Tragia amblyodonta	Tombstone Noseburn								PDEUP1D010	S1	G4
Cochise	PLANT	Tragia laciniata	Sonoran Noseburn				S				PDEUP1D060	S3?	G3G4
Cochise	PLANT	Trifolium amabile	Linda Clover								PDFAB40030	S1S2	G4
Cochise	PLANT	Tripsacum lanceolatum	Mexican Gama Grass								PMPOA68030	S2S3	G4
Cochise	PLANT	Vauquelinia californica ssp. pauciflora	Limestone Arizona Rosewood	SC						SR	PDROS1R022	S1	G4T3
Cochise	PLANT	Verbena pinetorum	Chihuahua Vervain								PDVER0N0P0	S1	G2G4
Cochise	PLANT	Viola umbraticola	Shade Violet				S				PDVIO042E0	S2?	G3G4
Cochise	PLANT	Xanthisma texanum	Sleepy Daisy								PDAST9Y010	S1	G5
Cochise	PLANT	Zigadenus virescens	Green Death Camas							SR	PMLIL280E0	S4	G4
Cochise	REPTILE	Aspidoscelis arizonae	Arizona Striped Whiptail		S						ARACJ02071	S1S2	G2

COUNTY	TAXON	SCIENTIFIC NAME	COMMON NAME	ESA	BLM	CRIT HAB	USFS	NESL	MEXFED	STATE	ELCODE	S RANK	G RANK
Cochise	REPTILE	Aspidoscelis burti stictogrammus	Giant Spotted Whiptail	SC			S				ARACJ02011	S2	G4T4
Cochise	REPTILE	Aspidoscelis exsanguis	Chihuahuan Spotted Whiptail								ARACJ02030	S2	G5
Cochise	REPTILE	Crotalus lepidus klauberi	Banded Rock Rattlesnake						PR		ARADE02051	S3	G5T5
Cochise	REPTILE	Crotalus pricei	Twin-spotted Rattlesnake				S		PR		ARADE02080	S2	G5
Cochise	REPTILE	Crotalus willardi obscurus	New Mexico Ridge-nosed Rattlesnake	LT					PR		ARADE02131	S1	G5T1T2
Cochise	REPTILE	Crotalus willardi willardi	Arizona Ridge-nosed Rattlesnake				S		PR	WSC	ARADE02132	S1S2	G5T4
Cochise	REPTILE	Gopherus morafkai	Sonoran Desert Tortoise	C*			S		A	WSC	ARAAF01013	S4	G4
Cochise	REPTILE	Gyalopion canum	Chihuahuan Hook-nosed Snake								ARADB16010	S3	G5
Cochise	REPTILE	Heloderma suspectum suspectum	Reticulate Gila Monster				S		A		ARACE01012	S4	G4T4
Cochise	REPTILE	Heterodon kennerlyi	Mexican Hog-nosed Snake								ARADB17012	S3	G5T4
Cochise	REPTILE	Hypsiglena sp. nov.	Hooded Nightsnake								ARADB18050	S4	G4
Cochise	REPTILE	Kinosternon flavescens	Yellow Mud Turtle								ARAAE01020	S1	G5
Cochise	REPTILE	Lampropeltis getula nigrita	Western Black Kingsnake						A		ARADB19026	S3	G5T3T4Q
Cochise	REPTILE	Lampropeltis triangulum celaenops	New Mexico Milksnake						A		ARADB19052	S1	G5TNR
Cochise	REPTILE	Phrynosoma cornutum	Texas Horned Lizard	SC							ARACF12010	S3S4	G4G5
Cochise	REPTILE	Phrynosoma hernandesi	Greater Short-horned Lizard								ARACF12080	S4	G5
Cochise	REPTILE	Phrynosoma modestum	Round-tailed Horned Lizard								ARACF12050	S3	G5
Cochise	REPTILE	Plestiodon callicephalus	Mountain Skink				S				ARACH01030	S2	G4G5
Cochise	REPTILE	Sceloporus slevini	Slevin's Bunchgrass Lizard		S		S				ARACF14180	S2	G4
Cochise	REPTILE	Sceloporus virgatus	Striped Plateau Lizard								ARACF14150	S3	G4
Cochise	REPTILE	Senticolis triaspis intermedia	Northern Green Ratsnake				S				ARADB44011	S3	G5T4
Cochise	REPTILE	Sistrurus catenatus edwardsii	Desert Massasauga						PR	WSC	ARADE03012	S1	G3G4T3T4Q
Cochise	REPTILE	Tantilla nigriceps	Plains Black-headed Snake								ARADB35050	S2	G5
Cochise	REPTILE	Tantilla wilcoxi	Chihuahuan Black-headed Snake								ARADB35120	S1	G4
Cochise	REPTILE	Tantilla yaquia	Yaqui Black-headed Snake				S				ARADB35130	S2	G4

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Cochise	REPTILE	Terrapene ornata luteola	Desert Box Turtle		S				PR		ARAAD08021	S2S3	G5T4
Cochise	REPTILE	Thamnophis eques megalops	Northern Mexican Gartersnake	C*			S		A	WSC	ARADB36061	S1	G5T5
Coconino	AMPHIBIAN	Anaxyrus microscaphus	Arizona Toad	SC			S				AAABB01110	S3S4	G3G4
Coconino	AMPHIBIAN	Hyla wrightorum (Mogollon Rim Pop.)	Mogollon Rim Treefrog								AAABC02081	S4	G4T4
Coconino	AMPHIBIAN	Lithobates chiricahuensis	Chiricahua Leopard Frog	LT		Y			A	WSC	AAABH01080	S2	G3
Coconino	AMPHIBIAN	Pseudacris triseriata	Western Chorus Frog								AAABC05130	S5	G5
Coconino	AMPHIBIAN	Rana pipiens	Northern Leopard Frog		S		S	2		WSC	AAABH01170	S2	G5
Coconino	AMPHIBIAN	Rana yavapaiensis	Lowland Leopard Frog	SC	S		S		PR	WSC	AAABH01250	S3	G4
Coconino	AMPHIBIAN	Spea intermontana	Great Basin Spadefoot								AAABF02030	S3	G5
Coconino	BIRD	Accipiter gentilis	Northern Goshawk	SC	S		S	4	A	WSC	ABNKC12060	S3B	G5
Coconino	BIRD	Anthus rubescens	American Pipit								ABPBM02050	S2B,S5N	G5
Coconino	BIRD	Aquila chrysaetos	Golden Eagle		S			3	A		ABNKC22010	S4	G5
Coconino	BIRD	Asio otus	Long-eared Owl								ABNSB13010	S2B,S3S4N	G5
Coconino	BIRD	Athene cunicularia hypugaea	Western Burrowing Owl	SC	S		S	4	PR		ABNSB10012	S3	G4T4
Coconino	BIRD	Buteo albonotatus	Zone-tailed Hawk				S		PR		ABNKC19090	S4	G4
Coconino	BIRD	Buteo regalis	Ferruginous Hawk	SC	S		S	3	PR	WSC	ABNKC19120	S2B,S4N	G4
Coconino	BIRD	Buteo swainsoni	Swainson's Hawk				S		PR		ABNKC19070	S3	G5
Coconino	BIRD	Buteogallus anthracinus	Common Black-Hawk				S		PR	WSC	ABNKC15010	S3	G4G5
Coconino	BIRD	Cathartes aura	Turkey Vulture								ABNKA02010	S5	G5
Coconino	BIRD	Empidonax traillii extimus	Southwestern Willow Flycatcher	LE		Y		2	E	WSC	ABPAE33043	S1	G5T1T2
Coconino	BIRD	Euptilotis neoxenus	Eared Quetzal				S		A		ABNWA03010	SAB,S1N	G3
Coconino	BIRD	Falco peregrinus anatum	American Peregrine Falcon	SC	S		S	4	PR	WSC	ABNKD06071	S4	G4T4
Coconino	BIRD	Haliaeetus leucocephalus	Bald Eagle	SC	S		S	2	P	WSC	ABNKC10010	S2S3B,S4N	G5
Coconino	BIRD	Haliaeetus leucocephalus (wintering pop.)	Bald Eagle - Winter Population	SC	S		S	2	P	WSC	ABNKC10015	S4N	G5TNR
Coconino	BIRD	Megaceryle alcyon	Belted Kingfisher					4		WSC	ABNXD01020	S2B,S5N	G5

COUNTY	TAXON	SCIENTIFIC NAME	COMMON NAME	ESA	BLM	CRIT HAB	USFS	NESL	MEXFED	STATE	ELCODE	S RANK	G RANK
Coconino	PLANT	Talinum parviflorum	Small-flowered Flame-flower								PDPOR080E0	S3	G5
Coconino	PLANT	Talinum validulum	Tusayan Flame Flower	SC						SR	PDPOR080M0	S3	G3
Coconino	PLANT	Thelypteris puberula var. sonorensis	Aravaipa Woodfern		S		S				PPTHE05192	S2	G5T3
Coconino	PLANT	Triteleia lemmoniae	Mazatzal Triteleia							SR	PMLIL210C0	S3	G3
Coconino	PLANT	Yucca whipplei	Our Lords Candle							SR	PMAGA0B0X0	S3S4	G4G5
Coconino	PLANT	Zigadenus vaginatus	Sheathed Deathcamas					3			PMLIL280C0	S1	G2
Coconino	PLANT	Zigadenus virescens	Green Death Camas							SR	PMLIL280E0	S4	G4
Coconino	PLANT	Zuckia brandegeei var. arizonica	Arizona Siltbush								PDCHE0R011	S2S3	G4T3
Coconino	REPTILE	Crotalus oreganus abyssus	Grand Canyon Rattlesnake								ARADE02121	S4	G5T4
Coconino	REPTILE	Crotaphytus bicinctores	Great Basin Collared Lizard								ARACF04010	S4	G5
Coconino	REPTILE	Lampropeltis triangulum taylori	Utah Milksnake					4			ARADB19058	S2	G5T4Q
Coconino	REPTILE	Phrynosoma hernandesi	Greater Short-horned Lizard								ARACF12080	S4	G5
Coconino	REPTILE	Plestiodon multivirgatus epipleurotus	Variable Skink						PR		ARACH01091	S3S4	G5T5
Coconino	REPTILE	Plestiodon skiltonianus	Western Skink								ARACH01110	S1	G5
Coconino	REPTILE	Thamnophis eques megalops	Northern Mexican Gartersnake	C*			S		A	WSC	ARADB36061	S1	G5T5
Coconino	REPTILE	Thamnophis rufipunctatus	Narrow-headed Gartersnake	SC			S			WSC	ARADB36110	S1	G3G4
Gila	AMPHIBIAN	Anaxyrus microscaphus	Arizona Toad	SC			S				AAABB01110	S3S4	G3G4
Gila	AMPHIBIAN	Craugastor augusti cactorum	Western Barking Frog				S			WSC	AAABD04171	S2	G5T5
Gila	AMPHIBIAN	Hyla wrightorum (Mogollon Rim Pop.)	Mogollon Rim Treefrog								AAABC02081	S4	G4T4
Gila	AMPHIBIAN	Lithobates chiricahuensis	Chiricahua Leopard Frog	LT		Y			A	WSC	AAABH01080	S2	G3
Gila	AMPHIBIAN	Rana yavapaiensis	Lowland Leopard Frog	SC	S		S		PR	WSC	AAABH01250	S3	G4
Gila	BIRD	Accipiter gentilis	Northern Goshawk	SC	S		S	4	A	WSC	ABNKC12060	S3B	G5
Gila	BIRD	Aquila chrysaetos	Golden Eagle		S			3	A		ABNKC22010	S4	G5
Gila	BIRD	Buteo albonotatus	Zone-tailed Hawk				S		PR		ABNKC19090	S4	G4
Gila	BIRD	Buteo plagiatus	Gray Hawk	SC			S			WSC	ABNKC19150	S3	G5

COUNTY	TAXON	SCIENTIFIC NAME	COMMON NAME	ESA	BLM	CRIT HAB	USFS	NESL	MEXFED	STATE	ELCODE	S RANK	G RANK
Gila	BIRD	Buteogallus anthracinus	Common Black-Hawk				S		PR	WSC	ABNKC15010	S3	G4G5
Gila	BIRD	Camptostoma imberbe	Northern Beardless-Tyrannulet				S				ABPAE04010	S4	G5
Gila	BIRD	Coccyzus americanus	Yellow-billed Cuckoo (Western U.S. DPS)	PS:C*			S	2		WSC	ABNRB02020	S3	G5
Gila	BIRD	Dolichonyx oryzivorus	Bobolink							WSC	ABPBXA9010	S1	G5
Gila	BIRD	Empidonax traillii extimus	Southwestern Willow Flycatcher	LE		Y		2	E	WSC	ABPAE33043	S1	G5T1T2
Gila	BIRD	Euptilotis neoxenus	Eared Quetzal				S		A		ABNWA03010	SAB,S1N	G3
Gila	BIRD	Falco peregrinus anatum	American Peregrine Falcon	SC	S		S	4	PR	WSC	ABNKD06071	S4	G4T4
Gila	BIRD	Haliaeetus leucocephalus (wintering pop.)	Bald Eagle - Winter Population	SC	S		S	2	P	WSC	ABNKC10015	S4N	G5TNR
Gila	BIRD	Haliaeetus leucocephalus pop. 3	Bald Eagle - Sonoran Desert Population	SC	S		S	2	P	WSC	ABNKC10014	S2S3	G5TNR
Gila	BIRD	Megaceryle alcyon	Belted Kingfisher					4		WSC	ABNXD01020	S2B,S5N	G5
Gila	BIRD	Pandion haliaetus	Osprey							WSC	ABNKC01010	S2B,S4N	G5
Gila	BIRD	Rallus longirostris yumanensis	Yuma Clapper Rail	LE					A	WSC	ABNME0501A	S3	G5T3
Gila	BIRD	Strix occidentalis lucida	Mexican Spotted Owl	LT		Y		3	A	WSC	ABNSB12012	S3S4	G3T3
Gila	FISH	Agosia chrysogaster chrysogaster	Gila Longfin Dace	SC	S		S		A		AFCJB37151	S3S4	G4T3T4
Gila	FISH	Catostomus clarkii	Desert Sucker	SC	S		S				AFCJC02040	S3S4	G3G4
Gila	FISH	Catostomus insignis	Sonora Sucker	SC	S		S		P		AFCJC02100	S3	G3
Gila	FISH	Gila intermedia	Gila Chub	LE		Y			P	WSC	AFCJB13160	S2	G2
Gila	FISH	Gila nigra	Headwater Chub	C			S				AFCJB13180	S2	G2Q
Gila	FISH	Gila robusta	Roundtail Chub	C*			S	2	A	WSC	AFCJB13150	S2	G3
Gila	FISH	Meda fulgida	Spikedace	LE		Y				WSC	AFCJB22010	S1	G2
Gila	FISH	Poeciliopsis occidentalis occidentalis	Gila Topminnow	LE					A	WSC	AFCNC05021	S1S2	G3
Gila	FISH	Rhinichthys osculus	Speckled Dace	SC	S				E		AFCJB37050	S3S4	G5
Gila	FISH	Xyrauchen texanus	Razorback Sucker	LE		Y		2	P	WSC	AFCJC11010	S1	G1
Gila	INVERTEBRATE	Agathon arizonicus	Netwing midge				S				IIDIP46010	S?	G1
Gila	INVERTEBRATE	Anodonta californiensis	California Floater	SC			S				IMBIV04020	S1	G3Q

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Gila	INVERTEBRATE	Cicindela oregona maricopa	Maricopa Tiger Beetle	SC							IICOL02362	S3	G5T3
Gila	INVERTEBRATE	Pyrgulopsis simplex	Fossil Springsnail	SC	S		S				IMGASJ0210	S1	G1G2
Gila	INVERTEBRATE	Pyrgulopsis sola	Brown Springsnail	SC	S		S				IMGASJ0220	S1	G1
Gila	MAMMAL	Antrozous pallidus	Pallid Bat								AMACC10010	S4	G5
Gila	MAMMAL	Bat Colony									OBATCOLONY	SU	GNR
Gila	MAMMAL	Bat Foraging Area	High Netting Concentration								OBATFORAG1	SU	GNR
Gila	MAMMAL	Corynorhinus townsendii pallescens	Pale Townsend's Big-eared Bat	SC	S		S	4			AMACC08014	S3S4	G3G4T3T4
Gila	MAMMAL	Eptesicus fuscus	Big Brown Bat								AMACC04010	S4S5	G5
Gila	MAMMAL	Eumops perotis californicus	Greater Western Bonneted Bat	SC	S		S				AMACD02011	S3	G5T4
Gila	MAMMAL	Idionycteris phyllotis	Allen's Lappet-browed Bat	SC	S		S				AMACC09010	S2S3	G3G4
Gila	MAMMAL	Lasionycteris noctivagans	Silver-haired Bat						PR		AMACC02010	S3S4	G5
Gila	MAMMAL	Lasiurus blossevillii	Western Red Bat				S			WSC	AMACC05060	S3	G5
Gila	MAMMAL	Lasiurus cinereus	Hoary Bat	No Status							AMACC05030	S4	G5
Gila	MAMMAL	Macrotus californicus	California Leaf-nosed Bat	SC	S		S			WSC	AMACB01010	S3	G4
Gila	MAMMAL	Myotis auriculus	Southwestern Myotis								AMACC01080	S3	G5
Gila	MAMMAL	Myotis californicus	California Myotis								AMACC01120	S4	G5
Gila	MAMMAL	Myotis occultus	Arizona Myotis	SC	S						AMACC01160	S3	G3G4
Gila	MAMMAL	Myotis thysanodes	Fringed Myotis	SC							AMACC01090	S3S4	G4
Gila	MAMMAL	Myotis velifer	Cave Myotis	SC	S						AMACC01050	S3S4	G5
Gila	MAMMAL	Myotis volans	Long-legged Myotis	SC							AMACC01110	S3S4	G5
Gila	MAMMAL	Myotis yumanensis	Yuma Myotis	SC							AMACC01020	S3S4	G5
Gila	MAMMAL	Nyctinomops femorosaccus	Pocketed Free-tailed Bat				S				AMACD04010	S3	G4
Gila	MAMMAL	Nyctinomops macrotis	Big Free-tailed Bat	SC							AMACD04020	S3	G5
Gila	MAMMAL	Perognathus flavus goodpasteri	Springerville Pocket Mouse	SC			S				AMAFD01031	S2	G5T3
Gila	PLANT	Abutilon parishii	Pima Indian Mallow	SC	S		S			SR	PDMAL020E0	S3	G2

COUNTY	TAXON	SCIENTIFIC NAME	COMMON NAME	ESA	BLM	CRIT HAB	USFS	NESL	MEXFED	STATE	ELCODE	S RANK	G RANK
Gila	PLANT	Actaea arizonica	Arizona Bugbane	SC			S			HS	PDRAN07020	S2	G2
Gila	PLANT	Adiantum pedatum	American Maidenhair								PPADI030B0	S5	G5
Gila	PLANT	Agastache rupestris	Baboquivari Giant Hyssop								PDLAM030D0	S2	G3?
Gila	PLANT	Agave delamateri	Tonto Basin Agave	SC			S			HS	PMAGA010W0	S2	G2
Gila	PLANT	Agave murpheyi	Hohokam Agave	SC	S		S			HS	PMAGA010F0	S3	G2
Gila	PLANT	Agave phillipsiana	Grand Canyon Century Plant				S			HS	PMAGA01100	S1	G1?
Gila	PLANT	Agave toumeyana var. bella	Toumey Agave							SR	PMAGA010R1	S3	G3T3
Gila	PLANT	Agave x arizonica	Arizona agave	No status						HS	PMAGA01030	SHYB	G1Q
Gila	PLANT	Agrimonia gryposepala	Hook-nosed Agrimony								PDROS03030	S4	G5
Gila	PLANT	Arenaria aberrans	Mt. Dellenbaugh Sandwort				S				PDCAR04010	S2	G2
Gila	PLANT	Carex chihuahuensis	Chihuahuan Sedge				S				PMCYP032T0	S2S3	G3G4
Gila	PLANT	Carex meadii	Mead Sedge								PMCYP03870	S3?	G4G5
Gila	PLANT	Centaurea americana	Star Thistle								PDAST1Y010	S2?	G5
Gila	PLANT	Clematis palmeri	Palmer Leather Flower								PDRAN080M0	S1	G2?Q
Gila	PLANT	Crataegus rivularis	River Hawthorn								PDROS0H4F0	S1	G5
Gila	PLANT	Danthonia californica	Oat Grass								PMPOA20010	S4	G5
Gila	PLANT	Desmodium metcalfei	Metcalfe's Tick-trefoil				S				PDFAB1D0V0	S2	G3G4
Gila	PLANT	Dieteria bigelovii var. mucronata	Bigelow's Tansy-aster								PDAST64073	S2	G4G5T2
Gila	PLANT	Dryopteris arguta	Western Shield Fern								PPDRY0A020	S2	G5
Gila	PLANT	Echinocereus triglochidiatus var. arizonicus	Arizona Hedgehog Cactus	LE						HS	PDCAC060K1	S2	G5T2
Gila	PLANT	Epilobium foliosum	Leafy Willow Herb								PDONA06080	S2	G5
Gila	PLANT	Ericameria brachylepis	Rayless Turpentine Bush								PDAST3L030	S4	G4
Gila	PLANT	Erigeron anchana	Mogollon Fleabane	SC			S				PDAST3M580	S2	G2
Gila	PLANT	Erigeron lobatus	Lobed Fleabane								PDAST3M2C0	S4	G4
Gila	PLANT	Erigeron pringlei	Pringle's Fleabane								PDAST3M3C0	S2	G2

COUNTY	TAXON	SCIENTIFIC NAME	COMMON NAME	ESA	BLM	CRIT HAB	USFS	NESL	MEXFED	STATE	ELCODE	S RANK	G RANK
Gila	PLANT	Eriogonum capillare	San Carlos Wild-buckwheat	SC						SR	PDPGN08100	S4	G4
Gila	PLANT	Ferocactus cylindraceus	Desert Barrel Cactus						PR	SR	PDCAC08080	S4	G5
Gila	PLANT	Fremontodendron californicum	Flannel Bush		S					SR	PDSTE03010	S2S3	G4
Gila	PLANT	Heuchera eastwoodiae	Eastwood Alum Root				S				PDSAX0E0B0	S3	G3
Gila	PLANT	Heuchera glomerulata	Arizona Alum Root				S				PDSAX0E0F0	S3	G3
Gila	PLANT	Hymenoxys ambigens var. ambigens	Pinaleno Mountain Plummera								PDAST530T1	S1?	G3?T1?
Gila	PLANT	Hymenoxys jamesii									PDAST530R0	S2S3	G2G3
Gila	PLANT	Juncus articulatus	Jointed Rush								PMJUN01090	S3	G5
Gila	PLANT	Limonium limbatum	Marsh Rosemary								PDPLU02030	S1	G4
Gila	PLANT	Lupinus latifolius ssp. leucanthus	Broadleaf Lupine				S				PDFAB2B29D	S1	G5T1T2
Gila	PLANT	Mammillaria viridiflora	Varied Fishhook Cactus							SR	PDCAC0A0D0	S4	G4
Gila	PLANT	Nuphar luteum ssp. polysepalum	Yellow Pond Lily								PDNYM04014	S1	G5T5
Gila	PLANT	Osmorhiza brachypoda	Sweet Cicely								PDAPI1K020	S1	G4
Gila	PLANT	Penstemon nudiflorus	Flagstaff Beardtongue				S				PDSCR1L4A0	S2S3	G2G3
Gila	PLANT	Penstemon superbus	Superb Beardtongue								PDSCR1L630	S2?	G3?
Gila	PLANT	Perityle gilensis var. salensis	Salt River Rock Daisy				S				PDAST700D2	S2?	G2?T2?
Gila	PLANT	Perityle saxicola	Fish Creek Rock Daisy	SC			S				PDAST700P0	S1	G1
Gila	PLANT	Phlox amabilis	Arizona Phlox				S				PDPLM0D050	S2	G2
Gila	PLANT	Plagiobothrys pringlei	Pringle Popcorn-flower								PDBOR0V0V0	S2	G3G4
Gila	PLANT	Polypodium glycyrrhiza	Licorice Fern								PPPOL020F0	S1	G5
Gila	PLANT	Polystichum scopulinum	Western Holly Fern								PPDRY0R0N0	S2	G5
Gila	PLANT	Rubus leucodermis	Western Raspberry								PDROS1K3Y0	S1S2	G5
Gila	PLANT	Rumex orthoneurus	Blumer's Dock	SC			S			HS	PDPGN0P0Z0	S3	G3
Gila	PLANT	Salvia amissa	Aravaipa Sage	SC	S		S				PDLAM1S020	S2	G2
Gila	PLANT	Senecio arizonicus	Arizona Groundsel								PDAST8H070	S4	G4

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Gila	PLANT	Trichostema brachiatum	Flux Weed								PDLAM22030	S4	G5
Gila	PLANT	Triteleia lemmoniae	Mazatzal Triteleia							SR	PMLIL210C0	S3	G3
Gila	REPTILE	Aspidoscelis pai	Pai Striped Whiptail								ARACJ02300	S1	G3G4
Gila	REPTILE	Gopherus morafkai	Sonoran Desert Tortoise	C*			S		A	WSC	ARAAF01013	S4	G4
Gila	REPTILE	Heloderma suspectum	Gila Monster						A		ARACE01010	S4	G4
Gila	REPTILE	Heloderma suspectum suspectum	Reticulate Gila Monster				S		A		ARACE01012	S4	G4T4
Gila	REPTILE	Phrynosoma hernandesi	Greater Short-horned Lizard								ARACF12080	S4	G5
Gila	REPTILE	Tantilla hobartsmithi	Smith's Black-headed Snake								ARADB35140	S5	G5
Gila	REPTILE	Thamnophis eques megalops	Northern Mexican Gartersnake	C*			S		A	WSC	ARADB36061	S1	G5T5
Gila	REPTILE	Thamnophis rufipunctatus	Narrow-headed Gartersnake	SC			S			WSC	ARADB36110	S1	G3G4
Gila	REPTILE	Xantusia bezyi	Bezy's Night Lizard								ARACK01060	S2	G3
Graham	AMPHIBIAN	Anaxyrus debilis insidior	Western Green Toad						PR		AAABB01062	S3	G5T5
Graham	AMPHIBIAN	Anaxyrus microscaphus	Arizona Toad	SC			S				AAABB01110	S3S4	G3G4
Graham	AMPHIBIAN	Lithobates chiricahuensis	Chiricahua Leopard Frog	LT		Y			A	WSC	AAABH01080	S2	G3
Graham	AMPHIBIAN	Rana yavapaiensis	Lowland Leopard Frog	SC	S		S		PR	WSC	AAABH01250	S3	G4
Graham	AMPHIBIAN	Spea bombifrons	Plains Spadefoot								AAABF02010	S4	G5
Graham	BIRD	Accipiter gentilis	Northern Goshawk	SC	S		S	4	A	WSC	ABNKC12060	S3B	G5
Graham	BIRD	Amazilia violiceps	Violet-crowned Hummingbird				S			WSC	ABNUC29150	S3	G5
Graham	BIRD	Aquila chrysaetos	Golden Eagle		S			3	A		ABNKC22010	S4	G5
Graham	BIRD	Asio otus	Long-eared Owl								ABNSB13010	S2B,S3S4N	G5
Graham	BIRD	Athene cunicularia hypugaea	Western Burrowing Owl	SC	S		S	4	PR		ABNSB10012	S3	G4T4
Graham	BIRD	Buteo albonotatus	Zone-tailed Hawk				S		PR		ABNKC19090	S4	G4
Graham	BIRD	Buteo plagiatus	Gray Hawk	SC			S			WSC	ABNKC19150	S3	G5
Graham	BIRD	Buteo swainsoni	Swainson's Hawk				S		PR		ABNKC19070	S3	G5
Graham	BIRD	Buteogallus anthracinus	Common Black-Hawk				S		PR	WSC	ABNKC15010	S3	G4G5

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Graham	BIRD	Camptostoma imberbe	Northern Beardless-Tyrannulet				S				ABPAE04010	S4	G5
Graham	BIRD	Coccyzus americanus	Yellow-billed Cuckoo (Western U.S. DPS)	PS:C*			S	2		WSC	ABNRB02020	S3	G5
Graham	BIRD	Empidonax traillii extimus	Southwestern Willow Flycatcher	LE		Y		2	E	WSC	ABPAE33043	S1	G5T1T2
Graham	BIRD	Falco peregrinus anatum	American Peregrine Falcon	SC	S		S	4	PR	WSC	ABNKD06071	S4	G4T4
Graham	BIRD	Haliaeetus leucocephalus (wintering pop.)	Bald Eagle - Winter Population	SC	S		S	2	P	WSC	ABNKC10015	S4N	G5TNR
Graham	BIRD	Haliaeetus leucocephalus pop. 3	Bald Eagle - Sonoran Desert Population	SC	S		S	2	P	WSC	ABNKC10014	S2S3	G5TNR
Graham	BIRD	Megaceryle alcyon	Belted Kingfisher					4		WSC	ABNXD01020	S2B,S5N	G5
Graham	BIRD	Recurvirostra americana	American Avocet								ABNND02010	S2	G5
Graham	BIRD	Strix occidentalis lucida	Mexican Spotted Owl	LT		Y		3	A	WSC	ABNSB12012	S3S4	G3T3
Graham	BIRD	Trogon elegans	Elegant Trogon							WSC	ABNWA02070	S3	G5
Graham	FISH	Agosia chrysogaster chrysogaster	Gila Longfin Dace	SC	S		S		A		AFCJB37151	S3S4	G4T3T4
Graham	FISH	Catostomus clarkii	Desert Sucker	SC	S		S				AFCJC02040	S3S4	G3G4
Graham	FISH	Catostomus insignis	Sonora Sucker	SC	S		S		P		AFCJC02100	S3	G3
Graham	FISH	Cyprinodon macularius	Desert Pupfish	LE		Y			P	WSC	AFCNB02060	S1	G1
Graham	FISH	Gila intermedia	Gila Chub	LE		Y			P	WSC	AFCJB13160	S2	G2
Graham	FISH	Gila nigra	Headwater Chub	C			S				AFCJB13180	S2	G2Q
Graham	FISH	Gila robusta	Roundtail Chub	C*			S	2	A	WSC	AFCJB13150	S2	G3
Graham	FISH	Meda fulgida	Spikedace	LE		Y				WSC	AFCJB22010	S1	G2
Graham	FISH	Oncorhynchus apache	Apache Trout	LT						WSC	AFCHA02102	S3	G3T3
Graham	FISH	Poeciliopsis occidentalis occidentalis	Gila Topminnow	LE					A	WSC	AFCNC05021	S1S2	G3
Graham	FISH	Rhinichthys osculus	Speckled Dace	SC	S				E		AFCJB37050	S3S4	G5
Graham	FISH	Tiaroga cobitis	Loach Minnow	LE		Y			E	WSC	AFCJB37140	S1	G2
Graham	FISH	Xyrauchen texanus	Razorback Sucker	LE		Y		2	P	WSC	AFCJC11010	S1	G1
Graham	INVERTEBRATE	Anodonta californiensis	California Floater	SC			S				IMBIV04020	S1	G3Q
Graham	INVERTEBRATE	Cicindela oregona maricopa	Maricopa Tiger Beetle	SC							IICOL02362	S3	G5T3

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Graham	INVERTEBRATE	Eumorsea pinaleno	Pinaleno Monkey Grasshopper	SC			S				IIORT14010	S1S3	G1G3
Graham	INVERTEBRATE	Limenitis archippus obsoleta	Obsolete Viceroy Butterfly								IILEPL3024	S4	G5T3T4
Graham	INVERTEBRATE	Oreohelix grahamensis	Pinaleno Mountainsnail				S				IMGASB5120	S2	G2
Graham	INVERTEBRATE	Pyrgulopsis arizonae	Bylas Springsnail	SC	S						IMGASJ0770	S1	G1
Graham	INVERTEBRATE	Sonorella christenseni	Clark Peak Talussnail	SC			S				IMGASC9150	S1	G1
Graham	INVERTEBRATE	Sonorella grahamensis	Pinaleno Talussnail	SC			S				IMGASC9280	S1	G1
Graham	INVERTEBRATE	Sonorella imitator	Mimic Talussnail				S				IMGASC9320	S2	G2
Graham	INVERTEBRATE	Sonorella macrophallus	Wet Canyon Talussnail	SC			S				IMGASC9360	S1	G1
Graham	INVERTEBRATE	Tryonia gilae	Gila Tryonia	SC	S						IMGASJ7160	S1	G1
Graham	MAMMAL	Antrozous pallidus	Pallid Bat								AMACC10010	S4	G5
Graham	MAMMAL	Baiomys taylori	Northern Pygmy Mouse				S				AMAFF05010	S3	G4G5
Graham	MAMMAL	Bat Colony									OBATCOLONY	SU	GNR
Graham	MAMMAL	Bat Foraging Area	High Netting Concentration								OBATFORAG1	SU	GNR
Graham	MAMMAL	Choeronycteris mexicana	Mexican Long-tongued Bat	SC	S		S		A	WSC	AMACB02010	S3	G4
Graham	MAMMAL	Corynorhinus townsendii pallescens	Pale Townsend's Big-eared Bat	SC	S		S	4			AMACC08014	S3S4	G3G4T3T4
Graham	MAMMAL	Eumops perotis californicus	Greater Western Bonneted Bat	SC	S		S				AMACD02011	S3	G5T4
Graham	MAMMAL	Idionycteris phyllotis	Allen's Lappet-browed Bat	SC	S		S				AMACC09010	S2S3	G3G4
Graham	MAMMAL	Lasionycteris noctivagans	Silver-haired Bat						PR		AMACC02010	S3S4	G5
Graham	MAMMAL	Lasiurus blossevillii	Western Red Bat				S			WSC	AMACC05060	S3	G5
Graham	MAMMAL	Lasiurus cinereus	Hoary Bat	No Status							AMACC05030	S4	G5
Graham	MAMMAL	Lasiurus xanthinus	Western Yellow Bat				S			WSC	AMACC05070	S2S3	G5
Graham	MAMMAL	Leptonycteris curasoae yerbabuenae	Lesser Long-nosed Bat	LE					A	WSC	AMACB03030	S2S3	G4
Graham	MAMMAL	Macrotus californicus	California Leaf-nosed Bat	SC	S		S			WSC	AMACB01010	S3	G4
Graham	MAMMAL	Microtus longicaudus leucophaeus	White-bellied Long-tailed Vole				S				AMAFF11061	S2	G5T3
Graham	MAMMAL	Mustela frenata	Long-tailed Weasel								AMAJF02030	S4	G5

COUNTY	TAXON	SCIENTIFIC NAME	COMMON NAME	ESA	BLM	CRIT HAB	USFS	NESL	MEXFED	STATE	ELCODE	S RANK	G RANK
Graham	MAMMAL	Myotis ciliolabrum	Western Small-footed Myotis	SC							AMACC01140	S3S4	G5
Graham	MAMMAL	Myotis velifer	Cave Myotis	SC	S						AMACC01050	S3S4	G5
Graham	MAMMAL	Myotis yumanensis	Yuma Myotis	SC							AMACC01020	S3S4	G5
Graham	MAMMAL	Nyctinomops femorosaccus	Pocketed Free-tailed Bat				S				AMACD04010	S3	G4
Graham	MAMMAL	Nyctinomops macrotis	Big Free-tailed Bat	SC							AMACD04020	S3	G5
Graham	MAMMAL	Reithrodontomys montanus	Plains Harvest Mouse				S				AMAFF02010	S3	G5
Graham	MAMMAL	Sigmodon ochrognathus	Yellow-nosed Cotton Rat	SC			S				AMAFF07040	S4	G4G5
Graham	MAMMAL	Tadarida brasiliensis	Brazilian Free-tailed Bat								AMACD01010	S3S4	G5
Graham	MAMMAL	Tamiasciurus hudsonicus grahamensis	Mt Graham Red Squirrel	LE		Y				WSC	AMAFB08011	S1	G5T1
Graham	MAMMAL	Thomomys bottae mearnsi	Mearns' Southern Pocket Gopher	SC			PS				AMAFC0102G	S5	G5T5
Graham	PLANT	Abutilon parishii	Pima Indian Mallow	SC	S		S			SR	PDMAL020E0	S3	G2
Graham	PLANT	Abutilon reventum	Yellow Indian Mallow								PDMAL020J0	S2	G3G5
Graham	PLANT	Allium bigelovii	Bigelow Onion							SR	PMLIL02070	S2S3	G3
Graham	PLANT	Ammannia auriculata	Eared Toothcup								PDLYT01010	S1	G5
Graham	PLANT	Bacopa rotundifolia	Disk Water Hyssop								PDSCR06080	S1	G5
Graham	PLANT	Carex chihuahuensis	Chihuahuan Sedge				S				PMCYP032T0	S2S3	G3G4
Graham	PLANT	Carex ultra	Arizona Giant Sedge		S		S				PMCYP03E50	S2	G3?
Graham	PLANT	Castilleja lanata	White-woolly Indian-paintbrush								PDSCR0D1L0	S4	G5
Graham	PLANT	Danthonia californica	Oat Grass								PMPOA20010	S4	G5
Graham	PLANT	Echinocereus ledingii	Pinaleno Hedgehog Cactus							SR	PDCAC06066	S4	G4G5T4
Graham	PLANT	Erigeron arizonicus	Arizona Fleabane								PDAST3M0B0	S3	G3?
Graham	PLANT	Erigeron heliographis	Pinalenos Fleabane	SC			S				PDAST3M500	S2	G2
Graham	PLANT	Erigeron piscaticus	Fish Creek Fleabane	SC	S		S			SR	PDAST3M4X0	S1	G1
Graham	PLANT	Erigeron pringlei	Pringle's Fleabane								PDAST3M3C0	S2	G2
Graham	PLANT	Eriogonum capillare	San Carlos Wild-buckwheat	SC						SR	PDPGN08100	S4	G4

