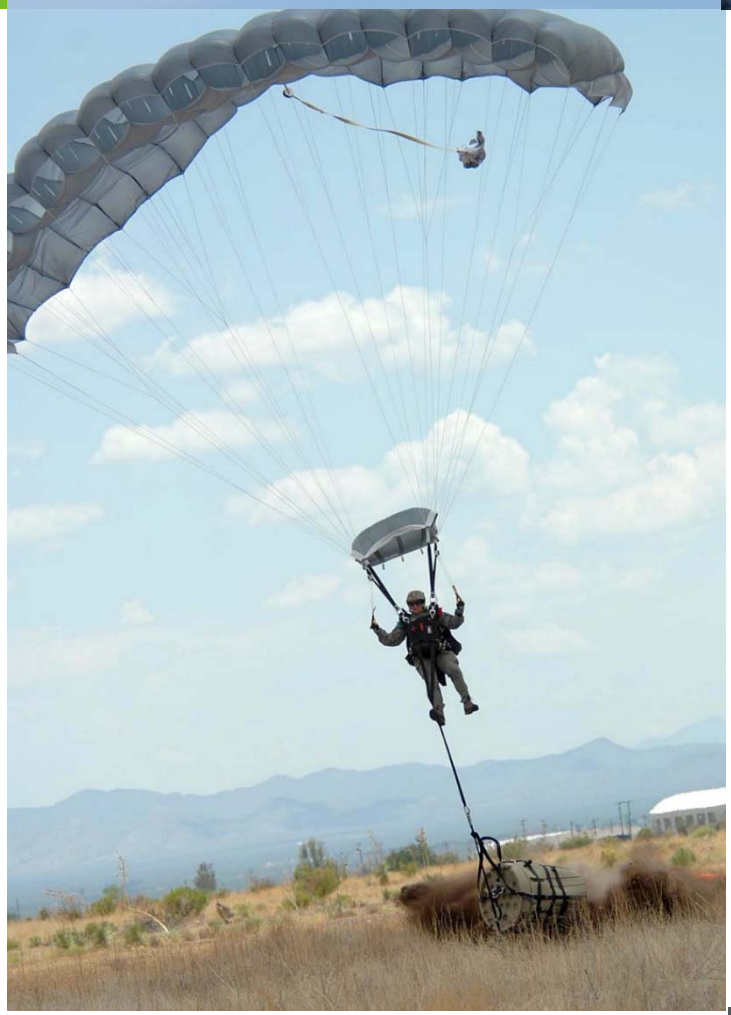

Final

Environmental Assessment

Addressing the Angel Thunder Personnel Recovery/Rescue Training Exercise in the Southwestern United States

Volume I

May

2017

ABBREVIATIONS AND ACRONYMS

µg/m3	micrograms per cubic meter
AA	Alert Area
ABW	Air Base Wing
ACC	Air Combat Command
ACP	Airspace Control Plan
AFB	Air Force Base
AFI	Air Force Instruction
AFPD	Air Force Policy Directive
AFOSH	Air Force Occupational and Environmental Safety, Fire Protection, and Health
AGL	above ground level
AICUZ	Air Installation Compatible Use Zone
APCD	Air Pollution Control District
APE	area of potential effect
AQCR	air quality control region
AR	Aerial Refueling Track
ARB	Air Reserve Base
ARTCC	Air Route Traffic Control Center
AT	Angel Thunder
ATC	Air Traffic Control
BMGR	Barry M. Goldwater Range
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	carbon monoxide
CO2	carbon dioxide
CO2e	carbon dioxide equivalent
CRO	Combat Rescue Officer
CSAR	Combat Search and Rescue
CTS	Combat Training Squadron
dB	decibel
dBA	A-weighted decibels
DNL	Day-Night Sound Level
DOD	Department of Defense
DPS	Department of Public Safety
DZ	drop zone
EA	Environmental Assessment
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulation
FARP	forward aircraft refueling point
FONSI	Finding of No Significant Impact
FR	Federal Register
FW	Fighter Wing
HLZ	helicopter landing zone
IAP	International Airport
ICRMP	Integrated Cultural Resources Management Plan
INRMP	Integrated Natural Resources Management Plan
IR	instrument route
ISR	Intelligence Surveillance and Reconnaissance
LATN	low altitude tactical navigation
L_{eq}	Equivalent Sound Level
LTO	landing takeoff cycle
LZ	landing zone
MBTA	Migratory Bird Treaty Act
mg/m^3	milligrams per cubic meter

continued on inside of back cover →

← *continued from inside of front cover*

Mgpy	megagrams per year
MOA	Military Operations Area
MOU	Memorandum of Understanding
MOUT	military operations in urban terrain
MSL	mean sea level
MTR	military training route
NAAQS	National Ambient Air Quality Standards
NAR	non-conventional assisted recovery
NAS	Naval Air Station
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NF	National Forest
NM	nautical mile(s)
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
NOTAM	Notice to Airmen
NRHP	National Register of Historic Places
O_3	ozone
Pb	lead
PCE	primary constituent element
PM_{10}	particulate matter equal to or less than 10 microns in aerodynamic diameter
$PM_{2.5}$	particulate matter equal to or less than 2.5 microns in aerodynamic diameter
POL	petroleum, oil, and lubricants
ppb	parts per billion
ppm	parts per million
PR	Personnel Recovery
PSD	Prevention of Significant Deterioration
RA	Restricted Area
RCRA	Resource Conservation and Recovery Act
ROI	region of influence
RQG	Rescue Group
RQS	Rescue Squadron
SERE	Survival, Evasion, Resistance and Escape
SFAR	Special Federal Aviation Regulation
SHPO	State Historic Preservation Officer
SO_2	sulfur dioxide
SPCC	Spill Prevention Control and Countermeasures
SR	Slow Route
SUA	special use airspace
TCPs	traditional cultural properties
THPO	Tribal Historic Preservation Officer
tpy	tons per year
U.S.	United States
UAS	unmanned aerial system
USAF	U.S. Air Force
U.S.C.	United States Code
USEPA	U.S. Environmental Protection Agency
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
VR	visual route
VOC	volatile organic compound
WA	warning area
WTA	water training area
ZAB	Albuquerque
ZLA	Los Angeles

FINDING OF NO SIGNIFICANT IMPACT
for the
ENVIRONMENTAL ASSESSMENT ADDRESSING THE ANGEL THUNDER
PERSONNEL RECOVERY/RESCUE TRAINING EXERCISE IN THE SOUTHWESTERN UNITED STATES

Pursuant to provisions of the National Environmental Policy Act (NEPA), Title 42 United States Code (USC) Sections 4321 to 4347, implemented by Council on Environmental Quality (CEQ) Regulations, Title 40, Code of Federal Regulations (CFR) §1500-1508, and 32 CFR §989, Environmental Impact Analysis Process, the U.S. Air Force (USAF) assessed the potential environmental consequences associated with the USAF proposal to conduct Air Combat Command (ACC) biannual Angel Thunder (AT) Personnel Recovery/Rescue (PR) exercises, which is primarily based out of Davis-Monthan Air Force Base (AFB), Arizona.

The purpose of the Proposed Action is to provide adequate PR training during ACC's biannual AT PR exercise in the southwestern United States (U.S.) [see **Table 2-1** in the Environmental Assessment (EA)]. Exercise participants would include USAF PR forces, Joint Services, local/state agencies, Department of Defense (DOD) Interagencies, and Foreign Partner Nations.

The need for the action is to ensure PR preparation efforts keep pace with changes in the global operating environment; be prepared to plan and execute PR operations with other interagency partners; and be prepared to conduct interoperable and mutually cooperative PR operations with partner and host nations to rescue DOD personnel whenever possible. PR is an Air Force Service Core Function. DOD Directive 3002.01E, *Personnel Recovery*, defines PR as "one of the highest priorities of the DOD," and tasks Service Chiefs with this responsibility. The biannual AT exercise needs to provide the most realistic PR training environment available to USAF Rescue forces so that they comply with DOD Directive 3002.01E, as well as Air Force Policy Directive 10-30, *Personnel Recovery*.

The EA, incorporated by reference into this finding, analyzes the potential environmental consequences of activities associated with the AT PR exercise, and provides environmental protection measures to avoid or reduce adverse environmental impacts.

The EA considers all potential impacts of the Proposed Action and the No-Action Alternative. The EA also considers cumulative environmental impacts with other projects throughout the southwestern U.S.

PROPOSED ACTION
The USAF proposes to conduct the biannual AT exercise throughout the southwestern U.S. Specifically, the Proposed Action includes using DOD and non-DOD properties as landing zones (LZs), helicopter landing zones (HLZs), drop zones (DZs), ground training sites, and aircraft training sorties (a combat mission of an individual aircraft from takeoff to landing). Training would involve related DOD training airspaces and ranges using various numbers and types of American and foreign aircraft operating primarily from Davis-Monthan AFB.

Training
Each proposed biannual AT training exercise would consist of a three week exercise with multiple training missions that provide Rescue, PR, and Combat Search and Rescue (CSAR) training for aircrews; Pararescue; Intelligence personnel; Battle Managers; Special Forces; and Joint, Interagency, and International partners. This training would incorporate current CSAR training activities and would include additional proposed training activities. The first week of an exercise would be for classroom

training of support personnel, followed by a two to three day mobilization period, 10 to 11 days of field training, one day of de-mobilization and return to home base. The biannual training is proposed to normally occur during each spring and fall. Preparation of the training environment would occur five to six times before each exercise for several days at a time. Preparation would primarily consist of site surveys using approximately 10 to 20 personnel to assess the safety of specific locations for intended exercise execution.

Training missions include fully integrated large force scenarios during designated vulnerability windows or "VUL" periods and non-scenario based part-task training (e.g., training not associated with the active training scenario, such as weapons training on installation small arms ranges). Although up to 3,000 personnel could be engaged in an AT exercise a more realistic event would typically engage approximately 1,000 personnel, with international participation normally limited to five nations per training event. Training would include day/night extractions and day/night infiltration/evasion/exfiltration training. Aerial training activities would include aircraft refueling; tactical combat maneuvering by fixed- and rotary-wing aircraft; abrupt, unpredictable changes in altitude and direction of flight; airdrops of personnel and equipment; water hoists; and landing on unimproved surfaces.