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Graham	PLANT	Eupatorium bigelovii	Bigelow Thoroughwort								PDAST3P080	S1	G2?
Graham	PLANT	Euphorbia trachysperma	Roughseed Spurge								PDEUP0D2E0	S4	G4
Graham	PLANT	Hackelia ursina	Chihuahuan Stickseed								PDBOR0G0R0	S2	G3?
Graham	PLANT	Heteranthera limosa	Mud Plantain								PMPON03030	S1	G5
Graham	PLANT	Heuchera glomerulata	Arizona Alum Root				S				PDSAX0E0F0	S3	G3
Graham	PLANT	Hieracium rusbyi	Rusby Hawkweed				S				PDAST4W1A0	S1	G2?
Graham	PLANT	Hymenoxys ambigens var. ambigens	Pinaleno Mountain Plummera								PDAST530T1	S1?	G3?T1?
Graham	PLANT	Hypericum anagalloides	Pygmy St Johns Wort								PDCLU03020	S2	G4
Graham	PLANT	Limonium limbatum	Marsh Rosemary								PDPLU02030	S1	G4
Graham	PLANT	Lindernia dubia var. anagallidea	False Pimpernel								PDSCR12041	S1	G5T4
Graham	PLANT	Ludwigia palustris	Marsh Purslane								PDONA0B0H0	S1	G5
Graham	PLANT	Mammillaria viridiflora	Varied Fishhook Cactus							SR	PDCAC0A0D0	S4	G4
Graham	PLANT	Mammillaria wrightii var. wilcoxii	Wilcox Fishhook Cactus							SR	PDCAC0A0E1	S4	G4T4
Graham	PLANT	Maurandya wislizeni	Dune Snapdragon Vine								PDSCR2G010	S1	G4
Graham	PLANT	Pediomelum pentaphyllum	Small Indian Breadroot	SC	S		S				PDFAB5L070	S1	G1
Graham	PLANT	Penstemon discolor	Catalina Beardtongue				S			HS	PDSCR1L210	S2	G2
Graham	PLANT	Penstemon ramosus	Branching Penstemon								PDSCR1L7L0	S1	G3G4Q
Graham	PLANT	Penstemon superbus	Superb Beardtongue								PDSCR1L630	S2?	G3?
Graham	PLANT	Physalis latiphysa	Broad-leaf Ground-cherry				S				PDSOL0S0H0	S1	G1
Graham	PLANT	Physocarpus monogynus	Mountain Ninebark								PDROS19040	S4	G4
Graham	PLANT	Platanthera hyperborea	Boreal Bog Orchid							SR	PMORC1Y0B0	S3S4	G5
Graham	PLANT	Platanthera purpurascens	Slender Bog Orchid							SR	PMORC1Y0P0	S4	G5
Graham	PLANT	Polemonium flavum	Pinaleno Jacobs Ladder								PDPLM0E0B2	S2	G5T3?
Graham	PLANT	Polystichum lonchitis	Mountain Holly Fern								PPDRY0R0F0	S3	G5
Graham	PLANT	Potentilla albiflora	White-flowered Cinquefoil				S				PDROS1B010	S1S2	G1G2

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Graham	PLANT	Purshia subintegra	Arizona Cliff Rose	LE						HS	PDROS1E080	S1	GNA
Graham	PLANT	Rotala ramosior	Branched Toothcup								PDLYT0B030	S1	G5
Graham	PLANT	Rumex orthoneurus	Blumer's Dock	SC			S			HS	PDPGN0P0Z0	S3	G3
Graham	PLANT	Sagittaria longiloba	Flecha de Agua								PMALI040J0	S1	G5
Graham	PLANT	Salvia amissa	Aravaipa Sage	SC	S		S				PDLAM1S020	S2	G2
Graham	PLANT	Schiedeella arizonica	Fallen Ladies'-tresses							SR	PMORC67020	S4	GNR
Graham	PLANT	Senecio arizonicus	Arizona Groundsel								PDAST8H070	S4	G4
Graham	PLANT	Solanum heterodoxum	Melonleaf Nightshade								PDSOL0Z0X0	S4	G4G5
Graham	PLANT	Sophora arizonica	Arizona Necklace								PDFAB3N020	S3	G3
Graham	PLANT	Streptanthus carinatus	Lyre-leaved Twistflower								PDBRA2G0C0	S3S4	G4
Graham	PLANT	Talinum gooddingii	Goodding's Flameflower								PDPOR08090	S1	G1Q
Graham	PLANT	Tillandsia recurvata	Ball Moss								PMBRO090E0	S2	G5
Graham	REPTILE	Aspidoscelis arizonae	Arizona Striped Whiptail		S						ARACJ02071	S1S2	G2
Graham	REPTILE	Aspidoscelis burti stictogrammus	Giant Spotted Whiptail	SC			S				ARACJ02011	S2	G4T4
Graham	REPTILE	Crotalus pricei	Twin-spotted Rattlesnake				S		PR		ARADE02080	S2	G5
Graham	REPTILE	Gopherus morafkai	Sonoran Desert Tortoise	C*			S		A	WSC	ARAAF01013	S4	G4
Graham	REPTILE	Gyalopion canum	Chihuahuan Hook-nosed Snake								ARADB16010	S3	G5
Graham	REPTILE	Heterodon kennerlyi	Mexican Hog-nosed Snake								ARADB17012	S3	G5T4
Graham	REPTILE	Kinosternon flavescens	Yellow Mud Turtle								ARAAE01020	S1	G5
Graham	REPTILE	Phrynosoma cornutum	Texas Horned Lizard	SC							ARACF12010	S3S4	G4G5
Graham	REPTILE	Phrynosoma modestum	Round-tailed Horned Lizard								ARACF12050	S3	G5
Graham	REPTILE	Tantilla nigriceps	Plains Black-headed Snake								ARADB35050	S2	G5
Graham	REPTILE	Terrapene ornata luteola	Desert Box Turtle		S				PR		ARAAD08021	S2S3	G5T4
Graham	REPTILE	Thamnophis elegans vagrans	Wandering Gartersnake								ARADB36051	S5	G5T5
Graham	REPTILE	Thamnophis eques megalops	Northern Mexican Gartersnake	C*			S		A	WSC	ARADB36061	S1	G5T5

COUNTY	TAXON	SCIENTIFIC NAME	COMMON NAME	ESA	BLM	CRIT HAB	USFS	NESL	MEXFED	STATE	ELCODE	S RANK	G RANK
Graham	REPTILE	Thamnophis rufipunctatus	Narrow-headed Gartersnake	SC			S			WSC	ARADB36110	S1	G3G4
Greenlee	AMPHIBIAN	Anaxyrus microscaphus	Arizona Toad	SC			S				AAABB01110	S3S4	G3G4
Greenlee	AMPHIBIAN	Hyla wrightorum (Mogollon Rim Pop.)	Mogollon Rim Treefrog								AAABC02081	S4	G4T4
Greenlee	AMPHIBIAN	Lithobates chiricahuensis	Chiricahua Leopard Frog	LT		Y			A	WSC	AAABH01080	S2	G3
Greenlee	AMPHIBIAN	Rana pipiens	Northern Leopard Frog		S		S	2		WSC	AAABH01170	S2	G5
Greenlee	AMPHIBIAN	Rana yavapaiensis	Lowland Leopard Frog	SC	S		S		PR	WSC	AAABH01250	S3	G4
Greenlee	BIRD	Accipiter gentilis	Northern Goshawk	SC	S		S	4	A	WSC	ABNKC12060	S3B	G5
Greenlee	BIRD	Aquila chrysaetos	Golden Eagle		S			3	A		ABNKC22010	S4	G5
Greenlee	BIRD	Buteo albonotatus	Zone-tailed Hawk				S		PR		ABNKC19090	S4	G4
Greenlee	BIRD	Buteogallus anthracinus	Common Black-Hawk				S		PR	WSC	ABNKC15010	S3	G4G5
Greenlee	BIRD	Coccyzus americanus	Yellow-billed Cuckoo (Western U.S. DPS)	PS:C*			S	2		WSC	ABNRB02020	S3	G5
Greenlee	BIRD	Empidonax traillii extimus	Southwestern Willow Flycatcher	LE		Y		2	E	WSC	ABPAE33043	S1	G5T1T2
Greenlee	BIRD	Euptilotis neoxenus	Eared Quetzal				S		A		ABNWA03010	SAB,S1N	G3
Greenlee	BIRD	Falco peregrinus anatum	American Peregrine Falcon	SC	S		S	4	PR	WSC	ABNKD06071	S4	G4T4
Greenlee	BIRD	Haliaeetus leucocephalus (wintering pop.)	Bald Eagle - Winter Population	SC	S		S	2	P	WSC	ABNKC10015	S4N	G5TNR
Greenlee	BIRD	Pandion haliaetus	Osprey							WSC	ABNKC01010	S2B,S4N	G5
Greenlee	BIRD	Strix occidentalis lucida	Mexican Spotted Owl	LT		Y		3	A	WSC	ABNSB12012	S3S4	G3T3
Greenlee	FISH	Agosia chrysogaster chrysogaster	Gila Longfin Dace	SC	S		S		A		AFCJB37151	S3S4	G4T3T4
Greenlee	FISH	Catostomus clarkii	Desert Sucker	SC	S		S				AFCJC02040	S3S4	G3G4
Greenlee	FISH	Catostomus insignis	Sonora Sucker	SC	S		S		P		AFCJC02100	S3	G3
Greenlee	FISH	Gila intermedia	Gila Chub	LE		Y			P	WSC	AFCJB13160	S2	G2
Greenlee	FISH	Gila robusta	Roundtail Chub	C*			S	2	A	WSC	AFCJB13150	S2	G3
Greenlee	FISH	Meda fulgida	Spikedace	LE		Y				WSC	AFCJB22010	S1	G2
Greenlee	FISH	Oncorhynchus apache	Apache Trout	LT						WSC	AFCHA02102	S3	G3T3
Greenlee	FISH	Oncorhynchus gilae	Gila Trout	LT						WSC	AFCHA02100	S1	G3

COUNTY	TAXON	SCIENTIFIC NAME	COMMON NAME	ESA	BLM	CRIT HAB	USFS	NESL	MEXFED	STATE	ELCODE	S RANK	G RANK
Navajo	REPTILE	Thamnophis rufipunctatus	Narrow-headed Gartersnake	SC			S			WSC	ARADB36110	S1	G3G4
Pima	AMPHIBIAN	Anaxyrus retiformis	Sonoran Green Toad		S				PR		AAABB01140	S3	G3G4
Pima	AMPHIBIAN	Craugastor augusti cactorum	Western Barking Frog				S			WSC	AAABD04171	S2	G5T5
Pima	AMPHIBIAN	Gastrophryne olivacea	Western Narrow-mouthed Toad		S		S		PR	WSC	AAABE01020	S3	G5
Pima	AMPHIBIAN	Lithobates chiricahuensis	Chiricahua Leopard Frog	LT		Y			A	WSC	AAABH01080	S2	G3
Pima	AMPHIBIAN	Rana yavapaiensis	Lowland Leopard Frog	SC	S		S		PR	WSC	AAABH01250	S3	G4
Pima	AMPHIBIAN	Smilisca fodiens	Lowland Burrowing Treefrog		S					WSC	AAABC06010	S2	G4
Pima	BIRD	Accipiter gentilis	Northern Goshawk	SC	S		S	4	A	WSC	ABNKC12060	S3B	G5
Pima	BIRD	Ammodramus bairdii	Baird's Sparrow	SC			S			WSC	ABPBXA0010	S2N	G4
Pima	BIRD	Ammodramus savannarum ammolegus	Arizona grasshopper sparrow		S		S				ABPBXA0021	S1S2	G5TU
Pima	BIRD	Amphispiza quinquestriata	Five-striped Sparrow								ABPBX97030	S1S2	G4
Pima	BIRD	Antrostomus ridgwayi	Buff-collared Nightjar				S				ABNTA07060	S2S3	G5
Pima	BIRD	Aquila chrysaetos	Golden Eagle		S			3	A		ABNKC22010	S4	G5
Pima	BIRD	Ardea herodias	Great Blue Heron						|		ABNGA04010	S5	G5
Pima	BIRD	Asio otus	Long-eared Owl								ABNSB13010	S2B,S3S4N	G5
Pima	BIRD	Athene cunicularia hypugaea	Western Burrowing Owl	SC	S		S	4	PR		ABNSB10012	S3	G4T4
Pima	BIRD	Buteo albonotatus	Zone-tailed Hawk				S		PR		ABNKC19090	S4	G4
Pima	BIRD	Buteo lineatus	Red-shouldered Hawk						PR		ABNKC19030	SA	G5
Pima	BIRD	Buteo plagiatus	Gray Hawk	SC			S			WSC	ABNKC19150	S3	G5
Pima	BIRD	Buteo swainsoni	Swainson's Hawk				S		PR		ABNKC19070	S3	G5
Pima	BIRD	Buteogallus anthracinus	Common Black-Hawk				S		PR	WSC	ABNKC15010	S3	G4G5
Pima	BIRD	Calamospiza melanocorys	Lark Bunting								ABPBX98010	S1B,S5N	G5
Pima	BIRD	Camptostoma imberbe	Northern Beardless-Tyrannulet				S				ABPAE04010	S4	G5
Pima	BIRD	Caracara cheriway	Crested Caracara	No Status						WSC	ABNKD02020	S1S2	G5
Pima	BIRD	Cathartes aura	Turkey Vulture								ABNKA02010	S5	G5

COUNTY	TAXON	SCIENTIFIC NAME	COMMON NAME	ESA	BLM	CRIT HAB	USFS	NESL	MEXFED	STATE	ELCODE	S RANK	G RANK
Pima	BIRD	Catharus ustulatus	Swainson's Thrush								ABPBJ18100	S1	G5
Pima	BIRD	Chloroceryle americana	Green Kingfisher								ABNXD02020	S2	G5
Pima	BIRD	Coccyzus americanus	Yellow-billed Cuckoo (Western U.S. DPS)	PS:C*			S	2		WSC	ABNRB02020	S3	G5
Pima	BIRD	Colinus virginianus ridgwayi	Masked Bobwhite	LE					P	WSC	ABNLC21022	S1	G5T1
Pima	BIRD	Coragyps atratus	Black Vulture								ABNKA01010	S1S2	G5
Pima	BIRD	Dendrocygna autumnalis	Black-bellied Whistling-Duck							WSC	ABNJB01040	S3	G5
Pima	BIRD	Dendrocygna bicolor	Fulvous Whistling-Duck	SC							ABNJB01010	SAN	G5
Pima	BIRD	Empidonax fulvifrons pygmaeus	Northern Buff-breasted Flycatcher	SC			S			WSC	ABPAE33141	S1	G5T5
Pima	BIRD	Empidonax traillii extimus	Southwestern Willow Flycatcher	LE		Y		2	E	WSC	ABPAE33043	S1	G5T1T2
Pima	BIRD	Falco peregrinus anatum	American Peregrine Falcon	SC	S		S	4	PR	WSC	ABNKD06071	S4	G4T4
Pima	BIRD	Glaucidium brasilianum cactorum	Cactus Ferruginous Pygmy-owl	SC	S		S			WSC	ABNSB08041	S1	G5T3
Pima	BIRD	Himantopus mexicanus	Black-necked Stilt								ABNND01010	S2	G5
Pima	BIRD	Icterus bullockii	Bullock's Oriole								ABPBXB9220	S4BS1N	G5
Pima	BIRD	Mniotilta varia	Black-and-white Warbler								ABPBX05010	S1B,S1N	G5
Pima	BIRD	Pachyramphus aglaiae	Rose-throated Becard				S			WSC	ABPAE53070	S1	G4G5
Pima	BIRD	Pandion haliaetus	Osprey							WSC	ABNKC01010	S2B,S4N	G5
Pima	BIRD	Parabuteo unicinctus	Harris's Hawk						PR		ABNKC16010	S5	G5
Pima	BIRD	Peucaea carpalis	Rufous-winged Sparrow								ABPBX91080	S3	G4
Pima	BIRD	Polioptila nigriceps	Black-capped Gnatcatcher							WSC	ABPBJ08040	S1	G5
Pima	BIRD	Rallus longirostris yumanensis	Yuma Clapper Rail	LE					A	WSC	ABNME0501A	S3	G5T3
Pima	BIRD	Spinus tristis	American Goldfinch								ABPBY06110	S1B,S5N	G5
Pima	BIRD	Strix occidentalis lucida	Mexican Spotted Owl	LT		Y		3	A	WSC	ABNSB12012	S3S4	G3T3
Pima	BIRD	Trogon elegans	Elegant Trogon							WSC	ABNWA02070	S3	G5
Pima	BIRD	Tyrannus crassirostris	Thick-billed Kingbird				S			WSC	ABPAE52040	S2	G5
Pima	BIRD	Tyrannus melancholicus	Tropical Kingbird							WSC	ABPAE52010	S3	G5

COUNTY	TAXON	SCIENTIFIC NAME	COMMON NAME	ESA	BLM	CRIT HAB	USFS	NESL	MEXFED	STATE	ELCODE	S RANK	G RANK
Pima	BIRD	Zonotrichia leucophrys	White-crowned Sparrow								ABPBXA4040	S1B,S5N	G5
Pima	FISH	Agosia chrysogaster chrysogaster	Gila Longfin Dace	SC	S		S		A		AFCJB37151	S3S4	G4T3T4
Pima	FISH	Catostomus clarkii	Desert Sucker	SC	S		S				AFCJC02040	S3S4	G3G4
Pima	FISH	Cyprinodon eremus	Quitobaquito Pupfish	LE		Y				WSC	AFCNB02140	S1	G1
Pima	FISH	Cyprinodon macularius	Desert Pupfish	LE		Y			P	WSC	AFCNB02060	S1	G1
Pima	FISH	Gila intermedia	Gila Chub	LE		Y			P	WSC	AFCJB13160	S2	G2
Pima	FISH	Poeciliopsis occidentalis occidentalis	Gila Topminnow	LE					A	WSC	AFCNC05021	S1S2	G3
Pima	INVERTEBRATE	Abaeis nicippe	Sleepy Orange								IILEPB4110	S?	G5
Pima	INVERTEBRATE	Agathymus aryxna	Arizona Giant Skipper								IILEP87080	S5	G4G5
Pima	INVERTEBRATE	Agathymus gentryi	Gentry's Giant-skipper								IILEP87220	S?	G3G4
Pima	INVERTEBRATE	Agathymus polingi	Poling's Giant Skipper								IILEP87190	S2	G4
Pima	INVERTEBRATE	Albiorix anophthalmus	A Cave Obligate Pseudoscorpion								ILARAD4010	S?	G1G2
Pima	INVERTEBRATE	Amblyscirtes nysa	Nysa Roadside Skipper								IILEP80160	S?	G5
Pima	INVERTEBRATE	Amblyscirtes tolteca	Toltec Roadside-skipper								IILEP80110	S?	G3G4
Pima	INVERTEBRATE	Anthocharis cethura	Desert Orangetip								IILEPA6010	S4	G4G5
Pima	INVERTEBRATE	Anthocharis thoosa	Sonoran Orangetip								IILEPA6090	S5	G5
Pima	INVERTEBRATE	Apodemia palmerii	Palmer's Metalmark								IILEPH7040	S?	G5
Pima	INVERTEBRATE	Appias drusilla	Tropical White								IILEPA0010	S?	G5
Pima	INVERTEBRATE	Argia sabino	Sabino Canyon Dancer	SC			S				IIODO68100	S2	G2
Pima	INVERTEBRATE	Asterocampa leilia	Empress Leilia								IILEPM7050	S?	G5
Pima	INVERTEBRATE	Battus philenor	Pipevine Swallowtail								IILEP92010	S?	G5
Pima	INVERTEBRATE	Brephidium exilis	Western Pygmy-blue								IILEPF5010	S?	G5
Pima	INVERTEBRATE	Calephelis arizonensis	Arizona Metalmark								IILEPH2073	S2	G3G4
Pima	INVERTEBRATE	Celastrina "argiolus-ladon complex"	Azures in Part								IILEPG0090	S?	G5
Pima	INVERTEBRATE	Chlosyne californica	California Patch								IILEPJ9060	S?	G5

COUNTY	TAXON	SCIENTIFIC NAME	COMMON NAME	ESA	BLM	CRIT HAB	USFS	NESL	MEXFED	STATE	ELCODE	S RANK	G RANK
Pima	INVERTEBRATE	Chlosyne fulvia	Fulvia Checkerspot								IILEPJA040	S?	G5
Pima	INVERTEBRATE	Chlosyne lacinia	Bordered Patch								IILEPJ9070	S?	G5
Pima	INVERTEBRATE	Cicindela sedecimpunctata	Western Red-bellied Tiger Beetle								IICOL024F0	S5	G5
Pima	INVERTEBRATE	Cogia hippalus	Acacia Skipper								IILEP21020	S?	G5
Pima	INVERTEBRATE	Colias eurytheme	Alfalfa Sulphur								IILEPA8020	S?	G5
Pima	INVERTEBRATE	Copaeodes aurantiaca	Orange Skipperling								IILEP58010	S?	G5
Pima	INVERTEBRATE	Cylindera lemniscata	White-striped Tiger Beetle								IICOL025W0	S5	G5
Pima	INVERTEBRATE	Danaus gilippus	Queen								IILEPP2020	S?	G5
Pima	INVERTEBRATE	Danaus plexippus	Monarch						PR		IILEPP2010	SN?	G5
Pima	INVERTEBRATE	Dymasia dymas	Dymas Checkerspot								IILEPK1010	S?	G5
Pima	INVERTEBRATE	Echinargus isola	Reakirt's Blue								IILEPF8030	S?	G5
Pima	INVERTEBRATE	Erynnis funeralis	Funereal Dusky Wing								IILEP37130	S?	G5
Pima	INVERTEBRATE	Erynnis tristis	Mournful Dusky Wing								IILEP37090	S?	G5
Pima	INVERTEBRATE	Euphilotes bernardino	Bernadino Blue								IILEPG2070	S?	G3G4
Pima	INVERTEBRATE	Euptoieta claudia	Variegated Fritillary								IILEPJ5010	S?	G5
Pima	INVERTEBRATE	Eurema mexicana	Mexican Yellow								IILEPB4030	S?	G5
Pima	INVERTEBRATE	Heliopyrgus domicella	Erichson's White-skipper								IILEP39010	S?	G5
Pima	INVERTEBRATE	Hemiargus ceraunus	Ceraunus Blue								IILEPF8020	S?	G5
Pima	INVERTEBRATE	Hylephila phyleus	Fiery Skipper								IILEP61010	S?	G5
Pima	INVERTEBRATE	Junonia coenia	Buckeye								IILEPL0010	S?	G5
Pima	INVERTEBRATE	Kricogonia lyside	Lyside								IILEPB3010	S?	G5
Pima	INVERTEBRATE	Leptotes marina	Marine Blue								IILEPF6020	S?	G5
Pima	INVERTEBRATE	Lerodea arabus	Violet-clouded Skipper								IILEP81020	S?	G5
Pima	INVERTEBRATE	Lerodea eufala	Eufala Skipper								IILEP81010	S?	G5
Pima	INVERTEBRATE	Limenitis archippus obsoleta	Obsolete Viceroy Butterfly								IILEPL3024	S4	G5T3T4

COUNTY	TAXON	SCIENTIFIC NAME	COMMON NAME	ESA	BLM	CRIT HAB	USFS	NESL	MEXFED	STATE	ELCODE	S RANK	G RANK
Pima	INVERTEBRATE	Ministrymon leda	Leda Hairstreak								IILEPD6020	S?	G5
Pima	INVERTEBRATE	Myscelia cyananthe	Blackened Bluewing								IILEPL5040	S?	G5
Pima	INVERTEBRATE	Nathalis iole	Dainty Sulphur								IILEPB7010	S?	G5
Pima	INVERTEBRATE	Neophasia terlooii	Chiricahua Pine White								IILEP99020	S4	G3G4
Pima	INVERTEBRATE	Nymphalis antiopa	Mourning Cloak								IILEPK6030	S?	G5
Pima	INVERTEBRATE	Papilio cresphontes	Giant Swallowtail								IILEP94120	S?	G5
Pima	INVERTEBRATE	Papilio multicaudata	Two-tailed Swallowtail								IILEP94200	S?	G5
Pima	INVERTEBRATE	Papilio polyxenes	Black Swallowtail								IILEP94010	S?	G5
Pima	INVERTEBRATE	Phoebis sennae	Cloudless Sulphur								IILEPB1010	S?	G5
Pima	INVERTEBRATE	Pholisora catullus	Common Sooty Wing								IILEP41010	S?	G5
Pima	INVERTEBRATE	Pieris rapae	Cabbage Butterfly								IILEPA2030	SE	G5
Pima	INVERTEBRATE	Polygonus leo	Hammock Skipper								IILEP05010	S?	G5
Pima	INVERTEBRATE	Pyrgus albescens	Western Checkered Skipper								IILEP38060	S?	G5
Pima	INVERTEBRATE	Pyrgus philetas	Philetas Checkered Skipper								IILEP38080	S?	G5
Pima	INVERTEBRATE	Pyrisitia proterpia	Tailed Orange								IILEPB4050	S1S2B	G5
Pima	INVERTEBRATE	Sonorella eremita	San Xavier Talussnail	SC							IMGASC9240	S1	G1
Pima	INVERTEBRATE	Sonorella papagorum	Black Mountain Talussnail								IMGASC9480	S1	G1
Pima	INVERTEBRATE	Staphylus ceos	Ceos Skipper								IILEP25010	S?	G5
Pima	INVERTEBRATE	Strymon melinus	Gray Hairstreak								IILEPF2010	S?	G5
Pima	INVERTEBRATE	Systasea zampa	Arizona Powdered Skipper								IILEP30020	S?	G5
Pima	INVERTEBRATE	Texola elada	Elada Checkerspot								IILEPK2010	S?	G5
Pima	INVERTEBRATE	Tryonia quitobaquitae	Quitobaquito Tryonia	SC							IMGASJ7130	S1	G1
Pima	INVERTEBRATE	Urbanus dorantes	Dorantes Skipper								IILEP12040	S?	G5
Pima	INVERTEBRATE	Vanessa annabella	West Coast Lady								IILEPK7030	S?	G5
Pima	INVERTEBRATE	Vanessa atalanta	Red Admiral								IILEPK7040	S?	G5

COUNTY	TAXON	SCIENTIFIC NAME	COMMON NAME	ESA	BLM	CRIT HAB	USFS	NESL	MEXFED	STATE	ELCODE	S RANK	G RANK
Pima	INVERTEBRATE	Vanessa cardui	Painted Lady								IILEPK7020	S?	G5
Pima	INVERTEBRATE	Vanessa virginiensis	American Painted Lady								IILEPK7010	S?	G5
Pima	INVERTEBRATE	Zerene cesonia	Southern Dogface								IILEPA9010	S?	G5
Pima	MAMMAL	Antilocapra americana sonoriensis	Sonoran Pronghorn	LE					P	WSC	AMALD01012	S1	G5T1
Pima	MAMMAL	Antrozous pallidus	Pallid Bat								AMACC10010	S4	G5
Pima	MAMMAL	Baiomys taylori	Northern Pygmy Mouse				S				AMAFF05010	S3	G4G5
Pima	MAMMAL	Bat Colony									OBATCOLONY	SU	GNR
Pima	MAMMAL	Bat Foraging Area	High Netting Concentration								OBATFORAG1	SU	GNR
Pima	MAMMAL	Chaetodipus intermedius	Rock Pocket Mouse								AMAFD05060	S5	G5
Pima	MAMMAL	Choeronycteris mexicana	Mexican Long-tongued Bat	SC	S		S		A	WSC	AMACB02010	S3	G4
Pima	MAMMAL	Corynorhinus townsendii pallescens	Pale Townsend's Big-eared Bat	SC	S		S	4			AMACC08014	S3S4	G3G4T3T4
Pima	MAMMAL	Cynomys ludovicianus	Black-tailed Prairie Dog	SC	S		S		A	WSC	AMAFB06010	SXS1	G4
Pima	MAMMAL	Didelphis virginiana californica	Mexican Opossum								AMAAA01011	S3	G5TNR
Pima	MAMMAL	Eptesicus fuscus	Big Brown Bat								AMACC04010	S4S5	G5
Pima	MAMMAL	Eumops perotis californicus	Greater Western Bonneted Bat	SC	S		S				AMACD02011	S3	G5T4
Pima	MAMMAL	Eumops underwoodi	Underwood's Bonneted Bat	SC							AMACD02020	S1	G4
Pima	MAMMAL	Lasionycteris noctivagans	Silver-haired Bat						PR		AMACC02010	S3S4	G5
Pima	MAMMAL	Lasiurus blossevillii	Western Red Bat				S			WSC	AMACC05060	S3	G5
Pima	MAMMAL	Lasiurus cinereus	Hoary Bat	No Status							AMACC05030	S4	G5
Pima	MAMMAL	Lasiurus xanthinus	Western Yellow Bat				S			WSC	AMACC05070	S2S3	G5
Pima	MAMMAL	Leptonycteris curasoae yerbabuenae	Lesser Long-nosed Bat	LE					A	WSC	AMACB03030	S2S3	G4
Pima	MAMMAL	Lepus alleni	Antelope Jackrabbit						|		AMAEB03070	S3	G5
Pima	MAMMAL	Macrotus californicus	California Leaf-nosed Bat	SC	S		S			WSC	AMACB01010	S3	G4
Pima	MAMMAL	Myotis californicus	California Myotis								AMACC01120	S4	G5
Pima	MAMMAL	Myotis occultus	Arizona Myotis	SC	S						AMACC01160	S3	G3G4

COUNTY	TAXON	SCIENTIFIC NAME	COMMON NAME	ESA	BLM	CRIT HAB	USFS	NESL	MEXFED	STATE	ELCODE	S RANK	G RANK
Pima	MAMMAL	Myotis thysanodes	Fringed Myotis	SC							AMACC01090	S3S4	G4
Pima	MAMMAL	Myotis velifer	Cave Myotis	SC	S						AMACC01050	S3S4	G5
Pima	MAMMAL	Neotoma mexicana	Mexican Woodrat								AMAFF08070	S5	G5
Pima	MAMMAL	Notiosorex cockrumi	Cockrum's Desert Shrew				S				AMABA05020	S1	GNR
Pima	MAMMAL	Nyctinomops femorosaccus	Pocketed Free-tailed Bat				S				AMACD04010	S3	G4
Pima	MAMMAL	Nyctinomops macrotis	Big Free-tailed Bat	SC							AMACD04020	S3	G5
Pima	MAMMAL	Panthera onca	Jaguar	LE		P			P	WSC	AMAJH02010	S1	G3
Pima	MAMMAL	Parastrellus hesperus	Canyon Bat								AMACC03010	S5	G5
Pima	MAMMAL	Peromyscus eremicus	Cactus Mouse								AMAFF03010	S5	G5
Pima	MAMMAL	Peromyscus merriami	Merriam's Deermouse				S				AMAFF03020	S2	G5
Pima	MAMMAL	Reithrodontomys fulvescens	Fulvous Harvest Mouse				S				AMAFF02050	S4	G5
Pima	MAMMAL	Reithrodontomys montanus	Plains Harvest Mouse				S				AMAFF02010	S3	G5
Pima	MAMMAL	Sciurus arizonensis	Arizona Gray Squirrel				S		A		AMAFB07060	S4	G4
Pima	MAMMAL	Sigmodon ochrognathus	Yellow-nosed Cotton Rat	SC			S				AMAFF07040	S4	G4G5
Pima	MAMMAL	Tadarida brasiliensis	Brazilian Free-tailed Bat								AMACD01010	S3S4	G5
Pima	MAMMAL	Thomomys bottae	Botta's Pocket Gopher								AMAFC01020	S5	G5
Pima	PLANT	Abutilon parishii	Pima Indian Mallow	SC	S		S			SR	PDMAL020E0	S3	G2
Pima	PLANT	Abutilon reventum	Yellow Indian Mallow								PDMAL020J0	S2	G3G5
Pima	PLANT	Abutilon thurberi	Thurber Indian Mallow							SR	PDMAL020P0	S1	G2?
Pima	PLANT	Acacia farnesiana	Sweet Acacia								PDFAB020D0	S1S2	G5
Pima	PLANT	Agastache rupestris	Baboquivari Giant Hyssop								PDLAM030D0	S2	G3?
Pima	PLANT	Agave parviflora ssp. parviflora	Santa Cruz Striped Agave	SC			S		A	HS	PMAGA010L2	S3	G3T3
Pima	PLANT	Agave schottii var. treleasei	Trelease Agave	SC			S			HS	PMAGA010N2	S1	G5T1Q
Pima	PLANT	Allium gooddingii	Goodding Onion	SC			S	3		HS	PMLIL02120	S3S4	G4
Pima	PLANT	Allium plummerae	Plummer Onion							SR	PMLIL021V0	S3	G4

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Pima	PLANT	Aloysia gratissima	Common Bee Brush								PDVER02010	S3	G5
Pima	PLANT	Amoreuxia gonzalezii	Saiya	SC			S			HS	PDBIX01010	S1	G1
Pima	PLANT	Amsonia grandiflora	Large-flowered Blue Star	SC			S				PDAPO03060	S2	G2
Pima	PLANT	Amsonia kearneyana	Kearney's Blue-star	LE						HS	PDAPO030M0	S1	G1
Pima	PLANT	Anoda abutiloides	False Indian Mallow								PDMAL07010	S2	G3
Pima	PLANT	Antirrhinum kingii	King Snapdragon								PDSCR2S040	S3	G4
Pima	PLANT	Arabis tricornuta	Chiricahua Rock Cress				S				PDBRA06200	S1	G1
Pima	PLANT	Arceuthobium apachecum	Apache Dwarf Mistletoe								PDVIS03030	S3?	G3G4
Pima	PLANT	Arceuthobium blumeri	Blumer Dwarf Mistletoe								PDVIS03040	S1?	G3?
Pima	PLANT	Asclepias lemmonii	Lemmon Milkweed				S				PDASC020Z0	S2	G4?
Pima	PLANT	Asplenium dalhousiae	Dalhouse Spleenwort		S						PPASP020A0	S1	GNR
Pima	PLANT	Aster potosinus	Lemmon's Aster								PDASTE8160	S1	G2
Pima	PLANT	Atamisquea emarginata	Desert Tree Caper								PDCPP01010	S1	G4
Pima	PLANT	Ayenia jaliscana	Ayenia				S				PDSTE010C0	S1	GNR
Pima	PLANT	Berberis harrisoniana	Kofa Mt Barberry		S						PDBER02030	S1	G1G2
Pima	PLANT	Boerhavia megaptera	Tucson Mountain Spiderling								PDNYC06090	S3	G3
Pima	PLANT	Capsicum annuum var. glabriusculum	Chiltepin				S				PDSOL06012	S2	G5T5
Pima	PLANT	Cardiospermum corindum	Balloon Vine								PDSPN03010	S1	G5
Pima	PLANT	Carex chihuahuensis	Chihuahuan Sedge				S				PMCYP032T0	S2S3	G3G4
Pima	PLANT	Carex ultra	Arizona Giant Sedge		S		S				PMCYP03E50	S2	G3?
Pima	PLANT	Cathestecum erectum	False Grama								PMPOA1B010	S1	G5?
Pima	PLANT	Cheilanthes pringlei	Pringle Lip Fern								PPADI090M0	S3	G4
Pima	PLANT	Corchorus hirtus	Orinico Jute								PDTIL01030	S1	G5
Pima	PLANT	Coryphantha scheeri var. robustispina	Pima Pineapple Cactus	LE						HS	PDCAC040C1	S2	G4T2
Pima	PLANT	Cylindropuntia x kelvinensis	Kelvin Cholla							SR	PDCAC0D2M0	SHYB	GNA

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Pima	PLANT	Cynanchum ligulatum	Sinaloa Milkweed Vine								PDASC050V0	S1	G4
Pima	PLANT	Dalea lumholtzii	Lumholtz's Prairie-clover								PDFAB1A0Y0	S2S3	G3G4
Pima	PLANT	Dalea tentaculoides	Gentry's Indigo Bush	SC	S		S			HS	PDFAB1A1K0	S1	G1
Pima	PLANT	Desmanthus covillei	Coville Bundleflower								PDFAB1C030	S1	G3G4
Pima	PLANT	Echinocactus horizonthalonius var. nicholii	Nichol Turk's Head Cactus	LE						HS	PDCAC05022	S2	G4T2
Pima	PLANT	Echinocereus fasciculatus	Magenta-flower Hedgehog-cactus							SR	PDCAC06065	S3	G4G5T4T5
Pima	PLANT	Echinomastus erectocentrus var. acunensis	Acuna Cactus	PE		P			P	HS	PDCAC0J0E1	S1	G3T1T2Q
Pima	PLANT	Echinomastus erectocentrus var. erectocentrus	Needle-spined Pineapple Cactus	SC						SR	PDCAC0J0E2	S3	G3T3Q
Pima	PLANT	Erigeron arisolius	Arid Throne Fleabane				S				PDAST3M510	S2	G2
Pima	PLANT	Erigeron arizonicus	Arizona Fleabane								PDAST3M0B0	S3	G3?
Pima	PLANT	Erigeron lobatus	Lobed Fleabane								PDAST3M2C0	S4	G4
Pima	PLANT	Erigeron piscaticus	Fish Creek Fleabane	SC	S		S			SR	PDAST3M4X0	S1	G1
Pima	PLANT	Eriogonum capillare	San Carlos Wild-buckwheat	SC						SR	PDPGN08100	S4	G4
Pima	PLANT	Eriogonum ericifolium var. ericifolium	Heathleaf Wild-buckwheat				S				PDPGN08231	S2	G3T2
Pima	PLANT	Eriogonum terrenatum	San Pedro River Wild Buckwheat		S						PDPGN08760	S1	G1
Pima	PLANT	Eryngium sparganophyllum	Ribbonleaf Button Snakeroot								PDAPI0Z0T0	S1	G2
Pima	PLANT	Eucnide rupestris	Flor de la Piedra								PDLOA02020	S1	G3
Pima	PLANT	Euphorbia gracillima	Mexican Broomspurge								PDEUP0D110	S3	G4?
Pima	PLANT	Ferocactus cylindraceus	Desert Barrel Cactus						PR	SR	PDCAC08080	S4	G5
Pima	PLANT	Ferocactus emoryi	Emory's Barrel-cactus							SR	PDCAC08090	S1S2	G4
Pima	PLANT	Gonolobus arizonicus	Rincon Milkweed Vine								PDASC0A020	S4	G4
Pima	PLANT	Graptopetalum bartramii	Bartram Stonecrop	SC	S		S			SR	PDCRA06010	S3	G3
Pima	PLANT	Hackelia ursina	Chihuahuan Stickseed								PDBOR0G0R0	S2	G3?
Pima	PLANT	Hedeoma dentatum	Mock-pennyroyal								PDLAM0M0M0	S3	G3
Pima	PLANT	Hermannia pauciflora	Sparseleaf Hermannia								PDSTE06010	S1	G2?

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Pima	PLANT	Heterotheca rutteri	Huachuca Golden Aster	SC	S		S				PDAST4V0J0	S2	G2
Pima	PLANT	Hexalectris arizonica	Arizona Crested coral-root				S			SR	PMORC1C041	S1S2	G5T2T4
Pima	PLANT	Hexalectris colemanii	Coleman's coral-root				S				PMORC1C060	S1S2	G1G2
Pima	PLANT	Hieracium pringlei	Pringle Hawkweed	SC							PDAST4W170	S1	G2Q
Pima	PLANT	Hymenoxys quinquesquamata	Five Scale Bitterweed								PDAST530F0	S3	G3
Pima	PLANT	Ibervillea tenuisecta	Texas Globe Berry								PDCUC0F020	S1	G4
Pima	PLANT	Ipomoea tenuiloba	Trumpet Morning-glory								PDCON0A1H0	S4	G4
Pima	PLANT	Jacquemontia pringlei	Pringle's Cluster-vine								PDCON0B080	S2S3	G5
Pima	PLANT	Jatropha cinerea	Sangre de Drago								PDEUP0X030	S1	G5
Pima	PLANT	Justicia candicans	Hierba Azul								PDACA0E0L0	S2	G4
Pima	PLANT	Lagascea decipiens	Beguiling Mexican Daisy								PDAST5G010	S4	G5
Pima	PLANT	Lilaeopsis schaffneriana ssp. recurva	Huachuca Water-umbel	LE		Y				HS	PDAPI19051	S2	G4T2
Pima	PLANT	Lilium parryi	Lemmon Lily	SC			S			SR	PMLIL1A0J0	S2	G3
Pima	PLANT	Listera convallarioides	Broadleaf Twayblade							SR	PMORC1N050	S1	G5
Pima	PLANT	Lophocereus schottii	Senita						|	SR	PDCAC14010	S1S2	G4
Pima	PLANT	Lupinus huachucanus	Huachuca Mountain Lupine				S				PDFAB2B210	S2	G2
Pima	PLANT	Lupinus lemmonii	Lemmon's Lupine				S				PDFAB2B2A0	S1Q	G1Q
Pima	PLANT	Lysiloma watsonii	Littleleaf False Tamarind							SR	PDFAB2C040	S1	G4?
Pima	PLANT	Machaeranthera arida	Arid Tansy-aster								PDAST64040	S1	G3G4
Pima	PLANT	Malaxis tenuis	Slender Adders Mouth							SR	PMORC1R090	S1	G4
Pima	PLANT	Malvastrum bicuspidatum	Mexican Shrub Mallow								PDMAL0S030	S2	G4
Pima	PLANT	Mammillaria heyderi var. bullingtoniana	Cream Cactus							SR	PDCAC0A035	S1S2	G4?T2T4
Pima	PLANT	Mammillaria mainiae	Counter Clockwise Fishhook Cactus				S			SR	PDCAC0A060	S1	G3
Pima	PLANT	Mammillaria thornberi	Thornber Fishhook Cactus							SR	PDCAC0A0C0	S4	G4
Pima	PLANT	Mammillaria viridiflora	Varied Fishhook Cactus							SR	PDCAC0A0D0	S4	G4

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Pima	PLANT	Manihot davisiae	Arizona Manihot				S				PDEUP0Z010	S2	G4
Pima	PLANT	Matelea cordifolia	Sonoran Milkweed Vine								PDASC0A080	S1	G4
Pima	PLANT	Metastelma mexicanum	Wiggins Milkweed Vine	SC			S				PDASC050P0	S1S2	G3G4
Pima	PLANT	Microchloa kunthii	Kunth Grass								PMPOA40010	S1	G5
Pima	PLANT	Mimosa distachya var. laxiflora	Garabatillo								PDFAB2K070	S2	G5
Pima	PLANT	Muhlenbergia dubioides	Box Canyon Muhly				S				PMPOA480G0	S1	G1Q
Pima	PLANT	Muhlenbergia xerophila	Weeping Muhly				S				PMPOA48220	S1	G3
Pima	PLANT	Notholaena lemmonii	Lemmon Cloak Fern	SC							PPADI0G0D0	S1S2	G3?
Pima	PLANT	Opuntia engelmannii									PDCAC0D220	S3?	G5
Pima	PLANT	Opuntia engelmannii var. flavispina								SR	PDCAC0D224	S3?	G5T3?
Pima	PLANT	Opuntia versicolor	Stag-horn Cholla							SR	PDCAC0D1K0	S2S3	G4
Pima	PLANT	Passiflora arizonica	Arizona Passionflower				S				PDPAS01073	S2	G5T3T5
Pima	PLANT	Pectis imberbis	Beardless Chinch Weed	SC			S				PDAST6W0A0	S1	G3
Pima	PLANT	Pellaea wrightiana	Wright Cliff Brake								PPADI0H0E0	S3S4	G5
Pima	PLANT	Peniocereus greggii var. transmontanus	Desert Night-blooming Cereus						PR	SR	PDCAC0V012	S3S4	G3G4T3T4
Pima	PLANT	Peniocereus striatus	Dahlia Rooted Cereus							SR	PDCAC0V020	S1	G4
Pima	PLANT	Penstemon discolor	Catalina Beardtongue				S			HS	PDSCR1L210	S2	G2
Pima	PLANT	Penstemon superbus	Superb Beardtongue								PDSCR1L630	S2?	G3?
Pima	PLANT	Perityle ajoensis	Ajo Rock Daisy							SR	PDAST700Y0	S1	G1
Pima	PLANT	Petalonyx linearis	Longleaf Sandpaper Plant								PDLOA04010	S2	G4
Pima	PLANT	Physalis latiphysa	Broad-leaf Ground-cherry				S				PDSOL0S0H0	S1	G1
Pima	PLANT	Plagiobothrys pringlei	Pringle Popcorn-flower								PDBOR0V0V0	S2	G3G4
Pima	PLANT	Platanthera limosa	Thurber's Bog Orchid							SR	PMORC1Y0G0	S4	G4
Pima	PLANT	Polygonum fusiforme	Needles Knotweed								PDPGN0L110	S3?	G3G4Q
Pima	PLANT	Polypogon elongatus	American Rabbitfoot Grass								PMPOA50020	S1	G5

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Pima	PLANT	Potentilla albiflora	White-flowered Cinquefoil				S				PDROS1B010	S1S2	G1G2
Pima	PLANT	Proboscidea parviflora	Small-flower Unicorn-plant								PDPED06040	S4	G4G5
Pima	PLANT	Psilotum nudum	Whisk Fern				S			HS	PPPSI01020	S1	G5
Pima	PLANT	Pyrrhopappus rothrockii	False Dandelion								PDAST7V050	S3	G4
Pima	PLANT	Salvia columbariae	California Sage								PDLAM1S0D0	S4S5	G5
Pima	PLANT	Samolus vagans	Chiricahua Mountain Brookweed				S				PDPRI09040	S2	G2?
Pima	PLANT	Schiedeella arizonica	Fallen Ladies'-tresses							SR	PMORC67020	S4	GNR
Pima	PLANT	Selaginella eremophila	Desert Spike Moss								PPSEL010G0	S3S4	G4
Pima	PLANT	Senecio carlomasonii	Seemann Groundsel								PDAST8H3W0	S2S3	G4?Q
Pima	PLANT	Senecio neomexicanus var. toumeyi	Toumey Groundsel				S				PDAST8H274	S2	G5T2Q
Pima	PLANT	Senecio parryi	Mountain Groundsel								PDAST8H2B0	S4	G4
Pima	PLANT	Sisyrinchium cernuum	Nodding Blue-eyed Grass				S				PMIRI0D0B0	S2	G5
Pima	PLANT	Solanum lumholtzianum	Lumholtz Nightshade								PDSOL0Z180	S3	G3G4
Pima	PLANT	Sophora arizonica	Arizona Necklace								PDFAB3N020	S3	G3
Pima	PLANT	Stenocereus thurberi	Organ Pipe Cactus							SR	PDCAC10020	S4	G5
Pima	PLANT	Stephanomeria schottii	Schott Wire Lettuce		S						PDAST8U0D0	S2	G2
Pima	PLANT	Stevia lemmonii	Lemmon's Stevia				S				PDAST8V010	S2	G3G4
Pima	PLANT	Streptanthus carinatus	Lyre-leaved Twistflower								PDBRA2G0C0	S3S4	G4
Pima	PLANT	Talinum angustissimum	Yellow Flame Flower								PDPOR08010	S2	G4
Pima	PLANT	Tephrosia thurberi	Thurber Hoary Pea								PDFAB3X0M0	S3	G4G5
Pima	PLANT	Thalictrum dasycarpum	Purple Meadow Rue								PDRAN0M060	S2	G5
Pima	PLANT	Thelypteris puberula var. sonorensis	Aravaipa Woodfern		S		S				PPTHE05192	S2	G5T3
Pima	PLANT	Tithonia thurberi	Thurber Tithonia								PDAST9A030	S4	G4
Pima	PLANT	Tragia laciniata	Sonoran Noseburn				S				PDEUP1D060	S3?	G3G4
Pima	PLANT	Triteleiopsis palmeri	Blue Sand Lily		S					SR	PMLIL22010	S1	G3

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Pima	PLANT	Tumamoca macdougalii	Tumamoc Globeberry		S		S			SR	PDCUC0S010	S3	G4
Pima	PLANT	Vauquelinia californica ssp. sonorensis	Arizona Sonoran Rosewood		S						PDROS1R024	S1S2	G4T2
Pima	PLANT	Verbena pinetorum	Chihuahua Vervain								PDVER0N0P0	S1	G2G4
Pima	PLANT	Viola umbraticola	Shade Violet				S				PDVIO042E0	S2?	G3G4
Pima	PLANT	Ziziphus obtusifolia	Lotebush								PDRHA0E030	S3S4	G4G5
Pima	REPTILE	Aspidoscelis arizonae	Arizona Striped Whiptail		S						ARACJ02071	S1S2	G2
Pima	REPTILE	Aspidoscelis burti stictogrammus	Giant Spotted Whiptail	SC			S				ARACJ02011	S2	G4T4
Pima	REPTILE	Aspidoscelis xanthonota	Redback Whiptail	SC							ARACJ02012	S2	G4T2
Pima	REPTILE	Chionactis occipitalis klauberi	Tucson Shovel-nosed Snake	C*		P					ARADB05012	S1	G5T3Q
Pima	REPTILE	Chionactis palarostris organica	Organ Pipe Shovel-nosed Snake								ARADB05021	S1	G3G4T2
Pima	REPTILE	Coluber bilineatus	Sonoran Whipsnake								ARADB21010	S5	G5
Pima	REPTILE	Crotalus lepidus klauberi	Banded Rock Rattlesnake						PR		ARADE02051	S3	G5T5
Pima	REPTILE	Crotaphytus nebrius	Sonoran Collared Lizard								ARACF04050	S3S4	G4
Pima	REPTILE	Gopherus morafkai	Sonoran Desert Tortoise	C*			S		A	WSC	ARAAF01013	S4	G4
Pima	REPTILE	Gyalopion canum	Chihuahuan Hook-nosed Snake								ARADB16010	S3	G5
Pima	REPTILE	Heloderma suspectum	Gila Monster						A		ARACE01010	S4	G4
Pima	REPTILE	Heloderma suspectum suspectum	Reticulate Gila Monster				S		A		ARACE01012	S4	G4T4
Pima	REPTILE	Heterodon kennerlyi	Mexican Hog-nosed Snake								ARADB17012	S3	G5T4
Pima	REPTILE	Hypsiglena sp. nov.	Hooded Nightsnake								ARADB18050	S4	G4
Pima	REPTILE	Kinosternon arizonense	Arizona Mud Turtle								ARAAE01060	S2	G4
Pima	REPTILE	Kinosternon sonoriense longifemorale	Sonoyta Mud Turtle	C					P		ARAAE01041	S1	G4T1
Pima	REPTILE	Lampropeltis getula nigrita	Western Black Kingsnake						A		ARADB19026	S3	G5T3T4Q
Pima	REPTILE	Lichanura trivirgata trivirgata	Mexican Rosy Boa	SC					A		ARADA01023	S1S2	G4G5T3
Pima	REPTILE	Oxybelis aeneus	Brown Vinesnake				S			WSC	ARADB24010	S1	G5
Pima	REPTILE	Phrynosoma cornutum	Texas Horned Lizard	SC							ARACF12010	S3S4	G4G5

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Pima	REPTILE	Phrynosoma hernandesi	Greater Short-horned Lizard								ARACF12080	S4	G5
Pima	REPTILE	Phyllorhynchus browni	Saddled Leaf-nosed Snake				PS		PR		ARADB25010	S5	G5
Pima	REPTILE	Plestiodon callicephalus	Mountain Skink				S				ARACH01030	S2	G4G5
Pima	REPTILE	Sceloporus slevini	Slevin's Bunchgrass Lizard		S		S				ARACF14180	S2	G4
Pima	REPTILE	Senticolis triaspis intermedia	Northern Green Ratsnake				S				ARADB44011	S3	G5T4
Pima	REPTILE	Tantilla nigriceps	Plains Black-headed Snake								ARADB35050	S2	G5
Pima	REPTILE	Tantilla wilcoxi	Chihuahuan Black-headed Snake								ARADB35120	S1	G4
Pima	REPTILE	Terrapene ornata luteola	Desert Box Turtle		S				PR		ARAAD08021	S2S3	G5T4
Pima	REPTILE	Thamnophis eques megalops	Northern Mexican Gartersnake	C*			S		A	WSC	ARADB36061	S1	G5T5
Pima	REPTILE	Uma rufopunctata	Yuman Desert Fringe-toed Lizard	SC	S				P	WSC	ARACF15040	S2	G3
Pinal	AMPHIBIAN	Anaxyrus retiformis	Sonoran Green Toad		S				PR		AAABB01140	S3	G3G4
Pinal	AMPHIBIAN	Gastrophryne olivacea	Western Narrow-mouthed Toad		S		S		PR	WSC	AAABE01020	S3	G5
Pinal	AMPHIBIAN	Rana yavapaiensis	Lowland Leopard Frog	SC	S		S		PR	WSC	AAABH01250	S3	G4
Pinal	BIRD	Antrostomus ridgwayi	Buff-collared Nightjar				S				ABNTA07060	S2S3	G5
Pinal	BIRD	Aquila chrysaetos	Golden Eagle		S			3	A		ABNKC22010	S4	G5
Pinal	BIRD	Ardea alba	Great Egret							WSC	ABNGA04040	S1B,S4N	G5
Pinal	BIRD	Ardea herodias	Great Blue Heron						|		ABNGA04010	S5	G5
Pinal	BIRD	Athene cunicularia hypugaea	Western Burrowing Owl	SC	S		S	4	PR		ABNSB10012	S3	G4T4
Pinal	BIRD	Buteo albonotatus	Zone-tailed Hawk				S		PR		ABNKC19090	S4	G4
Pinal	BIRD	Buteo plagiatus	Gray Hawk	SC			S			WSC	ABNKC19150	S3	G5
Pinal	BIRD	Buteo swainsoni	Swainson's Hawk				S		PR		ABNKC19070	S3	G5
Pinal	BIRD	Buteogallus anthracinus	Common Black-Hawk				S		PR	WSC	ABNKC15010	S3	G4G5
Pinal	BIRD	Camptostoma imberbe	Northern Beardless-Tyrannulet				S				ABPAE04010	S4	G5
Pinal	BIRD	Caracara cheriway	Crested Caracara	No Status						WSC	ABNKD02020	S1S2	G5
Pinal	BIRD	Coccyzus americanus	Yellow-billed Cuckoo (Western U.S. DPS)	PS:C*			S	2		WSC	ABNRB02020	S3	G5

COUNTY	TAXON	SCIENTIFIC NAME	COMMON NAME	ESA	BLM	CRIT HAB	USFS	NESL	MEXFED	STATE	ELCODE	S RANK	G RANK
Pinal	BIRD	Dendrocygna autumnalis	Black-bellied Whistling-Duck							WSC	ABNJB01040	S3	G5
Pinal	BIRD	Empidonax traillii extimus	Southwestern Willow Flycatcher	LE		Y		2	E	WSC	ABPAE33043	S1	G5T1T2
Pinal	BIRD	Falco peregrinus anatum	American Peregrine Falcon	SC	S		S	4	PR	WSC	ABNKD06071	S4	G4T4
Pinal	BIRD	Glaucidium brasilianum cactorum	Cactus Ferruginous Pygmy-owl	SC	S		S			WSC	ABNSB08041	S1	G5T3
Pinal	BIRD	Haliaeetus leucocephalus (wintering pop.)	Bald Eagle - Winter Population	SC	S		S	2	P	WSC	ABNKC10015	S4N	G5TNR
Pinal	BIRD	Haliaeetus leucocephalus pop. 3	Bald Eagle - Sonoran Desert Population	SC	S		S	2	P	WSC	ABNKC10014	S2S3	G5TNR
Pinal	BIRD	Icterus bullockii	Bullock's Oriole								ABPBXB9220	S4BS1N	G5
Pinal	BIRD	Ictinia mississippiensis	Mississippi Kite						PR	WSC	ABNKC09010	S3	G5
Pinal	BIRD	Ixobrychus exilis	Least Bittern						PR	WSC	ABNGA02010	S3	G5
Pinal	BIRD	Parabuteo unicinctus	Harris's Hawk						PR		ABNKC16010	S5	G5
Pinal	BIRD	Rallus longirostris yumanensis	Yuma Clapper Rail	LE					A	WSC	ABNME0501A	S3	G5T3
Pinal	BIRD	Strix occidentalis lucida	Mexican Spotted Owl	LT		Y		3	A	WSC	ABNSB12012	S3S4	G3T3
Pinal	BIRD	Tyrannus crassirostris	Thick-billed Kingbird				S			WSC	ABPAE52040	S2	G5
Pinal	BIRD	Tyrannus melancholicus	Tropical Kingbird							WSC	ABPAE52010	S3	G5
Pinal	FISH	Agosia chrysogaster chrysogaster	Gila Longfin Dace	SC	S		S		A		AFCJB37151	S3S4	G4T3T4
Pinal	FISH	Catostomus clarkii	Desert Sucker	SC	S		S				AFCJC02040	S3S4	G3G4
Pinal	FISH	Catostomus insignis	Sonora Sucker	SC	S		S		P		AFCJC02100	S3	G3
Pinal	FISH	Cyprinodon macularius	Desert Pupfish	LE		Y			P	WSC	AFCNB02060	S1	G1
Pinal	FISH	Gila intermedia	Gila Chub	LE		Y			P	WSC	AFCJB13160	S2	G2
Pinal	FISH	Gila robusta	Roundtail Chub	C*			S	2	A	WSC	AFCJB13150	S2	G3
Pinal	FISH	Meda fulgida	Spikedace	LE		Y				WSC	AFCJB22010	S1	G2
Pinal	FISH	Poeciliopsis occidentalis occidentalis	Gila Topminnow	LE					A	WSC	AFCNC05021	S1S2	G3
Pinal	FISH	Rhinichthys osculus	Speckled Dace	SC	S				E		AFCJB37050	S3S4	G5
Pinal	FISH	Tiaroga cobitis	Loach Minnow	LE		Y			E	WSC	AFCJB37140	S1	G2
Pinal	INVERTEBRATE	Cicindela oregona maricopa	Maricopa Tiger Beetle	SC							IICOL02362	S3	G5T3

COUNTY	TAXON	SCIENTIFIC NAME	COMMON NAME	ESA	BLM	CRIT HAB	USFS	NESL	MEXFED	STATE	ELCODE	S RANK	G RANK
Pinal	MAMMAL	Antrozous pallidus	Pallid Bat								AMACC10010	S4	G5
Pinal	MAMMAL	Bat Colony									OBATCOLONY	SU	GNR
Pinal	MAMMAL	Bat Foraging Area	High Netting Concentration								OBATFORAG1	SU	GNR
Pinal	MAMMAL	Choeronycteris mexicana	Mexican Long-tongued Bat	SC	S		S		A	WSC	AMACB02010	S3	G4
Pinal	MAMMAL	Corynorhinus townsendii pallescens	Pale Townsend's Big-eared Bat	SC	S		S	4			AMACC08014	S3S4	G3G4T3T4
Pinal	MAMMAL	Eptesicus fuscus	Big Brown Bat								AMACC04010	S4S5	G5
Pinal	MAMMAL	Eumops perotis californicus	Greater Western Bonneted Bat	SC	S		S				AMACD02011	S3	G5T4
Pinal	MAMMAL	Lasionycteris noctivagans	Silver-haired Bat						PR		AMACC02010	S3S4	G5
Pinal	MAMMAL	Lasiurus blossevillii	Western Red Bat				S			WSC	AMACC05060	S3	G5
Pinal	MAMMAL	Lasiurus cinereus	Hoary Bat	No Status							AMACC05030	S4	G5
Pinal	MAMMAL	Lasiurus xanthinus	Western Yellow Bat				S			WSC	AMACC05070	S2S3	G5
Pinal	MAMMAL	Leopardus pardalis	Ocelot	LE					P	WSC	AMAJH05010	S1	G4
Pinal	MAMMAL	Leptonycteris curasoae yerbabuenae	Lesser Long-nosed Bat	LE					A	WSC	AMACB03030	S2S3	G4
Pinal	MAMMAL	Lepus alleni	Antelope Jackrabbit						|		AMAEB03070	S3	G5
Pinal	MAMMAL	Macrotus californicus	California Leaf-nosed Bat	SC	S		S			WSC	AMACB01010	S3	G4
Pinal	MAMMAL	Myotis ciliolabrum	Western Small-footed Myotis	SC							AMACC01140	S3S4	G5
Pinal	MAMMAL	Myotis velifer	Cave Myotis	SC	S						AMACC01050	S3S4	G5
Pinal	MAMMAL	Myotis yumanensis	Yuma Myotis	SC							AMACC01020	S3S4	G5
Pinal	MAMMAL	Nyctinomops femorosaccus	Pocketed Free-tailed Bat				S				AMACD04010	S3	G4
Pinal	MAMMAL	Parastrellus hesperus	Canyon Bat								AMACC03010	S5	G5
Pinal	MAMMAL	Reithrodontomys montanus	Plains Harvest Mouse				S				AMAFF02010	S3	G5
Pinal	MAMMAL	Tadarida brasiliensis	Brazilian Free-tailed Bat								AMACD01010	S3S4	G5
Pinal	PLANT	Abutilon parishii	Pima Indian Mallow	SC	S		S			SR	PDMAL020E0	S3	G2
Pinal	PLANT	Agastache rupestris	Baboquivari Giant Hyssop								PDLAM030D0	S2	G3?
Pinal	PLANT	Agave murpheyi	Hohokam Agave	SC	S		S			HS	PMAGA010F0	S3	G2

COUNTY	TAXON	SCIENTIFIC NAME	COMMON NAME	ESA	BLM	CRIT HAB	USFS	NESL	MEXFED	STATE	ELCODE	S RANK	G RANK
Pinal	PLANT	Agave toumeyana var. bella	Toumey Agave							SR	PMAGA010R1	S3	G3T3
Pinal	PLANT	Allium glandulosum	Gland Onion							SR	PMLIL02110	S1	G4
Pinal	PLANT	Ammoselinum giganteum	Sand Parsley								PDAPI05020	S1	G2G3
Pinal	PLANT	Carex ultra	Arizona Giant Sedge		S		S				PMCYP03E50	S2	G3?
Pinal	PLANT	Echinocactus horizonthalonius var. nicholii	Nichol Turk's Head Cactus	LE						HS	PDCAC05022	S2	G4T2
Pinal	PLANT	Echinocereus triglochidiatus var. arizonicus	Arizona Hedgehog Cactus	LE						HS	PDCAC060K1	S2	G5T2
Pinal	PLANT	Echinomastus erectocentrus var. acunensis	Acuna Cactus	PE		P			P	HS	PDCAC0J0E1	S1	G3T1T2Q
Pinal	PLANT	Echinomastus erectocentrus var. erectocentrus	Needle-spined Pineapple Cactus	SC						SR	PDCAC0J0E2	S3	G3T3Q
Pinal	PLANT	Epilobium foliosum	Leafy Willow Herb								PDONA06080	S2	G5
Pinal	PLANT	Erigeron anchana	Mogollon Fleabane	SC			S				PDAST3M580	S2	G2
Pinal	PLANT	Erigeron lobatus	Lobed Fleabane								PDAST3M2C0	S4	G4
Pinal	PLANT	Eriogonum capillare	San Carlos Wild-buckwheat	SC						SR	PDPGN08100	S4	G4
Pinal	PLANT	Euphorbia gracillima	Mexican Broomspurge								PDEUP0D110	S3	G4?
Pinal	PLANT	Ferocactus cylindraceus	Desert Barrel Cactus						PR	SR	PDCAC08080	S4	G5
Pinal	PLANT	Fremontodendron californicum	Flannel Bush		S					SR	PDSTE03010	S2S3	G4
Pinal	PLANT	Gutierrezia wrightii	Wright's Snakeweed								PDAST4B0C0	S2S3	G4?
Pinal	PLANT	Hedeoma dentatum	Mock-pennyroyal								PDLAM0M0M0	S3	G3
Pinal	PLANT	Lilaeopsis schaffneriana ssp. recurva	Huachuca Water-umbel	LE		Y				HS	PDAPI19051	S2	G4T2
Pinal	PLANT	Lotus alamosanus	Alamos Deer Vetch				S				PDFAB2A020	S1	G3G4
Pinal	PLANT	Mabrya acerifolia	Mapleleaf False Snapdragon				S				PDSCR2L010	S2	G2
Pinal	PLANT	Machaeranthera arida	Arid Tansy-aster								PDAST64040	S1	G3G4
Pinal	PLANT	Mammillaria thornberi	Thornber Fishhook Cactus							SR	PDCAC0A0C0	S4	G4
Pinal	PLANT	Mammillaria viridiflora	Varied Fishhook Cactus							SR	PDCAC0A0D0	S4	G4
Pinal	PLANT	Opuntia versicolor	Stag-horn Cholla							SR	PDCAC0D1K0	S2S3	G4
Pinal	PLANT	Penstemon discolor	Catalina Beardtongue				S			HS	PDSCR1L210	S2	G2

COUNTY	TAXON	SCIENTIFIC NAME	COMMON NAME	ESA	BLM	CRIT HAB	USFS	NESL	MEXFED	STATE	ELCODE	S RANK	G RANK
Pinal	PLANT	Perityle gilensis var. gilensis	Gila Rock Daisy								PDAST700D1	S2?	G2?T2?
Pinal	PLANT	Plagiobothrys pringlei	Pringle Popcorn-flower								PDBOR0V0V0	S2	G3G4
Pinal	PLANT	Salvia amissa	Aravaipa Sage	SC	S		S				PDLAM1S020	S2	G2
Pinal	PLANT	Stenocereus thurberi	Organ Pipe Cactus							SR	PDCAC10020	S4	G5
Pinal	PLANT	Streptanthus carinatus	Lyre-leaved Twistflower								PDBRA2G0C0	S3S4	G4
Pinal	PLANT	Talinum gooddingii	Goodding's Flameflower								PDPOR08090	S1	G1Q
Pinal	PLANT	Thelypteris puberula var. sonorensis	Aravaipa Woodfern		S		S				PPTHE05192	S2	G5T3
Pinal	PLANT	Tripsacum lanceolatum	Mexican Gama Grass								PMPOA68030	S2S3	G4
Pinal	PLANT	Tumamoca macdougalii	Tumamoc Globeberry		S		S			SR	PDCUC0S010	S3	G4
Pinal	REPTILE	Aspidoscelis burti stictogrammus	Giant Spotted Whiptail	SC			S				ARACJ02011	S2	G4T4
Pinal	REPTILE	Aspidoscelis xanthonota	Redback Whiptail	SC							ARACJ02012	S2	G4T2
Pinal	REPTILE	Chionactis occipitalis	Western Shovel-nosed Snake								ARADB05010	S3S4	G5
Pinal	REPTILE	Chionactis occipitalis klauberi	Tucson Shovel-nosed Snake	C*		P					ARADB05012	S1	G5T3Q
Pinal	REPTILE	Crotaphytus bicinctores	Great Basin Collared Lizard								ARACF04010	S4	G5
Pinal	REPTILE	Gopherus morafkai	Sonoran Desert Tortoise	C*			S		A	WSC	ARAAF01013	S4	G4
Pinal	REPTILE	Heloderma suspectum suspectum	Reticulate Gila Monster				S		A		ARACE01012	S4	G4T4
Pinal	REPTILE	Lampropeltis getula nigrita	Western Black Kingsnake						A		ARADB19026	S3	G5T3T4Q
Pinal	REPTILE	Phrynosoma hernandesi	Greater Short-horned Lizard								ARACF12080	S4	G5
Pinal	REPTILE	Phyllorhynchus browni	Saddled Leaf-nosed Snake				PS		PR		ARADB25010	S5	G5
Pinal	REPTILE	Terrapene ornata luteola	Desert Box Turtle		S				PR		ARAAD08021	S2S3	G5T4
Pinal	REPTILE	Xantusia bezyi	Bezy's Night Lizard								ARACK01060	S2	G3
Santa Cruz	AMPHIBIAN	Ambystoma mavortium stebbinsi	Sonora Tiger Salamander	LE						WSC	AAAAA01145	S1	G5T1T2
Santa Cruz	AMPHIBIAN	Craugastor augusti cactorum	Western Barking Frog				S			WSC	AAABD04171	S2	G5T5
Santa Cruz	AMPHIBIAN	Gastrophryne olivacea	Western Narrow-mouthed Toad		S		S		PR	WSC	AAABE01020	S3	G5
Santa Cruz	AMPHIBIAN	Hyla wrightorum (Huachuca/Canelo Pop.)	Arizona Treefrog (Huachuca/Canelo DPS)	C,DPS							AAABC02082	S1	G4T2

COUNTY	TAXON	SCIENTIFIC NAME	COMMON NAME	ESA	BLM	CRIT HAB	USFS	NESL	MEXFED	STATE	ELCODE	S RANK	G RANK
Santa Cruz	AMPHIBIAN	Lithobates chiricahuensis	Chiricahua Leopard Frog	LT		Y			A	WSC	AAABH01080	S2	G3
Santa Cruz	AMPHIBIAN	Rana tarahumarae	Tarahumara Frog	SC			S			WSC	AAABH01210	SXS1	G3
Santa Cruz	AMPHIBIAN	Rana yavapaiensis	Lowland Leopard Frog	SC	S		S		PR	WSC	AAABH01250	S3	G4
Santa Cruz	BIRD	Accipiter gentilis	Northern Goshawk	SC	S		S	4	A	WSC	ABNKC12060	S3B	G5
Santa Cruz	BIRD	Amazilia beryllina	Berylline Hummingbird								ABNUC29080	S1	G4
Santa Cruz	BIRD	Amazilia violiceps	Violet-crowned Hummingbird				S			WSC	ABNUC29150	S3	G5
Santa Cruz	BIRD	Ammodramus bairdii	Baird's Sparrow	SC			S			WSC	ABPBXA0010	S2N	G4
Santa Cruz	BIRD	Ammodramus savannarum ammolegus	Arizona grasshopper sparrow		S		S				ABPBXA0021	S1S2	G5TU
Santa Cruz	BIRD	Amphispiza quinquestriata	Five-striped Sparrow								ABPBX97030	S1S2	G4
Santa Cruz	BIRD	Anthus spragueii	Sprague's Pipit	C*						WSC	ABPBM02060	S2N	G4
Santa Cruz	BIRD	Antrostomus ridgwayi	Buff-collared Nightjar				S				ABNTA07060	S2S3	G5
Santa Cruz	BIRD	Aquila chrysaetos	Golden Eagle		S			3	A		ABNKC22010	S4	G5
Santa Cruz	BIRD	Athene cunicularia hypugaea	Western Burrowing Owl	SC	S		S	4	PR		ABNSB10012	S3	G4T4
Santa Cruz	BIRD	Buteo albonotatus	Zone-tailed Hawk				S		PR		ABNKC19090	S4	G4
Santa Cruz	BIRD	Buteo plagiatus	Gray Hawk	SC			S			WSC	ABNKC19150	S3	G5
Santa Cruz	BIRD	Buteogallus anthracinus	Common Black-Hawk				S		PR	WSC	ABNKC15010	S3	G4G5
Santa Cruz	BIRD	Calothorax lucifer	Lucifer Hummingbird				S				ABNUC44010	S2	G4G5
Santa Cruz	BIRD	Camptostoma imberbe	Northern Beardless-Tyrannulet				S				ABPAE04010	S4	G5
Santa Cruz	BIRD	Catharus ustulatus	Swainson's Thrush								ABPBJ18100	S1	G5
Santa Cruz	BIRD	Chloroceryle americana	Green Kingfisher								ABNXD02020	S2	G5
Santa Cruz	BIRD	Coccyzus americanus	Yellow-billed Cuckoo (Western U.S. DPS)	PS:C*			S	2		WSC	ABNRB02020	S3	G5
Santa Cruz	BIRD	Dendrocygna autumnalis	Black-bellied Whistling-Duck							WSC	ABNJB01040	S3	G5
Santa Cruz	BIRD	Empidonax fulvifrons pygmaeus	Northern Buff-breasted Flycatcher	SC			S			WSC	ABPAE33141	S1	G5T5
Santa Cruz	BIRD	Empidonax traillii extimus	Southwestern Willow Flycatcher	LE		Y		2	E	WSC	ABPAE33043	S1	G5T1T2
Santa Cruz	BIRD	Falco peregrinus anatum	American Peregrine Falcon	SC	S		S	4	PR	WSC	ABNKD06071	S4	G4T4

COUNTY	TAXON	SCIENTIFIC NAME	COMMON NAME	ESA	BLM	CRIT HAB	USFS	NESL	MEXFED	STATE	ELCODE	S RANK	G RANK
Santa Cruz	BIRD	Glaucidium brasilianum cactorum	Cactus Ferruginous Pygmy-owl	SC	S		S			WSC	ABNSB08041	S1	G5T3
Santa Cruz	BIRD	Haliaeetus leucocephalus (wintering pop.)	Bald Eagle - Winter Population	SC	S		S	2	P	WSC	ABNKC10015	S4N	G5TNR
Santa Cruz	BIRD	Icterus bullockii	Bullock's Oriole								ABPBXB9220	S4BS1N	G5
Santa Cruz	BIRD	Lampornis clemenciae	Blue-throated Hummingbird								ABNUC34040	S4	G5
Santa Cruz	BIRD	Pachyramphus aglaiae	Rose-throated Becard				S			WSC	ABPAE53070	S1	G4G5
Santa Cruz	BIRD	Pandion haliaetus	Osprey							WSC	ABNKC01010	S2B,S4N	G5
Santa Cruz	BIRD	Polioptila nigriceps	Black-capped Gnatcatcher							WSC	ABPBJ08040	S1	G5
Santa Cruz	BIRD	Sialia sialis fulva	Azure Bluebird								ABPBJ15012	S3	G5TU
Santa Cruz	BIRD	Strix occidentalis lucida	Mexican Spotted Owl	LT		Y		3	A	WSC	ABNSB12012	S3S4	G3T3
Santa Cruz	BIRD	Tachybaptus dominicus	Least Grebe						PR		ABNCA01010	SAB	G5
Santa Cruz	BIRD	Trogon elegans	Elegant Trogon							WSC	ABNWA02070	S3	G5
Santa Cruz	BIRD	Tyrannus crassirostris	Thick-billed Kingbird				S			WSC	ABPAE52040	S2	G5
Santa Cruz	BIRD	Tyrannus melancholicus	Tropical Kingbird							WSC	ABPAE52010	S3	G5
Santa Cruz	FISH	Agosia chrysogaster chrysogaster	Gila Longfin Dace	SC	S		S		A		AFCJB37151	S3S4	G4T3T4
Santa Cruz	FISH	Catostomus clarkii	Desert Sucker	SC	S		S				AFCJC02040	S3S4	G3G4
Santa Cruz	FISH	Catostomus insignis	Sonora Sucker	SC	S		S		P		AFCJC02100	S3	G3
Santa Cruz	FISH	Cyprinodon macularius	Desert Pupfish	LE		Y			P	WSC	AFCNB02060	S1	G1
Santa Cruz	FISH	Gila ditaenia	Sonora Chub	LT		Y			A	WSC	AFCJB13090	S1	G2
Santa Cruz	FISH	Gila intermedia	Gila Chub	LE		Y			P	WSC	AFCJB13160	S2	G2
Santa Cruz	FISH	Poeciliopsis occidentalis occidentalis	Gila Topminnow	LE					A	WSC	AFCNC05021	S1S2	G3
Santa Cruz	FISH	Rhinichthys osculus	Speckled Dace	SC	S				E		AFCJB37050	S3S4	G5
Santa Cruz	INVERTEBRATE	Agathymus aryxna	Arizona Giant Skipper								IILEP87080	S5	G4G5
Santa Cruz	INVERTEBRATE	Amblyscirtes aenus	Bronze Roadside Skipper								IILEP80040	S?	G5
Santa Cruz	INVERTEBRATE	Amblyscirtes elissa	Elissa Roadside-skipper								IILEP80240	S?	G3G4
Santa Cruz	INVERTEBRATE	Amblyscirtes nysa	Nysa Roadside Skipper								IILEP80160	S?	G5