All activities identified in the 2002 CSAR EA would continue to be an integral part of any AT exercise. In addition to these current training activities, part of the action would include Survival, Evasion, Resistance, and Escape (SERE) and Intelligence Surveillance and Reconnaissance (ISR) training. SERE training would be conducted at the various types of training areas with isolated personnel being recovered by various means. Participating sites would be determined in advance and coordination with controlling agencies would occur prior to the exercise. All vehicular ground operations would be conducted using existing paved and unpaved roads. No off-road vehicular activity is proposed.
A maximum of 800 sorties per exercise would be flown as part of the biannual AT exercise; 600 sorties would be flown out of Davis-Monthan AFB and 200 sorties would be flown from the respective unit's home station to the exercise site and return to home station. In addition, remotely piloted aircraft, such as the MQ-1 Predator or MQ-9 Reaper, would participate in restricted airspaces or under other conditions deemed allowable by the Federal Aviation Administration (FAA).

Operations centers would be set up at one or more forward operating airfields, would provide a centralized location for the command and control of training operations, and would serve as the focal point for planning, executing, and assessing air component operations. The present mobility concept is to rapidly deploy a force; provide beddown for aircraft, support equipment, and forces at a forward operating bare base for rescue; and provide aeromedical evacuation, security, and reconnaissance missions in support of a global contingency scenario. The bare base would have the minimum essential facilities to house, sustain, and support operations. The nucleus of the bare base Command, Control, Communications, Computers, and Intelligence operations would center on the Air Operations Center at Davis-Monthan AFB, Arizona with a forward Operations Center at Camp Navajo, Arizona.
Depending upon location and suitability, a few tents may be set up to support exercise activities. Alternatively, a similar number of conex shipping containers or recreational vehicles may be used to achieve the same objective. The mission objective would be to leave sites in the same condition they were in prior to the exercise. Surface and subsurface conditions such as sensitive resources or utility lines would determine whether tents or conexes would be used. In either situation, appropriate coordination would be completed with the specific airfield prior to execution. Additionally, when coordinated and available, the participating maintenance unit would use a supporting Fixed-Base Operator at the Flagstaff Pulliam Airport and the Winslow Regional Airport.

All airspace used during AT exercises would be governed by the AT Airspace Control Plan (ACP). The ACP outlines procedures and designates airspace for AT operations within temporary Playas Military Operation Area/Air Traffic Control Assigned Airspace and the Barry M. Goldwater Range East (the "Exercise Area"), and other identified restricted airspace. Responsibilities and procedures described in the ACP would be applicable to all participating aircraft and would be adhered to unless prior coordination was conducted.

Training Sites

The proposed training sites are located on federal, tribal, state, municipal, and private land in areas of Nevada, New Mexico, Arizona, and California that have been previously disturbed or that currently or have been previously used for the activities conducted under the Proposed Action. There are 53 sites used as HLZs, LZs, and DZs that would be located on current military installations, 37 on U.S. Forest Service (USFS) land, and 49 on miscellaneous non-DOD land. The locations would be selected in coordination with the appropriate range and other installation personnel and would be permitted sites already governed by the installations' environmental policies and procedures. In other cases, such as HLZs on USFS lands, special use permits would be required on an annual basis from the affected land managers for use of the proposed sites; and, the Air Force would ensure all such permits were current.

The training activities that would occur at each of the proposed training sites are included in **Table 2-1** in the EA. Numerous sites could serve multiple training purposes and not all of the proposed sites would be used every year. It is anticipated that under most training scenarios, 30 to 40 sites (21 to 28 percent) would be used during a single AT event with non-military sites being used on only one or two occasions during the training cycle. The nature and location of sites would vary from training cycle to training cycle depending on the scenario developed for the exercise. Through the use of varying training scenarios, overuse of specific sites would be avoided.

Helicopter Landing Zones. Most HLZs would consist of dedicated helicopter landing pads currently under use by other DOD, federal, state and local agencies. In more austere locations where no pad exists, HLZs would meet all requirements identified in Air Force Instruction (AFI) 13-217, *Drop Zone and Landing Zone Operations*. All HLZs would be surveyed in accordance with AFI 13-217 prior to their use. During the course of the biannual three-week exercises, up to 300 rotary-wing sorties could be conducted, of which up to 250 would derive from Davis-Monthan AFB, and the remainder could fly to the HLZs and return to their respective home station.

Landing Zones. LZs for fixed-wing aircraft would be located at established military and municipally owned airfields. Airfields would be subject to surveys prior to use in accordance with AFI 13-217. During the course of the biannual three-week exercises, up to 100 fixed-wing sorties would be conducted, of which up to 80 would derive from Davis-Monthan AFB, and the remainder would fly to the LZ and return to their respective home station.

Drop Zones. DZs would meet the requirements of AFI 13-217. With noted exceptions in **Table 2-1** of the EA, the use of a DZ would be for the insertion of pararescue personnel in small squad units normally around eight to 12 individuals.

Forward Aircraft Refueling Points. All airfields proposed for refueling activities currently have appropriate fuel storage on site and are managed in accordance with facility Spill Prevention Control, Countermeasure, and Contingency Plans. All AT refueling of fixed and rotary-wing aircraft would occur

within designated areas of the airfields and in accordance with airfield policies and procedures. Hot refueling and aircraft-to-aircraft ground refueling operations would be limited to existing approved locations on municipal airports and military installations.

Civil Search and Rescue/Non-Conventional Assisted Recovery. There are two regions designated as areas where non-conventional assisted recovery training would occur. The East region surrounds Springerville and Alpine in Arizona and the Reserve in New Mexico. The West region surrounds Flagstaff, Winslow, and Camp Navajo in Arizona only. A Non-Conventional Assisted Recovery training mission could be a rescue performed somewhere in an urban setting in conjunction with local law enforcement. Fixed-wing aircraft would train in close air support on existing military ranges and conduct air refueling within existing designated military training routes.

Miscellaneous. Other important training components that would be necessary to fulfill biannual AT exercise objectives include classroom training, technical rope work, small arms qualification, military operations in urban terrain (MOUT) training, and preparation of the training environment.

Training Site Locations

Additional Military Installations. There are 53 sites used as HLZs, LZs, and DZs that would be located on current military installations (see EA **Table 2-1**). The locations would be selected in coordination with the appropriate range and other installation personnel and would be permitted sites already governed by the installations' environmental policies and procedures. Under installation environmental programs, range control managers are required to ensure that all training activities on approved range site are in compliance with the goals and objectives of all environmental management plans and any associated conditions relating to their use resulting from consultation efforts with federal, state and local agencies. If AT training needs meet these objectives, the requests would be placed on the training calendars for the specific ranges.

Lands under the Control of the USFS. AT proposes to use 37 sites within the Kaibab, Coconino, Apache-Sitgreaves, Tonto, Coronado, and Gila National Forests of Arizona and New Mexico (see EA **Table 2-1**). All USFS HLZ sites in EA **Table 2-1** are currently or formerly used by their personnel or contractors in helicopter operations supporting fire suppression and pest control activities. The proposed sites were selected in coordination with the respective district rangers and their staff. If a USFS site is proposed for training activities for a given exercise, USAF would continue to coordinate with district rangers to ensure proper USFS procedures would be followed. Use of any site would require a current special use permit that would be consistent with appropriate USFS Plans, specify the area to be used, nature of the activity to be conducted, designated trails to be used for foot traffic and availability of the road network as well as any seasonal restrictions to use. Sites would be permitted for use subject to availability and the results of this EA. If the USFS determines that a site would not be suitable for training, special use permits would not be issued and alternative sites would be chosen.

Tribal, State, and Municipal Lands. These properties would offer a variety of training opportunities to AT. Many of the sites would consist of municipal airports that would provide for HLZs, LZs, and DZs and, in some instances, of forward aircraft refueling points. Others consist of tribal and state recreation areas that allow for water training at locations in closer proximity to Davis-Monthan AFB than proposed Pacific coast sites associated with military installation training areas in California (see EA **Table 2-1**). All activities at all locations would be reviewed in consultation and coordination with the appropriate Tribal, state, and local approval or permitting authorities.

Private Property. Several sites proposed as DZ/HLZs are on private ranches (see "Private" under Controlling Agency in EA **Table 2-1**).The use of these sites would be subject to terms and agreements prepared between the USAF and the property owner prior to use.

Airspace. Training airspace used by AT would largely cover Arizona, southern New Mexico, and off the coast of San Diego, California, using established military operations areas (MOAs). No new MOAs or military training routes are proposed under this action, nor are any modifications to airspace proposed.

ALTERNATIVES CONSIDERED

Two alternatives to the Proposed Action were considered: (1), only DOD personnel, federal interagencies, local/state law enforcement, and emergency responders would train in the absence of foreign aircrews and (2) only USAF PR personnel and local law enforcement/local emergency responders would train in DOD airspace and training areas. Neither was determined to be a reasonable alternative and both have been eliminated from detailed analysis in this EA.

NO-ACTION ALTERNATIVE

Under the No-Action Alternative, the AT exercise would not be developed and would result in the absence of valuable training under realistic and varied environments for combat aircrews and PR forces expecting to deploy to real world combat zones, while reducing the opportunity to train with Joint Services; local, state, and DOD Interagencies; and Foreign Partner Nations. Biannual PR training capabilities would not be developed beyond the baseline established in the 2002 CSAR EA, including the number of biannual sorties and additional training airspace and training areas.

SUMMARY OF FINDINGS

The analyses of the affected environment and environmental consequences of implementing the Proposed Action presented in the EA concluded that by implementing environmental protection measures (see **Table 5-2** in the EA for potential site-specific concerns) the USAF and ACC would be in compliance with all terms and conditions and reporting requirements for implementation of the reasonable and prudent measures stipulated by the USFS.

Based on the identified assumptions, the estimated emissions for the entire region do not exceed any single county's General Conformity threshold. Indeed, the total estimated emissions for the entire expanded AT exercise are less than any single county's General Conformity threshold level. Therefore, no General Conformity analysis would be required and the expanded AT exercise would not represent a significant impact to air quality in the region.

The analyses focused on the following environmental resources: noise, air quality, airspace management, biological resources, cultural resources, health and safety, and hazardous materials and wastes. The Air Force has concluded that no significant adverse effects would result to the following resources as a result of the Proposed Action: noise, air quality, airspace management, biological resources, health and safety and hazardous materials and wastes. No significant adverse cumulative impacts would result from activities associated with the Proposed Action when considered with past, present, or reasonably foreseeable future projects in the southwestern U.S. In addition, the EA concluded that the action alternatives would not affect land use, geological resources and soils, water resources, utilities and infrastructure, transportation, environmental justice, and socioeconomics.