COUNTY	TAXON	SCIENTIFIC NAME	COMMON NAME	ESA	BLM	CRIT HAB	USFS	NESL	MEXFED	STATE	ELCODE	S RANK	G RANK
Santa Cruz	INVERTEBRATE	Amblyscirtes oslari	Oslar's Roadside Skipper								IILEP80060	S?	G4
Santa Cruz	INVERTEBRATE	Argia sabino	Sabino Canyon Dancer	SC			S				IIODO68100	S2	G2
Santa Cruz	INVERTEBRATE	Calephelis arizonensis	Arizona Metalmark								IILEPH2073	S2	G3G4
Santa Cruz	INVERTEBRATE	Heterelmis stephani	Stephan's Heterelmis Riffle Beetle	C			S				IICOL5B010	S1	G1
Santa Cruz	INVERTEBRATE	Limenitis archippus obsoleta	Obsolete Viceroy Butterfly								IILEPL3024	S4	G5T3T4
Santa Cruz	INVERTEBRATE	Neophasia terlooii	Chiricahua Pine White								IILEP99020	S4	G3G4
Santa Cruz	INVERTEBRATE	Pyrgulopsis thompsoni	Huachuca Springsnail	C	S		S				IMGASJ0230	S2	G2
Santa Cruz	INVERTEBRATE	Stygobromus arizonensis	Arizona Cave Amphipod	SC	S						ICMAL05360	S1?	G1
Santa Cruz	INVERTEBRATE	Sympetrum signiferum	Spot-winged Meadowhawk								IIODO61150	S2	G2G3
Santa Cruz	INVERTEBRATE	Thorybes pylades	Northern Cloudy Wing								IILEP16020	S?	G5
Santa Cruz	INVERTEBRATE	Tuberochernes ubicki	A Cave Obligate Pseudoscorpion								ILARAD3020	S?	G1G2
Santa Cruz	MAMMAL	Antrozous pallidus	Pallid Bat								AMACC10010	S4	G5
Santa Cruz	MAMMAL	Baiomys taylori	Northern Pygmy Mouse				S				AMAFF05010	S3	G4G5
Santa Cruz	MAMMAL	Bat Colony									OBATCOLONY	SU	GNR
Santa Cruz	MAMMAL	Bat Foraging Area	High Netting Concentration								OBATFORAG1	SU	GNR
Santa Cruz	MAMMAL	Choeronycteris mexicana	Mexican Long-tongued Bat	SC	S		S		A	WSC	AMACB02010	S3	G4
Santa Cruz	MAMMAL	Conepatus leuconotus leuconotus	Hog-nosed Skunk								AMAJF07022	S3	G4T4
Santa Cruz	MAMMAL	Corynorhinus townsendii pallescens	Pale Townsend's Big-eared Bat	SC	S		S	4			AMACC08014	S3S4	G3G4T3T4
Santa Cruz	MAMMAL	Didelphis virginiana californica	Mexican Opossum								AMAAA01011	S3	G5TNR
Santa Cruz	MAMMAL	Lasiurus blossevillii	Western Red Bat				S			WSC	AMACC05060	S3	G5
Santa Cruz	MAMMAL	Lasiurus cinereus	Hoary Bat	No Status							AMACC05030	S4	G5
Santa Cruz	MAMMAL	Leptonycteris curasoae yerbabuenae	Lesser Long-nosed Bat	LE					A	WSC	AMACB03030	S2S3	G4
Santa Cruz	MAMMAL	Macrotus californicus	California Leaf-nosed Bat	SC	S		S			WSC	AMACB01010	S3	G4
Santa Cruz	MAMMAL	Mormoops megalophylla	Ghost-faced Bat								AMACA01010	SA	G4
Santa Cruz	MAMMAL	Myotis velifer	Cave Myotis	SC	S						AMACC01050	S3S4	G5

COUNTY	TAXON	SCIENTIFIC NAME	COMMON NAME	ESA	BLM	CRIT HAB	USFS	NESL	MEXFED	STATE	ELCODE	S RANK	G RANK
Santa Cruz	MAMMAL	Panthera onca	Jaguar	LE		P			P	WSC	AMAJH02010	S1	G3
Santa Cruz	MAMMAL	Reithrodontomys fulvescens	Fulvous Harvest Mouse				S				AMAFF02050	S4	G5
Santa Cruz	MAMMAL	Reithrodontomys montanus	Plains Harvest Mouse				S				AMAFF02010	S3	G5
Santa Cruz	MAMMAL	Sciurus arizonensis	Arizona Gray Squirrel				S		A		AMAFB07060	S4	G4
Santa Cruz	MAMMAL	Sigmodon ochrognathus	Yellow-nosed Cotton Rat	SC			S				AMAFF07040	S4	G4G5
Santa Cruz	MAMMAL	Sorex arizonae	Arizona Shrew	SC			S		P	WSC	AMABA01240	S2	G3
Santa Cruz	MAMMAL	Tadarida brasiliensis	Brazilian Free-tailed Bat								AMACD01010	S3S4	G5
Santa Cruz	MAMMAL	Thomomys bottae	Botta's Pocket Gopher								AMAFC01020	S5	G5
Santa Cruz	MAMMAL	Thomomys umbrinus intermedius	Southern Pocket Gopher				S				AMAFC01012	S3	G5T3
Santa Cruz	PLANT	Abutilon parishii	Pima Indian Mallow	SC	S		S			SR	PDMAL020E0	S3	G2
Santa Cruz	PLANT	Abutilon reventum	Yellow Indian Mallow								PDMAL020J0	S2	G3G5
Santa Cruz	PLANT	Acacia farnesiana	Sweet Acacia								PDFAB020D0	S1S2	G5
Santa Cruz	PLANT	Aeschynomene villosa	Sensitive Joint Vetch								PDFAB04070	S2?	G4
Santa Cruz	PLANT	Agastache pallida	Barber Giant Hyssop								PDLAM03090	S1?	G4?
Santa Cruz	PLANT	Agastache rupestris	Baboquivari Giant Hyssop								PDLAM030D0	S2	G3?
Santa Cruz	PLANT	Agave parviflora ssp. parviflora	Santa Cruz Striped Agave	SC			S		A	HS	PMAGA010L2	S3	G3T3
Santa Cruz	PLANT	Allium glandulosum	Gland Onion							SR	PMLIL02110	S1	G4
Santa Cruz	PLANT	Allium rhizomatum	Redflower Onion							SR	PMLIL02320	S1	G3?Q
Santa Cruz	PLANT	Aloysia gratissima	Common Bee Brush								PDVER02010	S3	G5
Santa Cruz	PLANT	Amoreuxia gonzalezii	Saiya	SC			S			HS	PDBIX01010	S1	G1
Santa Cruz	PLANT	Amsonia grandiflora	Large-flowered Blue Star	SC			S				PDAPO03060	S2	G2
Santa Cruz	PLANT	Anoda abutiloides	False Indian Mallow								PDMAL07010	S2	G3
Santa Cruz	PLANT	Arabis tricornuta	Chiricahua Rock Cress				S				PDBRA06200	S1	G1
Santa Cruz	PLANT	Argyrochosma incana	Hoary Cloak Fern								PPADI0N030	S2	G5
Santa Cruz	PLANT	Asclepias incarnata ssp. incarnata	Purple Milkweed								PDASC020U1	S1	G5T5

COUNTY	TAXON	SCIENTIFIC NAME	COMMON NAME	ESA	BLM	CRIT HAB	USFS	NESL	MEXFED	STATE	ELCODE	S RANK	G RANK
Santa Cruz	PLANT	Asclepias lemmonii	Lemmon Milkweed				S				PDASC020Z0	S2	G4?
Santa Cruz	PLANT	Asclepias uncialis	Greene Milkweed	SC			S				PDASC02220	S1?	G3G4
Santa Cruz	PLANT	Asplenium exiguum	Sonoran Spleenwort								PPASP020D0	S1	GU
Santa Cruz	PLANT	Aster pauciflorus	Marsh Alkali Aster								PDASTEL010	S1	G4
Santa Cruz	PLANT	Aster potosinus	Lemmon's Aster								PDASTE8160	S1	G2
Santa Cruz	PLANT	Astragalus hypoxylus	Huachuca Milkvetch	SC	S		S			SR	PDFAB0F470	S1	G1
Santa Cruz	PLANT	Ayenia glabra	See: Ayenia jaliscana								PDSTE01090	SRF	G4
Santa Cruz	PLANT	Bouchea prismatica	Prism Bouchea								PDVER04020	S4	G4G5
Santa Cruz	PLANT	Browallia eludens	Bush-violet	SC			S				PDSOL03030	S1	G2?
Santa Cruz	PLANT	Capsicum annuum var. glabriusculum	Chiltepin				S				PDSOL06012	S2	G5T5
Santa Cruz	PLANT	Carex chihuahuensis	Chihuahuan Sedge				S				PMCYP032T0	S2S3	G3G4
Santa Cruz	PLANT	Carex ultra	Arizona Giant Sedge		S		S				PMCYP03E50	S2	G3?
Santa Cruz	PLANT	Centaurea rothrockii	Knap Thistle								PDAST1Y0P0	S3	G4
Santa Cruz	PLANT	Choisya mollis	Santa Cruz Star Leaf	SC			S				PDRUT02022	S2	G5?T2?
Santa Cruz	PLANT	Conioselinum mexicanum	Mexican Hemlock Parsley	SC			S				PDAPI0P030	S1	G2?
Santa Cruz	PLANT	Corchorus hirtus	Orinico Jute								PDTIL01030	S1	G5
Santa Cruz	PLANT	Coryphantha recurvata	Santa Cruz Beehive Cactus				S			HS	PDCAC04090	S3	G3
Santa Cruz	PLANT	Coryphantha scheeri var. robustispina	Pima Pineapple Cactus	LE						HS	PDCAC040C1	S2	G4T2
Santa Cruz	PLANT	Coursetia glabella	Smooth Baby-bonnets	SC			S				PDFAB140B0	S1	G3?
Santa Cruz	PLANT	Croton ciliatoglandulifer	Tropical Glandular Croton								PDEUP0H070	S1	G5
Santa Cruz	PLANT	Cynanchum ligulatum	Sinaloa Milkweed Vine								PDASC050V0	S1	G4
Santa Cruz	PLANT	Dalea lumholtzii	Lumholtz's Prairie-clover								PDFAB1A0Y0	S2S3	G3G4
Santa Cruz	PLANT	Dalea tentaculoides	Gentry's Indigo Bush	SC	S		S			HS	PDFAB1A1K0	S1	G1
Santa Cruz	PLANT	Desmanthus bicornutus	Ruby Bundleflower								PDFAB1C0A0	S1	G4
Santa Cruz	PLANT	Desmodium metcalfei	Metcalfe's Tick-trefoil				S				PDFAB1D0V0	S2	G3G4

COUNTY	TAXON	SCIENTIFIC NAME	COMMON NAME	ESA	BLM	CRIT HAB	USFS	NESL	MEXFED	STATE	ELCODE	S RANK	G RANK
Santa Cruz	PLANT	Dichondra repens var. sericea	Silky Pony Foot								PDCON08090	S1	G5
Santa Cruz	PLANT	Erigeron arisolius	Arid Throne Fleabane				S				PDAST3M510	S2	G2
Santa Cruz	PLANT	Erigeron arizonicus	Arizona Fleabane								PDAST3M0B0	S3	G3?
Santa Cruz	PLANT	Erigeron pringlei	Pringle's Fleabane								PDAST3M3C0	S2	G2
Santa Cruz	PLANT	Erigeron sceptrifer	Scepterbearing Fleabane								PDAST3M520	S1	GNR
Santa Cruz	PLANT	Euphorbia macropus	Woodland Spurge	SC						SR	PDEUP0Q2U0	S2	G4
Santa Cruz	PLANT	Fraxinus gooddingii	Goodding Ash								PDOLE04080	S3	G3
Santa Cruz	PLANT	Gentianopsis macrantha	Mexican Fringed Gentian								PDGEN08060	S1S2	G4
Santa Cruz	PLANT	Gonolobus arizonicus	Rincon Milkweed Vine								PDASC0A020	S4	G4
Santa Cruz	PLANT	Graptopetalum bartramii	Bartram Stonecrop	SC	S		S			SR	PDCRA06010	S3	G3
Santa Cruz	PLANT	Gutierrezia wrightii	Wright's Snakeweed								PDAST4B0C0	S2S3	G4?
Santa Cruz	PLANT	Hedeoma dentatum	Mock-pennyroyal								PDLAM0M0M0	S3	G3
Santa Cruz	PLANT	Henrya insularis	Henrya								PDACA0R010	S1	G5
Santa Cruz	PLANT	Heteranthera limosa	Mud Plantain								PMPON03030	S1	G5
Santa Cruz	PLANT	Heterotheca rutteri	Huachuca Golden Aster	SC	S		S				PDAST4V0J0	S2	G2
Santa Cruz	PLANT	Hexalectris arizonica	Arizona Crested coral-root				S			SR	PMORC1C041	S1S2	G5T2T4
Santa Cruz	PLANT	Hexalectris colemanii	Coleman's coral-root				S				PMORC1C060	S1S2	G1G2
Santa Cruz	PLANT	Hieracium pringlei	Pringle Hawkweed	SC							PDAST4W170	S1	G2Q
Santa Cruz	PLANT	Ipomoea plummerae var. cuneifolia	Huachuca Morning Glory								PDCON0A141	S3	G4T3
Santa Cruz	PLANT	Ipomoea tenuiloba	Trumpet Morning-glory								PDCON0A1H0	S4	G4
Santa Cruz	PLANT	Ipomoea thurberi	Thurber's Morning-glory								PDCON0A1K0	S1	G3
Santa Cruz	PLANT	Laennecia eriophylla	Woolly Fleabane								PDASTDL020	S2	G3
Santa Cruz	PLANT	Lagascea decipiens	Beguiling Mexican Daisy								PDAST5G010	S4	G5
Santa Cruz	PLANT	Leibnitzia lyrata	Woodland Sunbonnets								PDASTDM010	S4	G5
Santa Cruz	PLANT	Lilaeopsis schaffneriana ssp. recurva	Huachuca Water-umbel	LE		Y				HS	PDAPI19051	S2	G4T2

COUNTY	TAXON	SCIENTIFIC NAME	COMMON NAME	ESA	BLM	CRIT HAB	USFS	NESL	MEXFED	STATE	ELCODE	S RANK	G RANK
Santa Cruz	PLANT	Lilium parryi	Lemmon Lily	SC			S			SR	PMLIL1A0J0	S2	G3
Santa Cruz	PLANT	Lobelia fenestralis	Leafy Lobelia							SR	PDCAM0E0H0	S1	G4
Santa Cruz	PLANT	Lobelia laxiflora	Mexican Lobelia							SR	PDCAM0E0X0	S1	G4
Santa Cruz	PLANT	Loeselia glandulosa	Tropical Spiny Phlox								PDPLM0A010	S2	G4
Santa Cruz	PLANT	Lotus alamosanus	Alamos Deer Vetch				S				PDFAB2A020	S1	G3G4
Santa Cruz	PLANT	Ludwigia palustris	Marsh Purslane								PDONA0B0H0	S1	G5
Santa Cruz	PLANT	Lupinus huachucanus	Huachuca Mountain Lupine				S				PDFAB2B210	S2	G2
Santa Cruz	PLANT	Macroptilium supinum	Supine Bean	SC			S			SR	PDFAB330L0	S1	G2
Santa Cruz	PLANT	Malaxis corymbosa	Madrean Adders Mouth							SR	PMORC1R020	S3S4	G4
Santa Cruz	PLANT	Malaxis porphyrea	Purple Adder's Mouth							SR	PMORC1R0Q0	S2	G4
Santa Cruz	PLANT	Malvastrum bicuspidatum	Mexican Shrub Mallow								PDMAL0S030	S2	G4
Santa Cruz	PLANT	Mammillaria wrightii var. wilcoxii	Wilcox Fishhook Cactus							SR	PDCAC0A0E1	S4	G4T4
Santa Cruz	PLANT	Manihot davisiae	Arizona Manihot				S				PDEUP0Z010	S2	G4
Santa Cruz	PLANT	Marina diffusa	Spreading False Prairie-clover								PDFAB2F020	S1	G5?
Santa Cruz	PLANT	Metastelma mexicanum	Wiggins Milkweed Vine	SC			S				PDASC050P0	S1S2	G3G4
Santa Cruz	PLANT	Microchloa kunthii	Kunth Grass								PMPOA40010	S1	G5
Santa Cruz	PLANT	Muhlenbergia dubioides	Box Canyon Muhly				S				PMPOA480G0	S1	G1Q
Santa Cruz	PLANT	Muhlenbergia xerophila	Weeping Muhly				S				PMPOA48220	S1	G3
Santa Cruz	PLANT	Nemastylis tenuis	Slender Shell Flower								PMIRI0B040	S1	G5
Santa Cruz	PLANT	Notholaena lemmonii	Lemmon Cloak Fern	SC							PPADI0G0D0	S1S2	G3?
Santa Cruz	PLANT	Ophioglossum engelmannii	Engelmann Adders Tongue								PPOPH02040	S1	G5
Santa Cruz	PLANT	Opuntia versicolor	Stag-horn Cholla							SR	PDCAC0D1K0	S2S3	G4
Santa Cruz	PLANT	Paspalum virletii	Virlet Paspalum				S				PMPOA4P1L0	S1	G3?
Santa Cruz	PLANT	Passiflora arizonica	Arizona Passionflower				S				PDPAS01073	S2	G5T3T5
Santa Cruz	PLANT	Passiflora bryonioides	Mossy Passionflower								PDPAS01040	S1	G3G5

COUNTY	TAXON	SCIENTIFIC NAME	COMMON NAME	ESA	BLM	CRIT HAB	USFS	NESL	MEXFED	STATE	ELCODE	S RANK	G RANK
Santa Cruz	PLANT	Pectis imberbis	Beardless Chinch Weed	SC			S				PDAST6W0A0	S1	G3
Santa Cruz	PLANT	Pediomelum palmeri	Palmer's Breadroot								PDFAB5L0M0	SH	G5
Santa Cruz	PLANT	Pellaea ternifolia	Ternate Cliffbrake								PPADI0H0B0	S2	G5
Santa Cruz	PLANT	Penstemon discolor	Catalina Beardtongue				S			HS	PDSCR1L210	S2	G2
Santa Cruz	PLANT	Penstemon stenophyllus	Narrowleaf Beardtongue								PDSCR1L5V0	S3	G4?
Santa Cruz	PLANT	Penstemon superbus	Superb Beardtongue								PDSCR1L630	S2?	G3?
Santa Cruz	PLANT	Phyllanthus polygonoides	Knotleaf Flower								PDEUP130E0	S2	G5
Santa Cruz	PLANT	Physalis latiphysa	Broad-leaf Ground-cherry				S				PDSOL0S0H0	S1	G1
Santa Cruz	PLANT	Plagiobothrys pringlei	Pringle Popcorn-flower								PDBOR0V0V0	S2	G3G4
Santa Cruz	PLANT	Polygala glochidiata	Spiny Milkwort								PDPGL020J0	S2	G5
Santa Cruz	PLANT	Polypogon elongatus	American Rabbitfoot Grass								PMPOA50020	S1	G5
Santa Cruz	PLANT	Potentilla rhyolitica var. rhyolitica	Huachuca Cinquefoil				S				PDROS132X2	S1S2	G1G2T1T2
Santa Cruz	PLANT	Psilotum nudum	Whisk Fern				S			HS	PPPSI01020	S1	G5
Santa Cruz	PLANT	Pyrrhopappus rothrockii	False Dandelion								PDAST7V050	S3	G4
Santa Cruz	PLANT	Ranunculus arizonicus	Arizona Buttercup								PDRAN0L0B0	S3	G4
Santa Cruz	PLANT	Rhynchosia edulis	Pan-american Snoutbean								PDFAB3F060	S2S3	G4G5
Santa Cruz	PLANT	Rhynchosia precatoria	Mexican Rosary Bean								PDFAB3F0H0	S2	G4
Santa Cruz	PLANT	Sagittaria longiloba	Flecha de Agua								PMALI040J0	S1	G5
Santa Cruz	PLANT	Samolus vagans	Chiricahua Mountain Brookweed				S				PDPRI09040	S2	G2?
Santa Cruz	PLANT	Schiedeella arizonica	Fallen Ladies'-tresses							SR	PMORC67020	S4	GNR
Santa Cruz	PLANT	Senecio carlomasonii	Seemann Groundsel								PDAST8H3W0	S2S3	G4?Q
Santa Cruz	PLANT	Senecio multidentatus var. huachucanus	Huachuca Groundsel				S			HS	PDAST8H411	S2	G2G4T2
Santa Cruz	PLANT	Sisyrinchium cernuum	Nodding Blue-eyed Grass				S				PMIRI0D0B0	S2	G5
Santa Cruz	PLANT	Solanum lumholtzianum	Lumholtz Nightshade								PDSOL0Z180	S3	G3G4
Santa Cruz	PLANT	Spiranthes delitescens	Canelo Hills Ladies'-tresses	LE						HS	PMORC2B140	S1	G1

COUNTY	TAXON	SCIENTIFIC NAME	COMMON NAME	ESA	BLM	CRIT HAB	USFS	NESL	MEXFED	STATE	ELCODE	S RANK	G RANK
Santa Cruz	PLANT	Stenorrhynchos michuacanum	Michoacan Ladies'-tresses							SR	PMORC2B0L0	S3	G4
Santa Cruz	PLANT	Stevia lemmonii	Lemmon's Stevia				S				PDAST8V010	S2	G3G4
Santa Cruz	PLANT	Talinum gooddingii	Goodding's Flameflower								PDPOR08090	S1	G1Q
Santa Cruz	PLANT	Talinum humile	Pinos Altos Flame Flower	SC			S			SR	PDPOR080A0	S1	G2
Santa Cruz	PLANT	Talinum marginatum	Tepic Flame Flower	SC			S			SR	PDPOR080N0	S1	G2
Santa Cruz	PLANT	Tephrosia thurberi	Thurber Hoary Pea								PDFAB3X0M0	S3	G4G5
Santa Cruz	PLANT	Tillandsia recurvata	Ball Moss								PMBRO090E0	S2	G5
Santa Cruz	PLANT	Tithonia thurberi	Thurber Tithonia								PDAST9A030	S4	G4
Santa Cruz	PLANT	Tragia laciniata	Sonoran Noseburn				S				PDEUP1D060	S3?	G3G4
Santa Cruz	PLANT	Tripsacum lanceolatum	Mexican Gama Grass								PMPOA68030	S2S3	G4
Santa Cruz	PLANT	Verbena pinetorum	Chihuahua Vervain								PDVER0N0P0	S1	G2G4
Santa Cruz	PLANT	Viola umbraticola	Shade Violet				S				PDVIO042E0	S2?	G3G4
Santa Cruz	REPTILE	Aspidoscelis burti stictogrammus	Giant Spotted Whiptail	SC			S				ARACJ02011	S2	G4T4
Santa Cruz	REPTILE	Crotalus lepidus klauberi	Banded Rock Rattlesnake						PR		ARADE02051	S3	G5T5
Santa Cruz	REPTILE	Crotalus pricei	Twin-spotted Rattlesnake				S		PR		ARADE02080	S2	G5
Santa Cruz	REPTILE	Crotalus willardi willardi	Arizona Ridge-nosed Rattlesnake				S		PR	WSC	ARADE02132	S1S2	G5T4
Santa Cruz	REPTILE	Gopherus morafkai	Sonoran Desert Tortoise	C*			S		A	WSC	ARAAF01013	S4	G4
Santa Cruz	REPTILE	Gyalopion canum	Chihuahuan Hook-nosed Snake								ARADB16010	S3	G5
Santa Cruz	REPTILE	Gyalopion quadrangulare	Thornscrub Hook-nosed Snake				S		PR		ARADB16020	S1	G4
Santa Cruz	REPTILE	Heterodon kennerlyi	Mexican Hog-nosed Snake								ARADB17012	S3	G5T4
Santa Cruz	REPTILE	Hypsiglena sp. nov.	Hooded Nightsnake								ARADB18050	S4	G4
Santa Cruz	REPTILE	Lampropeltis getula nigrita	Western Black Kingsnake						A		ARADB19026	S3	G5T3T4Q
Santa Cruz	REPTILE	Oxybelis aeneus	Brown Vinesnake				S			WSC	ARADB24010	S1	G5
Santa Cruz	REPTILE	Phrynosoma hernandesi	Greater Short-horned Lizard								ARACF12080	S4	G5
Santa Cruz	REPTILE	Plestiodon callicephalus	Mountain Skink				S				ARACH01030	S2	G4G5

COUNTY	TAXON	SCIENTIFIC NAME	COMMON NAME	ESA	BLM	CRIT HAB	USFS	NESL	MEXFED	STATE	ELCODE	S RANK	G RANK
Santa Cruz	REPTILE	Sceloporus slevini	Slevin's Bunchgrass Lizard		S		S				ARACF14180	S2	G4
Santa Cruz	REPTILE	Senticolis triaspis intermedia	Northern Green Ratsnake				S				ARADB44011	S3	G5T4
Santa Cruz	REPTILE	Tantilla wilcoxi	Chihuahuan Black-headed Snake								ARADB35120	S1	G4
Santa Cruz	REPTILE	Tantilla yaquia	Yaqui Black-headed Snake				S				ARADB35130	S2	G4
Santa Cruz	REPTILE	Terrapene ornata luteola	Desert Box Turtle		S				PR		ARAAD08021	S2S3	G5T4
Santa Cruz	REPTILE	Thamnophis eques megalops	Northern Mexican Gartersnake	C*			S		A	WSC	ARADB36061	S1	G5T5
Yavapai	AMPHIBIAN	Anaxyrus microscaphus	Arizona Toad	SC			S				AAABB01110	S3S4	G3G4
Yavapai	AMPHIBIAN	Hyla wrightorum (Mogollon Rim Pop.)	Mogollon Rim Treefrog								AAABC02081	S4	G4T4
Yavapai	AMPHIBIAN	Lithobates chiricahuensis	Chiricahua Leopard Frog	LT		Y			A	WSC	AAABH01080	S2	G3
Yavapai	AMPHIBIAN	Rana pipiens	Northern Leopard Frog		S		S	2		WSC	AAABH01170	S2	G5
Yavapai	AMPHIBIAN	Rana yavapaiensis	Lowland Leopard Frog	SC	S		S		PR	WSC	AAABH01250	S3	G4
Yavapai	BIRD	Accipiter gentilis	Northern Goshawk	SC	S		S	4	A	WSC	ABNKC12060	S3B	G5
Yavapai	BIRD	Aix sponsa	Wood Duck								ABNJB09010	S2B,S3N	G5
Yavapai	BIRD	Aquila chrysaetos	Golden Eagle		S			3	A		ABNKC22010	S4	G5
Yavapai	BIRD	Ardea herodias	Great Blue Heron						|		ABNGA04010	S5	G5
Yavapai	BIRD	Asio otus	Long-eared Owl								ABNSB13010	S2B,S3S4N	G5
Yavapai	BIRD	Athene cunicularia hypugaea	Western Burrowing Owl	SC	S		S	4	PR		ABNSB10012	S3	G4T4
Yavapai	BIRD	Buteo albonotatus	Zone-tailed Hawk				S		PR		ABNKC19090	S4	G4
Yavapai	BIRD	Buteo lineatus	Red-shouldered Hawk						PR		ABNKC19030	SA	G5
Yavapai	BIRD	Buteo regalis	Ferruginous Hawk	SC	S		S	3	PR	WSC	ABNKC19120	S2B,S4N	G4
Yavapai	BIRD	Buteo swainsoni	Swainson's Hawk				S		PR		ABNKC19070	S3	G5
Yavapai	BIRD	Buteogallus anthracinus	Common Black-Hawk				S		PR	WSC	ABNKC15010	S3	G4G5
Yavapai	BIRD	Coccyzus americanus	Yellow-billed Cuckoo (Western U.S. DPS)	PS:C*			S	2		WSC	ABNRB02020	S3	G5
Yavapai	BIRD	Empidonax traillii extimus	Southwestern Willow Flycatcher	LE		Y		2	E	WSC	ABPAE33043	S1	G5T1T2
Yavapai	BIRD	Falco peregrinus anatum	American Peregrine Falcon	SC	S		S	4	PR	WSC	ABNKD06071	S4	G4T4

STATUS DEFINITIONS
ARIZONA GAME AND FISH DEPARTMENT (AGFD)
HERITAGE DATA MANAGEMENT SYSTEM (HDMS)

FEDERAL US STATUS

FWS US Fish and Wildlife Service

BGA Bald and Golden Eagle Protection Act
(http://www.fws.gov/migratorybirds/baldeagle.htm)
Prohibits take of bald and golden eagles without prior US Fish and Wildlife Service permit.

ESA Endangered Species Act (1973 as amended) (http://www.fws.gov/southwest/es/arizona)
US Department of Interior, Fish and Wildlife Service

Listed

- **LE** Listed Endangered: imminent jeopardy of extinction.
- **LT** Listed Threatened: imminent jeopardy of becoming Endangered.
- **PS** Partial Status: listed Endangered or Threatened, but not in entire range.
- **XN** Experimental Nonessential population.
- **PDL** Proposed for delisting.
- **No Status**: certain populations of this taxon do not have designated status (check with state or regional USFWS office for details about which populations have designated status).
- **SAT** Listed Threatened due to Similarity of Appearance. This happens when a member of a non-listed population is found within the geographic area of a Distinct Population Segment for a listed species (e.g., a wintering bald eagle within the DPS for listed bald eagles).

Proposed for Listing

- **PE** Proposed Endangered.
- **PT** Proposed Threatened.

Candidate (Notice of Review: 2012)
(http://www.fws.gov/endangered/what-we-do/cnor.html)

- **C** Candidate. Species for which the USFWS has on file sufficient information on biological vulnerability and threats to support proposals to list as Endangered or Threatened under ESA. Proposed rules for these species is precluded at present by other higher priority listing actions.
- **C*** The Service identifies species for which they made a continued warranted-but-precluded finding on a resubmitted petition by the code "C*" in the category column. This code was put into use starting in 2008.
- **SC** Species of Concern. The terms "Species of Concern" or "Species at Risk" should be considered as terms-of-art that describe the entire realm of taxa whose conservation status may be of concern to the US Fish and Wildlife

Service, but neither term has official status (currently includes all former C2 and delisted species).

Critical Habitat (check with state or regional USFWS office for location details)

Y Yes: Critical Habitat has been designated.

P Proposed: Critical Habitat has been proposed.

DPS Distinct Population Segment: a portion of a species' or subspecies' population or range. The DPS is generally described geographically. A DPS can apply to a Candidate or Listed or Proposed Species.

10(j) 10(j) Recovery Area: Under section 10(j), a population of a listed species re-established outside its current range, but within its probable historic range may be designated as "experimental" at the discretion of the Secretary of the Interior. The 10(j) recovery area is the geographic boundary established under Final Rule and may be larger than the actual occupied area or "primary recovery zone."

10(a)(1)(A) An experimental population currently managed under a 10(a)(1)(A) permit from the U.S. Fish and Wildlife Service. A 10(a)(1)(A) permit can be issued under the authority of section 10(a)(1)(A) of the Endangered Species Act "for scientific purposes or to enhance the propagation or survival of the affected species including, but not limited to, acts necessary for the establishment and maintenance of experimental populations." The 10(a)(1)(A) recovery area is a geographic boundary and may be larger than the actual occupied area.

USFS **US Forest Service** (2007 Animals, 2007 Plants)
US Department of Agriculture, Forest Service, Region 3 (http://www.fs.fed.us/r3/)

S Sensitive: those taxa occurring on National Forests in Arizona which are considered sensitive by the Regional Forester.

BLM **US Bureau of Land Management** (2008 Animals, 2008 Plants)
US Department of Interior, Bureau of Land Management, Arizona State Office (http://azwww.az.blm.gov)

S Sensitive: those taxa occurring on BLM Field Office Lands in Arizona which are considered sensitive by the Arizona State Office.

P Population: only those populations of Banded Gila monster (*Heloderma suspectum cinctum*) that occur north and west of the Colorado River are considered sensitive by the Arizona State Office.

TRIBAL STATUS

NESL Navajo Endangered Species List (2008)
Navajo Nation, Navajo Fish and Wildlife Department
(http://nnhp.navajofishandwildlife.org/endangered.htm)

The Navajo Endangered Species List contains taxa with status from the entire Navajo Nation which includes parts of Arizona, Utah, and New Mexico. In this notebook we provide NESL status for only those taxa whose distribution includes part or all of the Arizona portion of the Navajo Nation.

Groups

1 Those species or subspecies that no longer occur on the Navajo Nation.

2 Any species or subspecies which is in danger of being eliminated from all or a significant portion of its range on the Navajo Nation.

3 Any species or subspecies which is likely to become an endangered species, within the foreseeable future, throughout all or a significant portion of its range on the Navajo Nation.

4 Any species or subspecies for which the Navajo Fish and Wildlife Department (NF&WD) does not currently have sufficient information to support their being listed in Group 2 or Group 3 but has reason to consider them. The NF&WD will actively seek information on these species to determine if they warrant inclusion in a diferent group or removal from the list.

MEXICAN STATUS

MEX Mexican Federal Endangered Species List (December 30, 2010)
Proyecto de Norma Oficial Mexicana PROY-NOM-059-ECOL-2010

The Mexican Federal Endangered Species List contains taxa with status from the entire Mexican Republic and waters under its jurisdiction. In this notebook we provide MEX designations for only those taxa occurring in Arizona and also in Mexico.

P En Peligro de Extinción (Determined Endangered in Mexico): in danger of extinction.

A Amenazada (Determined Threatened in Mexico): could become endangered if factors causing habitat deterioration or population decline continue.

Pr Sujeta a Protección Especial (Determined Subject to Special Protection in Mexico): utilization limited due to reduced populations, restricted distribution, or to favor recovery and conservation of the taxon or associated taxa.

E Probablemente extinta en el medio silvestre (Probably extinct in the wild of Mexico): A native species whose individuals in the wild have disappeared, based on pertinent documentation and studies that prove it. The only existing individuals of the species are in captivity or outside the Mexican territory.

[|] One or more subspecies of this species has status in Mexico, but the HDMS does not track it at the subspecies level (most of these subspecies are endemic to Mexico). Please consult the NORMA Oficial Mexicana PROY-NOM-059-ECOL-2000 for details.**]**

STATE STATUS

ADA Arizona Department of Agriculture

NPL **Arizona Native Plant Law** (2008)
Arizona Department of Agriculture (http://www.azda.gov/ESD/nativeplants.htm)

HS Highly Safeguarded: no collection allowed.
SR Salvage Restricted: collection only with permit.
ER Export Restricted: transport out of State prohibited.
SA Salvage Assessed: permits required to remove live trees.
HR Harvest Restricted: permits required to remove plant by-products.

AGFD Arizona Game and Fish Department

WSC **Wildlife of Special Concern in Arizona** (in prep)
Arizona Game and Fish Department (http://www.azgfd.gov)

WSC Wildlife of Special Concern in Arizona. Species whose occurrence in Arizona is or may be in jeopardy, or with known or perceived threats or population declines, as described by the Arizona Game and Fish Department's listing of Wildlife of Special Concern in Arizona (WSCA, in prep). Species indicated on printouts as WSC are currently the same as those in **Threatened Native Wildlife in Arizona** (1988).

SGCN Species of Greater Conservation Need (2012)
(http://www.azgfd.gov/w_c/swap.shtml)
Arizona Game and Fish Department. 2012. Arizona's State Wildlife Action Plan: 2012-2022. Arizona Game and Fish Department, Phoenix, Arizona.

Each species in the SGCN list was scored for each of the following vulnerability criteria. If a species ranked as "vulnerable" (i.e., score = "1") under one or more of the vulnerability criteria it was included in the SGCN. Ranks were not additive. The rank was based on the following criteria:

Extirpated from Arizona
Federal or State status
Declining status
Disjunct status
Demographic status

Concentration status
Fragmentation status
Distribution status

Tiers

The list of SGCN was further categorized in to three tiers reflecting the Department's management commitments and priorities; tiers were ranked as follows:

Tier 1A: Scored "1" for Vulnerability in at least one of the eight categories and matches at least one of the following:

- Federally listed as endangered or threatened under the Endangered Species Act (ESA).
- Candidate species under ESA.
- Is specifically covered under a signed conservation agreement (CCA) or a signed conservation agreement with assurances (CCAA).
- Recently removed from ESA and currently requires post-delisting monitoring.
- Closed season species (i.e., no take permitted) as identified in Arizona Game and Fish Commission Orders 40, 41, 42 or 43.

Tier 1B: Scored "1" for Vulnerability in at least one of the eight categories, but match none of the above criteria.

Tier 1C: Unknown status species. Scored "0" for Vulnerability in one of the eight categories, meaning there are no data with which to address one or more categories, and vulnerability status cannot be assessed. These species are those for which we are unable to assess status, and thus represent priority research and information needs. As more information becomes available, their tier status will be re-evaluated

U.S. Fish & Wildlife Service

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- Listings and Occurrences for each State>
- Listings and occurrences for Arizona

Listings and occurrences for Arizona

Notes:

- This report shows the listed species associated in some way with this state.
- This list does not include experimental populations and similarity of appearance listings.
- This list includes non-nesting sea turtles and whales in State/Territory coastal waters.
- This list includes species or populations under the sole jurisdiction of the National Marine Fisheries Service.
- Click on the highlighted scientific names below to view a Species Profile for each listing.

Summary of Animals listings

Animal species listed in this state and that occur in this state (37 species)

Status	Species
E	Ambersnail, Kanab Entire (*Oxyloma haydeni kanabensis*)
E	Bat, lesser long-nosed Entire (*Leptonycteris curasoae yerbabuenae*)
E	Bobwhite, masked (quail) Entire (*Colinus virginianus ridgwayi*)
T	Catfish, Yaqui Entire (*Ictalurus pricei*)
E	Chub, bonytail Entire (*Gila elegans*)
E	Chub, Gila Entire (*Gila intermedia*)
E	Chub, humpback Entire (*Gila cypha*)
T	Chub, Sonora Entire (*Gila ditaenia*)
E	Chub, Virgin River Entire (*Gila seminuda (=robusta)*)
E	Chub, Yaqui Entire (*Gila purpurea*)
E	Condor, California Entire, except where listed as an experimental population below (*Gymnogyps californianus*)
E	Ferret, black-footed entire population, except where EXPN (*Mustela nigripes*)

Status	Species
E	Flycatcher, southwestern willow Entire (*Empidonax traillii extimus*)
T	Frog, Chiricahua leopard Entire (*Rana chiricahuensis*)
E	Jaguar U.S.A(AZ,CA,LA,NM,TX),Mexico,Central and South America (*Panthera onca*)
E	Minnow, loach Entire (*Tiaroga cobitis*)
E	Ocelot U.S.A.(AZ, TX) to Central and South America (*Leopardus (=Felis) pardalis*)
T	Owl, Mexican spotted Entire (*Strix occidentalis lucida*)
E	Pikeminnow (=squawfish), Colorado except Salt and Verde R. drainages, AZ (*Ptychocheilus lucius*)
E	Pronghorn, Sonoran Entire (*Antilocapra americana sonoriensis*)
E	Pupfish, desert Entire (*Cyprinodon macularius*)
E	Rail, Yuma clapper U.S.A. only (*Rallus longirostris yumanensis*)
T	Rattlesnake, New Mexican ridge-nosed Entire (*Crotalus willardi obscurus*)
E	Salamander, Sonora tiger Entire (*Ambystoma tigrinum stebbinsi*)
T	Shiner, beautiful Entire (*Cyprinella formosa*)
E	Spikedace Entire (*Meda fulgida*)
T	Spinedace, Little Colorado Entire (*Lepidomeda vittata*)
T	springsnail, San Bernardino Entire (*Pyrgulopsis bernardina*)
E	Springsnail, Three Forks Entire (*Pyrgulopsis trivialis*)
E	Squirrel, Mount Graham red Entire (*Tamiasciurus hudsonicus grahamensis*)
E	Sucker, razorback Entire (*Xyrauchen texanus*)
E	Topminnow, Gila (incl. Yaqui) U.S.A. only (*Poeciliopsis occidentalis*)
T	Tortoise, desert U.S.A., except in Sonoran Desert (*Gopherus agassizii*)
T	Trout, Apache Entire (*Oncorhynchus apache*)
T	Trout, Gila Entire (*Oncorhynchus gilae*)
E	Vole, Hualapai Mexican Entire (*Microtus mexicanus hualpaiensis*)
E	Woundfin except Gila R. drainage, AZ, NM (*Plagopterus argentissimus*)

Animal species listed in this state that do not occur in this state (6 species)

Status	Species
T	Bear, grizzly lower 48 States, except where listed as an experimental population or delisted (*Ursus arctos horribilis*)
T	Caracara, Audubon's crested FL pop. (*Polyborus plancus audubonii*)
E	falcon, northern aplomado Entire, except where listed as an experimental population (*Falco femoralis septentrionalis*)
E	Jaguarundi, Sinaloan Entire (*Herpailurus (=Felis) yagouaroundi tolteca*)
E	Parrot, thick-billed Mexico, U.S.A. (AZ, NM) (*Rhynchopsitta pachyrhyncha*)
E	Wolf, gray U.S.A.: All of AL, AR, CA, CO, CT, DE, FL, GA, KS, KY, LA, MA, MD, ME, MO, MS, NC, NE, NH, NJ, NV, NY, OK, PA, RI, SC, TN, VA, VT and WV; those portions of AZ, NM, and TX not included in an experimental population; and portions of IA, IN, IL, ND, OH, OR, SD, UT, and WA. Mexico. (*Canis lupus*)

Animal listed species occurring in this state that are not listed in this state (1 species)

Status	Species
E	Tern, California least (*Sterna antillarum browni*)

Summary of Plant listings

Plant species listed in this state and that occur in this state (17 species)

Status	Species
E	Blue-star, Kearney's (*Amsonia kearneyana*)
E	Cactus, Arizona hedgehog (*Echinocereus triglochidiatus var. arizonicus*)
E	Cactus, Brady pincushion (*Pediocactus bradyi*)
T	Cactus, Cochise pincushion (*Coryphantha robbinsiorum*)
E	Cactus, Nichol's Turk's head (*Echinocactus horizonthalonius var. nicholii*)
E	Cactus, Peebles Navajo (*Pediocactus peeblesianus var. peeblesianus*)
E	Cactus, Pima pineapple (*Coryphantha scheeri var. robustispina*)
T	Cactus, Siler pincushion (*Pediocactus (=Echinocactus,=Utahia) sileri*)
E	Cliff-rose, Arizona (*Purshia (=Cowania) subintegra*)
T	Cycladenia, Jones (*Cycladenia humilis var. jonesii*)
E	Ladies'-tresses, Canelo Hills (*Spiranthes delitescens*)
E	Milk-vetch, Holmgren (*Astragalus holmgreniorum*)
E	Milk-vetch, Sentry (*Astragalus cremnophylax var. cremnophylax*)
T	Milkweed, Welsh's (*Asclepias welshii*)
T	Ragwort, San Francisco Peaks (*Packera franciscana*)
T	Sedge, Navajo (*Carex specuicola*)
E	Water-umbel, Huachuca (*Lilaeopsis schaffneriana var. recurva*)

Plant listed species occurring in this state that are not listed in this state (1 species)

Status	Species
T	Fleabane, Zuni (*Erigeron rhizomatus*)

Cochise County

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Beautiful shiner	*Cyprinella formosa*	Threatened	Small (2.5 inches) shiny minnow, very similar to red shiner. Males colorful during breeding (yellow-orange or orange on caudal and lower fins, bluish body).	Cochise	< 4,500 ft	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 populations on San Bernardino National Wildlife Refuge. Same critical habitat as Yaqui Chub and Catfish (see 49 FR 34490).
Canelo Hills ladies' tresses	*Spiranthes delitescens*	Endangered	Slender, erect member of the orchid family (Orchidaceae). Flower stalk 20 inches tall, may contain 40 white flowers spirally arranged on the flowering stalk.	Cochise, Santa Cruz	~ 5,000 ft	Finely grained, highly organic, saturated soils of cienegas.	Found in the San Pedro watershed. Potential habitat occurs in Sonora, Mexico, but no populations have been found.
Chiricahua leopard frog	*Lithobates chiricahuensis*	Threatened	Cream colored tubercles (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 leopard frogs.	Apache, Cochise, Coconino, Gila, Graham, Greenlee, Navajo, Pima, Santa Cruz, Yavapai	3,281-8,890 ft	Restricted to springs, livestock tanks, and streams in upper portion of watersheds that are free from nonnative predators or where marginal habitat for nonnative predators exists.	Critical habitat is designated for 10,346 acres in Apache, Cochise, Gila, Graham, Greenlee, Pima, Santa Cruz, and Yavapai counties in Arizona; and Catron, Hidalgo, Grant, Sierra, and Socorro counties in New Mexico (77 FR 16324).
Cochise pincushion cactus	*Coryphantha robbinsorum*	Threatened	A small unbranched cactus with no central spines and 11-17 white radial spines. The bell-shaped flowers are borne on the ends of tubercles (protrusions). Flowers: bell shaped, pale yellow-green. Fruits: orange-red to red.	Cochise	> 4,200 ft	Semidesert grassland with small shrubs, agave, other cacti, and grama grass.	Grows on gray limestone hills. Species also occurs in Sonora, Mexico.

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Desert pupfish	*Cyprinodon macularius*	Endangered	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 and juveniles tan to olive colored back and silvery sides.	Cochise, Graham, Maricopa, Pima, Pinal, Santa Cruz, Yavapai	< 4,000 ft	Shallow springs, small streams, and marshes. Tolerates saline and warm water.	Two subspecies are recognized: Desert Pupfish (C.m. macularis) and Quitobaquito Pupfish (C.m. eremus). Critical habitat includes Quitobaquito Springs, Pima County, portions of San Felipe Creek, Carrizo Wash, and Fish Creek Wash, Imperial County, California.
Gila chub	*Gila intermedia*	Endangered	Deep compressed body, flat head. Dark olive-gray color above, silver sides. Endemic to Gila River Basin.	Cochise, Gila, Graham, Greenlee, Pima, Pinal, Santa Cruz, Yavapai	2,000-5,500 ft	Pools, springs, cienegas, and streams.	Occurs on Federal, State, and private lands, including the Nature Conservancy and the Audubon Society. Also occurs in Sonora, Mexico. Critical habitat includes Cochise, Gila, Graham, Greenlee, Pima, Pinal, Santa Cruz, and Yavapai counties (70 FR 66664).
Gila topminnow	*Poeciliopsis occidentalis occidentalis*	Endangered	Small (2 inches), guppy-like, live bearing, lacks dark spots on its fins. Breeding males are jet black with yellow fins.	Cochise, Gila, Graham, La Paz, Maricopa, Pima, Pinal, Santa Cruz, Yavapai	< 4,500 ft	Small streams, springs, and cienegas vegetated shallows.	Species historically also occurred in backwaters of large rivers but is currently isolated to small streams and springs.
Huachuca water umbel	*Lilaeopsis schaffneriana ssp. recurva*	Endangered	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.	Cochise, Pima, Santa Cruz	3,500-6,500 ft	Cienegas, perennial low gradient streams, wetlands.	Species also occurs in adjacent Sonora, Mexico, west of the continental divide. Critical habitat includes Cochise and Santa Cruz counties (64 FR 37441).
Jaguar	*Panthera onca*	Endangered	Largest species of cat native to Southwest. Muscular, with relatively short, massive limbs, and a deep-chested body. Usually cinnamon-buff in color with many black spots. Weights ranges from 90-300 lbs.	Cochise, Pima, Santa Cruz	1,600-9,000 ft	Found in Sonoran desertscrub up through subalpine conifer forest.	Critical habitat is being proposed for a total of 838,232 ac. in Cochise, Pima, and Santa Cruz counties, Arizona; and Hidalgo County, New Mexico (77 FR 50214). A recovery team for the jaguar was formed in 2010, who completed a recovery outline for the species in April, 2012. The recovery team is currently developing a full recovery plan for the species based on the recovery outline.

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Lesser long-nosed bat	*Leptonycteris curasoae yerbabuenae*	Endangered	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.	Cochise, Gila, Graham, Greenlee, Maricopa, Pima, Pinal, Santa Cruz, Yuma	1,600-7,500 ft	Desert scrub habitat with agave and columnar 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 September and south of the border the remainder of the year.
Loach minnow	*Tiaroga cobitis*	Endangered	Small (<3 inches) slender, elongated fish, olive colored with dirty white spots at the base of the dorsal and caudal fins. Breeding males vivid red on mouth and base of fins.	Apache, Cochise, Gila, Graham, Greenlee, Navajo, Pinal, Yavapai	< 8,000 ft	Benthic species of small to large perennial streams with swift shallow water over cobble and gravel. Recurrent flooding and natural hydrograph important.	Presently found in Aravaipa Creek, Deer Creek, Turkey Creek, Blue River, Campbell Blue Creek, Little Blue Creek, San Francisco River, Eagle Creek, North Fork of the East Fork Black River, Boneyard Creek, and White River and East Fork White River in Arizona, and Dry Blue Creek, Pace Creek, Frieborn Creek, the San Francisco River, Tularosa River, Negrito Creek, Whitewater Creek, the East, Middle, and West Forks of the Gila River, mainstem upper Gila River. Bear Creek and Mangas Creek in New Mexico. Populations have been recently reintroduced in Hot Springs and Redfield canyons in Cochise and Graham counties; Fossil Creek in Gila County; and Bonita Creek in Graham County Arizona. Critical habitat has been designated in Apache, Cochise, Gila, Graham, Greenlee, Pinal, and Yavapai counties, Arizona, as well as in Catron, Grant, and Hidalgo counties in New Mexico (77 FR 10810).
Mexican spotted owl	*Strix occidentalis lucida*	Threatened	Medium sized with dark eyes and no ear tufts. Brownish and heavily spotted with white or beige.	Apache, Cochise, Coconino, Gila, Graham, Greenlee, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, Yavapai	4,100-9,000 ft	Nests in canyons and dense forests with multi-layered foliage structure.	Generally nest in older forests of mixed conifer or ponderosa pine/gambel oak type, in canyons, and use variety of habitats for foraging. Sites with cool microclimates appear to be of importance or are preferred. Critical habitat was finalized on August 31, 2004 (69 FR 53182) in Arizona in Apache, Cochise, Coconino, Gila, Graham, Greenlee, Maricopa, Navajo, Pima, Pinal, Santa Cruz, and Yavapai counties.

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
New Mexico ridge-nosed rattlesnake	*Crotalus willardi obscurus*	Threatened	Small 12-24 inches, secretive grayish-brown with a distinct ridge on the end of the snout. The dorsal surface has obscure, irregularly spaced white crossbars edged with brown (not a bold pattern).	Cochise	5,000-6,600 ft	Primarily canyon bottoms in pine-oak communities.	The subspecies has been documented in the Peloncillo Mountains in Arizona. There are only three known records from Arizona. Also occurs in Animas Mountains of New Mexico and Sierra San Luis in Sonora/Chihuahua.
Northern aplomado falcon	*Falco femoralis septentrionalis*	Endangered	Rufus underparts, gray back, long banded tail, and a distinct black and white facial pattern. Smaller than peregrine falcon but larger than a kestrel. Breeds between March and June.	Currently extirpated from AZ with unconfirmed sightings occasionally reported in Cochise County.	3,500-9,000 ft	Grassland and savannah	Non-essential experimental population designated in Arizona and New Mexico in 2006 (71 FR 42298). Species formerly nested in southwestern U.S., now rarely occurs. Good habitat has low ground cover and mesquite or yucca for nesting platforms. Pesticide use in Mexico had endangered this species but DDT use is now banned there. Reintroductions are occurring in New Mexico and Texas. One confirmed sighting in AZ occurred in recent years.
Ocelot	*Leopardus pardalis*	Endangered	Medium-sized spotted cat that is yellowish with black streaks and stripes running from front to back. Tail is spotted and about 1/2 the length of head and body. Face is less heavily streaked than the back and sides.	Cochise,Gila, Graham, Pima, Pinal, Santa Cruz	< 8,000 ft	Desert scrub in Arizona. Humid tropical and sub-tropical forests, and savannahs in areas south of the U.S.	Little is known about ocelot habitat use in Arizona; however, ocelots are typically associated with areas of dense cover. Four confirmed reports of ocelots have been received from Gila (one) and Cochise (three) counties since 2009. Based on photographic evidence, two of the reports from Cochise County were most likely of the same ocelot.
San Bernardino springsnail	*Pyrgulopsis bernardina*	Threatened	Aquatic snail of family Hydrobiidae. Narrow-conic shell; height 1.3-1.7 mm; 3.25-4.0 whorls.	Cochise	3,806 ft	Springs with firm substrate composed of cobble, gravel, woody debris, and aquatic vegetation.	Distribution limited to Goat Tank Spring and Horse Spring. Critical habitat is designated on 2.013 acres (77 FR 23060).
Sonoran tiger salamander	*Ambystoma mavortium stebbinsi*	Endangered	Large, light-colored blotches or reticulations on a dark background. Metamorphosed individuals are 1.8 to 5.9 inches in snout-vent length. Aquatic larvae are uniform dark colored with plume-like gills and developed tail fins.	Cochise, Santa Cruz	4,000-6,300 ft	Stock tanks and impounded cienegas; rodent burrows, rotted logs, and other moist cover sites.	Populations occur within the headwaters of the Santa Cruz and San Pedro Rivers. These include San Rafael Valley and in the foothills of the east slope of the Patagonia and Huachuca Mountains and Fort Huachuca.

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Southwestern willow flycatcher	*Empidonax traillii extimus*	Endangered	Small passerine (about 6 inches) grayish-green back and wings, whitish throat, light olive-gray breast and pale yellowish belly. Two wingbars visible. Eye-ring faint or absent.	Apache, Cochise, Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, Yavapai, Yuma	< 8,500 ft	Cottonwood/willow and tamarisk vegetation communities along rivers and streams.	Riparian-obligate bird that occupies migratory/breeding habitat from late April-Sept. Critical habitat was finalized on October 19, 2005 in Apache, Cochise, Gila, Graham, Greenlee, Maricopa, Mohave, Pima, Pinal, and Yavapai counties (70 FR 60886). Revised critical habitat was proposed August 15, 2011 (76 FR 50542) and includes river segments in counties currently designated plus those in La Paz, Santa Cruz, and Yuma counties. The 2005 critical habitat designation remains in effect until the current proposal is finalized. Training seminar/permits required for those conducting call playback surveys.
Spikedace	*Meda fulgida*	Endangered	Small (<3 inches) slim fish with silvery sides and "spine" on dorsal fin. Breeding males are a brassy golden color.	Cochise, Gila, Graham, Greenlee, Pinal, Yavapai	< 6,000 ft	Medium to large perennial streams with moderate to swift velocity waters over cobble and gravel substrate. Recurrent flooding and natural hydrograph important to withstand invading exotic species.	Presently found in Aravaipa Creek, Eagle Creek, and the Verde River in Arizona, and the Gila River, the East, Middle, and West Forks of the Gial River, and Mangas Creek in New Mexico. Populations have been recently reintroduced in Hot Springs and Redfield canyons in Cochise and Graham counties; Fossil Creek in Gila County; and Bonita Creek in Graham County Arizona, and in the San Francisco River in Catron County, New Mexico. Critical habitat (77 FR 10810) has been designated in Cochise, Gila, Graham, Greenlee, Pinal, and Yavapai counties in Arizona, and in Catron, Grant, and Hidalgo counties in New Mexico.
Yaqui catfish	*Ictalurus pricei*	Threatened	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.	Cochise	4,000-5,000 ft	Moderate to large streams with slow current over sand and rock bottoms.	Critical habitat includes all aquatic habitats on San Bernadino National Wildlife Refuge (49 FR 34490).

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Yaqui chub	*Gila purpurea*	Endangered	Medium sized minnow (<6 inches) dark colored, lighter below. Dark triangular caudal spot.	Cochise	4,000-6,000 ft	Deep pools of small streams near undercut banks and debris; pools associated with springheads, and artificial ponds.	Introduced populations exist in Leslie Canyon, in San Bernardino National Wildlife Refuge, and ponds and mainstem of West Turkey Creek in the Chiricahua Mountains. Critical habitat includes all aquatic habitats on San Bernardino National Wildlife Refuge (49 FR 34490).
Yaqui topminnow	*Poeciliopsis occidentalis sonoriensis*	Endangered	Small (2 inches) guppy-like, live bearing fish (lacking dark spots on fins). Breeding males are jet black with yellow fins.	Cochise	< 4,500 ft	Small to moderate sized streams, springs, and cienegas. Generally found in shallow areas with aquatic vegetations or debris. Tolerates relatively high water temperature and low dissolved oxygen.	Natural and introduced populations occur on San Bernardino National Wildlife Refuge and an introduced population is found in Leslie Canyon. Populations also exist in Mexico.
Arizona treefrog (Huachuca/Canelo DPS)	*Hyla wrightorum*	Candidate	Small (1.8 inches in length) green frog; dark eye stripe extends past shoulder onto the sides of the body, may break into spots or dashes past shoulder, throat on males dusky green or tan; larger tadpoles golden brown above and below with mottled black tails.	Cochise, Santa Cruz	5,000-8,500 ft	Madrean oak woodlands, savannah, pine-oak woodlands, and mixed conifer forests.	Known from less than 20 localities in the Huachuca Mountains and adjacent Canelo Hills. Believed this population is geographically disjunct from the other known locality in the wetlands at Rancho Los Fresnos, Sonora, Mexico.
Huachuca springsnail	*Pyrgulopsis thompsoni*	Candidate	Very small (.06-.12 inches) conical shell. Identification must be verified by characteristics of reproductive organs.	Cochise, Santa Cruz	4,500-7,200 ft	Aquatic areas, small springs with vegetation and slow to moderate flow.	Individuals found on firm substances (roots, wood, and rocks). Other populations found on Fort Huachuca.

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Northern Mexican Gartersnake	*Thamnophis eques megalops*	Candidate	Background color ranges from olive, olive-brown, to olive-gray. Body has three yellow or light colored stripes running down the length of the body, darker towards tail. Species distinguished from other native gartersnakes by the lateral stripes reaching the 3rd and 4th scale rows. Paired black spots extend along dorsolateral fields.	Apache, Cochise, Coconino, Gila, Graham, Navajo, Pima, Pinal, Santa Cruz, Yavapai	130-8,500 ft	Cienegas, stock tanks, large-river riparian woodlands and forests, streamside gallery forests.	Core population areas in the U.S. include mid/upper Verde River drainage, mid/lower Tonto Creek, and the San Rafael Valley and surrounding area. Status on tribal lands unknown. Distributed south into Mexico along the Sierra Madre Occidental and Mexican Plateau. Strongly associated with the presence of a native prey base including leopard frogs and native fish.
Sonoran desert tortoise	*Gopherus morafkai*	Candidate	Large herbivorous reptile with domed shell and round stumpy hind legs. The carapace is a dull brown or grey color and the plastron is unhinged, often pale yellow in coloration. Sonoran desert tortoises generally have a flatter carapace than tortoises in the Mohave population. Active in spring and during the monsoon; dormant in winter and mid-summer months.	Cochise, Gila, Graham, La Paz, Maricopa, Mohave, Pima, Pinal, Santa Cruz, Yavapai, Yuma	< 7,800 ft	Primarily rocky (often steep) hillsides and bajadas of Mohave and Sonoran desertscub but may encroach into desert grassland, juniper woodland, interior chaparral habitats, and even pine communities. Washes and valley bottoms may be used in dispersal.	Desert tortoises that occur east and south of the Colorado River in Arizona are known as the Sonoran desert tortoise. Individuals are found throughout their historic range; but populations are becoming increasingly fragmented due to threats to their habitat in valley bottoms, which are used for dispersal and exchange of genetic material.
Sprague's pipit	*Anthus spragueii*	Candidate	Small, sparrow-sized bird (10-15 cm in length), with buff and blackish streaking on the crown, nape, and underparts. Has a short bill with a blackish upper mandible, a buffy face with a large eye ring, white outer tail feathers and pale to yellowish legs.	Cochise, Maricopa, La Paz, Santa Cruz, Yuma	<5,000 ft	Strong preference to native grasslands with vegetation of intermediate height and lacking woody shrubs.	Rare in Arizona. Few individuals of this elusive species have been sighted during October through March. Native grass fields are rare in Arizona but cultivated, dry Bermuda grass, alfalfa fields mixed with patches of dry grass, or fallow fields appear to support the species during wintering. They will not use mowed or burned areas until the vegetation has had a chance to grow. There are no breeding records in Arizona.

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Yellow-billed cuckoo	*Coccyzus americanus*	Candidate	Medium-sized bird with a slender, long-tailed profile, slightly down-curved bill that is blue-black with yellow on the lower half. Plumage is grayish-brown above and white below, with rufous primary flight feathers.	Apache, Cochise, Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, Yavapai, Yuma	< 6,500 ft	Large blocks of riparian woodlands (cottonwood, willow, or tamarisk galleries).	Neotropical migrant that winters primarily in South America and breeds primarily in the U.S. (but also in southern Canada and northern Mexico). As a migrant it is rarely detected; can occur outside of riparian areas. Cuckoos are found nesting statewide, mostly below 5,000 feet in central, western, and southeastern Arizona. Concern for cuckoos are primarily focused upon alterations to its nesting and foraging habitat. Nesting cuckoos are associated with relatively dense, wooded, streamside riparian habitat, with varying combinations of Fremont cottonwood, willow, velvet ash, Arizona walnut, mesquite, and tamarisk. Some cuckoos have also been detected nesting in velvet mesquite, netleaf hackberry, Arizona sycamore, Arizona alder, and some exotic neighborhood shade trees.
American peregrine falcon	*Falco pereginus anatum*	Delisted	A crow-sized falcon with slate blue-gray on the back and wings, and white on the underside; a black head with vertical “bandit’s mask” pattern over the eyes; long pointed wings; and a long wailing call made during breeding. Very adept flyers and hunters, reaching diving speeds of 200 mph.	Apache, Cochise, Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, Yavapai, Yuma	3,500-9,000 ft	Areas with rocky, steep cliffs, primarily near water, where prey (primarily shorebirds, songbirds, and waterfowl) concentrations are high. Nests are found on ledges of cliffs, and sometimes on man-made structures such as office towers and bridge abutments.	Species recovered with over 1,650 breeding birds in the US and Canada.

Gila County

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Apache (Arizona) trout	*Oncorhynchus gilae apache*	Threatened	Yellowish to yellow-olive cutthroat-like trout with large dark spots on body. Dorsal, anal, and caudal fins edged with white. No red lateral band.	Apache, Coconino, Gila, Graham, Greenlee, Navajo	> 5,000 ft	Streams and rivers generally above 6,000 ft. elevation with adequate stream flow and shading; temperatures below 77 degrees F; and substrate composed of boulders, rocks, gravel and some sand and silt.	Presently restricted to drainages in the White Mountains. Hybridization with introduced trout has complicated efforts to maintain the genetic purity of some populations. Special regulations (4d Rule) allow Arizona to manage the species as a sport fish (40 FR 29863).
Arizona hedgehog cactus	*Echinocereus triglochidiatus var. arizonicus*	Endangered	Dark green cylindroid stem, 2.5-12 inches tall, 2-10 inches in diameter. Occurs singly or in clusters. Has 1-3 gray or pinkish central spines, the largest deflexed, and 5-11 radial spines. Flower are brilliant red along side of stem.	Gila, Pinal	3,200-5,200 ft	Ecotone between interior chaparral and madrean evergreen woodland.	Open slopes, in narrow cracks between boulders, and in understory of shrubs. Additional genetic studies have determined that the species does not occur outside of the type locality.
Chiricahua leopard frog	*Lithobates chiricahuensis*	Threatened	Cream colored tubercles (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 leopard frogs.	Apache, Cochise, Coconino, Gila, Graham, Greenlee, Navajo, Pima, Santa Cruz, Yavapai	3,281-8,890 ft	Restricted to springs, livestock tanks, and streams in upper portion of watersheds that are free from nonnative predators or where marginal habitat for nonnative predators exists.	Critical habitat is designated for 10,346 acres in Apache, Cochise, Gila, Graham, Greenlee, Pima, Santa Cruz, and Yavapai counties in Arizona; and Catron, Hidalgo, Grant, Sierra, and Socorro counties in New Mexico (77 FR 16324).
Colorado pikeminnow	*Ptychocheilus lucius*	Endangered	Largest American minnow (up to 6 feet and 80 lbs) dusky-green, slender body with gold flecks on the dorsal surface. Head long and slender.	Gila, Yavapai	< 4,000 ft	Warm, swift, turbid mainstem rivers. Prefers eddies and pools.	Experimental non-essential population (treated as proposed threatened species) (52 FR 32143). No critical habitat in Arizona.

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Gila chub	*Gila intermedia*	Endangered	Deep compressed body, flat head. Dark olive-gray color above, silver sides. Endemic to Gila River Basin.	Cochise, Gila, Graham, Greenlee, Pima, Pinal, Santa Cruz, Yavapai	2,000-5,500 ft	Pools, springs, cienegas, and streams.	Occurs on Federal, State, and private lands, including the Nature Conservancy and the Audubon Society. Also occurs in Sonora, Mexico. Critical habitat includes Cochise, Gila, Graham, Greenlee, Pima, Pinal, Santa Cruz, and Yavapai counties (70 FR 66664).
Gila topminnow	*Poeciliopsis occidentalis occidentalis*	Endangered	Small (2 inches), guppy-like, live bearing, lacks dark spots on its fins. Breeding males are jet black with yellow fins.	Cochise, Gila, Graham, La Paz, Maricopa, Pima, Pinal, Santa Cruz, Yavapai	< 4,500 ft	Small streams, springs, and cienegas vegetated shallows.	Species historically also occurred in backwaters of large rivers but is currently isolated to small streams and springs.
Lesser long-nosed bat	*Leptonycteris curasoae yerbabuenae*	Endangered	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.	Cochise, Gila, Graham, Greenlee, Maricopa, Pima, Pinal, Santa Cruz, Yuma	1,600-7,500 ft	Desert scrub habitat with agave and columnar 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 September and south of the border the remainder of the year.
Loach minnow	*Tiaroga cobitis*	Endangered	Small (<3 inches) slender, elongated fish, olive colored with dirty white spots at the base of the dorsal and caudal fins. Breeding males vivid red on mouth and base of fins.	Apache, Cochise, Gila, Graham, Greenlee, Navajo, Pinal, Yavapai	< 8,000 ft	Benthic species of small to large perennial streams with swift shallow water over cobble and gravel. Recurrent flooding and natural hydrograph important.	Presently found in Aravaipa Creek, Deer Creek, Turkey Creek, Blue River, Campbell Blue Creek, Little Blue Creek, San Francisco River, Eagle Creek, North Fork of the East Fork Black River, Boneyard Creek, and White River and East Fork White River in Arizona, and Dry Blue Creek, Pace Creek, Frieborn Creek, the San Francisco River, Tularosa River, Negrito Creek, Whitewater Creek, the East, Middle, and West Forks of the Gila River, mainstem upper Gila River. Bear Creek and Mangas Creek in New Mexico. Populations have been recently reintroduced in Hot Springs and Redfield canyons in Cochise and Graham counties; Fossil Creek in Gila County; and Bonita Creek in Graham County Arizona. Critical habitat has been designated in Apache, Cochise, Gila, Graham, Greenlee, Pinal, and Yavapai counties, Arizona, as well as in Catron, Grant, and Hidalgo counties in New Mexico (77 FR 10810).

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Mexican gray wolf	*Canis lupus baileyi*	Endangered	Large dog-like carnivore. Head and feet are large in proportion to rest of body. Coat color varies with mix of brown, rust, black, gray, and white. Distinct white lip line around mouth. Adults weigh between 60-90 pounds.	Apache, Gila, Greenlee, Navajo	4,000-12,000 ft	Chaparral, woodland, and forested areas. May cross desert areas.	In January 1998, Mexican gray wolves were reintroduced as an experimental nonessential section 10(j) population under a program to re-establish the subspecies to a portion of its historical range (63 FR 1752). Wolves are released within the experimental boundary into a designated area known as the “Blue Range Wolf Recovery Area” (BRWRA) located in the Apache National Forest in Apache and Greenlee counties. Mexican gray wolves found outside of the experimental nonessential boundary are considered endangered. In 2002, the White Mountain Apache tribe (WMAT) became one of the lead agencies for the reintroduction and allowed wolves on their lands. This effectively expanded the experimental nonessential population into Apache, Gila, and Navajo counties on WMAT lands.
Mexican spotted owl	*Strix occidentalis lucida*	Threatened	Medium sized with dark eyes and no ear tufts. Brownish and heavily spotted with white or beige.	Apache, Cochise, Coconino, Gila, Graham, Greenlee, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, Yavapai	4,100-9,000 ft	Nests in canyons and dense forests with multi-layered foliage structure.	Generally nest in older forests of mixed conifer or ponderosa pine/gambel oak type, in canyons, and use variety of habitats for foraging. Sites with cool microclimates appear to be of importance or are preferred. Critical habitat was finalized on August 31, 2004 (69 FR 53182) in Arizona in Apache, Cochise, Coconino, Gila, Graham, Greenlee, Maricopa, Navajo, Pima, Pinal, Santa Cruz, and Yavapai counties.
Ocelot	*Leopardus pardalis*	Endangered	Medium-sized spotted cat that is yellowish with black streaks and stripes running from front to back. Tail is spotted and about 1/2 the length of head and body. Face is less heavily streaked than the back and sides.	Cochise,Gila, Graham, Pima, Pinal, Santa Cruz	< 8,000 ft	Desert scrub in Arizona. Humid tropical and sub-tropical forests, and savannahs in areas south of the U.S.	Little is known about ocelot habitat use in Arizona; however, ocelots are typically associated with areas of dense cover. Four confirmed reports of ocelots have been received from Gila (one) and Cochise (three) counties since 2009. Based on photographic evidence, two of the reports from Cochise County were most likely of the same ocelot.

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Razorback sucker	*Xyrauchen texanus*	Endangered	Large, up to 3 feet long and up to 6 lbs, high sharp-edged keel-like hump behind the head. Head flattened on top. Olive-brown above to yellowish below.	Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Pinal, Yavapai, Yuma	< 6,000 ft	Riverine and lacustrine areas, generally not in fast moving water and may use backwaters.	Big River fish also found in Horseshoe reservoir (Maricopa County). Critical habitat includes the 100-year floodplain of the river through the Grand Canyon from confluence with Paria River to Hoover Dam; Hoover Dam to Davis Dam; Parker Dam to Imperial Dam. Also Gila River from Arizona/New Mexico border to Coolidge Dam; and Salt River from Hwy 60/SR77 Bridge to Roosevelt Dam; Verde River from FS boundary to Horseshoe Lake (59 FR 13374).
Southwestern willow flycatcher	*Empidonax traillii extimus*	Endangered	Small passerine (about 6 inches) grayish-green back and wings, whitish throat, light olive-gray breast and pale yellowish belly. Two wingbars visible. Eye-ring faint or absent.	Apache, Cochise, Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, Yavapai, Yuma	< 8,500 ft	Cottonwood/willow and tamarisk vegetation communities along rivers and streams.	Riparian-obligate bird that occupies migratory/breeding habitat from late April-Sept. Critical habitat was finalized on October 19, 2005 in Apache, Cochise, Gila, Graham, Greenlee, Maricopa, Mohave, Pima, Pinal, and Yavapai counties (70 FR 60886). Revised critical habitat was proposed August 15, 2011 (76 FR 50542) and includes river segments in counties currently designated plus those in La Paz, Santa Cruz, and Yuma counties. The 2005 critical habitat designation remains in effect until the current proposal is finalized. Training seminar/permits required for those conducting call playback surveys.
Spikedace	*Meda fulgida*	Endangered	Small (<3 inches) slim fish with silvery sides and "spine" on dorsal fin. Breeding males are a brassy golden color.	Cochise, Gila, Graham, Greenlee, Pinal, Yavapai	< 6,000 ft	Medium to large perennial streams with moderate to swift velocity waters over cobble and gravel substrate. Recurrent flooding and natural hydrograph important to withstand invading exotic species.	Presently found in Aravaipa Creek, Eagle Creek, and the Verde River in Arizona, and the Gila River, the East, Middle, and West Forks of the Gial River, and Mangas Creek in New Mexico. Populations have been recently reintroduced in Hot Springs and Redfield canyons in Cochise and Graham counties; Fossil Creek in Gila County; and Bonita Creek in Graham County Arizona, and in the San Francisco River in Catron County, New Mexico. Critical habitat (77 FR 10810) has been designated in Cochise, Gila, Graham, Greenlee, Pinal, and Yavapai counties in Arizona, and in Catron, Grant, and Hidalgo counties in New Mexico.

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Yuma clapper rail	*Rallus longirostris yumanensis*	Endangered	Water bird with long legs and short tail. Long, slender decurved bill. Mottled brown or gray on its rump. Flanks and undersides are dark gray with narrow vertical stripes producing a barring effect.	Gila, La Paz, Maricopa, Mohave, Pinal, Yuma	< 4,500 ft	Fresh water and brackish marshes.	Species is associated with dense emergent riparian vegetation. Requires wet substrate (mudflat, sandbar) with dense herbaceous or woody vegetation for nesting and foraging. Channelization and marsh destruction are primary sources of habitat loss.
Headwater chub	*Gila nigra*	Candidate	Streamlined, dark gray to brown fish, often with longitudinal stripes on the sides. Adults reach a maximum size of about 12 inches.	Gila, Graham, Yavapai	3,000-6,700 ft	Medium-sized streams in large, deep pools often associated with cover such as undercut banks or deep places created by trees or rocks.	Occurs in the East Verde River and tributaries, Fossil Creek, Wet Bottom Creek, Deadman Creek, Tonto Creek and tributaries, San Carlos River, Ash Creek, and the upper Gila River in New Mexico. Statewide Conservation Agreement with Arizona Game and Fish was signed on December 2003.
Northern Mexican Gartersnake	*Thamnophis eques megalops*	Candidate	Background color ranges from olive, olive-brown, to olive-gray. Body has three yellow or light colored stripes running down the length of the body, darker towards tail. Species distinguished from other native gartersnakes by the lateral stripes reaching the 3rd and 4th scale rows. Paired black spots extend along dorsolateral fields.	Apache, Cochise, Coconino, Gila, Graham, Navajo, Pima, Pinal, Santa Cruz, Yavapai	130-8,500 ft	Cienegas, stock tanks, large-river riparian woodlands and forests, streamside gallery forests.	Core population areas in the U.S. include mid/upper Verde River drainage, mid/lower Tonto Creek, and the San Rafael Valley and surrounding area. Status on tribal lands unknown. Distributed south into Mexico along the Sierra Madre Occidental and Mexican Plateau. Strongly associated with the presence of a native prey base including leopard frogs and native fish.
Roundtail chub	*Gila robusta*	Candidate	Member of the minnow family Cyprinidae and characterized by streamlined body shape. Color usually olive gray with silvery sides and a white belly. Breeding males develop red or orange coloration on the lower half of the cheeks and on the bases of paired fins. Individuals may reach 49.0 cm (19.3 in) but usually average 25-30 cm (9.8 - 11.8 in).	Apache, Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Navajo, Pinal, Yavapai	1,000-7,500 ft.	Cool to warm waters of rivers and streams, often occupy the deepest pools and eddies of large streams.	Historical range of roundtail chub included both the upper and lower Colorado River basins. A 2009 status review determined that the lower Colorado River basin roundtail chub population segment (Arizona and New Mexico) qualifies as a distinct vertebrate population segment (DPS). Populations in the Little Colorado, Bill Williams, and Gila River basins are considered candidate species.

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Sonoran desert tortoise	*Gopherus morafkai*	Candidate	Large herbivorous reptile with domed shell and round stumpy hind legs. The carapace is a dull brown or grey color and the plastron is unhinged, often pale yellow in coloration. Sonoran desert tortoises generally have a flatter carapace than tortoises in the Mohave population. Active in spring and during the monsoon; dormant in winter and mid-summer months.	Cochise, Gila, Graham, La Paz, Maricopa, Mohave, Pima, Pinal, Santa Cruz, Yavapai, Yuma	< 7,800 ft	Primarily rocky (often steep) hillsides and bajadas of Mohave and Sonoran desertscub but may encroach into desert grassland, juniper woodland, interior chaparral habitats, and even pine communities. Washes and valley bottoms may be used in dispersal.	Desert tortoises that occur east and south of the Colorado River in Arizona are known as the Sonoran desert tortoise. Individuals are found throughout their historic range; but populations are becoming increasingly fragmented due to threats to their habitat in valley bottoms, which are used for dispersal and exchange of genetic material.
Yellow-billed cuckoo	*Coccyzus americanus*	Candidate	Medium-sized bird with a slender, long-tailed profile, slightly down-curved bill that is blue-black with yellow on the lower half. Plumage is grayish-brown above and white below, with rufous primary flight feathers.	Apache, Cochise, Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, Yavapai, Yuma	< 6,500 ft	Large blocks of riparian woodlands (cottonwood, willow, or tamarisk galleries).	Neotropical migrant that winters primarily in South America and breeds primarily in the U.S. (but also in southern Canada and northern Mexico). As a migrant it is rarely detected; can occur outside of riparian areas. Cuckoos are found nesting statewide, mostly below 5,000 feet in central, western, and southeastern Arizona. Concern for cuckoos are primarily focused upon alterations to its nesting and foraging habitat. Nesting cuckoos are associated with relatively dense, wooded, streamside riparian habitat, with varying combinations of Fremont cottonwood, willow, velvet ash, Arizona walnut, mesquite, and tamarisk. Some cuckoos have also been detected nesting in velvet mesquite, netleaf hackberry, Arizona sycamore, Arizona alder, and some exotic neighborhood shade trees.
Arizona bugbane	*Cimicifuga arizonica*	Conservation Agreement	Herbaceous perennial plant in the buttercup family, grows 6-7 feet tall. Small, white petal-less flowers appear between July-August. Fruit is a follicle that splits open on one side as it dries.	Coconino, Gila	5,300-8,300 ft	Areas of deep shade and moist, loamy soils with high humus content, and high humidity; typically along the bottoms and lower slopes of steep narrow canyons.	Occurs within mixed conifer and high elevation riparian deciduous forests near perennial or intermittent streams or seeps. All known populations are found in the Coconino, Kaibab, and Tonto National Forests. A Conservation Agreement was signed in June 1999.