The Air Force will develop a process to review each planned AT exercise in light of the activities analyzed in the EA to ensure all training events are within the scope of the analysis conducted and conform to the findings and determinations made during required consultations. Any additional analysis and/or consultation will be completed prior to approval of the training activity or event for the associated exercise. The process developed will preserve flexibility for exercise planning and management while ensuring environmental requirements have already been sufficiently analyzed or any necessary additional analysis or consultation is properly completed.

For example, in order to avoid affecting archaeological resources, the sites approved for use in the May 2017 exercise are those that have had complete, recent cultural resources surveys, or have been previously disturbed. The Arizona State Historic Preservation Office (SHPO) has concurred with the Air Force's Finding of No Adverse Effects on Historic Properties for the May 2017 exercise. Additional consultation with the Arizona SHPO and other State Historic Preservation Officers will be required before using other training sites for future exercises. The tables in Appendix H of the EA provide current survey information for future proposed sites. Consultation with the U.S. Fish and Wildlife Service for the May 2017 exercise has been completed with a determination that activities may affect but are not likely to adversely affect threatened or endangered species.

FINDING OF NO SIGNIFICANT IMPACT

Based on my review of the facts and analyses contained in the attached EA, conducted under the provisions of NEPA, CEQ Regulations, and 32 CFR Part 989, I conclude that the AT Personnel Recovery/Rescue exercise would not have a significant environmental impact, either by itself or cumulatively with other projects in the southwestern U.S. Accordingly, an Environmental Impact Statement is not required. Subject to the commitment for reviewing exercise plans to ensure compliance with the scope of this finding, the signing of this Finding of No Significant Impact completes the environmental impact analysis process.

Jennifer L. Kilbourn

Date 2 May 2017

JENNIFER L. KILBOURN,
Colonel, USAF
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HALLAZGO DE IMPACTO NO SIGNIFICATIVO
[Finding of No Significant Impact (FONSI)]
DE LA
EVALUACIÓN AMBIENTAL (EA) DEL EJERCICIO DE ENTRENAMIENTO "ANGEL THUNDER" PARA RECUPERACIÓN/RESCATE DE PERSONAL EN EL SUDOESTE DE LOS ESTADOS UNIDOS

De conformidad con las disposiciones de la Ley de Política Ambiental Nacional (NEPA, por sus siglas en inglés), Secciones 4321 a 4347 del Título 42 del Código de los Estados Unidos, implementado por el Reglamento del Consejo de Calidad Ambiental (CEQ), Título 40, Código de Regulaciones Federales (CFR) §1500-1508 y 32 CFR §989, Proceso de Análisis de Impacto Ambiental, la Fuerza Aérea de los Estados Unidos (USAF) evaluó las potenciales consecuencias ambientales asociadas con la propuesta de la USAF de llevar a cabo los ejercicios bianuales del Comando de Combate Aéreo (ACC), "Angel Thunder" (AT) para la Recuperación/Rescate de Personal (PR), que opera principalmente desde la Base de la Fuerza Aérea Davis-Monthan, Arizona.

El objetivo de la Acción Propuesta es proporcionar el entrenamiento PR adecuado durante el ejercicio bianual AT PR del ACC en el sudoeste de los Estados Unidos (U.S.) [ver **Tabla 2-1** en la Evaluación Ambiental (EA)]. Los participantes del ejercicio incluirán fuerzas PR de USAF, Servicios Conjuntos, agencias locales y estatales, Interagencias del Departamento de Defensa (DOD), y Naciones Extranjeras asociadas.

La necesidad para esta acción es asegurar que los esfuerzos de preparación PR se mantengan a la vanguardia de los cambios globales en el ambiente operativo; estar preparado para planificar y ejecutar operaciones PR con otras interagencias asociadas; y estar preparado para conducir operaciones PR interoperables y de cooperación mutua con naciones anfitrionas y asociadas para rescatar personal del DOD siempre que sea posible. PR es una Función Central del Servicio de la Fuerza Aérea. La Directiva del DOD 3002.01E, *Recuperación de Personal*, define PR como "una de las prioridades más altas del DOD," y responsabiliza a los Jefes de Servicio con esta tarea. El ejercicio AT bianual debe proporcionar a las fuerzas de Rescate USAF el entorno de entrenamiento PR más realista disponible para que cumplan con la Directiva del DOD 3002.01E, así como con la Directiva de Política de la Fuerza Aérea 10-30, *Recuperación de Personal*.

La EA, incorporada por referencia en este hallazgo, analiza las potenciales consecuencias ambientales de las actividades asociadas con el ejercicio AT PR, y proporciona medidas de protección ambiental para y evitar o reducir los impactos ambientales.

La EA considera todos los potenciales impactos de la Propuesta de Acción y de la Alternativa de No Acción. La EA también considera la acumulación de impactos ambientales de otros proyectos a través del sudoeste de los Estados Unidos.

Propuesta de Acción

USAF propone llevar acabo el ejercicio AT bianual a través del sudoeste de los Estados Unidos. Específicamente, la Acción Propuesta incluye la utilización de propiedades del DOD y no DOD como como zonas de aterrizaje (LZs), zonas de aterrizaje de helicóptero (HLZs), zonas de lanzamiento (DZs), sitios de entrenamiento en tierra, y entrenamiento de maniobras de aviones (una misión de combate de un solo avión desde el despeje hasta el aterrizaje). El entrenamiento involucraría espacios aéreos y polígonos de entrenamiento del DOD utilizando varios números y tipos de aviones estadounidenses y foráneos operando principalmente desde Davis-Monthan AFB.

Entrenamiento

Cada ejercicio bianual de entrenamiento AT propuesto consistirá en un ejercicio de tres semanas con múltiples misiones de entrenamiento que proveen capacitación en Rescate, en PR, y en Búsqueda y Rescate en Combate (CSAR) para tripulaciones; Pararescate; Personal de Inteligencia; Gerentes de Combate; Fuerzas Especiales; socios conjuntos, internacionales, e interagenciales. Este entrenamiento incorpora actividades de entrenamiento CSAR existentes y las propuestas de actividades de entrenamiento adicionales. La primera semana del ejercicio será reservada para entrenamiento en aula del personal de apoyo, seguida por un periodo de movilización de dos o tres días, 10 a 11 días de entrenamiento de campo, un día de desmovilización y regreso a la base. Se propone que el entrenamiento bianual ocurra normalmente durante la primavera y el otoño. Preparación del ambiente ocurriría cinco o seis veces antes de cada ejercicio durante varios días a la vez. La preparación consistirá principalmente de encuestas sobre los sitios de entrenamiento, utilizando aproximadamente de 10 a 20 personas para evaluar la seguridad de la ubicación específicamente designada para la ejecución del entrenamiento.

Las misiones de entrenamiento incluyen escenarios de gran fuerza totalmente integrados durante periodos designados como ventanas de vulnerabilidad o periodos “VUL” y entrenamiento, no basado en escenarios, de tareas específicas (entrenamiento no asociado con el escenario de entrenamiento activo, como por ejemplo, entrenamiento de armas en instalaciones con polígonos de armas pequeñas). A pesar que hasta 3,000 personas podrían estar involucradas en el ejercicio AT, en un evento real típicamente estarían involucradas aproximadamente 1,000 personas, con una participación internacional limitada a cinco naciones por evento de entrenamiento. El entrenamiento incluye extracciones diurnas y nocturnas, y entrenamiento diurno y nocturno de infiltraciones/evasión/extracción. Actividades de entrenamiento aéreo incluyen reabastecimiento de aeronaves, maniobras de combate táctico en aeronaves de ala fija y rotativa, cambios abruptos e impredecibles de altitud y dirección de la aeronave, lanzamiento de personal y equipo, extracción de agua, y aterrizaje en superficies no mejoradas.

Las actividades identificadas en la EA 2002 CSAR continuarán siendo parte integral de cualquier ejercicio AT. Adicionalmente, a las actuales actividades de entrenamiento, parte de la acción incluirá entrenamiento de Sobrevivencia, Evasión, Resistencia y Escape (SERE) y entrenamiento de Vigilancia y Reconocimiento de Inteligencia (ISR). Entrenamiento SERE se llevará a cabo en diferentes tipos de áreas

de entrenamiento, recuperando al personal aislado mediante diversos medios. Las áreas de entrenamiento serán determinadas con anterioridad, y previo al ejercicio se coordinará con las agencias de control. Todas las operaciones de vehículos terrestres serán llevadas a cabo en calles existentes, tanto pavimentadas como de lastre. No se proponen actividades vehiculares fuera de carreteras existentes.

Un máximo de 800 maniobras por ejercicio serán voladas como parte del ejercicio AT bianual; 600 maniobras se originarán desde Davis-Monthan AFB y 200 maniobras se originarán desde sus respectivas estaciones base hasta el sitio del ejercicio y devuelta a su estación base. Adicionalmente, aeronaves piloteadas remotamente, tal como el MQ-1 Predator o MQ-9 Reaper, participarán en áreas aéreas restringidas o bajo condiciones designadas como permitidas por la Administración Federal de Aviación (FAA).

Centros de operación serán instalados en uno o más aeródromos de operación, y proveerán una ubicación centralizada para el comando y control de las operaciones de entrenamiento; y servirá como un punto focal para la planificación, ejecución, y evaluación del componente de operaciones aéreas. El actual concepto de movilidad es el de desplazar rápidamente las fuerzas; proveer asentamiento para la aeronave, equipo de apoyo, y fuerzas en una base elemental de operaciones para el rescate; y proveer evacuación médica aérea, seguridad y misiones de reconocimiento en apoyo a un escenario de contingencia global. La base elemental tendrá las instalaciones esenciales mínimas para hospedar, mantener, y apoyar las operaciones. El núcleo del Comando, Control, Comunicaciones, Computadoras y Operaciones de Inteligencia de la base elemental se centralizarán en el Centro de las Operaciones Aéreas de Davis-Monthan AFB, Arizona, con un Centro de Operaciones delantero en Camp Navajo, Arizona.