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
American peregrine falcon	*Falco pereginus anatum*	Delisted	A crow-sized falcon with slate blue-gray on the back and wings, and white on the underside; a black head with vertical "bandit's mask" pattern over the eyes; long pointed wings; and a long wailing call made during breeding. Very adept flyers and hunters, reaching diving speeds of 200 mph.	Apache, Cochise, Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, Yavapai, Yuma	3,500-9,000 ft	Areas with rocky, steep cliffs, primarily near water, where prey (primarily shorebirds, songbirds, and waterfowl) concentrations are high. Nests are found on ledges of cliffs, and sometimes on man-made structures such as office towers and bridge abutments.	Species recovered with over 1,650 breeding birds in the US and Canada.
Arizona agave	*Agave arizonica*	Delisted	Member of the agave family. Has rosettes of bright green leaves, 17-24cm long and 2-4cm wide, broadest in the middle. Flowers are small, pale yellow, and jar shaped.	Gila, Maricopa, Yavapai	3,600-5,800 ft	Occurs on open slopes in chaparral or juniper grasslands. Prefers shallow, cobbled, and gravelly soils on steep slopes.	Arizona agave is a hybrid produced by a crossing of two other common agave species (A. chrysantha x A. toumeyana ssp. toumeyana).
Bald eagle	*Haliaeetus leucocephalus*	Delisted	Large, adults have white head and tail. Height 28 to 38 inches; wingspan 66 to 96 inches. Juveniles and subadults are dark brown with varying degrees of white mottling on chest, wings, and head.	Apache, Coconino, Gila, Graham, La Paz, Maricopa, Mohave, Pinal, and Yavapai	Varies	Large trees or cliffs near water (reservoirs, rivers, and streams) with abundant prey.	Nationwide and throughout the State of Arizona, the bald eagle is currently not listed under the Endangered Species Act. On September 30, 2010, the U.S. District Court dissolved an injunction that led to the bald eagle in the Sonoran Desert Area of central Arizona being placed on the Endangered Species list in 2008. This determination is presently (January 2011) under judicial consideration. Bald eagles are protected under the Bald and Golden Eagle Protection Act (Eagle Act) and other Federal and state statutes. The word "disturb" under the Eagle Act was recently clarified, as well as the implementation of new regulations requiring permits to incidentally "take" eagles. Retrieve more information on management and life history at http://SWBEMC.org.

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
California brown pelican	*Pelecanus occidentalis californicus*	Delisted	Large, dark gray-brown water bird with webbed feet, pouch underneath its long bill, and wingspan of 7 ft. Adults have a white head and neck, brownish black breast, and silver gray upper parts.	Gila, La Paz, Maricopa, Mohave, Pinal, Yuma	Varies	Coastal land and islands; species found occasionally around Arizona's lakes and rivers.	Considered an uncommon transient in Arizona. Most observations recorded along the Colorado River and in the Gila Valley. Individuals known to wander up from Mexico in summer and fall. No breeding has been documented in Arizona. Delisted on November 17, 2009 (74 FR 59444).

Graham County

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Apache (Arizona) trout	*Oncorhynchus gilae apache*	Threatened	Yellowish to yellow-olive cutthroat-like trout with large dark spots on body. Dorsal, anal, and caudal fins edged with white. No red lateral band.	Apache, Coconino, Gila, Graham, Greenlee, Navajo	> 5,000 ft	Streams and rivers generally above 6,000 ft. elevation with adequate stream flow and shading; temperatures below 77 degrees F; and substrate composed of boulders, rocks, gravel and some sand and silt.	Presently restricted to drainages in the White Mountains. Hybridization with introduced trout has complicated efforts to maintain the genetic purity of some populations. Special regulations (4d Rule) allow Arizona to manage the species as a sport fish (40 FR 29863).
Arizona cliffrose	*Purshia subintegra*	Endangered	Evergreen shrub of the rose family (Roseaceae). Bark pale gray and shreddy. Young twigs covered with dense hairs. Leaves have 1-5 lobes and edges curl downward (revolute). Flowers: 5 petals, white or yellow <0.5 inches long.	Graham, Maricopa, Mohave, Yavapai	< 4,000 ft	White limestone soils derived from tertiary lakebed deposits.	Occurs across central Arizona: in the Burro Creek drainage, near Bylas, near Cottonwood in the Verde Valley, and at Horseshoe Lake.
Chiricahua leopard frog	*Lithobates chiricahuensis*	Threatened	Cream colored tubercles (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 leopard frogs.	Apache, Cochise, Coconino, Gila, Graham, Greenlee, Navajo, Pima, Santa Cruz, Yavapai	3,281-8,890 ft	Restricted to springs, livestock tanks, and streams in upper portion of watersheds that are free from nonnative predators or where marginal habitat for nonnative predators exists.	Critical habitat is designated for 10,346 acres in Apache, Cochise, Gila, Graham, Greenlee, Pima, Santa Cruz, and Yavapai counties in Arizona; and Catron, Hidalgo, Grant, Sierra, and Socorro counties in New Mexico (77 FR 16324).
Desert pupfish	*Cyprinodon macularius*	Endangered	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 and juveniles tan to olive colored back and silvery sides.	Cochise, Graham, Maricopa, Pima, Pinal, Santa Cruz, Yavapai	< 4,000 ft	Shallow springs, small streams, and marshes. Tolerates saline and warm water.	Two subspecies are recognized: Desert Pupfish (C.m. macularis) and Quitobaquito Pupfish (C.m. eremus). Critical habitat includes Quitobaquito Springs, Pima County, portions of San Felipe Creek, Carrizo Wash, and Fish Creek Wash, Imperial County, California.

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Gila chub	*Gila intermedia*	Endangered	Deep compressed body, flat head. Dark olive-gray color above, silver sides. Endemic to Gila River Basin.	Cochise, Gila, Graham, Greenlee, Pima, Pinal, Santa Cruz, Yavapai	2,000-5,500 ft	Pools, springs, cienegas, and streams.	Occurs on Federal, State, and private lands, including the Nature Conservancy and the Audubon Society. Also occurs in Sonora, Mexico. Critical habitat includes Cochise, Gila, Graham, Greenlee, Pima, Pinal, Santa Cruz, and Yavapai counties (70 FR 66664).
Gila topminnow	*Poeciliopsis occidentalis occidentalis*	Endangered	Small (2 inches), guppy-like, live bearing, lacks dark spots on its fins. Breeding males are jet black with yellow fins.	Cochise, Gila, Graham, La Paz, Maricopa, Pima, Pinal, Santa Cruz, Yavapai	< 4,500 ft	Small streams, springs, and cienegas vegetated shallows.	Species historically also occurred in backwaters of large rivers but is currently isolated to small streams and springs.
Lesser long-nosed bat	*Leptonycteris curasoae yerbabuenae*	Endangered	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.	Cochise, Gila, Graham, Greenlee, Maricopa, Pima, Pinal, Santa Cruz, Yuma	1,600-7,500 ft	Desert scrub habitat with agave and columnar 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 September and south of the border the remainder of the year.
Loach minnow	*Tiaroga cobitis*	Endangered	Small (<3 inches) slender, elongated fish, olive colored with dirty white spots at the base of the dorsal and caudal fins. Breeding males vivid red on mouth and base of fins.	Apache, Cochise, Gila, Graham, Greenlee, Navajo, Pinal, Yavapai	< 8,000 ft	Benthic species of small to large perennial streams with swift shallow water over cobble and gravel. Recurrent flooding and natural hydrograph important.	Presently found in Aravaipa Creek, Deer Creek, Turkey Creek, Blue River, Campbell Blue Creek, Little Blue Creek, San Francisco River, Eagle Creek, North Fork of the East Fork Black River, Boneyard Creek, and White River and East Fork White River in Arizona, and Dry Blue Creek, Pace Creek, Frieborn Creek, the San Francisco River, Tularosa River, Negrito Creek, Whitewater Creek, the East, Middle, and West Forks of the Gila River, mainstem upper Gila River. Bear Creek and Mangas Creek in New Mexico. Populations have been recently reintroduced in Hot Springs and Redfield canyons in Cochise and Graham counties; Fossil Creek in Gila County; and Bonita Creek in Graham County Arizona. Critical habitat has been designated in Apache, Cochise, Gila, Graham, Greenlee, Pinal, and Yavapai counties, Arizona, as well as in Catron, Grant, and Hidalgo counties in New Mexico (77 FR 10810).

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Mexican spotted owl	*Strix occidentalis lucida*	Threatened	Medium sized with dark eyes and no ear tufts. Brownish and heavily spotted with white or beige.	Apache, Cochise, Coconino, Gila, Graham, Greenlee, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, Yavapai	4,100-9,000 ft	Nests in canyons and dense forests with multi-layered foliage structure.	Generally nest in older forests of mixed conifer or ponderosa pine/gambel oak type, in canyons, and use variety of habitats for foraging. Sites with cool microclimates appear to be of importance or are preferred. Critical habitat was finalized on August 31, 2004 (69 FR 53182) in Arizona in Apache, Cochise, Coconino, Gila, Graham, Greenlee, Maricopa, Navajo, Pima, Pinal, Santa Cruz, and Yavapai counties.
Mount Graham red squirrel	*Tamiasciurus hudsonicus grahamensis*	Endangered	Grayish-brown tree squirrel, tinged rusty or yellowish along back. Summer-dark lateral line separates the light-colored underparts from the grayer sides. Ears are slightly tufted in the winter and the tail is bushy.	Graham	> 8,000 ft	Montane conifer forests from spruce-fir to mixed conifer.	Distribution limited to higher elevation spruce-fir and old growth Douglas-fir forests in the Pinaleno Mountains. Diet primarily conifer seeds. Critical habitat has been designated for this species (55 FR 425).
Ocelot	*Leopardus pardalis*	Endangered	Medium-sized spotted cat that is yellowish with black streaks and stripes running from front to back. Tail is spotted and about 1/2 the length of head and body. Face is less heavily streaked than the back and sides.	Cochise,Gila, Graham, Pima, Pinal, Santa Cruz	< 8,000 ft	Desert scrub in Arizona. Humid tropical and sub-tropical forests, and savannahs in areas south of the U.S.	Little is known about ocelot habitat use in Arizona; however, ocelots are typically associated with areas of dense cover. Four confirmed reports of ocelots have been received from Gila (one) and Cochise (three) counties since 2009. Based on photographic evidence, two of the reports from Cochise County were most likely of the same ocelot.
Razorback sucker	*Xyrauchen texanus*	Endangered	Large, up to 3 feet long and up to 6 lbs, high sharp-edged keel-like hump behind the head. Head flattened on top. Olive-brown above to yellowish below.	Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Pinal, Yavapai, Yuma	< 6,000 ft	Riverine and lacustrine areas, generally not in fast moving water and may use backwaters.	Big River fish also found in Horseshoe reservoir (Maricopa County). Critical habitat includes the 100-year floodplain of the river through the Grand Canyon from confluence with Paria River to Hoover Dam; Hoover Dam to Davis Dam; Parker Dam to Imperial Dam. Also Gila River from Arizona/New Mexico border to Coolidge Dam; and Salt River from Hwy 60/SR77 Bridge to Roosevelt Dam; Verde River from FS boundary to Horseshoe Lake (59 FR 13374).

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Southwestern willow flycatcher	*Empidonax traillii extimus*	Endangered	Small passerine (about 6 inches) grayish-green back and wings, whitish throat, light olive-gray breast and pale yellowish belly. Two wingbars visible. Eye-ring faint or absent.	Apache, Cochise, Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, Yavapai, Yuma	< 8,500 ft	Cottonwood/willow and tamarisk vegetation communities along rivers and streams.	Riparian-obligate bird that occupies migratory/breeding habitat from late April-Sept. Critical habitat was finalized on October 19, 2005 in Apache, Cochise, Gila, Graham, Greenlee, Maricopa, Mohave, Pima, Pinal, and Yavapai counties (70 FR 60886). Revised critical habitat was proposed August 15, 2011 (76 FR 50542) and includes river segments in counties currently designated plus those in La Paz, Santa Cruz, and Yuma counties. The 2005 critical habitat designation remains in effect until the current proposal is finalized. Training seminar/permits required for those conducting call playback surveys.
Spikedace	*Meda fulgida*	Endangered	Small (<3 inches) slim fish with silvery sides and "spine" on dorsal fin. Breeding males are a brassy golden color.	Cochise, Gila, Graham, Greenlee, Pinal, Yavapai	< 6,000 ft	Medium to large perennial streams with moderate to swift velocity waters over cobble and gravel substrate. Recurrent flooding and natural hydrograph important to withstand invading exotic species.	Presently found in Aravaipa Creek, Eagle Creek, and the Verde River in Arizona, and the Gila River, the East, Middle, and West Forks of the Gial River, and Mangas Creek in New Mexico. Populations have been recently reintroduced in Hot Springs and Redfield canyons in Cochise and Graham counties; Fossil Creek in Gila County; and Bonita Creek in Graham County Arizona, and in the San Francisco River in Catron County, New Mexico. Critical habitat (77 FR 10810) has been designated in Cochise, Gila, Graham, Greenlee, Pinal, and Yavapai counties in Arizona, and in Catron, Grant, and Hidalgo counties in New Mexico.
Headwater chub	*Gila nigra*	Candidate	Streamlined, dark gray to brown fish, often with longitudinal stripes on the sides. Adults reach a maximum size of about 12 inches.	Gila, Graham, Yavapai	3,000-6,700 ft	Medium-sized streams in large, deep pools often associated with cover such as undercut banks or deep places created by trees or rocks.	Occurs in the East Verde River and tributaries, Fossil Creek, Wet Bottom Creek, Deadman Creek, Tonto Creek and tributaries, San Carlos River, Ash Creek, and the upper Gila River in New Mexico. Statewide Conservation Agreement with Arizona Game and Fish was signed on December 2003.

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Northern Mexican Gartersnake	*Thamnophis eques megalops*	Candidate	Background color ranges from olive, olive-brown, to olive-gray. Body has three yellow or light colored stripes running down the length of the body, darker towards tail. Species distinguished from other native gartersnakes by the lateral stripes reaching the 3rd and 4th scale rows. Paired black spots extend along dorsolateral fields.	Apache, Cochise, Coconino, Gila, Graham, Navajo, Pima, Pinal, Santa Cruz, Yavapai	130-8,500 ft	Cienegas, stock tanks, large-river riparian woodlands and forests, streamside gallery forests.	Core population areas in the U.S. include mid/upper Verde River drainage, mid/lower Tonto Creek, and the San Rafael Valley and surrounding area. Status on tribal lands unknown. Distributed south into Mexico along the Sierra Madre Occidental and Mexican Plateau. Strongly associated with the presence of a native prey base including leopard frogs and native fish.
Roundtail chub	*Gila robusta*	Candidate	Member of the minnow family Cyprinidae and characterized by streamlined body shape. Color usually olive gray with silvery sides and a white belly. Breeding males develop red or orange coloration on the lower half of the cheeks and on the bases of paired fins. Individuals may reach 49.0 cm (19.3 in) but usually average 25-30 cm (9.8 - 11.8 in).	Apache, Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Navajo, Pinal, Yavapai	1,000-7,500 ft.	Cool to warm waters of rivers and streams, often occupy the deepest pools and eddies of large streams.	Historical range of roundtail chub included both the upper and lower Colorado River basins. A 2009 status review determined that the lower Colorado River basin roundtail chub population segment (Arizona and New Mexico) qualifies as a distinct vertebrate population segment (DPS). Populations in the Little Colorado, Bill Williams, and Gila River basins are considered candidate species.
Sonoran desert tortoise	*Gopherus morafkai*	Candidate	Large herbivorous reptile with domed shell and round stumpy hind legs. The carapace is a dull brown or grey color and the plastron is unhinged, often pale yellow in coloration. Sonoran desert tortoises generally have a flatter carapace than tortoises in the Mohave population. Active in spring and during the monsoon; dormant in winter and mid-summer months.	Cochise, Gila, Graham, La Paz, Maricopa, Mohave, Pima, Pinal, Santa Cruz, Yavapai, Yuma	< 7,800 ft	Primarily rocky (often steep) hillsides and bajadas of Mohave and Sonoran desertscub but may encroach into desert grassland, juniper woodland, interior chaparral habitats, and even pine communities. Washes and valley bottoms may be used in dispersal.	Desert tortoises that occur east and south of the Colorado River in Arizona are known as the Sonoran desert tortoise. Individuals are found throughout their historic range; but populations are becoming increasingly fragmented due to threats to their habitat in valley bottoms, which are used for dispersal and exchange of genetic material.

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Yellow-billed cuckoo	*Coccyzus americanus*	Candidate	Medium-sized bird with a slender, long-tailed profile, slightly down-curved bill that is blue-black with yellow on the lower half. Plumage is grayish-brown above and white below, with rufous primary flight feathers.	Apache, Cochise, Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, Yavapai, Yuma	< 6,500 ft	Large blocks of riparian woodlands (cottonwood, willow, or tamarisk galleries).	Neotropical migrant that winters primarily in South America and breeds primarily in the U.S. (but also in southern Canada and northern Mexico). As a migrant it is rarely detected; can occur outside of riparian areas. Cuckoos are found nesting statewide, mostly below 5,000 feet in central, western, and southeastern Arizona. Concern for cuckoos are primarily focused upon alterations to its nesting and foraging habitat. Nesting cuckoos are associated with relatively dense, wooded, streamside riparian habitat, with varying combinations of Fremont cottonwood, willow, velvet ash, Arizona walnut, mesquite, and tamarisk. Some cuckoos have also been detected nesting in velvet mesquite, netleaf hackberry, Arizona sycamore, Arizona alder, and some exotic neighborhood shade trees.
Wet Canyon talussnail	*Sonorella macrophallus*	Conservation Agreement	Very small (<1 inch in diameter) land snail; globose shell light with 4.5 whorls. Brown stripe encircles outside perimeter of shell.	Graham	6,050-6,900 ft	Talus slopes in heavily vegetated area of Wet Canyon (Pinaleno Mountains).	Talus must be deep and largely free of excess sedimentation with stable moisture conditions. This species cannot be distinguished from other Sonorella species without dissection.
American peregrine falcon	*Falco pereginus anatum*	Delisted	A crow-sized falcon with slate blue-gray on the back and wings, and white on the underside; a black head with vertical “bandit’s mask” pattern over the eyes; long pointed wings; and a long wailing call made during breeding. Very adept flyers and hunters, reaching diving speeds of 200 mph.	Apache, Cochise, Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, Yavapai, Yuma	3,500-9,000 ft	Areas with rocky, steep cliffs, primarily near water, where prey (primarily shorebirds, songbirds, and waterfowl) concentrations are high. Nests are found on ledges of cliffs, and sometimes on man-made structures such as office towers and bridge abutments.	Species recovered with over 1,650 breeding birds in the US and Canada.

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Bald eagle	*Haliaeetus leucocephalus*	Delisted	Large, adults have white head and tail. Height 28 to 38 inches; wingspan 66 to 96 inches. Juveniles and subadults are dark brown with varying degrees of white mottling on chest, wings, and head.	Apache, Coconino, Gila, Graham, La Paz, Maricopa, Mohave, Pinal, and Yavapai	Varies	Large trees or cliffs near water (reservoirs, rivers, and streams) with abundant prey.	Nationwide and throughout the State of Arizona, the bald eagle is currently not listed under the Endangered Species Act. On September 30, 2010, the U.S. District Court dissolved an injunction that led to the bald eagle in the Sonoran Desert Area of central Arizona being placed on the Endangered Species list in 2008. This determination is presently (January 2011) under judicial consideration. Bald eagles are protected under the Bald and Golden Eagle Protection Act (Eagle Act) and other Federal and state statutes. The word "disturb" under the Eagle Act was recently clarified, as well as the implementation of new regulations requiring permits to incidentally "take" eagles. Retrieve more information on management and life history at http://SWBEMC.org.

Pima County

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Acuna cactus	*Echinomastus erectocentrus var. acunensis*	Proposed Endangered	Less than 12 inches tall; spine clusters borne on tubercles, each with a groove on the upper surface. 2-3 central spines and 12 radial spines. Radial spines are dirty white with maroon tips. Flowers pink to purple.	Maricopa, Pima, Pinal	1,198 to 3,773 ft	Well drained knolls and gravel ridges in Sonoran desertscrub.	Immature plants distinctly different from mature plants. Immatures are disc-shaped or spherical and have no central spines until they are about 1.5 inches. Critical habitat is being proposed for a total of 53,720 ac in Maricopa, Pima, and Pinal counties (77 FR 60510).
California Least Tern	*Sterna antillarum browni*	Endangered	Smallest of the North American terns. Body length is 21-24 cm (8-9 inches) with a wingspan of 45-51 cm (18-20 inches). Has black crown and loral stripe on head, snowy white forehead and underside, and gray upperparts. Outer two primaries black, yellow or orange bill with black tip, and orange legs. Males have a wider dark loral stripe but sexes mostly distinguished by behavior.	Maricopa, Mohave, Pima	< 2,000 ft	Open, bare or sparsely vegetated sand, sandbars, gravel pits, or exposed flats along shorelines of inland rivers, lakes, reservoirs, or drainage systems.	Breeding occasionally documented in Arizona; migrants may occur more frequently. Feeds primarily on fish in shallow waters and secondarily on invertebrates. Nests in a simple scrape on sandy or gravelly soil.
Chiricahua leopard frog	*Lithobates chiricahuensis*	Threatened	Cream colored tubercles (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 leopard frogs.	Apache, Cochise, Coconino, Gila, Graham, Greenlee, Navajo, Pima, Santa Cruz, Yavapai	3,281-8,890 ft	Restricted to springs, livestock tanks, and streams in upper portion of watersheds that are free from nonnative predators or where marginal habitat for nonnative predators exists.	Critical habitat is designated for 10,346 acres in Apache, Cochise, Gila, Graham, Greenlee, Pima, Santa Cruz, and Yavapai counties in Arizona; and Catron, Hidalgo, Grant, Sierra, and Socorro counties in New Mexico (77 FR 16324).

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Desert pupfish	*Cyprinodon macularius*	Endangered	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 and juveniles tan to olive colored back and silvery sides.	Cochise, Graham, Maricopa, Pima, Pinal, Santa Cruz, Yavapai	< 4,000 ft	Shallow springs, small streams, and marshes. Tolerates saline and warm water.	Two subspecies are recognized: Desert Pupfish (C.m. macularis) and Quitobaquito Pupfish (C.m. eremus). Critical habitat includes Quitobaquito Springs, Pima County, portions of San Felipe Creek, Carrizo Wash, and Fish Creek Wash, Imperial County, California.
Gila chub	*Gila intermedia*	Endangered	Deep compressed body, flat head. Dark olive-gray color above, silver sides. Endemic to Gila River Basin.	Cochise, Gila, Graham, Greenlee, Pima, Pinal, Santa Cruz, Yavapai	2,000-5,500 ft	Pools, springs, cienegas, and streams.	Occurs on Federal, State, and private lands, including the Nature Conservancy and the Audubon Society. Also occurs in Sonora, Mexico. Critical habitat includes Cochise, Gila, Graham, Greenlee, Pima, Pinal, Santa Cruz, and Yavapai counties (70 FR 66664).
Gila topminnow	*Poeciliopsis occidentalis occidentalis*	Endangered	Small (2 inches), guppy-like, live bearing, lacks dark spots on its fins. Breeding males are jet black with yellow fins.	Cochise, Gila, Graham, La Paz, Maricopa, Pima, Pinal, Santa Cruz, Yavapai	< 4,500 ft	Small streams, springs, and cienegas vegetated shallows.	Species historically also occurred in backwaters of large rivers but is currently isolated to small streams and springs.
Huachuca water umbel	*Lilaeopsis schaffneriana ssp. recurva*	Endangered	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.	Cochise, Pima, Santa Cruz	3,500-6,500 ft	Cienegas, perennial low gradient streams, wetlands.	Species also occurs in adjacent Sonora, Mexico, west of the continental divide. Critical habitat includes Cochise and Santa Cruz counties (64 FR 37441).
Jaguar	*Panthera onca*	Endangered	Largest species of cat native to Southwest. Muscular, with relatively short, massive limbs, and a deep-chested body. Usually cinnamon-buff in color with many black spots. Weights ranges from 90-300 lbs.	Cochise, Pima, Santa Cruz	1,600-9,000 ft	Found in Sonoran desertscrub up through subalpine conifer forest.	Critical habitat is being proposed for a total of 838,232 ac. in Cochise, Pima, and Santa Cruz counties, Arizona; and Hidalgo County, New Mexico (77 FR 50214). A recovery team for the jaguar was formed in 2010, who completed a recovery outline for the species in April, 2012. The recovery team is currently developing a full recovery plan for the species based on the recovery outline.

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Kearney's blue star	*Amsonia kearneyana*	Endangered	A herbaceous perennial about 2 feet tall in the dogbane family (Apocynaceae). Thickened woody root and many pubescent (hairy) stems that rarely branch. Flowers: white terminal inflorescence in April and May.	Pima	3,600-3,800 ft	West-facing drainages in the Baboquivari Mountains.	Plants grow in stable, partially shaded, coarse alluvium along a dry wash in the Baboquivari Mountains. Range is extremely limited. Protected by Arizona Native Plant Law.
Lesser long-nosed bat	*Leptonycteris curasoae yerbabuenae*	Endangered	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.	Cochise, Gila, Graham, Greenlee, Maricopa, Pima, Pinal, Santa Cruz, Yuma	1,600-7,500 ft	Desert scrub habitat with agave and columnar 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 September and south of the border the remainder of the year.
Masked bobwhite	*Colinus virginianus ridgewayi*	Endangered	Males have a brick-red breast and black head and throat. Females are generally nondescript but resemble other races such as the Texas bobwhite.	Pima	1,000-4,000 ft	Desert grasslands with diversity of dense native grasses, forbs, and brush.	Species is closely associated with Prairie acacia (Acacia angustissima). Formerly occurred in Altar and Santa Cruz valleys, as well as Sonora, Mexico. Presently only known from reintroduced populations on Buenos Aires NWR.
Mexican spotted owl	*Strix occidentalis lucida*	Threatened	Medium sized with dark eyes and no ear tufts. Brownish and heavily spotted with white or beige.	Apache, Cochise, Coconino, Gila, Graham, Greenlee, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, Yavapai	4,100-9,000 ft	Nests in canyons and dense forests with multi-layered foliage structure.	Generally nest in older forests of mixed conifer or ponderosa pine/gambel oak type, in canyons, and use variety of habitats for foraging. Sites with cool microclimates appear to be of importance or are preferred. Critical habitat was finalized on August 31, 2004 (69 FR 53182) in Arizona in Apache, Cochise, Coconino, Gila, Graham, Greenlee, Maricopa, Navajo, Pima, Pinal, Santa Cruz, and Yavapai counties.
Nichol Turk's head cactus	*Echinocactus horizonthalonius var. nicholii*	Endangered	Blue-green to yellowish-green, columnar, 18 inches tall, 8 inches in diameter. Spine clusters have 5 radial and 3 central spines; one curves downward and is short; 2 spines curve upward and are red or pale gray. Flowers: pink; fruit: woolly white.	Pima, Pinal	2,400-4,100 ft	Sonoran desertscrub.	Found in unshaded microsites in Sonoran desertscrub on dissected alluvial fans at the foot of limestone mountains and on inclined terraces and saddles on limestone mountain sides.

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Ocelot	*Leopardus pardalis*	Endangered	Medium-sized spotted cat that is yellowish with black streaks and stripes running from front to back. Tail is spotted and about 1/2 the length of head and body. Face is less heavily streaked than the back and sides.	Cochise,Gila, Graham, Pima, Pinal, Santa Cruz	< 8,000 ft	Desert scrub in Arizona. Humid tropical and sub-tropical forests, and savannahs in areas south of the U.S.	Little is known about ocelot habitat use in Arizona; however, ocelots are typically associated with areas of dense cover. Four confirmed reports of ocelots have been received from Gila (one) and Cochise (three) counties since 2009. Based on photographic evidence, two of the reports from Cochise County were most likely of the same ocelot.
Pima pineapple cactus	*Coryphantha scheeri var. robustispina*	Endangered	Hemispherical 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.	Pima, Santa Cruz	2,300-5,000 ft	Sonoran desertscrub or semi-desert grassland communities.	Occurs in alluvial valleys or on hillsides in rocky to sandy or silty soils. This species can be confused with juvenile barrel cactus (Ferocactus). However, the spines of the later are flattened, in contrast with the round cross-section of the Coryphanta spines. About 80-90% of individuals occur on state or private land.
Sonoran pronghorn	*Antilocapra americana sonoriensis*	Endangered	Upperparts tan; underparts, rump, and two bands across the neck are white. Male has two black cheek pouches. Hoofed with slightly curved black horns having a single prong. Smallest and palest of the pronghorn subspecies.	Maricopa, Pima, Yuma	2,000-4,000 ft	Broad intermountain alluvial valleys with creosote-bursage and palo verde-mixed cacti associations.	Typically, bajadas are used as fawning areas and sandy dune areas provide food seasonally. Cacti (jumping cholla) appears to make up substantial part of diet. This subspecies also occurs in Mexico.
Southwestern willow flycatcher	*Empidonax traillii extimus*	Endangered	Small passerine (about 6 inches) grayish-green back and wings, whitish throat, light olive-gray breast and pale yellowish belly. Two wingbars visible. Eye-ring faint or absent.	Apache, Cochise, Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, Yavapai, Yuma	< 8,500 ft	Cottonwood/willow and tamarisk vegetation communities along rivers and streams.	Riparian-obligate bird that occupies migratory/breeding habitat from late April-Sept. Critical habitat was finalized on October 19, 2005 in Apache, Cochise, Gila, Graham, Greenlee, Maricopa, Mohave, Pima, Pinal, and Yavapai counties (70 FR 60886). Revised critical habitat was proposed August 15, 2011 (76 FR 50542) and includes river segments in counties currently designated plus those in La Paz, Santa Cruz, and Yuma counties. The 2005 critical habitat designation remains in effect until the current proposal is finalized. Training seminar/permits required for those conducting call playback surveys.

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Northern Mexican Gartersnake	*Thamnophis eques megalops*	Candidate	Background color ranges from olive, olive-brown, to olive-gray. Body has three yellow or light colored stripes running down the length of the body, darker towards tail. Species distinguished from other native gartersnakes by the lateral stripes reaching the 3rd and 4th scale rows. Paired black spots extend along dorsolateral fields.	Apache, Cochise, Coconino, Gila, Graham, Navajo, Pima, Pinal, Santa Cruz, Yavapai	130-8,500 ft	Cienegas, stock tanks, large-river riparian woodlands and forests, streamside gallery forests.	Core population areas in the U.S. include mid/upper Verde River drainage, mid/lower Tonto Creek, and the San Rafael Valley and surrounding area. Status on tribal lands unknown. Distributed south into Mexico along the Sierra Madre Occidental and Mexican Plateau. Strongly associated with the presence of a native prey base including leopard frogs and native fish.
Sonoran desert tortoise	*Gopherus morafkai*	Candidate	Large herbivorous reptile with domed shell and round stumpy hind legs. The carapace is a dull brown or grey color and the plastron is unhinged, often pale yellow in coloration. Sonoran desert tortoises generally have a flatter carapace than tortoises in the Mohave population. Active in spring and during the monsoon; dormant in winter and mid-summer months.	Cochise, Gila, Graham, La Paz, Maricopa, Mohave, Pima, Pinal, Santa Cruz, Yavapai, Yuma	< 7,800 ft	Primarily rocky (often steep) hillsides and bajadas of Mohave and Sonoran desertscub but may encroach into desert grassland, juniper woodland, interior chaparral habitats, and even pine communities. Washes and valley bottoms may be used in dispersal.	Desert tortoises that occur east and south of the Colorado River in Arizona are known as the Sonoran desert tortoise. Individuals are found throughout their historic range; but populations are becoming increasingly fragmented due to threats to their habitat in valley bottoms, which are used for dispersal and exchange of genetic material.
Sonoyta mud turtle	*Kinosternon sonoriense longifemorale*	Candidate	Aquatic; dark, medium-sized; shell up to 7 inches long; head, neck, and limbs mottled; carapace is olive brown to dark brown; plastron hinged; long barbels on chin, webbed feet.	Pima	1,100 ft	Ponds and streams.	Found only in Quitobaquito Springs in Organ Pipe Cactus National Monument, Arizona. Species also occurs in Rio Sonoyta, Sonora, Mexico.

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Tucson shovel-nosed snake	*Chionactis occipitalis klauberi*	Candidate	Small snake (10-17 inches total length) in the family Colubridae, with a shovel-shaped snout and an inset lower jaw. Overall coloring mimics coral snakes, with pale yellow to cream-colored body, 21 or more black or brown saddle-like bands across the back, and orange-red saddle-like bands in between. The subspecies is distinguished from the other subspecies in that these secondary orange-red crossbands are suffused with dark pigment, making them appear brown or partly black, and the black and red crossbands do not encircle the entire body.	Maricopa, Pima, Pinal	785-1,662 ft	Sonoran Desertscrub; associated with soft, sandy soils having sparse gravel.	Found in creosote-mesquite floodplain environments, finds refuge under desert shrubs,active during crepuscular (dawn and dusk) and daylight hours.
Yellow-billed cuckoo	*Coccyzus americanus*	Candidate	Medium-sized bird with a slender, long-tailed profile, slightly down-curved bill that is blue-black with yellow on the lower half. Plumage is grayish-brown above and white below, with rufous primary flight feathers.	Apache, Cochise, Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, Yavapai, Yuma	< 6,500 ft	Large blocks of riparian woodlands (cottonwood, willow, or tamarisk galleries).	Neotropical migrant that winters primarily in South America and breeds primarily in the U.S. (but also in southern Canada and northern Mexico). As a migrant it is rarely detected; can occur outside of riparian areas. Cuckoos are found nesting statewide, mostly below 5,000 feet in central, western, and southeastern Arizona. Concern for cuckoos are primarily focused upon alterations to its nesting and foraging habitat. Nesting cuckoos are associated with relatively dense, wooded, streamside riparian habitat, with varying combinations of Fremont cottonwood, willow, velvet ash, Arizona walnut, mesquite, and tamarisk. Some cuckoos have also been detected nesting in velvet mesquite, netleaf hackberry, Arizona sycamore, Arizona alder, and some exotic neighborhood shade trees.

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Gooddings onion	*Allium gooddingii*	Conservation Agreement	Herbaceous perennial plant; broad, flat, rather blunt leaves; flowering stalk 14-18 inches tall, flattened, and narrowly winged toward apex; fruit is broader than long; seeds are short and thick.	Apache, Greenlee, Pima	7,500-11,250 ft	Shaded sites on north-trending drainages, on slopes, or in narrow canyons, within mixed conifer and spruce fir forests.	Known from the White, Santa Catalina, and Chuska Mountains. Also found in New Mexico on the Lincoln and Gila National Forests. A Conservation Agreement between the Service and the Forest Service signed in February 1998.
San Xavier talussnail	*Sonorella eremita*	Conservation Agreement	Land snail, less than one inch in diameter (about .75 inches); round shell with 4.5 whorls; white to pinkish tint and chestnut-brown shoulder band.	Pima	3,850-3,920 ft	Inhabits a deep, northwest-facing limestone rockslide.	Restricted to 50 by 100 foot area of land privately owned in southeastern Arizona. A Conservation Agreement was finalized in 1995 and renewed in May 2008.
American peregrine falcon	*Falco pereginus anatum*	Delisted	A crow-sized falcon with slate blue-gray on the back and wings, and white on the underside; a black head with vertical “bandit’s mask” pattern over the eyes; long pointed wings; and a long wailing call made during breeding. Very adept flyers and hunters, reaching diving speeds of 200 mph.	Apache, Cochise, Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, Yavapai, Yuma	3,500-9,000 ft	Areas with rocky, steep cliffs, primarily near water, where prey (primarily shorebirds, songbirds, and waterfowl) concentrations are high. Nests are found on ledges of cliffs, and sometimes on man-made structures such as office towers and bridge abutments.	Species recovered with over 1,650 breeding birds in the US and Canada.
Cactus ferruginous pygmy-owl	*Glaucidium brasilianum cactorum*	Delisted; petitioned for relisting	Small reddish-brown owl with a cream-colored belly streaked with reddish-brown. Males average 2.2 oz and females average 2.6 oz. Length is approximately 6.5 in., including a relatively long tail. Lacks ear tufts, and has paired black spots on the back of the head.	Pima, Pinal	< 4,000 ft	Areas of desert woodlands with tall canopy cover. Primarily found in Sonoran desert scrub and occasionally in riparian drainages and woodlands within semi-desert grassland communities. Prefers to nest in cavities in saguaro cacti but has been found in low-density suburban developments that include natural open spaces.	Not recognized as a protected taxonomic entity under the Act, but protected from direct take of individuals and nests/eggs under the Migratory Bird Treaty Act. A 2006 petition for relisting under the Act is currently being evaluated. Due to low population numbers, captive breeding research was initiated in 2006 with some success.