Dependiendo de la ubicación e idoneidad, algunas tiendas serán erguidas en apoyo a las actividades del ejercicio. Alternativamente, un número similar de contenedores de transporte conex o vehículos recreacionales podrían ser utilizados para lograr el mismo objetivo. El objetivo de la misión sería dejar los sitios en las mismas condiciones en las que se encontraban previo al ejercicio. Las condiciones de las superficies y subsuelos, tales como recursos sensibles o líneas de servicios públicos determinarán el uso de tiendas o de contenedores de transporte conex. En ambos casos, se llevará a cabo la coordinación apropiada con la pista de aterrizaje previo a su ejecución. Adicionalmente, cuando se haya coordinado y esté disponible, la unidad de mantenimiento participante utilizará el Operador de Base Fija (FBO) en el aeropuerto de Flagstaff Pulliam y el Aeropuerto Regional del Winslow.

Todo el espacio aéreo utilizado durante el ejercicio AT será gobernado por el Plan de Control del Espacio Aéreo AT (ACP). El ACP determina los procedimientos y designa espacios aéreos para las operaciones AT dentro del Área temporal de Operación Militar Playas/Espacio aéreo asignado al Control del Tráfico Aéreo y el Barry M. Goldwater Polígono Este (la “Área de Ejercicio”), y otros espacios aéreos identificados como áreas restringidas. Responsabilidades y procedimiento descritos en el ACP serán aplicables a todas las aeronaves participantes y deberán ser cumplidas excepto con previa coordinación.

Sitios de Entrenamiento

Los sitios de entrenamiento propuestos están ubicados en tierras federales, tribales, estatales, municipales, y privadas en las áreas de Nevada, Nuevo México, Arizona, y California que han sido previamente perturbadas o que se han utilizado previa y actualmente para las actividades realizadas bajo la Acción Propuesta. Hay 53 sitios utilizados como HLZs, LZs, y DZs que serán ubicados en instalaciones militares actuales, 37 en tierra del Servicio Forestal Estadounidense (USFS), y 49 en diversas tierras que no pertenecen al DOD. Las ubicaciones serán elegidas en coordinación con el polígono apropiado y personal de las instalaciones, y serán sitios actualmente gobernados por las políticas y procedimientos ambientales de las instalaciones. En otros casos, como los HLZs en tierras del USFS, permisos anuales de uso especial serán necesarios por parte de los administradores de las tierras afectadas, y la Fuerza Aérea se asegurará que dichos permisos estén vigentes.

Las actividades de entrenamiento que ocurrirán en cada una de los sitios de entrenamiento propuestos están incluidas en la **Tabla 2-1** de la EA. Numerosos sitios podrían servir para múltiples propósitos de entrenamiento, y no todos los sitios propuestos serán utilizados cada año. Se anticipa que durante la mayoría de los escenarios de entrenamiento se utilizaran de 30 a 40 sitios (21 al 28 por ciento) en cada evento AT, recurriendo a los terrenos no militares únicamente en una o dos ocasiones durante el ciclo de entrenamiento. La naturaleza y ubicación de los sitios variaría de ciclo a ciclo, dependiendo en el escenario desarrollado para el ejercicio. Mediante el uso variado de escenarios de entrenamiento, se evita el sobreuso de sitios específicos.

Zonas de Aterrizaje de Helicóptero. La mayoría de los HLZs consistirá en zonas dedicadas al aterrizaje de helicópteros actualmente utilizadas bajo otras agencias del DOD, federales, estatales o locales. En ubicaciones más austeras, donde no existan zonas de aterrizaje, los HLZs deberán cumplir con los requerimientos identificados en la Instrucción de la Fuerza Aérea (AFI) 13-217, *Zona de Lanzamiento y Operaciones en Zonas de Aterrizaje*. Todos los HLZs deberán ser evaluados de acuerdo con el AFI 13-217 previo a su uso. Durante el transcurso de las tres semanas de ejercicio bianual, hasta 300 maniobras de ala-rotativa podrán ser ejecutadas, de las cuales hasta 250 serán derivadas de Davis Monthan AFB, y las restante podrán volar hasta el HLZ y volver a su respectiva estación base.

Zonas de Aterrizaje. LZs para aeronaves de ala fija serán ubicadas en campos de aviación militares y municipales. Los campos de aviación serán evaluados previo a su uso, de acuerdo con el AFI 13-217. Durante el transcurso de las tres semanas de ejercicio bianual, hasta 100 maniobras de ala fija serán llevadas a cabo, de las cuales 80 serán derivados de Davis-Monthan AFB, y el restante podrá volar hasta el LZ y volver a su respectiva estación base.

Zonas de Lanzamiento. DZs deberán cumplir con los requisitos del AFI 13-217. A excepción de lo establecido en la **Tabla 2-1** de la EA, el uso de DZ será para la incursión de personal de pararescate en pequeños escuadrones de aproximadamente 8 a 12 personas.

Puntos de Reabastecimiento de Aeronaves. Todos los campos de aterrizaje propuestos para actividades de reabastecimiento actualmente tienen sitios de almacenamiento de combustible y son

administrados de acuerdo con los Planes de Prevención, Control, Contramedidas y Contingencia de Derrame. Todos los reabastecimientos de aeronaves de ala fija o rotativa ocurrirán en las áreas designadas, y de acuerdo con las políticas y procedimientos, de los campos de aterrizaje. Reabastecimiento caliente y el reabastecimiento en tierra de aeronave a aeronave serán limitados a las ubicaciones aprobadas en los aeropuertos municipales e instalaciones militares.

Búsqueda y Rescate Civil/Recuperación con Asistencia No-Convencional. Hay dos regiones designadas como áreas donde el entrenamiento para la recuperación con asistencia no-convencional puede llevarse a cabo. La región Este rodea Springerville y Alpine en Arizona, y la Reserva en Nuevo México. La región Oeste rodea Flagstaff, Winslow, and Camp Navajo en Arizona únicamente. La misión de entrenamiento de Recuperación con Asistencia No Convencional puede ser el rescate en un lugar urbano en conjunto con la fuerza policial local. Aeronaves de ala fija entrenarán con apoyo aéreo en polígonos militares existentes, y el reabastecimiento de combustible en el aire se realizará dentro de las rutas de entrenamiento militar.

Misceláneos. Otros componentes importantes necesarios para cumplir con los objetivos del ejercicio bianual AT, incluyen el entrenamiento en aula, uso técnico de cuerdas, capacitación en armas pequeñas, operaciones militares en terreno urbano (MOUT), y preparación del ambiente de entrenamiento.

Ubicaciones de Sitios de Entrenamiento

Instalaciones Militares Adicionales. Hay 53 sitios utilizados como HLZs, LZs, y DZs que serán ubicados en instalaciones militares actuales (ver EA **Tabla 2-1**). Las ubicaciones serán elegidas en coordinación con el polígono apropiado y personal de las instalaciones, y serán sitios actualmente gobernados por las políticas y procedimientos ambientales de las instalaciones. Bajo los programas ambientales de la instalación, los administradores de los polígonos deben asegurarse que todas las actividades de entrenamiento aprobadas para el sitio estén en conformidad con las metas y objetivos de todos los planes de manejo ambiental y todas las condiciones asociadas relacionadas con su uso, como resultado de los esfuerzos de consulta con agencias federales, estatales y locales. Si la necesidad del entrenamiento AT cumple con estos objetivos, la solicitud se incluirá en los calendarios de entrenamiento para los polígonos específicos.

Tierras bajo Control del USFS. AT propone el uso de 37 sitios dentro de los Bosques Nacionales de Kaibab, Coconino, Apache-Sitgreaves, Tonto, Coronado, and Gila en Arizona and Nuevo México (ver EA **Tabla 2-1**). Todos los sitios HLZ del USFS en la **Tabla 2-1** de la EA están actualmente o fueron previamente utilizados por su personal o contratistas en operaciones de helicóptero apoyando actividades supresión de incendios y control de plagas. Los sitios propuestos fueron seleccionados en coordinación con los respectivos distritos y su personal. Si un sitio USFS es propuesto para el uso de actividades de entrenamiento de un ejercicio, USAF continuará coordinando con el distrito correspondiente para asegurar que los procedimientos USFS sean cumplidos. El uso de cualquier sitio requiere de un permiso de uso especial vigente, el cual sea consistente con los Planes USFS apropiados, identificando el área específica que va a utilizarse, naturaleza de la actividad, designación de trillos utilizados para tráfico a pie y disponibilidad de la red de carreteras, así como cualquier restricción de uso

por la época. Los sitios serán permitidos para el uso dependiendo en la disponibilidad y resultados de esta EA. Si la USFS determina que un sitio no es apropiado para el entrenamiento, no se emitirán los permisos de uso especial y se deberán escoger otros sitios alternativos.

Tierras Tribales, Estatales y Municipales. Estas propiedades ofrecen una variedad en oportunidades de entrenamiento AT. Muchos de los sitios consistirían en aeropuertos municipales que proveen HLZs, LZs, and DZs, y en algunas instancias puntos de reabastecimiento de combustible. Otros consisten en áreas de recreación tribales y estatales, que permiten entrenamiento en agua en ubicaciones más cercanas a Davis-Monthan AFB que los sitios en la costa Pacífica asociados con sitios de entrenamiento en instalaciones militares en California (ver EA **Tabla 2-1**). Todas las actividades en todas las ubicaciones serán evaluadas en consulta y coordinación con las autoridades Tribales, estatales, y locales pertinentes.

Propiedad Privada. Varios sitios propuestos como DZ/HLZs se encuentran en ranchos privados (ver "Privado" bajo Agencia Controladora en la **Tabla 2-1** de la EA). El uso de estos sitios depende de los términos y acuerdos preparados entre USAF y los propietarios, previo a su uso.

Espacio Aéreo. Espacio aéreo utilizado para el entrenamiento AT, en su mayoría cubre Arizona, el sur de Nuevo México, y la costa de San Diego, California, utilizando operaciones aéreas militares (MOAs) establecidas. Esta acción no propone nuevas MOA sor rutas de entrenamiento militar, así como tampoco propuestas de modificaciones al espacio aéreo.

Alternativas Consideradas

Dos alternativas a la Acción Propuesta fueron consideradas: (1) solamente personal DOD, interagencias federales, fuerza pública local y estatal, y personal de emergencia entrenarían en la ausencia de tripulaciones foráneas; y (2) únicamente personal USAF PR, fuerza pública local, y personal de emergencia local entrenaría en el espacio aéreo y áreas de entrenamiento DOD. Ninguna de las alternativas fueron consideradas razonables y ambas han sido eliminadas del análisis detallado en la EA.

Alternativa de No Acción

Bajo la Alternativa de No Acción, el ejercicio AT no se desarrollaría, resultando en la ausencia de entrenamiento valioso bajo una variedad de ambientes reales para las tripulaciones de combate y fuerzas PR, que esperan ser enviadas a zonas de combate reales. Al mismo tiempo que se reducen las oportunidades de entrenar con los Servicios Conjuntos, Interagencias locales, estatales, del DOD, y Naciones Foráneas Asociadas. Las capacidades del entrenamiento PR bianual no avanzarían más allá de la base establecida en la EA 2002 CSAR, incluyendo el número de maniobras bianuales y entrenamiento adicional del espacio aéreo y otras áreas.

Resumen de Hallazgos

Los análisis del medio ambiente afectado y las consecuencias ambientales de la implementación de la Acción Propuesta presentada en la EA concluyeron que mediante la implementación de medidas de protección ambiental (ver **Tabla 5-2** en la EA para potenciales inquietudes de sitios específicos) la USAF y

ACC estarían en cumplimiento de todos los términos y condiciones, y requisitos de divulgación para la implementación de las medidas razonables y prudentes estipuladas por el USFS.

Basado en los supuestos identificados, las emisiones estimadas para toda la región no exceden el umbral de Conformidad General de ninguno de los condados. De hecho, las emisiones totales estimadas para todo el ejercicio ampliado AT son menores que el umbral de Conformidad General de cada uno de los condados. Por lo tanto, no se requeriría un análisis de Conformidad General, y el ejercicio ampliado AT no representaría un impacto significativo en la calidad del aire en la región.

El análisis se enfocó en los siguientes recursos ambientales: ruido, calidad del aire, gestión del espacio aéreo, recursos biológicos, recursos culturales, salud y seguridad, y materiales y desechos peligrosos. La Fuerza Aérea ha concluido que no se producirían efectos adversos significativos como resultado de la Acción Propuesta a los siguientes recursos: ruido, calidad del aire, gestión del espacio aéreo, recursos biológicos, salud y seguridad, y materiales y desechos peligrosos. Las actividades asociadas con la Acción Propuesta no producirían impactos adversos significativos acumulados con los impactos de proyectos pasados, presentes, y razonablemente previsibles en el sudoeste de los Estados Unidos. Además, la EA concluyó que las alternativas de acción no afectarían el uso del suelo, los recursos geológicos y los suelos, recursos hídricos, servicios públicos e infraestructura, transporte, justicia ambiental y socioeconomía.

La Fuerza Aérea desarrollará un proceso para revisar cada ejercicio AT planificado a la luz de las actividades analizadas en la EA para asegurar que todos los eventos de entrenamiento estén dentro del alcance del análisis realizado y se ajusten a las conclusiones y determinaciones realizadas durante las consultas requeridas. Cualquier análisis y / o consulta adicional se completará antes de la aprobación de la actividad de entrenamiento o evento para el ejercicio asociado. El proceso desarrollado preservará la flexibilidad para la planificación y gestión del ejercicio garantizando que los requisitos ambientales hayan sido suficientemente analizados o que cualquier análisis o consulta adicional necesaria sea completada correctamente.

Por ejemplo, para evitar que se afecten los recursos arqueológicos, los sitios aprobados para el ejercicio en Mayo 2017 son aquellos a los que se les haya completado una encuesta reciente de recursos culturales o que hayan sido previamente perturbados. La Oficina de Preservación Histórica (SHPO) del Estado de Arizona ha coincidido con el hallazgo de la Fuerza Aérea de Efectos No Adversos en Propiedades Históricas para el ejercicio en Mayo 2017. Consultas adicionales con SHPO de Arizona y otros oficiales de Preservación Histórica del Estado serán necesarias previo al uso de otros sitios de entrenamiento para ejercicios futuros. Las tablas en el Apéndice H de la EA proporcionan información actualizada para las encuestas de los sitios propuestos para futuros ejercicios. Consulta con el Servicio de Pesca y Vida Silvestre de los Estados Unidos para el ejercicio en Mayo 2017 ha sido completada y se ha determinado que las actividades pueden afectar pero no es probable que afecten negativamente a las especies amenazadas o en peligro de extinción.

Hallazgo de Impacto No Significativo

Basado en mi revisión de los hechos y el análisis de la EA adjunta, ejecutada en seguimiento de los requerimientos de NEPA, regulaciones CEQ, y 32 CFR 989, concluyo que el ejercicio AT de Recuperación/Rescate de Personal no tendrá impactos ambientales significativos, por sí mismo ni como resultado de la acumulación de otros proyectos en el Sudoeste de Estados Unidos. De manera que una Declaración de Impacto Ambiental no será requerida. Sujeto al compromiso de revisar los planes del ejercicio para asegurar el cumplimiento con el alcance de este hallazgo, la firma de este Hallazgo de Impactos No Significativos completa el proceso de análisis del impacto ambiental.

_____ Date_____

JENNIFER L. KILBOURN,
Colonel, USAF
Chief, Civil Engineer Division
HQ ACC/A4C

Cover Sheet

ENVIRONMENTAL ASSESSMENT
ADDRESSING THE ANGEL THUNDER PERSONNEL RECOVERY/RESCUE TRAINING EXERCISE IN THE SOUTHWESTERN UNITED STATES

Responsible Agencies: U.S. Air Force (USAF), Air Force Civil Engineer Center (AFCEC), Air Combat Command (ACC), 355th Fighter Wing, Davis-Monthan Air Force Base (AFB) and 99th Air Base Wing, Nellis AFB.

Affected Location: Davis-Monthan AFB and various federal, tribal, state, municipal, and private lands in Arizona, New Mexico, Nevada, and California.

Report Designation: Final Environmental Assessment (EA).

Abstract: The purpose of this action is to provide adequate personnel recovery/rescue training by conducting Air Combat Command biannual Angel Thunder (AT) Personnel Recovery/Rescue (PR) Exercises, primarily centered out of Davis-Monthan AFB, Arizona and conducted throughout the southwestern United States. Exercise participants include USAF PR forces, Joint Services, local and state agencies, Department of Defense (DOD) Interagencies, and Foreign Partner Nations.

The need for the action is to ensure PR preparation efforts keep pace with changes in the global operating environment; be prepared to plan and execute PR operations with other interagency partners; and be prepared to conduct interoperable and mutually cooperative PR operations with partner and host nations to rescue DOD personnel whenever possible. PR is an Air Force Service Core Function. DOD Directive 3002.01E defines PR as “one of the highest priorities of the DOD,” and tasks Service Chiefs with this responsibility. The biannual AT exercise needs to provide the most realistic PR training environment available to USAF Rescue forces so that they comply with DOD Directive 3002.01E, as well as Air Force Policy Directive 10-30, *Personnel Recovery*.

The USAF desires to conduct this exercise throughout the southwestern United States; therefore, the USAF is required to develop environmental impact analysis. Specifically, the Proposed Action includes using DOD and non-DOD properties as landing zones, helicopter landing zones, drop zones, ground training sites, and aircraft training sorties. Training would involve related DOD training airspaces and ranges using various numbers and types of American and foreign aircraft operating primarily from Davis-Monthan AFB.

The analysis in the EA will consider the Proposed Action and the No Action Alternative. The EA will be used to determine whether a Finding of No Significant Impact is reached or if an Environmental Impact Statement would be required.

All written comments received on the Draft EA during the Public Comment Period are included in Appendix A of this document.

PORTADA

EVALUACIÓN AMBIENTAL (EA) DEL EJERCICIO DE ENTRENAMIENTO "ANGEL THUNDER" PARA RECUPERACIÓN/RESCATE DE PERSONAL EN EL SUDOESTE DE LOS ESTADOS UNIDOS

Agencias Responsables: Fuerza Aérea de los Estados Unidos (USAF),Centro de Ingeniería Civil de la Fuerza Aérea (AFCEC), Comando de Combate Aéreo (ACC), 355ª Ala de Combate, Base de la Fuerza Aérea Davis-Monthan, y la 99ª Ala de la Base Aérea de Nellis.

Ubicación Afectada: Davis-Monthan AFB y varias propiedades federales, tribales, estatales, municipales y privadas en Arizona, Nuevo México, Nevada, y California.

Denominación del Reporte: Evaluación Ambiental (EA) Final.

Abstracto: El objetivo de esta acción es proporcionar el entrenamiento adecuado de recuperación/rescate de personal mediante la realización de ejercicios bianuales del Comando de Combate Aéreo, "Angel Thunder" (AT) para la Recuperación/Rescate de Personal (PR), principalmente basado en Davis-Monthan AFB, Arizona, y ejecutados a través del sudoeste de los Estados Unidos. Los participantes del ejercicio incluyen fuerzas PR de USAF, Servicios Conjuntos, agencias locales y estatales, Interagencias del Departamento de Defensa (DOD), y Naciones Extranjeras asociadas.

La necesidad para esta acción es asegurar que los esfuerzos de preparación PR se mantengan a la vanguardia de los cambios globales en el ambiente operativo; estar preparado para planificar y ejecutar operaciones PR con otras interagencias; y estar preparado para conducir operaciones PR interoperables y de cooperación mutua con naciones anfitrionas y asociadas para rescatar personal del DOD siempre que sea posible. PR es una Función Central del Servicio de la Fuerza Aérea. La Directiva del DOD 3002.01E define PR como "una de las prioridades más altas del DOD," y responsabiliza a los Jefes de Servicio con esta tarea. El ejercicio AT bianual debe proporcionar a las fuerzas de Rescate USAF el entorno de entrenamiento PR más realista disponible para que cumplan con la Directiva del DOD 3002.01E, así como con la Directiva de Política de la Fuerza Aérea 10-30, *Recuperación de Personal*.

USAF desea realizar este ejercicio a través del sudoeste de los Estados Unidos; por lo tanto, USAF debe desarrollar un análisis de impacto ambiental. Específicamente, la Acción Propuesta incluye el uso de propiedades del DOD y no DOD como zonas de aterrizaje, zonas de aterrizaje de helicóptero, zonas de lanzamiento, sitios de entrenamiento en tierra, y entrenamiento de maniobras de aviones. El entrenamiento involucraría espacios aéreos y polígonos de entrenamiento del DOD utilizando varios números y tipos de aviones estadounidenses y foráneos operando principalmente desde Davis-Monthan AFB.

El análisis de la EA considerará la Propuesta de Acción y la Alternativa de No Acción. La EA será utilizada para determinar si es posible concluir el Hallazgo de Impacto No Significativo o si se requiere una Declaración de Impacto Ambiental.

Los comentarios por escrito recibidos en el Borrador EA durante el Periodo de Comentarios Público están incluidos en el Apéndice A de este documento.