Pinal County

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Acuna cactus	*Echinomastus erectocentrus var. acunensis*	Proposed Endangered	Less than 12 inches tall; spine clusters borne on tubercles, each with a groove on the upper surface. 2-3 central spines and 12 radial spines. Radial spines are dirty white with maroon tips. Flowers pink to purple.	Maricopa, Pima, Pinal	1,198 to 3,773 ft	Well drained knolls and gravel ridges in Sonoran desertscrub.	Immature plants distinctly different from mature plants. Immatures are disc-shaped or spherical and have no central spines until they are about 1.5 inches. Critical habitat is being proposed for a total of 53,720 ac in Maricopa, Pima, and Pinal counties (77 FR 60510).
Arizona hedgehog cactus	*Echinocereus triglochidiatus var. arizonicus*	Endangered	Dark green cylindroid stem, 2.5-12 inches tall, 2-10 inches in diameter. Occurs singly or in clusters. Has 1-3 gray or pinkish central spines, the largest deflexed, and 5-11 radial spines. Flower are brilliant red along side of stem.	Gila, Pinal	3,200-5,200 ft	Ecotone between interior chaparral and madrean evergreen woodland.	Open slopes, in narrow cracks between boulders, and in understory of shrubs. Additional genetic studies have determined that the species does not occur outside of the type locality.
Desert pupfish	*Cyprinodon macularius*	Endangered	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 and juveniles tan to olive colored back and silvery sides.	Cochise, Graham, Maricopa, Pima, Pinal, Santa Cruz, Yavapai	< 4,000 ft	Shallow springs, small streams, and marshes. Tolerates saline and warm water.	Two subspecies are recognized: Desert Pupfish (C.m. macularis) and Quitobaquito Pupfish (C.m. eremus). Critical habitat includes Quitobaquito Springs, Pima County, portions of San Felipe Creek, Carrizo Wash, and Fish Creek Wash, Imperial County, California.
Gila chub	*Gila intermedia*	Endangered	Deep compressed body, flat head. Dark olive-gray color above, silver sides. Endemic to Gila River Basin.	Cochise, Gila, Graham, Greenlee, Pima, Pinal, Santa Cruz, Yavapai	2,000-5,500 ft	Pools, springs, cienegas, and streams.	Occurs on Federal, State, and private lands, including the Nature Conservancy and the Audubon Society. Also occurs in Sonora, Mexico. Critical habitat includes Cochise, Gila, Graham, Greenlee, Pima, Pinal, Santa Cruz, and Yavapai counties (70 FR 66664).
Gila topminnow	*Poeciliopsis occidentalis occidentalis*	Endangered	Small (2 inches), guppy-like, live bearing, lacks dark spots on its fins. Breeding males are jet black with yellow fins.	Cochise, Gila, Graham, La Paz, Maricopa, Pima, Pinal, Santa Cruz, Yavapai	< 4,500 ft	Small streams, springs, and cienegas vegetated shallows.	Species historically also occurred in backwaters of large rivers but is currently isolated to small streams and springs.

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Lesser long-nosed bat	*Leptonycteris curasoae yerbabuenae*	Endangered	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.	Cochise, Gila, Graham, Greenlee, Maricopa, Pima, Pinal, Santa Cruz, Yuma	1,600-7,500 ft	Desert scrub habitat with agave and columnar 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 September and south of the border the remainder of the year.
Loach minnow	*Tiaroga cobitis*	Endangered	Small (<3 inches) slender, elongated fish, olive colored with dirty white spots at the base of the dorsal and caudal fins. Breeding males vivid red on mouth and base of fins.	Apache, Cochise, Gila, Graham, Greenlee, Navajo, Pinal, Yavapai	< 8,000 ft	Benthic species of small to large perennial streams with swift shallow water over cobble and gravel. Recurrent flooding and natural hydrograph important.	Presently found in Aravaipa Creek, Deer Creek, Turkey Creek, Blue River, Campbell Blue Creek, Little Blue Creek, San Francisco River, Eagle Creek, North Fork of the East Fork Black River, Boneyard Creek, and White River and East Fork White River in Arizona, and Dry Blue Creek, Pace Creek, Frieborn Creek, the San Francisco River, Tularosa River, Negrito Creek, Whitewater Creek, the East, Middle, and West Forks of the Gila River, mainstem upper Gila River. Bear Creek and Mangas Creek in New Mexico. Populations have been recently reintroduced in Hot Springs and Redfield canyons in Cochise and Graham counties; Fossil Creek in Gila County; and Bonita Creek in Graham County Arizona. Critical habitat has been designated in Apache, Cochise, Gila, Graham, Greenlee, Pinal, and Yavapai counties, Arizona, as well as in Catron, Grant, and Hidalgo counties in New Mexico (77 FR 10810).
Mexican spotted owl	*Strix occidentalis lucida*	Threatened	Medium sized with dark eyes and no ear tufts. Brownish and heavily spotted with white or beige.	Apache, Cochise, Coconino, Gila, Graham, Greenlee, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, Yavapai	4,100-9,000 ft	Nests in canyons and dense forests with multi-layered foliage structure.	Generally nest in older forests of mixed conifer or ponderosa pine/gambel oak type, in canyons, and use variety of habitats for foraging. Sites with cool microclimates appear to be of importance or are preferred. Critical habitat was finalized on August 31, 2004 (69 FR 53182) in Arizona in Apache, Cochise, Coconino, Gila, Graham, Greenlee, Maricopa, Navajo, Pima, Pinal, Santa Cruz, and Yavapai counties.

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Nichol Turk's head cactus	*Echinocactus horizonthalonius var. nicholii*	Endangered	Blue-green to yellowish-green, columnar, 18 inches tall, 8 inches in diameter. Spine clusters have 5 radial and 3 central spines; one curves downward and is short; 2 spines curve upward and are red or pale gray. Flowers: pink; fruit: woolly white.	Pima, Pinal	2,400-4,100 ft	Sonoran desertscrub.	Found in unshaded microsites in Sonoran desertscrub on dissected alluvial fans at the foot of limestone mountains and on inclined terraces and saddles on limestone mountain sides.
Ocelot	*Leopardus pardalis*	Endangered	Medium-sized spotted cat that is yellowish with black streaks and stripes running from front to back. Tail is spotted and about 1/2 the length of head and body. Face is less heavily streaked than the back and sides.	Cochise,Gila, Graham, Pima, Pinal, Santa Cruz	< 8,000 ft	Desert scrub in Arizona. Humid tropical and sub-tropical forests, and savannahs in areas south of the U.S.	Little is known about ocelot habitat use in Arizona; however, ocelots are typically associated with areas of dense cover. Four confirmed reports of ocelots have been received from Gila (one) and Cochise (three) counties since 2009. Based on photographic evidence, two of the reports from Cochise County were most likely of the same ocelot.
Razorback sucker	*Xyrauchen texanus*	Endangered	Large, up to 3 feet long and up to 6 lbs, high sharp-edged keel-like hump behind the head. Head flattened on top. Olive-brown above to yellowish below.	Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Pinal, Yavapai, Yuma	< 6,000 ft	Riverine and lacustrine areas, generally not in fast moving water and may use backwaters.	Big River fish also found in Horseshoe reservoir (Maricopa County). Critical habitat includes the 100-year floodplain of the river through the Grand Canyon from confluence with Paria River to Hoover Dam; Hoover Dam to Davis Dam; Parker Dam to Imperial Dam. Also Gila River from Arizona/New Mexico border to Coolidge Dam; and Salt River from Hwy 60/SR77 Bridge to Roosevelt Dam; Verde River from FS boundary to Horseshoe Lake (59 FR 13374).

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Southwestern willow flycatcher	*Empidonax traillii extimus*	Endangered	Small passerine (about 6 inches) grayish-green back and wings, whitish throat, light olive-gray breast and pale yellowish belly. Two wingbars visible. Eye-ring faint or absent.	Apache, Cochise, Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, Yavapai, Yuma	< 8,500 ft	Cottonwood/willow and tamarisk vegetation communities along rivers and streams.	Riparian-obligate bird that occupies migratory/breeding habitat from late April-Sept. Critical habitat was finalized on October 19, 2005 in Apache, Cochise, Gila, Graham, Greenlee, Maricopa, Mohave, Pima, Pinal, and Yavapai counties (70 FR 60886). Revised critical habitat was proposed August 15, 2011 (76 FR 50542) and includes river segments in counties currently designated plus those in La Paz, Santa Cruz, and Yuma counties. The 2005 critical habitat designation remains in effect until the current proposal is finalized. Training seminar/permits required for those conducting call playback surveys.
Spikedace	*Meda fulgida*	Endangered	Small (<3 inches) slim fish with silvery sides and "spine" on dorsal fin. Breeding males are a brassy golden color.	Cochise, Gila, Graham, Greenlee, Pinal, Yavapai	< 6,000 ft	Medium to large perennial streams with moderate to swift velocity waters over cobble and gravel substrate. Recurrent flooding and natural hydrograph important to withstand invading exotic species.	Presently found in Aravaipa Creek, Eagle Creek, and the Verde River in Arizona, and the Gila River, the East, Middle, and West Forks of the Gial River, and Mangas Creek in New Mexico. Populations have been recently reintroduced in Hot Springs and Redfield canyons in Cochise and Graham counties; Fossil Creek in Gila County; and Bonita Creek in Graham County Arizona, and in the San Francisco River in Catron County, New Mexico. Critical habitat (77 FR 10810) has been designated in Cochise, Gila, Graham, Greenlee, Pinal, and Yavapai counties in Arizona, and in Catron, Grant, and Hidalgo counties in New Mexico.
Yuma clapper rail	*Rallus longirostris yumanensis*	Endangered	Water bird with long legs and short tail. Long, slender decurved bill. Mottled brown or gray on its rump. Flanks and undersides are dark gray with narrow vertical stripes producing a barring effect.	Gila, La Paz, Maricopa, Mohave, Pinal, Yuma	< 4,500 ft	Fresh water and brackish marshes.	Species is associated with dense emergent riparian vegetation. Requires wet substrate (mudflat, sandbar) with dense herbaceous or woody vegetation for nesting and foraging. Channelization and marsh destruction are primary sources of habitat loss.

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Northern Mexican Gartersnake	*Thamnophis eques megalops*	Candidate	Background color ranges from olive, olive-brown, to olive-gray. Body has three yellow or light colored stripes running down the length of the body, darker towards tail. Species distinguished from other native gartersnakes by the lateral stripes reaching the 3rd and 4th scale rows. Paired black spots extend along dorsolateral fields.	Apache, Cochise, Coconino, Gila, Graham, Navajo, Pima, Pinal, Santa Cruz, Yavapai	130-8,500 ft	Cienegas, stock tanks, large-river riparian woodlands and forests, streamside gallery forests.	Core population areas in the U.S. include mid/upper Verde River drainage, mid/lower Tonto Creek, and the San Rafael Valley and surrounding area. Status on tribal lands unknown. Distributed south into Mexico along the Sierra Madre Occidental and Mexican Plateau. Strongly associated with the presence of a native prey base including leopard frogs and native fish.
Roundtail chub	*Gila robusta*	Candidate	Member of the minnow family Cyprinidae and characterized by streamlined body shape. Color usually olive gray with silvery sides and a white belly. Breeding males develop red or orange coloration on the lower half of the cheeks and on the bases of paired fins. Individuals may reach 49.0 cm (19.3 in) but usually average 25-30 cm (9.8 - 11.8 in).	Apache, Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Navajo, Pinal, Yavapai	1,000-7,500 ft.	Cool to warm waters of rivers and streams, often occupy the deepest pools and eddies of large streams.	Historical range of roundtail chub included both the upper and lower Colorado River basins. A 2009 status review determined that the lower Colorado River basin roundtail chub population segment (Arizona and New Mexico) qualifies as a distinct vertebrate population segment (DPS). Populations in the Little Colorado, Bill Williams, and Gila River basins are considered candidate species.
Sonoran desert tortoise	*Gopherus morafkai*	Candidate	Large herbivorous reptile with domed shell and round stumpy hind legs. The carapace is a dull brown or grey color and the plastron is unhinged, often pale yellow in coloration. Sonoran desert tortoises generally have a flatter carapace than tortoises in the Mohave population. Active in spring and during the monsoon; dormant in winter and mid-summer months.	Cochise, Gila, Graham, La Paz, Maricopa, Mohave, Pima, Pinal, Santa Cruz, Yavapai, Yuma	< 7,800 ft	Primarily rocky (often steep) hillsides and bajadas of Mohave and Sonoran desertscub but may encroach into desert grassland, juniper woodland, interior chaparral habitats, and even pine communities. Washes and valley bottoms may be used in dispersal.	Desert tortoises that occur east and south of the Colorado River in Arizona are known as the Sonoran desert tortoise. Individuals are found throughout their historic range; but populations are becoming increasingly fragmented due to threats to their habitat in valley bottoms, which are used for dispersal and exchange of genetic material.

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Tucson shovel-nosed snake	*Chionactis occipitalis klauberi*	Candidate	Small snake (10-17 inches total length) in the family Colubridae, with a shovel-shaped snout and an inset lower jaw. Overall coloring mimics coral snakes, with pale yellow to cream-colored body, 21 or more black or brown saddle-like bands across the back, and orange-red saddle-like bands in between. The subspecies is distinguished from the other subspecies in that these secondary orange-red crossbands are suffused with dark pigment, making them appear brown or partly black, and the black and red crossbands do not encircle the entire body.	Maricopa, Pima, Pinal	785-1,662 ft	Sonoran Desertscrub; associated with soft, sandy soils having sparse gravel.	Found in creosote-mesquite floodplain environments, finds refuge under desert shrubs,active during crepuscular (dawn and dusk) and daylight hours.
Yellow-billed cuckoo	*Coccyzus americanus*	Candidate	Medium-sized bird with a slender, long-tailed profile, slightly down-curved bill that is blue-black with yellow on the lower half. Plumage is grayish-brown above and white below, with rufous primary flight feathers.	Apache, Cochise, Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, Yavapai, Yuma	< 6,500 ft	Large blocks of riparian woodlands (cottonwood, willow, or tamarisk galleries).	Neotropical migrant that winters primarily in South America and breeds primarily in the U.S. (but also in southern Canada and northern Mexico). As a migrant it is rarely detected; can occur outside of riparian areas. Cuckoos are found nesting statewide, mostly below 5,000 feet in central, western, and southeastern Arizona. Concern for cuckoos are primarily focused upon alterations to its nesting and foraging habitat. Nesting cuckoos are associated with relatively dense, wooded, streamside riparian habitat, with varying combinations of Fremont cottonwood, willow, velvet ash, Arizona walnut, mesquite, and tamarisk. Some cuckoos have also been detected nesting in velvet mesquite, netleaf hackberry, Arizona sycamore, Arizona alder, and some exotic neighborhood shade trees.

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
American peregrine falcon	*Falco pereginus anatum*	Delisted	A crow-sized falcon with slate blue-gray on the back and wings, and white on the underside; a black head with vertical "bandit's mask" pattern over the eyes; long pointed wings; and a long wailing call made during breeding. Very adept flyers and hunters, reaching diving speeds of 200 mph.	Apache, Cochise, Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, Yavapai, Yuma	3,500-9,000 ft	Areas with rocky, steep cliffs, primarily near water, where prey (primarily shorebirds, songbirds, and waterfowl) concentrations are high. Nests are found on ledges of cliffs, and sometimes on man-made structures such as office towers and bridge abutments.	Species recovered with over 1,650 breeding birds in the US and Canada.
Bald eagle	*Haliaeetus leucocephalus*	Delisted	Large, adults have white head and tail. Height 28 to 38 inches; wingspan 66 to 96 inches. Juveniles and subadults are dark brown with varying degrees of white mottling on chest, wings, and head.	Apache, Coconino, Gila, Graham, La Paz, Maricopa, Mohave, Pinal, and Yavapai	Varies	Large trees or cliffs near water (reservoirs, rivers, and streams) with abundant prey.	Nationwide and throughout the State of Arizona, the bald eagle is currently not listed under the Endangered Species Act. On September 30, 2010, the U.S. District Court dissolved an injunction that led to the bald eagle in the Sonoran Desert Area of central Arizona being placed on the Endangered Species list in 2008. This determination is presently (January 2011) under judicial consideration. Bald eagles are protected under the Bald and Golden Eagle Protection Act (Eagle Act) and other Federal and state statutes. The word "disturb" under the Eagle Act was recently clarified, as well as the implementation of new regulations requiring permits to incidentally "take" eagles. Retrieve more information on management and life history at http://SWBEMC.org.
Cactus ferruginous pygmy-owl	*Glaucidium brasilianum cactorum*	Delisted; petitioned for relisting	Small reddish-brown owl with a cream-colored belly streaked with reddish-brown. Males average 2.2 oz and females average 2.6 oz. Length is approximately 6.5 in., including a relatively long tail. Lacks ear tufts, and has paired black spots on the back of the head.	Pima, Pinal	< 4,000 ft	Areas of desert woodlands with tall canopy cover. Primarily found in Sonoran desert scrub and occasionally in riparian drainages and woodlands within semi-desert grassland communities. Prefers to nest in cavities in saguaro cacti but has been found in low-density suburban developments that include natural open spaces.	Not recognized as a protected taxonomic entity under the Act, but protected from direct take of individuals and nests/eggs under the Migratory Bird Treaty Act. A 2006 petition for relisting under the Act is currently being evaluated. Due to low population numbers, captive breeding research was initiated in 2006 with some success.

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
California brown pelican	*Pelecanus occidentalis californicus*	Delisted	Large, dark gray-brown water bird with webbed feet, pouch underneath its long bill, and wingspan of 7 ft. Adults have a white head and neck, brownish black breast, and silver gray upper parts.	Gila, La Paz, Maricopa, Mohave, Pinal, Yuma	Varies	Coastal land and islands; species found occasionally around Arizona's lakes and rivers.	Considered an uncommon transient in Arizona. Most observations recorded along the Colorado River and in the Gila Valley. Individuals known to wander up from Mexico in summer and fall. No breeding has been documented in Arizona. Delisted on November 17, 2009 (74 FR 59444).

Santa Cruz County

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Canelo Hills ladies' tresses	*Spiranthes delitescens*	Endangered	Slender, erect member of the orchid family (Orchidaceae). Flower stalk 20 inches tall, may contain 40 white flowers spirally arranged on the flowering stalk.	Cochise, Santa Cruz	~ 5,000 ft	Finely grained, highly organic, saturated soils of cienegas.	Found in the San Pedro watershed. Potential habitat occurs in Sonora, Mexico, but no populations have been found.
Chiricahua leopard frog	*Lithobates chiricahuensis*	Threatened	Cream colored tubercles (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 leopard frogs.	Apache, Cochise, Coconino, Gila, Graham, Greenlee, Navajo, Pima, Santa Cruz, Yavapai	3,281-8,890 ft	Restricted to springs, livestock tanks, and streams in upper portion of watersheds that are free from nonnative predators or where marginal habitat for nonnative predators exists.	Critical habitat is designated for 10,346 acres in Apache, Cochise, Gila, Graham, Greenlee, Pima, Santa Cruz, and Yavapai counties in Arizona; and Catron, Hidalgo, Grant, Sierra, and Socorro counties in New Mexico (77 FR 16324).
Desert pupfish	*Cyprinodon macularius*	Endangered	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 and juveniles tan to olive colored back and silvery sides.	Cochise, Graham, Maricopa, Pima, Pinal, Santa Cruz, Yavapai	< 4,000 ft	Shallow springs, small streams, and marshes. Tolerates saline and warm water.	Two subspecies are recognized: Desert Pupfish (C.m. macularis) and Quitobaquito Pupfish (C.m. eremus). Critical habitat includes Quitobaquito Springs, Pima County, portions of San Felipe Creek, Carrizo Wash, and Fish Creek Wash, Imperial County, California.
Gila chub	*Gila intermedia*	Endangered	Deep compressed body, flat head. Dark olive-gray color above, silver sides. Endemic to Gila River Basin.	Cochise, Gila, Graham, Greenlee, Pima, Pinal, Santa Cruz, Yavapai	2,000-5,500 ft	Pools, springs, cienegas, and streams.	Occurs on Federal, State, and private lands, including the Nature Conservancy and the Audubon Society. Also occurs in Sonora, Mexico. Critical habitat includes Cochise, Gila, Graham, Greenlee, Pima, Pinal, Santa Cruz, and Yavapai counties (70 FR 66664).
Gila topminnow	*Poeciliopsis occidentalis occidentalis*	Endangered	Small (2 inches), guppy-like, live bearing, lacks dark spots on its fins. Breeding males are jet black with yellow fins.	Cochise, Gila, Graham, La Paz, Maricopa, Pima, Pinal, Santa Cruz, Yavapai	< 4,500 ft	Small streams, springs, and cienegas vegetated shallows.	Species historically also occurred in backwaters of large rivers but is currently isolated to small streams and springs.

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Huachuca water umbel	*Lilaeopsis schaffneriana ssp. recurva*	Endangered	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.	Cochise, Pima, Santa Cruz	3,500-6,500 ft	Cienegas, perennial low gradient streams, wetlands.	Species also occurs in adjacent Sonora, Mexico, west of the continental divide. Critical habitat includes Cochise and Santa Cruz counties (64 FR 37441).
Jaguar	*Panthera onca*	Endangered	Largest species of cat native to Southwest. Muscular, with relatively short, massive limbs, and a deep-chested body. Usually cinnamon-buff in color with many black spots. Weights ranges from 90-300 lbs.	Cochise, Pima, Santa Cruz	1,600-9,000 ft	Found in Sonoran desertscrub up through subalpine conifer forest.	Critical habitat is being proposed for a total of 838,232 ac. in Cochise, Pima, and Santa Cruz counties, Arizona; and Hidalgo County, New Mexico (77 FR 50214). A recovery team for the jaguar was formed in 2010, who completed a recovery outline for the species in April, 2012. The recovery team is currently developing a full recovery plan for the species based on the recovery outline.
Lesser long-nosed bat	*Leptonycteris curasoae yerbabuenae*	Endangered	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.	Cochise, Gila, Graham, Greenlee, Maricopa, Pima, Pinal, Santa Cruz, Yuma	1,600-7,500 ft	Desert scrub habitat with agave and columnar 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 September and south of the border the remainder of the year.
Mexican spotted owl	*Strix occidentalis lucida*	Threatened	Medium sized with dark eyes and no ear tufts. Brownish and heavily spotted with white or beige.	Apache, Cochise, Coconino, Gila, Graham, Greenlee, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, Yavapai	4,100-9,000 ft	Nests in canyons and dense forests with multi-layered foliage structure.	Generally nest in older forests of mixed conifer or ponderosa pine/gambel oak type, in canyons, and use variety of habitats for foraging. Sites with cool microclimates appear to be of importance or are preferred. Critical habitat was finalized on August 31, 2004 (69 FR 53182) in Arizona in Apache, Cochise, Coconino, Gila, Graham, Greenlee, Maricopa, Navajo, Pima, Pinal, Santa Cruz, and Yavapai counties.

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Ocelot	*Leopardus pardalis*	Endangered	Medium-sized spotted cat that is yellowish with black streaks and stripes running from front to back. Tail is spotted and about 1/2 the length of head and body. Face is less heavily streaked than the back and sides.	Cochise,Gila, Graham, Pima, Pinal, Santa Cruz	< 8,000 ft	Desert scrub in Arizona. Humid tropical and sub-tropical forests, and savannahs in areas south of the U.S.	Little is known about ocelot habitat use in Arizona; however, ocelots are typically associated with areas of dense cover. Four confirmed reports of ocelots have been received from Gila (one) and Cochise (three) counties since 2009. Based on photographic evidence, two of the reports from Cochise County were most likely of the same ocelot.
Pima pineapple cactus	*Coryphantha scheeri var. robustispina*	Endangered	Hemispherical 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.	Pima, Santa Cruz	2,300-5,000 ft	Sonoran desertscrub or semi-desert grassland communities.	Occurs in alluvial valleys or on hillsides in rocky to sandy or silty soils. This species can be confused with juvenile barrel cactus (Ferocactus). However, the spines of the later are flattened, in contrast with the round cross-section of the Coryphanta spines. About 80-90% of individuals occur on state or private land.
Sonora chub	*Gila ditaenia*	Threatened	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.	Santa Cruz	3,900 ft	Perennial and intermittent, small to moderate sized streams with boulders and cliffs.	Critical habitat includes Sycamore Creek (Santa Cruz County) and a 15 meter buffer from the U.S.- Mexico border to approximately 8 km upstream; Yank Spring; lowermost 2 km of Penasco Creek; and lowermost 0.4 km of an unnamed Sycamore Creek tributary (51 FR 16042). Species extends into Mexico (Altar and Magdalena rivers).
Sonoran tiger salamander	*Ambystoma mavortium stebbinsi*	Endangered	Large, light-colored blotches or reticulations on a dark background. Metamorphosed individuals are 1.8 to 5.9 inches in snout-vent length. Aquatic larvae are uniform dark colored with plume-like gills and developed tail fins.	Cochise, Santa Cruz	4,000-6,300 ft	Stock tanks and impounded cienegas; rodent burrows, rotted logs, and other moist cover sites.	Populations occur within the headwaters of the Santa Cruz and San Pedro Rivers. These include San Rafael Valley and in the foothills of the east slope of the Patagonia and Huachuca Mountains and Fort Huachuca.

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Southwestern willow flycatcher	*Empidonax traillii extimus*	Endangered	Small passerine (about 6 inches) grayish-green back and wings, whitish throat, light olive-gray breast and pale yellowish belly. Two wingbars visible. Eye-ring faint or absent.	Apache, Cochise, Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, Yavapai, Yuma	< 8,500 ft	Cottonwood/willow and tamarisk vegetation communities along rivers and streams.	Riparian-obligate bird that occupies migratory/breeding habitat from late April-Sept. Critical habitat was finalized on October 19, 2005 in Apache, Cochise, Gila, Graham, Greenlee, Maricopa, Mohave, Pima, Pinal, and Yavapai counties (70 FR 60886). Revised critical habitat was proposed August 15, 2011 (76 FR 50542) and includes river segments in counties currently designated plus those in La Paz, Santa Cruz, and Yuma counties. The 2005 critical habitat designation remains in effect until the current proposal is finalized. Training seminar/permits required for those conducting call playback surveys.
Arizona treefrog (Huachuca/Canelo DPS)	*Hyla wrightorum*	Candidate	Small (1.8 inches in length) green frog; dark eye stripe extends past shoulder onto the sides of the body, may break into spots or dashes past shoulder, throat on males dusky green or tan; larger tadpoles golden brown above and below with mottled black tails.	Cochise, Santa Cruz	5,000-8,500 ft	Madrean oak woodlands, savannah, pine-oak woodlands, and mixed conifer forests.	Known from less than 20 localities in the Huachuca Mountains and adjacent Canelo Hills. Believed this population is geographically disjunct from the other known locality in the wetlands at Rancho Los Fresnos, Sonora, Mexico.
Huachuca springsnail	*Pyrgulopsis thompsoni*	Candidate	Very small (.06-.12 inches) conical shell. Identification must be verified by characteristics of reproductive organs.	Cochise, Santa Cruz	4,500-7,200 ft	Aquatic areas, small springs with vegetation and slow to moderate flow.	Individuals found on firm substances (roots, wood, and rocks). Other populations found on Fort Huachuca.

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Northern Mexican Gartersnake	*Thamnophis eques megalops*	Candidate	Background color ranges from olive, olive-brown, to olive-gray. Body has three yellow or light colored stripes running down the length of the body, darker towards tail. Species distinguished from other native gartersnakes by the lateral stripes reaching the 3rd and 4th scale rows. Paired black spots extend along dorsolateral fields.	Apache, Cochise, Coconino, Gila, Graham, Navajo, Pima, Pinal, Santa Cruz, Yavapai	130-8,500 ft	Cienegas, stock tanks, large-river riparian woodlands and forests, streamside gallery forests.	Core population areas in the U.S. include mid/upper Verde River drainage, mid/lower Tonto Creek, and the San Rafael Valley and surrounding area. Status on tribal lands unknown. Distributed south into Mexico along the Sierra Madre Occidental and Mexican Plateau. Strongly associated with the presence of a native prey base including leopard frogs and native fish.
Sonoran desert tortoise	*Gopherus morafkai*	Candidate	Large herbivorous reptile with domed shell and round stumpy hind legs. The carapace is a dull brown or grey color and the plastron is unhinged, often pale yellow in coloration. Sonoran desert tortoises generally have a flatter carapace than tortoises in the Mohave population. Active in spring and during the monsoon; dormant in winter and mid-summer months.	Cochise, Gila, Graham, La Paz, Maricopa, Mohave, Pima, Pinal, Santa Cruz, Yavapai, Yuma	< 7,800 ft	Primarily rocky (often steep) hillsides and bajadas of Mohave and Sonoran desertscub but may encroach into desert grassland, juniper woodland, interior chaparral habitats, and even pine communities. Washes and valley bottoms may be used in dispersal.	Desert tortoises that occur east and south of the Colorado River in Arizona are known as the Sonoran desert tortoise. Individuals are found throughout their historic range; but populations are becoming increasingly fragmented due to threats to their habitat in valley bottoms, which are used for dispersal and exchange of genetic material.
Sprague's pipit	*Anthus spragueii*	Candidate	Small, sparrow-sized bird (10-15 cm in length), with buff and blackish streaking on the crown, nape, and underparts. Has a short bill with a blackish upper mandible, a buffy face with a large eye ring, white outer tail feathers and pale to yellowish legs.	Cochise, Maricopa, La Paz, Santa Cruz, Yuma	<5,000 ft	Strong preference to native grasslands with vegetation of intermediate height and lacking woody shrubs.	Rare in Arizona. Few individuals of this elusive species have been sighted during October through March. Native grass fields are rare in Arizona but cultivated, dry Bermuda grass, alfalfa fields mixed with patches of dry grass, or fallow fields appear to support the species during wintering. They will not use mowed or burned areas until the vegetation has had a chance to grow. There are no breeding records in Arizona.
Stephan's riffle beetle	*Heterelmis stephani*	Candidate	Small aquatic beetle, typically less than 0.11 inches in total length.	Santa Cruz	5,100-6,600 ft	Free-flowing springs and seeps, commonly referred to as rheocrenes.	Current distribution is limited to Sylvester Spring. Historically known from Bog Springs, the type locality. Both springs located in Madera Canyon on the Coronado National Forest.

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Yellow-billed cuckoo	*Coccyzus americanus*	Candidate	Medium-sized bird with a slender, long-tailed profile, slightly down-curved bill that is blue-black with yellow on the lower half. Plumage is grayish-brown above and white below, with rufous primary flight feathers.	Apache, Cochise, Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, Yavapai, Yuma	< 6,500 ft	Large blocks of riparian woodlands (cottonwood, willow, or tamarisk galleries).	Neotropical migrant that winters primarily in South America and breeds primarily in the U.S. (but also in southern Canada and northern Mexico). As a migrant it is rarely detected; can occur outside of riparian areas. Cuckoos are found nesting statewide, mostly below 5,000 feet in central, western, and southeastern Arizona. Concern for cuckoos are primarily focused upon alterations to its nesting and foraging habitat. Nesting cuckoos are associated with relatively dense, wooded, streamside riparian habitat, with varying combinations of Fremont cottonwood, willow, velvet ash, Arizona walnut, mesquite, and tamarisk. Some cuckoos have also been detected nesting in velvet mesquite, netleaf hackberry, Arizona sycamore, Arizona alder, and some exotic neighborhood shade trees.
American peregrine falcon	*Falco peregrinus anatum*	Delisted	A crow-sized falcon with slate blue-gray on the back and wings, and white on the underside; a black head with vertical “bandit’s mask” pattern over the eyes; long pointed wings; and a long wailing call made during breeding. Very adept flyers and hunters, reaching diving speeds of 200 mph.	Apache, Cochise, Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, Yavapai, Yuma	3,500-9,000 ft	Areas with rocky, steep cliffs, primarily near water, where prey (primarily shorebirds, songbirds, and waterfowl) concentrations are high. Nests are found on ledges of cliffs, and sometimes on man-made structures such as office towers and bridge abutments.	Species recovered with over 1,650 breeding birds in the US and Canada.

APPENDIX E
AIR QUALITY CALCULATIONS

EDMS 5.1 Model Inputs for Pima_County Study

Study Created:	Wed Jan 08 15:27:19 2014
Report Date:	Wed Jan 15 07:59:37 2014
Study Pathname:	C:\EDMS 5.1\Angel_Thunder\Pima_County\Pima_County.edm

Study Setup

Unit System:	English
Dispersion Modeling:	Dispersion is not enabled for this study
Speciated Hydrocarbon Modeling:	Speciated Hydrocarbon Modeling is not enabled for this study
Analysis Years:	2014

Scenarios

Scenario Name:	Description:	Add a description.
Baseline	Aircraft Times in Mode Basis:	Performance-Based
	Taxi Time Modeling:	User-specified Taxi Times
	FOA3 Sulfur-to-Sulfate Conversion Rate:	2.400000 %

Airports

Airport Name:	Pima County
IATA Code:	DMA
ICAO Code:	KDMA
FAA Code:	
Country:	US
State:	Arizona
City:	
Airport Description:	Pima county
Latitude:	32.166°
Longitude:	-110.883°
Northing:	3558893.53
Easting:	511017.69
UTM Zone:	12
Elevation:	2704.00 feet
PM Modeling Methodology:	FOA3a (Sulfur-to-Sulfate Conversion Rate = 5.0%, Fuel Sulfur Content = 0.068%)

Scenario-Airport: Baseline, Pima County

Weather

Baseline, Pima County

Mixing Height:	3000.00 feet
Temperature:	68.00 °F
Daily High Temperature:	78.35 °F
Daily Low Temperature:	57.65 °F
Pressure:	29.92 inches of Hg
Sea Level Pressure:	29.89 inches of Hg
Relative Humidity:	33.22
Wind Speed:	6.81 knots
Wind Direction:	0.00 °
Ceiling:	99999.99 feet
Visibility:	50.00 miles

The user has used annual averages.

Base Elevation:	2704.00 feet
Date Range:	Thursday, January 01, 2004 to Friday, December 31, 2004
Source Data File Location:	
Upper Air Data File Location:	

Quarter-Hourly Operational Profiles

Baseline, Pima County

Name: DEFAULT

Quarter-Hour	Weight	Quarter-Hour	Weight	Quarter-Hour	Weight	Quarter-Hour	Weight
12:00am to 12:14 am	1.000000	6:00am to 6:14am	1.000000	12:00pm to 12:14 pm	1.000000	6:00pm to 6:14pm	1.000000
12:15am to 12:29 am	1.000000	6:15am to 6:29am	1.000000	12:15pm to 12:29 pm	1.000000	6:15pm to 6:29pm	1.000000
12:30am to 12:44 am	1.000000	6:30am to 6:44am	1.000000	12:30pm to 12:44 pm	1.000000	6:30pm to 6:44pm	1.000000
12:45am to 12:59 am	1.000000	6:45am to 6:59am	1.000000	12:45pm to 12:59 pm	1.000000	6:45pm to 6:59pm	1.000000
1:00am to 1:14am	1.000000	7:00am to 7:14am	1.000000	1:00pm to 1:14pm	1.000000	7:00pm to 7:14pm	1.000000
1:15am to 1:29am	1.000000	7:15am to 7:29am	1.000000	1:15pm to 1:29pm	1.000000	7:15pm to 7:29pm	1.000000
1:30am to 1:44am	1.000000	7:30am to 7:44am	1.000000	1:30pm to 1:44pm	1.000000	7:30pm to 7:44pm	1.000000
1:45am to 1:59am	1.000000	7:45am to 7:59am	1.000000	1:45pm to 1:59pm	1.000000	7:45pm to 7:59pm	1.000000
2:00am to 2:14am	1.000000	8:00am to 8:14am	1.000000	2:00pm to 2:14pm	1.000000	8:00pm to 8:14pm	1.000000
2:15am to 2:29am	1.000000	8:15am to 8:29am	1.000000	2:15pm to 2:29pm	1.000000	8:15pm to 8:29pm	1.000000
2:30am to 2:44am	1.000000	8:30am to 8:44am	1.000000	2:30pm to 2:44pm	1.000000	8:30pm to 8:44pm	1.000000
2:45am to 2:59am	1.000000	8:45am to 8:59am	1.000000	2:45pm to 2:59pm	1.000000	8:45pm to 8:59pm	1.000000
3:00am to 3:14am	1.000000	9:00am to 9:14am	1.000000	3:00pm to 3:14pm	1.000000	9:00pm to 9:14pm	1.000000
3:15am to 3:29am	1.000000	9:15am to 9:29am	1.000000	3:15pm to 3:29pm	1.000000	9:15pm to 9:29pm	1.000000
3:30am to 3:44am	1.000000	9:30am to 9:44am	1.000000	3:30pm to 3:44pm	1.000000	9:30pm to 9:44pm	1.000000
3:45am to 3:59am	1.000000	9:45am to 9:59am	1.000000	3:45pm to 3:59pm	1.000000	9:45pm to 9:59pm	1.000000
4:00am to 4:14am	1.000000	10:00am to 10:14am	1.000000	4:00pm to 4:14pm	1.000000	10:00pm to 10:14pm	1.000000
4:15am to 4:29am	1.000000	10:15am to 10:29am	1.000000	4:15pm to 4:29pm	1.000000	10:15pm to 10:29pm	1.000000
4:30am to 4:44am	1.000000	10:30am to 10:44am	1.000000	4:30pm to 4:44pm	1.000000	10:30pm to 10:44pm	1.000000
4:45am to 4:59am	1.000000	10:45am to 10:59am	1.000000	4:45pm to 4:59pm	1.000000	10:45pm to 10:59pm	1.000000
5:00am to 5:14am	1.000000	11:00am to 11:14am	1.000000	5:00pm to 5:14pm	1.000000	11:00pm to 11:14pm	1.000000
5:15am to 5:29am	1.000000	11:15am to 11:29am	1.000000	5:15pm to 5:29pm	1.000000	11:15pm to 11:29pm	1.000000
5:30am to 5:44am	1.000000	11:30am to 11:44am	1.000000	5:30pm to 5:44pm	1.000000	11:30pm to 11:44pm	1.000000
5:45am to 5:59am	1.000000	11:45am to 11:59am	1.000000	5:45pm to 5:59pm	1.000000	11:45pm to 11:59pm	1.000000

Daily Operational Profiles

Baseline, Pima County

Name: DEFAULT

Day	Weight	Day	Weight
Monday	1.000000	Friday	1.000000
Tuesday	1.000000	Saturday	1.000000
Wednesday	1.000000	Sunday	1.000000
Thursday	1.000000		

Monthly Operational Profiles

Baseline, Pima County

Name: DEFAULT

Month	Weight	Month	Weight
January	1.000000	July	1.000000
February	1.000000	August	1.000000
March	1.000000	September	1.000000
April	1.000000	October	1.000000
May	1.000000	November	1.000000
June	1.000000	December	1.000000

Aircraft

Baseline, Pima County

Default Taxi Out Time:	19.000000 min

Default Taxi In Time: 7.000000 min

Year:	Uses Schedule?	Schedule Filename:
2014	No	(None)

Aircraft Name:
Lockheed C-130 Hercules
Engine Type:
T56-A-15
Identification:
#1
Category:
LMTC

Take Off weight:	59874.00 Kgs
Approach Weight:	55111.00 Kgs
Glide Slope:	3.00°
APU Assignment:	None
APU Departure OP Time:	13.00 min
APU Arrival OP Time:	13.00 min
Gate Assignment:	None

Assigned GSE/AGE:	FUEL	Arrival Op Time (mins)	Departure Op Time (mins)	Horsepower (hp)	Load Factor (%)	Manufactured Year
Cart (Taylor Dunn)	Diesel	5.00	5.00	25.00	50.00	
Generator (Generic)	Diesel	0.00	120.00	158.00	82.00	
Lift (Generic)	Diesel	5.00	5.00	115.00	50.00	
Other (Generic)	Diesel	0.00	0.00	140.00	50.00	

Year:
2014

Annual Departures:	0
Annual Arrivals:	0
Annual TGOs:	2160
Taxi Out Time:	Determined by Sequencing model
Taxi In Time:	Determined by Sequencing model

Departure Quarter-Hourly Operational profile:	DEFAULT
Departure Daily Operational Profile:	DEFAULT
Departure Monthly Operational Profile:	DEFAULT
Arrival Quarter-Hourly Operational profile:	DEFAULT
Arrival Daily Operational Profile:	DEFAULT
Arrival Monthly Operational Profile:	DEFAULT
Touch & Go Quarter-Hourly Operational profile:	DEFAULT
Touch & Go Daily Operational Profile:	DEFAULT
Touch & Go Monthly Operational Profile:	DEFAULT

Aircraft Name:
Sikorsky SH-60 Sea Hawk
Engine Type:
T700-GE-401 -401C
Identification:
#1
Category:
SMTH

Take Off weight:	9185.00 Kgs
Approach Weight:	9185.00 Kgs
Glide Slope:	3.00°
APU Assignment:	None
APU Departure OP Time:	13.00 min
APU Arrival OP Time:	13.00 min
Gate Assignment:	None

Assigned GSE/AGE:	FUEL	Arrival Op Time (mins)	Departure Op Time (mins)	Horsepower (hp)	Load Factor (%)	Manufactured Year

Year:
2014

Annual Departures:	13500
Annual Arrivals:	13500
Annual TGOs:	0
Taxi Out Time:	Determined by Sequencing model
Taxi In Time:	Determined by Sequencing model

Departure Quarter-Hourly Operational profile:	DEFAULT
Departure Daily Operational Profile:	DEFAULT
Departure Monthly Operational Profile:	DEFAULT

Arrival Quarter-Hourly Operational profile:	DEFAULT
Arrival Daily Operational Profile:	DEFAULT
Arrival Monthly Operational Profile:	DEFAULT
Touch & Go Quarter-Hourly Operational profile:	DEFAULT
Touch & Go Daily Operational Profile:	DEFAULT
Touch & Go Monthly Operational Profile:	DEFAULT

GSE Population — Baseline, Pima County

None.