Final

ENVIRONMENTAL ASSESSMENT
ADDRESSING THE ANGEL THUNDER PERSONNEL RECOVERY/RESCUE TRAINING EXERCISE IN THE SOUTHWESTERN UNITED STATES

VOLUME I

AIR FORCE CIVIL ENGINEER CENTER
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MAY 2017

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Figures

Tables

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1. Purpose of and Need for the Proposed Action

1.1 Introduction

This Environmental Assessment (EA) has been prepared to evaluate the potential environmental impacts of the biannual Angel Thunder (AT) Personnel Recovery/Rescue (PR) Training Exercise. The AT exercise would be primarily centered out of Davis-Monthan Air Force Base (AFB), Arizona and would be conducted from locations throughout the southwestern United States (U.S.) listed in **Table 2-1**. The EA analyzes the potential for significant environmental impacts associated with the Proposed Action and alternatives, including the No Action Alternative. The EA was developed in compliance with the National Environmental Policy Act (NEPA); the regulations implementing NEPA (Title 40 Code of Federal Regulations [CFR] Parts 1500–1508); Department of Defense (DOD) Directive 6050.1, *Environmental Considerations in DOD Actions*; and the U. S. Air Force (USAF) implementing regulation for NEPA, the *Environmental Impact Analysis Process* (EIAP), Air Force Instruction (AFI) 32-7061. The AFI 32-7061 adopts Title 32 CFR Part 989, as amended, as the controlling document for EIAP.

1.2 Project Location Description

The AT exercises would be conducted throughout the southwestern U.S. (see **Figures 2-1** and **2-2** in **Section 2.1.1**). At least 75 percent of those exercises would originate from Davis-Monthan AFB, with the remaining 25 percent determined per exercise from a variable combination of beddown locations outlined in **Table 2-1** (see **Section 2.1.1**). Davis-Monthan AFB borders the city of Tucson in Pima County, Arizona, and falls within the city limits of Tucson except for the southeastern portion of the installation (**Figure 1-1**). The installation encompasses approximately 10,700 acres of federally-owned land, of which 5,700 acres are developed or semi-improved, 4,700 acres are undeveloped, and 300 acres are under easement and maintained by Pima County. Davis-Monthan AFB is the home of the 355th Fighter Wing (FW), which is part of the Air Combat Command (ACC). The primary mission of the 355 FW is to provide unified theater commanders with world-wide deployable combat-ready, A-10 close air support; OA-10 forward air controller support, command and control warfare capability; airborne battlefield air attack management; and early warning surveillance and radar control of combat aircraft near the forward battle area. Major associate units at Davis-Monthan AFB include Headquarters 12th Air Force, 563rd Rescue Group (RQG), 943 RQG of the Air Force, the Aerospace Maintenance and Regeneration Center, and U.S. Customs and Border Protection. The Aerospace Maintenance and Regeneration Center provides a single location to process and maintain aircraft and components stored by all services.

1.3 Background

In 2002, Davis-Monthan AFB was selected as the location for the West Coast Combat Search and Rescue (CSAR) Beddown (Davis-Monthan AFB 2002). The selection of Davis-Monthan AFB followed a two-step process.

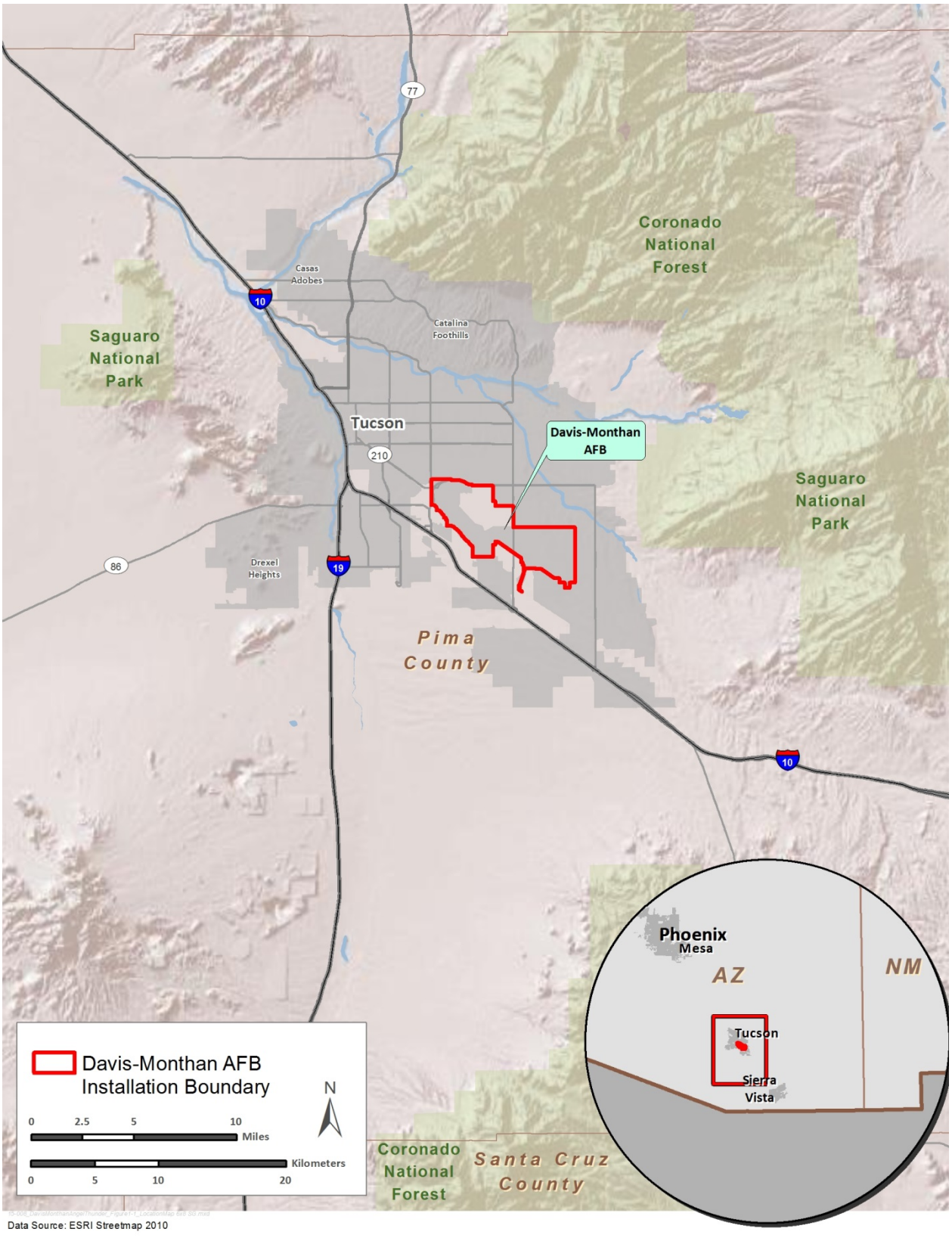

Figure 1-1. Davis-Monthan Air Force Base Vicinity Map

In Step one, the operational and physical elements needed to support the CSAR program were defined by the USAF. These elements were analyzed and six requirements were identified for an installation to be considered a viable and reasonable location for the beddown of a CSAR organization. These requirements included:

- ***Air Force Base in the Western United States****.* As an organization and responsibility, the CSAR assets needed to be located at an active duty USAF installation to maintain positive command and control and mission priority. In addition, they needed to be in a secure location within the contiguous U.S. to provide overall command, maintenance, data collection, upgrades, and training.
- ***Existing Training Requirements.*** To support effective crew training without incurring unnecessary Operations Tempo (i.e., the frequency of military actions or missions), Personnel Tempo (i.e., the number of days that military personnel are away from their home station to perform their duties), and minimal temporary duty costs. Ideally, any suitable alternative installation must be located such that the HC-130s can support existing helicopter aerial refueling training requirements at Nellis AFB, Las Vegas, Nevada, within their normal tactical training flight profile (**Figure 2-1** in **Section 2.1.1**).
- ***Runway Capacity***. CSAR assets include pararescue personnel and specially configured HH-60 and HC-130 aircraft. A suitable installation needed to be able to support HH-60 and HC-130 operational, maintenance, and storage requirements. In addition, CSAR aircraft are deployed overseas when necessary. To support these deployments, equipment, personnel, and HH-60 aircraft need to be transported to the overseas location. This requires large cargo and transport aircraft (e.g., C-5s and C-17s) to land and takeoff from the main operating base. Therefore, any suitable beddown location needed to include a runway capable of handling these types of aircraft.
- ***Accommodate Initial Beddown.*** Any suitable candidate installation had to have existing ramp space to accommodate HC-130 and HH-60 aircraft parking. Suitable installations also needed available facilities or space for temporary structures to beddown the units until permanent buildings, facilities, and infrastructure could be constructed.
- ***Accommodate Final Buildup***. To meet the beddown requirements, any suitable candidate installation needed available buildings, facilities, housing, and infrastructure (or the space to expand or develop the buildings, facilities, housing, and infrastructure) required for the CSAR aircraft, a full complement of operations and maintenance personnel, and equipment.
- ***Training Areas.*** To support unit training requirements, the candidate installation had to be located near training areas and ranges allowing HC-130 and HH-60 crews and pararescue personnel to complete required training activities with minimal negative impact on Operations Tempo (i.e., the frequency of military actions or missions), Personnel Tempo (i.e., the number of days that military personnel are away from their home station to perform their duties), and minimal temporary duty costs. Ideally, suitable alternative installations should be close enough to training areas and ranges to complete

required training events within a normal tactical crew duty day complement of operations and maintenance personnel, as well as equipment.

Step two of the selection process assessed numerous installations against the six requirements. Ultimately, Davis-Monthan AFB was the selected candidate.

This resulted in the establishment of a PR organization composed of collocated HH-60 helicopters, HC-130 fixed-wing cargo aircraft, and Combat Rescue Officer (CRO)-led squadrons, consisting of the 563rd RQG, 943 RQG, 305 Rescue Squadron (RQS), 306 RQS, 55 RQS, 48 RQS, and 79 RQS. The beddown added a total of 12 HH-60 helicopters, 10 HC-130 cargo aircraft, and 1,059 personnel to Davis-Monthan AFB.