Parking Facilities — Baseline, Pima County

None.

Roadways — Baseline, Pima County

None.

Stationary Sources — Baseline, Pima County

None.

Training Fires — Baseline, Pima County

None.

Gates — Baseline, Pima County

None.

Taxiways — Baseline, Pima County

None.

Runways — Baseline, Pima County

None.

Taxipaths — Baseline, Pima County

None.

Configurations — Baseline, Pima County

None.

Buildings — Baseline, Pima County

None.

Discrete Cartesian Receptors — Baseline, Pima County

None.

Discrete Polar Receptors — Baseline, Pima County

None.

Cartesian Receptor Networks — Baseline, Pima County

None.

Polar Receptor Networks — Baseline, Pima County

None.

User-Created Aircraft — Baseline, Pima County

None.

User-Created GSE — Baseline, Pima County

None.

User-Created APU — Baseline, Pima County

None.

Aircraft Emissions by Mode

(Short Tons per Year)

Baseline - Pima County 2014

Type	Engine	ID	Euro. ...	Mode	CO2	CO	THC	NM...	VOC	TOG	NOx	SOx	PM-...	PM-...	Fuel Consu...
Lockheed C-130 Herc...	T56-A-15	#1	TP	Startup	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lockheed C-130 Herc...	T56-A-15	#1	TP	Taxi Out	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lockheed C-130 Herc...	T56-A-15	#1	TP	Takeoff	293.683	0.107	0.005	0.006	0.006	0.006	1.050	0.120	N/A	N/A	93.085
Lockheed C-130 Herc...	T56-A-15	#1	TP	Climb Out	3,801.854	3.830	0.676	0.782	0.777	0.782	8.560	1.557	N/A	N/A	1,205.025
Lockheed C-130 Herc...	T56-A-15	#1	TP	Approach	177.053	1.002	0.448	0.518	0.516	0.518	0.247	0.073	N/A	N/A	56.118
Lockheed C-130 Herc...	T56-A-15	#1	TP	Taxi In	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sikorsky SH-60 Sea H...	T700-GE-401 -4...	#1	H2	Startup	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sikorsky SH-60 Sea H...	T700-GE-401 -4...	#1	H2	Taxi Out	4,945.959	19.247	1.038	1.200	1.194	1.200	7.930	2.025	N/A	N/A	1,567.657
Sikorsky SH-60 Sea H...	T700-GE-401 -4...	#1	H2	Takeoff	233.226	0.888	0.049	0.057	0.056	0.057	0.390	0.096	N/A	N/A	73.923
Sikorsky SH-60 Sea H...	T700-GE-401 -4...	#1	H2	Climb Out	16.213	0.062	0.003	0.004	0.004	0.004	0.027	0.007	N/A	N/A	5.139
Sikorsky SH-60 Sea H...	T700-GE-401 -4...	#1	H2	Approach	352.735	1.383	0.075	0.086	0.086	0.086	0.566	0.144	N/A	N/A	111.802
Sikorsky SH-60 Sea H...	T700-GE-401 -4...	#1	H2	Taxi In	5,450.404	21.396	1.154	1.334	1.327	1.334	8.743	2.232	N/A	N/A	1,727.545

Aircraft Emissions Summary

(Short Tons per Year)

Baseline - Pima County 2014

Type	Engine	ID	Euro. ...		CO2	CO	THC	NM...	VOC	TOG	NOx	SOx	PM-...	PM-...	Fuel Consu...
Lockheed C-130 Herc...	T56-A-15	#1	TP	Total	4,272.590	4.940	1.129	1.306	1.299	1.306	9.856	1.750	N/A	N/A	1,354.228
Lockheed C-130 Herc...	T56-A-15	#1	TP	APU(s)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lockheed C-130 Herc...	T56-A-15	#1	TP	GSE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sikorsky SH-60 Sea H...	T700-GE-401 -4...	#1	H2	Total	10,998.538	42.976	2.318	2.680	2.667	2.680	17.656	4.504	N/A	N/A	3,486.066
Sikorsky SH-60 Sea H...	T700-GE-401 -4...	#1	H2	APU(s)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sikorsky SH-60 Sea H...	T700-GE-401 -4...	#1	H2	GSE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Emissions Inventory Summary

(Short Tons per Year)

Baseline - Pima County 2014

Category	CO2	CO	THC	NMHC	VOC	TOG	NOx	SOx	PM-10	PM-2.5
Aircraft	15,271.128	47.915	3.448	3.986	3.965	3.986	27.512	6.254	N/A	N/A
GSE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
APUs	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Parking Facilities	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roadways	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Stationary Sources	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Training Fires	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grand Total	15,271.128	47.915	3.448	3.986	3.965	3.986	27.512	6.254	N/A	N/A

EDMS 5.1 Model Inputs for Cochise_County Study

Study Created:	Wed Jan 15 08:45:36 2014
Report Date:	Wed Jan 15 09:04:35 2014
Study Pathname:	C:\EDMS 5.1\Cochise_County\Cochise_County.edm

Study Setup

Unit System:	Metric
Dispersion Modeling:	Dispersion is not enabled for this study
Speciated Hydrocarbon Modeling:	Speciated Hydrocarbon Modeling is not enabled for this study
Analysis Years:	2014

Scenarios

Scenario Name:	Description:	Add a description.
Baseline	Aircraft Times in Mode Basis:	Performance-Based
	Taxi Time Modeling:	User-specified Taxi Times
	FOA3 Sulfur-to-Sulfate Conversion Rate:	2.400000 %

Airports

Airport Name:	Cochise County
IATA Code:	DMA
ICAO Code:	KDMA
FAA Code:	
Country:	US
State:	Arizona
City:	Tucson
Airport Description:	Davis Monthan Afb
Latitude:	32.166°
Longitude:	-110.883°
Northing:	3558893.53
Easting:	511017.69
UTM Zone:	12
Elevation:	2704.00 feet
PM Modeling Methodology:	FOA3a (Sulfur-to-Sulfate Conversion Rate = 5.0%, Fuel Sulfur Content = 0.068%)

Scenario-Airport: Baseline, Cochise County

Weather

Baseline, Cochise County

Mixing Height:	914.40 meters
Temperature:	20.00 °C
Daily High Temperature:	25.75 °C
Daily Low Temperature:	14.25 °C
Pressure:	101320.73 Pa
Sea Level Pressure:	101219.14 Pa
Relative Humidity:	33.22
Wind Speed:	12.61 kph
Wind Direction:	0.00 °
Ceiling:	30480.00 m
Visibility:	80.47 km
The user has used annual averages.	
Base Elevation:	824.18 meters
Date Range:	Thursday, January 01, 2004 to Friday, December 31, 2004
Source Data File Location:	
Upper Air Data File Location:	

Quarter-Hourly Operational Profiles

Baseline, Cochise County

Name: DEFAULT

Quarter-Hour	Weight	Quarter-Hour	Weight	Quarter-Hour	Weight	Quarter-Hour	Weight
12:00am to 12:14 am	1.000000	6:00am to 6:14am	1.000000	12:00pm to 12:14 pm	1.000000	6:00pm to 6:14pm	1.000000
12:15am to 12:29 am	1.000000	6:15am to 6:29am	1.000000	12:15pm to 12:29 pm	1.000000	6:15pm to 6:29pm	1.000000
12:30am to 12:44 am	1.000000	6:30am to 6:44am	1.000000	12:30pm to 12:44 pm	1.000000	6:30pm to 6:44pm	1.000000
12:45am to 12:59 am	1.000000	6:45am to 6:59am	1.000000	12:45pm to 12:59 pm	1.000000	6:45pm to 6:59pm	1.000000
1:00am to 1:14am	1.000000	7:00am to 7:14am	1.000000	1:00pm to 1:14pm	1.000000	7:00pm to 7:14pm	1.000000
1:15am to 1:29am	1.000000	7:15am to 7:29am	1.000000	1:15pm to 1:29pm	1.000000	7:15pm to 7:29pm	1.000000
1:30am to 1:44am	1.000000	7:30am to 7:44am	1.000000	1:30pm to 1:44pm	1.000000	7:30pm to 7:44pm	1.000000
1:45am to 1:59am	1.000000	7:45am to 7:59am	1.000000	1:45pm to 1:59pm	1.000000	7:45pm to 7:59pm	1.000000
2:00am to 2:14am	1.000000	8:00am to 8:14am	1.000000	2:00pm to 2:14pm	1.000000	8:00pm to 8:14pm	1.000000
2:15am to 2:29am	1.000000	8:15am to 8:29am	1.000000	2:15pm to 2:29pm	1.000000	8:15pm to 8:29pm	1.000000
2:30am to 2:44am	1.000000	8:30am to 8:44am	1.000000	2:30pm to 2:44pm	1.000000	8:30pm to 8:44pm	1.000000
2:45am to 2:59am	1.000000	8:45am to 8:59am	1.000000	2:45pm to 2:59pm	1.000000	8:45pm to 8:59pm	1.000000
3:00am to 3:14am	1.000000	9:00am to 9:14am	1.000000	3:00pm to 3:14pm	1.000000	9:00pm to 9:14pm	1.000000
3:15am to 3:29am	1.000000	9:15am to 9:29am	1.000000	3:15pm to 3:29pm	1.000000	9:15pm to 9:29pm	1.000000
3:30am to 3:44am	1.000000	9:30am to 9:44am	1.000000	3:30pm to 3:44pm	1.000000	9:30pm to 9:44pm	1.000000
3:45am to 3:59am	1.000000	9:45am to 9:59am	1.000000	3:45pm to 3:59pm	1.000000	9:45pm to 9:59pm	1.000000
4:00am to 4:14am	1.000000	10:00am to 10:14am	1.000000	4:00pm to 4:14pm	1.000000	10:00pm to 10:14pm	1.000000
4:15am to 4:29am	1.000000	10:15am to 10:29am	1.000000	4:15pm to 4:29pm	1.000000	10:15pm to 10:29pm	1.000000
4:30am to 4:44am	1.000000	10:30am to 10:44am	1.000000	4:30pm to 4:44pm	1.000000	10:30pm to 10:44pm	1.000000
4:45am to 4:59am	1.000000	10:45am to 10:59am	1.000000	4:45pm to 4:59pm	1.000000	10:45pm to 10:59pm	1.000000
5:00am to 5:14am	1.000000	11:00am to 11:14am	1.000000	5:00pm to 5:14pm	1.000000	11:00pm to 11:14pm	1.000000
5:15am to 5:29am	1.000000	11:15am to 11:29am	1.000000	5:15pm to 5:29pm	1.000000	11:15pm to 11:29pm	1.000000
5:30am to 5:44am	1.000000	11:30am to 11:44am	1.000000	5:30pm to 5:44pm	1.000000	11:30pm to 11:44pm	1.000000
5:45am to 5:59am	1.000000	11:45am to 11:59am	1.000000	5:45pm to 5:59pm	1.000000	11:45pm to 11:59pm	1.000000

Daily Operational Profiles

Baseline, Cochise County

Name: DEFAULT

Day	Weight	Day	Weight
Monday	1.000000	Friday	1.000000
Tuesday	1.000000	Saturday	1.000000
Wednesday	1.000000	Sunday	1.000000
Thursday	1.000000		

Monthly Operational Profiles

Baseline, Cochise County

Name: DEFAULT

Month	Weight	Month	Weight
January	1.000000	July	1.000000
February	1.000000	August	1.000000
March	1.000000	September	1.000000
April	1.000000	October	1.000000
May	1.000000	November	1.000000
June	1.000000	December	1.000000

Aircraft

Baseline, Cochise County

Default Taxi Out Time: 19.000000 min

Default Taxi In Time: 7.000000 min

Year:	Uses Schedule?	Schedule Filename:
2014	No	(None)

Aircraft Name:
Lockheed C-130 Hercules
Engine Type:
T56-A-15
Identification:
#1
Category:
LMTC

Take Off weight:	59874.00 Kgs
Approach Weight:	55111.00 Kgs
Glide Slope:	3.00°
APU Assignment:	None
APU Departure OP Time:	13.00 min
APU Arrival OP Time:	13.00 min
Gate Assignment:	None

Assigned GSE/AGE:	FUEL	Arrival Op Time (mins)	Departure Op Time (mins)	Horsepower (hp)	Load Factor (%)	Manufactured Year
Cart (Taylor Dunn)	Diesel	5.00	5.00	25.00	50.00	
Generator (Generic)	Diesel	0.00	120.00	158.00	82.00	
Lift (Generic)	Diesel	5.00	5.00	115.00	50.00	
Other (Generic)	Diesel	0.00	0.00	140.00	50.00	

Year:
2014

Annual Departures:	0
Annual Arrivals:	0
Annual TGOs:	1680
Taxi Out Time:	Determined by Sequencing model
Taxi In Time:	Determined by Sequencing model

Departure Quarter-Hourly Operational profile:	DEFAULT
Departure Daily Operational Profile:	DEFAULT
Departure Monthly Operational Profile:	DEFAULT
Arrival Quarter-Hourly Operational profile:	DEFAULT
Arrival Daily Operational Profile:	DEFAULT
Arrival Monthly Operational Profile:	DEFAULT
Touch & Go Quarter-Hourly Operational profile:	DEFAULT
Touch & Go Daily Operational Profile:	DEFAULT
Touch & Go Monthly Operational Profile:	DEFAULT

Aircraft Name:
Sikorsky SH-60 Sea Hawk
Engine Type:
T700-GE-401 -401C
Identification:
#1
Category:
SMTH

Take Off weight:	9185.00 Kgs
Approach Weight:	9185.00 Kgs
Glide Slope:	3.00°
APU Assignment:	None
APU Departure OP Time:	13.00 min
APU Arrival OP Time:	13.00 min
Gate Assignment:	None

Assigned GSE/AGE:	FUEL	Arrival Op Time (mins)	Departure Op Time (mins)	Horsepower (hp)	Load Factor (%)	Manufactured Year

Year:
2014

Annual Departures:	10500
Annual Arrivals:	10500
Annual TGOs:	0
Taxi Out Time:	0.010000 min
Taxi In Time:	0.010000 min

Departure Quarter-Hourly Operational profile:	DEFAULT
Departure Daily Operational Profile:	DEFAULT
Departure Monthly Operational Profile:	DEFAULT

Arrival Quarter-Hourly Operational profile:	DEFAULT
Arrival Daily Operational Profile:	DEFAULT
Arrival Monthly Operational Profile:	DEFAULT
Touch & Go Quarter-Hourly Operational profile:	DEFAULT
Touch & Go Daily Operational Profile:	DEFAULT
Touch & Go Monthly Operational Profile:	DEFAULT

GSE Population — Baseline, Cochise County

None.

Parking Facilities — Baseline, Cochise County

None.

Roadways — Baseline, Cochise County

None.

Stationary Sources — Baseline, Cochise County

None.

Training Fires — Baseline, Cochise County

None.

Gates — Baseline, Cochise County

None.

Taxiways — Baseline, Cochise County

None.

Runways — Baseline, Cochise County

None.

Taxipaths — Baseline, Cochise County

None.

Configurations — Baseline, Cochise County

None.

Buildings — Baseline, Cochise County

None.

Discrete Cartesian Receptors — Baseline, Cochise County

None.

Discrete Polar Receptors — Baseline, Cochise County

None.

Cartesian Receptor Networks — Baseline, Cochise County

None.

Polar Receptor Networks — Baseline, Cochise County

None.

User-Created Aircraft — Baseline, Cochise County

None.

User-Created GSE — Baseline, Cochise County

None.

User-Created APU — Baseline, Cochise County

None.

Aircraft Emissions by Mode

(Metric Tons per Year)

Baseline - Cochise County 2014

Type	Engine	ID	Euro. ...	Mode	CO2	CO	THC	NM...	VOC	TOG	NOx	SOx	PM-...	PM-...	Fuel Consu...
Lockheed C-130 Herc...	T56-A-15	#1	TP	Startup	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lockheed C-130 Herc...	T56-A-15	#1	TP	Taxi Out	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lockheed C-130 Herc...	T56-A-15	#1	TP	Takeoff	207.219	0.076	0.004	0.004	0.004	0.004	0.741	0.085	N/A	N/A	65.680
Lockheed C-130 Herc...	T56-A-15	#1	TP	Climb Out	2,682.543	2.702	0.477	0.551	0.549	0.551	6.039	1.099	N/A	N/A	850.251
Lockheed C-130 Herc...	T56-A-15	#1	TP	Approach	124.927	0.707	0.316	0.366	0.364	0.366	0.174	0.051	N/A	N/A	39.596
Lockheed C-130 Herc...	T56-A-15	#1	TP	Taxi In	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sikorsky SH-60 Sea H...	T700-GE-401 -4...	#1	H2	Startup	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sikorsky SH-60 Sea H...	T700-GE-401 -4...	#1	H2	Taxi Out	1.837	0.007	0.000	0.000	0.000	0.000	0.003	0.001	N/A	N/A	0.582
Sikorsky SH-60 Sea H...	T700-GE-401 -4...	#1	H2	Takeoff	164.562	0.627	0.035	0.040	0.040	0.040	0.275	0.067	N/A	N/A	52.159
Sikorsky SH-60 Sea H...	T700-GE-401 -4...	#1	H2	Climb Out	11.440	0.044	0.002	0.003	0.003	0.003	0.019	0.005	N/A	N/A	3.626
Sikorsky SH-60 Sea H...	T700-GE-401 -4...	#1	H2	Approach	248.886	0.976	0.053	0.061	0.061	0.061	0.399	0.102	N/A	N/A	78.886
Sikorsky SH-60 Sea H...	T700-GE-401 -4...	#1	H2	Taxi In	2,561.858	10.101	0.545	0.630	0.626	0.630	4.110	1.049	N/A	N/A	811.999

Aircraft Emissions Summary

(Metric Tons per Year)

Baseline - Cochise County 2014

Type	Engine	ID	Euro. G...		CO2	CO	THC	NM...	VOC	TOG	NOx	SOx	PM-...	PM-...	Fuel Consu...
Lockheed C-130 Herc...	T56-A-15	#1	TP	Total	3,014.689	3.485	0.797	0.921	0.916	0.921	6.954	1.235	N/A	N/A	955.527
Lockheed C-130 Herc...	T56-A-15	#1	TP	APU(s)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lockheed C-130 Herc...	T56-A-15	#1	TP	GSE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sikorsky SH-60 Sea H...	T700-GE-401 -40...	#1	H2	Total	2,988.582	11.754	0.635	0.734	0.730	0.734	4.807	1.224	N/A	N/A	947.253
Sikorsky SH-60 Sea H...	T700-GE-401 -40...	#1	H2	APU(s)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sikorsky SH-60 Sea H...	T700-GE-401 -40...	#1	H2	GSE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Emissions Inventory Summary

(Metric Tons per Year)

Baseline - Cochise County 2014

Category	CO2	CO	THC	NMHC	VOC	TOG	NOx	SOx	PM-10	PM-2.5
Aircraft	6,003.271	15.239	1.431	1.655	1.646	1.655	11.761	2.458	N/A	N/A
GSE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
APUs	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Parking Facilities	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roadways	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Stationary Sources	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Training Fires	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grand Total	6,003.271	15.239	1.431	1.655	1.646	1.655	11.761	2.458	N/A	N/A

EDMS 5.1 Model Inputs for Gila_Pinal_Santa_Cruz_Graham_Counties Study

Study Created:	Wed Jan 15 09:13:49 2014
Report Date:	Wed Jan 15 09:42:36 2014
Study Pathname:	C:\EDMS 5.1\Gila_Pinal_Santa_Cruz_Graham_Counties\Gila_Pinal_Santa_Cruz_Graham_Counties.edm

Study Setup

Unit System:	Metric
Dispersion Modeling:	Dispersion is not enabled for this study
Speciated Hydrocarbon Modeling:	Speciated Hydrocarbon Modeling is not enabled for this study
Analysis Years:	2014

Scenarios

Scenario Name:	Description:	Add a description.
Baseline	Aircraft Times in Mode Basis:	Performance-Based
	Taxi Time Modeling:	User-specified Taxi Times
	FOA3 Sulfur-to-Sulfate Conversion Rate:	2.400000 %

Airports

Airport Name:	Gila_Pinal_Santa Cruz and Graham Counties
IATA Code:	DMA
ICAO Code:	KDMA
FAA Code:	
Country:	US
State:	Arizona
City:	Tucson
Airport Description:	Davis Monthan Afb
Latitude:	32.166°
Longitude:	-110.883°
Northing:	3558893.53
Easting:	511017.69
UTM Zone:	12
Elevation:	2704.00 feet
PM Modeling Methodology:	FOA3a (Sulfur-to-Sulfate Conversion Rate = 5.0%, Fuel Sulfur Content = 0.068%)

Scenario-Airport: Baseline, Gila_Pinal_Santa Cruz and Graham Counties

Weather

Baseline, Gila_Pinal_Santa Cruz and Graham Counties

Mixing Height:	914.40 meters
Temperature:	20.00 °C
Daily High Temperature:	25.75 °C
Daily Low Temperature:	14.25 °C
Pressure:	101320.73 Pa
Sea Level Pressure:	101219.14 Pa
Relative Humidity:	33.22
Wind Speed:	12.61 kph
Wind Direction:	0.00 °
Ceiling:	30480.00 m
Visibility:	80.47 km

The user has used annual averages.

Base Elevation:	824.18 meters
Date Range:	Thursday, January 01, 2004 to Friday, December 31, 2004
Source Data File Location:	
Upper Air Data File Location:	

Quarter-Hourly Operational Profiles

Baseline, Gila_Pinal_Santa Cruz and Graham Counties

Name: DEFAULT

Quarter-Hour	Weight	Quarter-Hour	Weight	Quarter-Hour	Weight	Quarter-Hour	Weight
12:00am to 12:14 am	1.000000	6:00am to 6:14am	1.000000	12:00pm to 12:14 pm	1.000000	6:00pm to 6:14pm	1.000000
12:15am to 12:29 am	1.000000	6:15am to 6:29am	1.000000	12:15pm to 12:29 pm	1.000000	6:15pm to 6:29pm	1.000000
12:30am to 12:44 am	1.000000	6:30am to 6:44am	1.000000	12:30pm to 12:44 pm	1.000000	6:30pm to 6:44pm	1.000000
12:45am to 12:59 am	1.000000	6:45am to 6:59am	1.000000	12:45pm to 12:59 pm	1.000000	6:45pm to 6:59pm	1.000000
1:00am to 1:14am	1.000000	7:00am to 7:14am	1.000000	1:00pm to 1:14pm	1.000000	7:00pm to 7:14pm	1.000000
1:15am to 1:29am	1.000000	7:15am to 7:29am	1.000000	1:15pm to 1:29pm	1.000000	7:15pm to 7:29pm	1.000000
1:30am to 1:44am	1.000000	7:30am to 7:44am	1.000000	1:30pm to 1:44pm	1.000000	7:30pm to 7:44pm	1.000000
1:45am to 1:59am	1.000000	7:45am to 7:59am	1.000000	1:45pm to 1:59pm	1.000000	7:45pm to 7:59pm	1.000000
2:00am to 2:14am	1.000000	8:00am to 8:14am	1.000000	2:00pm to 2:14pm	1.000000	8:00pm to 8:14pm	1.000000
2:15am to 2:29am	1.000000	8:15am to 8:29am	1.000000	2:15pm to 2:29pm	1.000000	8:15pm to 8:29pm	1.000000
2:30am to 2:44am	1.000000	8:30am to 8:44am	1.000000	2:30pm to 2:44pm	1.000000	8:30pm to 8:44pm	1.000000
2:45am to 2:59am	1.000000	8:45am to 8:59am	1.000000	2:45pm to 2:59pm	1.000000	8:45pm to 8:59pm	1.000000
3:00am to 3:14am	1.000000	9:00am to 9:14am	1.000000	3:00pm to 3:14pm	1.000000	9:00pm to 9:14pm	1.000000
3:15am to 3:29am	1.000000	9:15am to 9:29am	1.000000	3:15pm to 3:29pm	1.000000	9:15pm to 9:29pm	1.000000
3:30am to 3:44am	1.000000	9:30am to 9:44am	1.000000	3:30pm to 3:44pm	1.000000	9:30pm to 9:44pm	1.000000
3:45am to 3:59am	1.000000	9:45am to 9:59am	1.000000	3:45pm to 3:59pm	1.000000	9:45pm to 9:59pm	1.000000
4:00am to 4:14am	1.000000	10:00am to 10:14am	1.000000	4:00pm to 4:14pm	1.000000	10:00pm to 10:14pm	1.000000
4:15am to 4:29am	1.000000	10:15am to 10:29am	1.000000	4:15pm to 4:29pm	1.000000	10:15pm to 10:29pm	1.000000
4:30am to 4:44am	1.000000	10:30am to 10:44am	1.000000	4:30pm to 4:44pm	1.000000	10:30pm to 10:44pm	1.000000
4:45am to 4:59am	1.000000	10:45am to 10:59am	1.000000	4:45pm to 4:59pm	1.000000	10:45pm to 10:59pm	1.000000
5:00am to 5:14am	1.000000	11:00am to 11:14am	1.000000	5:00pm to 5:14pm	1.000000	11:00pm to 11:14pm	1.000000
5:15am to 5:29am	1.000000	11:15am to 11:29am	1.000000	5:15pm to 5:29pm	1.000000	11:15pm to 11:29pm	1.000000
5:30am to 5:44am	1.000000	11:30am to 11:44am	1.000000	5:30pm to 5:44pm	1.000000	11:30pm to 11:44pm	1.000000
5:45am to 5:59am	1.000000	11:45am to 11:59am	1.000000	5:45pm to 5:59pm	1.000000	11:45pm to 11:59pm	1.000000

Daily Operational Profiles

Baseline, Gila_Pinal_Santa Cruz and Graham Counties

Name: DEFAULT

Day	Weight	Day	Weight
Monday	1.000000	Friday	1.000000
Tuesday	1.000000	Saturday	1.000000
Wednesday	1.000000	Sunday	1.000000
Thursday	1.000000		

Monthly Operational Profiles

Baseline, Gila_Pinal_Santa Cruz and Graham Counties

Name: DEFAULT

Month	Weight	Month	Weight
January	1.000000	July	1.000000
February	1.000000	August	1.000000
March	1.000000	September	1.000000
April	1.000000	October	1.000000
May	1.000000	November	1.000000
June	1.000000	December	1.000000

Aircraft

Baseline, Gila_Pinal_Santa Cruz and Graham Counties

Default Taxi Out Time:	19.000000 min

Default Taxi In Time: 7.000000 min

Year:	Uses Schedule?	Schedule Filename:
2014	No	(None)

Aircraft Name:
Lockheed C-130 Hercules
Engine Type:
T56-A-15
Identification:
#1
Category:
LMTC

Take Off weight:	70225.00 Kgs
Approach Weight:	61143.00 Kgs
Glide Slope:	3.00°
APU Assignment:	None
APU Departure OP Time:	13.00 min
APU Arrival OP Time:	13.00 min
Gate Assignment:	None

Assigned GSE/AGE:	FUEL	Arrival Op Time (mins)	Departure Op Time (mins)	Horsepower (hp)	Load Factor (%)	Manufactured Year
Cart (Taylor Dunn)	Diesel	5.00	5.00	25.00	50.00	
Generator (Generic)	Diesel	0.00	120.00	158.00	82.00	
Lift (Generic)	Diesel	5.00	5.00	115.00	50.00	
Other (Generic)	Diesel	0.00	0.00	140.00	50.00	

Year:
2014

Annual Departures:	1500
Annual Arrivals:	1500
Annual TGOs:	240
Taxi Out Time:	0.010000 min
Taxi In Time:	0.010000 min

Departure Quarter-Hourly Operational profile:	DEFAULT
Departure Daily Operational Profile:	DEFAULT
Departure Monthly Operational Profile:	DEFAULT
Arrival Quarter-Hourly Operational profile:	DEFAULT
Arrival Daily Operational Profile:	DEFAULT
Arrival Monthly Operational Profile:	DEFAULT
Touch & Go Quarter-Hourly Operational profile:	DEFAULT
Touch & Go Daily Operational Profile:	DEFAULT
Touch & Go Monthly Operational Profile:	DEFAULT

Aircraft Name:
Sikorsky SH-60 Sea Hawk
Engine Type:
T700-GE-401 -401C
Identification:
#1
Category:
SMTH

Take Off weight:	9185.00 Kgs
Approach Weight:	9185.00 Kgs
Glide Slope:	3.00°
APU Assignment:	None
APU Departure OP Time:	13.00 min
APU Arrival OP Time:	13.00 min
Gate Assignment:	None

Assigned GSE/AGE:	FUEL	Arrival Op Time (mins)	Departure Op Time (mins)	Horsepower (hp)	Load Factor (%)	Manufactured Year

Year:
2014

Annual Departures:	1500
Annual Arrivals:	1500
Annual TGOs:	0
Taxi Out Time:	Determined by Sequencing model
Taxi In Time:	Determined by Sequencing model

Departure Quarter-Hourly Operational profile:	DEFAULT
Departure Daily Operational Profile:	DEFAULT
Departure Monthly Operational Profile:	DEFAULT

Arrival Quarter-Hourly Operational profile:	DEFAULT
Arrival Daily Operational Profile:	DEFAULT
Arrival Monthly Operational Profile:	DEFAULT
Touch & Go Quarter-Hourly Operational profile:	DEFAULT
Touch & Go Daily Operational Profile:	DEFAULT
Touch & Go Monthly Operational Profile:	DEFAULT

GSE Population

Baseline, Gila_Pinal_Santa Cruz and Graham Counties

None.

Parking Facilities

Baseline, Gila_Pinal_Santa Cruz and Graham Counties

None.

Roadways

Baseline, Gila_Pinal_Santa Cruz and Graham Counties

None.

Stationary Sources

Baseline, Gila_Pinal_Santa Cruz and Graham Counties

None.

Training Fires

Baseline, Gila_Pinal_Santa Cruz and Graham Counties

None.

Gates

Baseline, Gila_Pinal_Santa Cruz and Graham Counties

None.

Taxiways

Baseline, Gila_Pinal_Santa Cruz and Graham Counties

None.

Runways

Baseline, Gila_Pinal_Santa Cruz and Graham Counties

None.

Taxipaths

Baseline, Gila_Pinal_Santa Cruz and Graham Counties

None.

Configurations

Baseline, Gila_Pinal_Santa Cruz and Graham Counties

None.

Buildings

Baseline, Gila_Pinal_Santa Cruz and Graham Counties

None.

Discrete Cartesian Receptors

Baseline, Gila_Pinal_Santa Cruz and Graham Counties

None.

Discrete Polar Receptors

Baseline, Gila_Pinal_Santa Cruz and Graham Counties

None.

Cartesian Receptor Networks

Baseline, Gila_Pinal_Santa Cruz and Graham Counties

None.

Polar Receptor Networks

Baseline, Gila_Pinal_Santa Cruz and Graham Counties

None.

User-Created Aircraft

Baseline, Gila_Pinal_Santa Cruz and Graham Counties

None.

User-Created GSE

Baseline, Gila_Pinal_Santa Cruz and Graham Counties

None.

User-Created APU

Baseline, Gila_Pinal_Santa Cruz and Graham Counties

None.

Aircraft Emissions by Mode

(Metric Tons per Year)

Baseline - Gila_Pinal_Santa Cruz and Graham Counties 2014

Type	Engine	ID	Euro. G...	Mode	CO2	CO	THC	NM...	VOC	TOG	NOx	SOx	PM-...	PM-...	Fuel Consu...
Lockheed C-130 Herc...	T56-A-15	#1	TP	Startup	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lockheed C-130 Herc...	T56-A-15	#1	TP	Taxi Out	0.394	0.004	0.002	0.003	0.003	0.003	0.000	0.000	N/A	N/A	0.125
Lockheed C-130 Herc...	T56-A-15	#1	TP	Takeoff	513.776	0.297	0.059	0.069	0.068	0.069	1.760	0.210	N/A	N/A	162.845
Lockheed C-130 Herc...	T56-A-15	#1	TP	Climb Out	797.126	0.473	0.046	0.054	0.053	0.054	2.387	0.326	N/A	N/A	252.655
Lockheed C-130 Herc...	T56-A-15	#1	TP	Approach	217.112	1.199	0.531	0.614	0.610	0.614	0.303	0.089	N/A	N/A	68.815
Lockheed C-130 Herc...	T56-A-15	#1	TP	Taxi In	15.281	0.091	0.044	0.051	0.050	0.051	0.022	0.006	N/A	N/A	4.843
Sikorsky SH-60 Sea H...	T700-GE-401 -40...	#1	H2	Startup	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sikorsky SH-60 Sea H...	T700-GE-401 -40...	#1	H2	Taxi Out	498.544	1.940	0.105	0.121	0.120	0.121	0.799	0.204	N/A	N/A	158.017
Sikorsky SH-60 Sea H...	T700-GE-401 -40...	#1	H2	Takeoff	23.509	0.090	0.005	0.006	0.006	0.006	0.039	0.010	N/A	N/A	7.451
Sikorsky SH-60 Sea H...	T700-GE-401 -40...	#1	H2	Climb Out	1.634	0.006	0.000	0.000	0.000	0.000	0.003	0.001	N/A	N/A	0.518
Sikorsky SH-60 Sea H...	T700-GE-401 -40...	#1	H2	Approach	35.555	0.139	0.008	0.009	0.009	0.009	0.057	0.015	N/A	N/A	11.269
Sikorsky SH-60 Sea H...	T700-GE-401 -40...	#1	H2	Taxi In	549.391	2.157	0.116	0.134	0.134	0.134	0.881	0.225	N/A	N/A	174.134

Aircraft Emissions Summary

(Metric Tons per Year)

Baseline - Gila_Pinal_Santa Cruz and Graham Counties 2014

Type	Engine	ID	Euro. G...		CO2	CO	THC	NM...	VOC	TOG	NOx	SOx	PM-...	PM-...	Fuel Consu...
Lockheed C-130 Herc...	T56-A-15	#1	TP	Total	1,543.689	2.064	0.683	0.789	0.785	0.789	4.472	0.632	N/A	N/A	489.283
Lockheed C-130 Herc...	T56-A-15	#1	TP	APU(s)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lockheed C-130 Herc...	T56-A-15	#1	TP	GSE	N/A	0.391	N/A	0.120	0.128	0.130	1.564	0.002	0.093	0.091	N/A
Sikorsky SH-60 Sea H...	T700-GE-401 -40...	#1	H2	Total	1,108.634	4.332	0.234	0.270	0.269	0.270	1.780	0.454	N/A	N/A	351.390
Sikorsky SH-60 Sea H...	T700-GE-401 -40...	#1	H2	APU(s)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sikorsky SH-60 Sea H...	T700-GE-401 -40...	#1	H2	GSE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Emissions Inventory Summary

(Metric Tons per Year)

Baseline - Gila_Pinal_Santa Cruz and Graham Counties 2014

Category	CO2	CO	THC	NMHC	VOC	TOG	NOx	SOx	PM-10	PM-2.5
Aircraft	2,652.323	6.396	0.916	1.059	1.054	1.059	6.252	1.086	N/A	N/A
GSE	N/A	0.391	N/A	0.120	0.128	0.130	1.564	0.002	0.093	0.091
APUs	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Parking Facilities	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roadways	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Stationary Sources	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Training Fires	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grand Total	2,652.323	6.787	0.916	1.179	1.182	1.190	7.815	1.089	0.093	0.091