In addition to on-going training, an annual large-scale training exercise called “Angel Thunder” was developed in 2006, which is proposed to become biannual as analyzed in this EA. The biannual exercise combines PR training for pararescue combat aircrews with training for intelligence personnel, battle managers, and joint search and rescue center personnel. AT is an ACC-sponsored, Joint National Training Capability Accredited/Certified PR exercise for Combat Air Force, Joint, Allied, and Interagency participants. AT provides the most realistic PR training environment available to more than 2,700 USAF Rescue forces, as well as their Joint, Interagency, and International partners, to engage in a variety of PR scenarios. AT is the largest and most realistic joint service, multinational, interagency CSAR exercise designed to provide training for PR assets using a variety of scenarios to simulate deployment conditions and contingencies. PR forces train through the full spectrum of PR capabilities with ground recovery personnel, air assets, Special Forces teams, and federal agents. The PR mission requires distinct tasks and skills that involve frequent, repetitive training to maintain combat proficiency. While the AT exercise is primarily centered out of Davis-Monthan AFB, the overall AT exercise takes place in California, Arizona, Nevada, and New Mexico. These environments provide the maximum amount of variety in training scenarios in a fictional country with similar environmental conditions. Various exercises take place within this setting, including air-sea battle, security cooperation, interagency operations, and support to civil authorities focused on catastrophic incident search and rescue.

In early 2016, command of the AT exercise was transitioned to a newly created Detachment 1 of the 414th Combat Training Squadron (CTS). The 414 CTS is assigned to the 57th Wing at Nellis AFB, Nevada under the Air Warfare Center, with its Detachment One based at Davis-Monthan AFB, Arizona to run the exercise.

1.4 Purpose of and Need for the Proposed Action

The purpose of this action is to provide adequate training for the ACC’s biannual AT PR exercise in the southwestern U.S. (see **Table 2-1** in **Section 2.1.1**). Exercise participants would include USAF PR forces, Joint Services, local and state agencies, DOD Interagencies, and Foreign Partner Nations.

The need for the action is to ensure PR preparation efforts keep pace with changes in the global operating environment; be prepared to plan and execute PR operations with other interagency partners; and be prepared to conduct interoperable and mutually cooperative PR operations

with partner and host nations to rescue DOD personnel whenever possible. PR is an Air Force Service Core Function. DOD Directive 3002.01E, *Personnel Recovery*, defines PR as "one of the highest priorities of the DOD," and tasks Service Chiefs with this responsibility. The biannual AT exercise needs to provide the most realistic PR training environment available to USAF Rescue forces so that they comply with DOD Directive 3002.01E, as well as Air Force Policy Directive (AFPD) 10-30, *Personnel Recovery*.

PR training at Davis-Monthan AFB was originally described in the 2002 EA for the West Coast CSAR Beddown. The initial beddown action evaluated an annual training "footprint" for an HC-130P fixed-wing aircraft squadron, an HH-60 helicopter squadron, and PR personnel including Pararescue Jumpers and CRO; and Survival, Evasion, Resistance, and Escape (SERE) specialists.

1.5 NEPA Compliance Requirements

NEPA is a federal law requiring analysis of potential environmental impacts associated with proposed federal actions, before the actions are taken. The intent of NEPA is to make informed decisions by identifying potential environmental consequences and take actions to protect, restore, or enhance the environment. NEPA established the Council on Environmental Quality (CEQ), which is responsible for ensuring federal agency compliance with NEPA.

The process for implementing NEPA is outlined in 40 CFR Parts 1500–1508, *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act*. CEQ regulations for NEPA specify an EA be prepared to determine whether a Finding of No Significant Impact (FONSI) is appropriate or the preparation of an Environmental Impact Statement (EIS) is necessary. An EA can aid in an agency's compliance with NEPA when an EIS is unnecessary and facilitate preparation of an EIS when one is required. The CEQ NEPA regulations mandate all federal agencies to use a prescribed approach to environmental impact analysis. The approach includes evaluation of potential environmental consequences associated with a Proposed Action and considers alternative courses of action.

AFPD 32-70, *Environmental Quality*, states USAF will comply with applicable federal, state and local environmental laws and regulations, including NEPA. The USAF's implementing regulation for NEPA is EIAP, AFI 32-7061. This EA was developed in compliance with EIAP. The USAF will determine whether or not the Proposed Action would result in significant impacts in the Final EA. If significant impacts are predicted, the USAF would decide whether to conduct mitigation to reduce impacts below the level of significance, consider other alternatives with less than significant impacts, prepare an EIS, or abandon the Proposed Action.

1.6 Intergovernmental and Stakeholder Coordination

NEPA requirements help ensure environmental information is made available to the public during the decision-making process and prior to actions being taken. A premise of NEPA is that the quality of federal decisions will be enhanced if the public is involved in the planning process. The Intergovernmental Coordination Act and Executive Order (EO) 12372, *Intergovernmental Review of Federal Programs*, require federal agencies to cooperate with and consider territorial and local views when implementing a federal proposal.

In compliance with NEPA, the 99th Air Base Wing (ABW) notifies relevant agencies, stakeholders, and federally-recognized tribes about the Proposed Action and alternatives (see **Appendix A** for stakeholder and public-involvement materials). The notification process provides these agencies and groups the opportunity to cooperate with Davis-Monthan AFB and provide comments on the Proposed Action.

A Notice of Availability for the Draft EA was published in the *Arizona Daily Star, Arizona Republic, Arizona Sun, Albuquerque Journal, El Defensor Chieftain, Deming Headlight, Las Cruces Sun News, Las Vegas Review Journal, El Tiempo, San Diego Union Tribune,* and the *Hoy* newspapers. The Draft EA was available to the public for a 30-day review and comment period beginning March 2, 2017. Hard copies of the Draft EA were provided at the following locations: *Burton Barr Public Library, 1221 North Central Avenue, Phoenix, Arizona 85004; Flagstaff City-Coconino County Main Public Library, 300 West Aspen Avenue, Flagstaff, Arizona 86004; Himmel Park Branch Library, 1035 North Treat Avenue, Tucson, Arizona 85716; Pascua Yaqui Tribe Public Library, 5100 West Calle Tetakusim, Tucson, Arizona 85757-9308; Quincie Douglas Library, 1585 East 36th Street, Tucson, Arizona 85713; Salazar-Ajo Library, 15 West Plaza Street, #179, Ajo, Arizona 85321; Venito Garcia Library and Archives, P.O. Box 837, Sells, Arizona 85634-0837; University of Arizona Library, 1510 East University Boulevard, Tucson, Arizona 85721-0055; Glenwood Library, P.O. Box 144, 14 Menges Lane, Glenwood, New Mexico 88039; Lordsburg-Hidalgo Library, 208 East Third Street, Lordsburg, New Mexico 8804*. The Draft EA was also made available online:

http://www.dm.af.mil/

Comments received during the public review period are provided in **Appendix A**. The 99th ABW received substantive and non-substantive comments. Responses to substantive comments are provided with the corresponding comment in **Appendix A**.

1.6.1 Interagency Coordination and Consultations

Scoping is an early and open process for developing the breadth of issues to be addressed in the EA and for identifying significant concerns related to a proposed action. Per the requirements of Intergovernmental Cooperation Act of 1968 [42 United States Code (U.S.C.) § 4231(a)] and EO 12372, federal, state, and local agencies with jurisdiction that could be affected by the Proposed Action were notified during the development of this EA. Initial letters were sent to 34 agencies on October 28, 2016. These letters described the Proposed Action and invited the agencies to provide input. Upon release of the Draft EA, letters were sent to the 34 agencies on March 2 and 3, 2017. **Appendix A** contains the list of agencies consulted during this analysis and copies of correspondence.

Per the requirements of Section 106 of the National Historic Preservation Act (NHPA) and implementing regulations (36 CFR § 800), Section 7 of the Endangered Species Act (ESA) and implementing regulations, the Migratory Bird Treaty Act (MBTA), and the Coastal Zone Management Act, the 99th ABW would consult on their findings of effect under the above statutes and request concurrence from the appropriate State Historic Preservation Officers (SHPOs), the Advisory Council on Historic Preservation (as applicable), U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service, and Coastal Zone Management Program.

The 99th ABW point-of-contact for consultation with the State Historic Preservation Offices and the Advisory Council on Historic Preservation is the Nellis AFB Cultural Resources Manager. Consultations with the SHPOs and the USFWS have been completed for the May exercise.

Letters initiating consultation under Section 106 of the NHPA were sent to the Arizona SHPO, New Mexico SHPO, Advisory Council on Historic Preservation (ACHP), and Bureau of Indian Affairs on October 28, 2016. The letters described the undertaking, defined the area of potential effect (APE), and identified known historic properties in the APE. USAF received a response from the ACHP on November 23, 2016 stating they would not engage in consultation unless requested or to assist with the resolution of adverse effects, if needed. USAF received responses from the Arizona SHPO and New Mexico SHPO on November 23 and December 2, 2016, respectively, requesting additional information on the project. USAF did not receive a response from the Bureau of Indian Affairs.

On March 2 and 3, 2017, USAF sent letters to the Arizona and New Mexico SHPOs that provided additional information on the project and requested concurrence with a finding of "no historic properties affected." A similar letter was sent to the Bureau of Indian Affairs requesting input on the finding of "no historic properties affected." A letter was also sent to the California SHPO that initiated Section 106 consultation in that state and requested concurrence with a finding of "no historic properties affected." The California SHPO concurred with the USAF's finding on March 20, 2017 and Section 106 consultation in California is completed. USAF received a letter of non-concurrence from the Arizona SHPO on April 11, 2017. Upon additional consultation, USAF made a finding of "no adverse effect" for 93 proposed training sites where cultural resource surveys are complete or the area is disturbed such that sensitive cultural resources would not be expected (**Table H-1** in **Appendix H**). The Arizona SHPO concurred with this finding in a letter dated April 26, 2017. Section 106 consultation is completed for these 93 locations. Additional consultation would be required prior to use of 46 training sites where effects on historic properties could occur (**Table H-2** in **Appendix H**). USAF did not receive a response from the New Mexico SHPO. Per the regulations implementing Section 106 of the NHPA at 36 CFR Part 800.3(c)(4), USAF may proceed with a determination of "no historic properties affected" in New Mexico without the SHPO's concurrence and Section106 consultation in New Mexico is completed. Additional information on Section 106 consultation is presented in **Section 4.5.1.6**. Section 106 consultation with federally-recognized tribes is discussed in **Section 1.6.2**.

On March 2, 2017, USAF sent a letter to the Arizona USFWS Ecological Field Office Supervisory Biologist requesting concurrence with the determinations that the Proposed Action is not likely to adversely affect threatened and endangered species. Consultation with USFWS for the May 2017 exercise has been completed with a determination that activities may affect but are not likely to adversely affect threatened or endangered species. All potential biological restrictions are included in **Table 5-2**.

1.6.2 Government to Government Consultations

The 414th CTS is assigned to the 57th Wing at Nellis AFB, Nevada, under the Air Warfare Center, but based at Davis-Monthan AFB, Arizona. However, the 99th ABW, as the host wing for

Nellis AFB, became the responsible agency for government-to-government consultations due to the broad geographical scope of the project.

The 99th ABW consulted with 59 Native American Tribes as part of the government-to-government consultation process as identified in EO 13175, *Consultation and Coordination with Indian Tribal Governments*, NEPA, NHPA, Native American Graves Protection and Repatriation Act , DOD Instruction 4710.02, and AFI 90-2002. These tribal governments were also consulted regarding impacts to tribal resources under Section 106 of the NHPA. The 99th ABW point-of-contact for Native American tribes is the Nellis AFB Installation Commander.

Initial letters were sent to the 59 tribes on October 28, 2016. These letters described the Proposed Action and invited tribes to government to government consultation. For tribes with traditional association with project areas in Arizona and New Mexico, the letters also invited the tribes to participate in Section 106 consultation and described the APE and identified historic properties. At this time, the APE was not defined to include military installations, including all project areas in California, and the 99th ABW did not intend to conduct Section 106 consultation in that state. Therefore, the letters to California tribes did not invite tribes to participate in Section 106 consultation. The 99th ABW received a response from one tribe, the Agua Caliente Band of Cahuilla Indians, which indicated training would occur in the tribe's traditional use areas and requested continued consultation.

On March 2 and 3, 2017, upon release of the Draft EA, the 99th ABW again sent letters to the 59 tribes containing the Draft EA and Section 106 finding of "no historic properties affected." The APE was revised to include military installations, including all proposed training locations in California; therefore letters sent to tribes with traditional association with project locations in California invited the tribes to participate in the Section 106 process. The letters provided an updated description of the APE, identified historic properties, explained the finding of no effect, and requested comments on the findings. Two proposed training locations are on the White Mountain Apache Reservation; therefore, the White Mountain THPO was asked to concur on the finding of no effect.

The 99th ABW received responses from six tribes. The Agua Caliente Band of Cahuilla Indians, San Manuel Band of Mission Indians, and Yavapai-Apache Nation each indicated they had no concerns with the Proposed Action. The Campo Band of Mission Indians requested additional information about any cultural resources at training areas in California, which the 99th ABW provided. The Ak-Chin Indian Community deferred comment to the Tohono O'odham Nation. The 99th ABW received correspondence from the Tohono O'odham concurring with the finding of "no historic properties affected." The Gila River Indian Community requested clarification on the findings of effect, which was provided. A complete listing of the Native American tribal representatives consulted and correspondence is in **Appendix A**.

1.7 Organization of this Document

This EA is organized into six sections, plus appendices. **Section 1** of the EA provides historical and background information, the project location, and the purpose of and need for the Proposed Action. **Section 2** contains a description of the Proposed Action and alternatives, including the No Action Alternative. **Section 3** describes the existing conditions of the potentially affected environment. **Section 4** identifies the environmental consequences of implementing all

reasonable alternatives. **Section 5** includes an analysis of the potential cumulative and other impacts. **Section 6** provides the names of those who prepared the EA. **Section 7** lists the references used in the preparation of this document. **Appendix A** includes all stakeholder and public involvement materials. **Appendix B** includes a complete list of potential training partners. More detailed, site-specific maps are included in **Appendix C**. **Appendix D** has examples of Special Use Permits from previous AT events. Detailed guidelines for the compatibility of various land uses with noise exposure levels are included in **Appendix E**. Assumptions made for the air emissions estimates are detailed in **Appendix F**. **Appendix G** provides additional detailed information on airspace above proposed AT training exercise locations. Lastly, **Appendix H** shows the results of the Cultural Resources records search for potentially historic sites.

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2. Description of the Proposed Action and Alternatives

This section presents information on the Proposed Action and Alternatives for the biannual AT PR exercise primarily centered out of Davis-Monthan AFB and conducted throughout the southwestern U.S. As discussed in **Section 1.5**, the NEPA process evaluates potential environmental consequences associated with a proposed action and considers alternative courses of action. Reasonable alternatives must satisfy the purpose of and need for a proposed action, defined in **Section 1.4**. CEQ regulations specify the inclusion of a No Action Alternative against which potential action alternative impacts can be compared. While the No Action Alternative would not satisfy the purpose of or need for the Proposed Action, it is analyzed in detail in accordance with CEQ regulations.

2.1 Proposed Action

The USAF proposes to conduct the biannual AT exercise (a military operation involving planning, preparation, and execution carried out for the purpose of training and evaluation) throughout the southwestern U.S., and therefore, requires USAF to conduct an environmental impact analysis. Specifically, the Proposed Action includes using DOD and non-DOD properties as landing zones (LZs), helicopter landing zones (HLZs), drop zones (DZs), ground training sites, and aircraft training sorties (a combat mission of an individual aircraft from takeoff to landing). Training would involve related DOD training airspaces and ranges using various numbers and types of American and foreign aircraft based at Davis-Monthan AFB. The number and types of aircraft and the related training airspace, locations, and ranges to be analyzed are discussed in **Sections 2.1.1** to **2.1.3**. **Table 2-1** details the DOD military installations and non-DOD properties proposed for use. Non-DOD properties are further categorized by U.S. Forest Service (USFS) properties and miscellaneous sites. These miscellaneous sites are under various state, local, and private control. **Figures 2-1** and **2-2** present the proposed DOD sites that could be used during the biannual AT exercise and **Figures 2-3** and **2-4** present the proposed non-DOD sites that could be used during the exercise. The numbered Map Book Page Index boxes shown in **Figures 2-1** to **2-4** correspond to more detailed, site-specific maps of the proposed training sites provided in **Appendix C**. The Map Book Page Indices for each proposed site are numbered starting from the northern-most site moving west to east finishing on the southern- and eastern-most site. The page indices that correspond to specific sites are also called out in **Table 2-1**.

2.1.1 Training

Each proposed biannual AT training exercise would consist of a three-week exercise with multiple training missions (components of the scenario developed for the training exercise). The AT exercises would provide training scenarios for Rescue, PR, and CSAR; Pararescue; Intelligence personnel; Battle Managers; Special Forces; and Joint, Interagency, and International partners. This training would incorporate current CSAR training activities and would include additional proposed training activities. The first week of an exercise would be for classroom training of support personnel, followed by a two- to three-day mobilization period, 10 to 11 days of field training, one day of de-mobilization and return to home base. The biannual training is proposed to normally occur during spring and fall.

1 **Table 2-1. Proposed Angel Thunder Training Exercise Expansion Locations**

Name	Type	Location	Controlling Agency	Training Activity *Key below	Map Book Page Index Number
Southern Arizona – Military Installations					
Aux 6	DZ/HLZ/LZ/FARP	BMGR East, Arizona	Luke AFB	1, 2, 3, 4, 5, 6, 7	33
Aux 6 Circular	DZ/HLZ/LZ	BMGR East, Arizona	Luke AFB	1, 2, 3, 4, 5, 6, 7	33
Aux 6 Rectangular	DZ/HLZ/LZ	BMGR East, Arizona	Luke AFB	1, 2, 3, 4, 5, 6, 7	33
Davis-Monthan AFB	DZ/HLZ/LZ/FARP	DM AFB, Arizona	Davis-Monthan AFB	1, 2, 3, 4, 5, 6, 7, 8	36
Davis-Monthan AFB CATM	Firing Range	DM AFB, Arizona	Davis-Monthan AFB	4, 5	36
Florence	DZ/HLZ/MOUT	Florence, Arizona	Florence Military Reservation	2, 3, 4, 5, 6, 7, 8	34
Gila Bend Air Force Auxiliary Base	DZ/HLZ/LZ/FARP	Gila Bend, Arizona	Luke AFB	1, 2, 3, 4, 5, 6, 7, 8	33
Hubbard	FARP	Fort Huachuca, Arizona	Fort Huachuca	1, 2, 3, 4, 5, 6, 7, 8	40
Hubbard (Tombstone)	LZ/HLZ/ Austere DZ/LZ/HLZ	Fort Huachuca, Arizona	Fort Huachuca	1, 2, 3, 4, 5, 6, 7, 8	40
Humor	DZ/HLZ	Fort Huachuca, Arizona	Fort Huachuca	2, 3, 4, 5	40
Libby Army Airfield	DZ/HLZ/LZ/FARP	Fort Huachuca, Arizona	Fort Huachuca	1, 2, 3, 4, 5, 6, 7, 8	40
NATO Hill (WPT 74)	HLZ	BMGR, Arizona	Luke AFB	2, 4, 5	33
OP Charlie	HLZ/Close Air Support	BMGR, Arizona	Luke AFB	2, 4, 5	33
Range 3 – HLZ 1	HLZ	BMGR East, Arizona	Luke AFB	2, 4, 5	33
Range 3 – HLZ 2	HLZ	BMGR East, Arizona	Luke AFB	2, 4, 5	18
Range 3 – HLZ 3	HLZ	BMGR East, Arizona	Luke AFB	2, 4, 5	33
Range 3 – HLZ 4	HLZ	BMGR East, Arizona	Luke AFB	2, 4, 5	33
Range 3 – HLZ 5	HLZ	BMGR East, Arizona	Luke AFB	2, 4, 5	18
Range 3 – HLZ 6	HLZ	BMGR East, Arizona	Luke AFB	2, 4, 5	33
Range 3 – Tower Helipad	HLZ	BMGR East, Arizona	Luke AFB	2, 4, 5	33
South Tactical Range	HLZ	BMGR East, Arizona	Luke AFB	2, 4, 5	32
Target 333	DZ/HLZ	BMGR East, Arizona	Luke AFB	2, 3, 4, 5	33

Name	Type	Location	Controlling Agency	Training Activity *Key below	Map Book Page Index Number
Southern Arizona – Military Installations (continued)					
Tombstone Circular	DZ	Fort Huachuca, Arizona	Fort Huachuca	2, 3, 4, 5	40
Tombstone Rectangular	DZ	Fort Huachuca, Arizona	Fort Huachuca	2, 3, 4, 5	40
Southern Arizona –USFS					
Canelo	DZ/HLZ	Canelo, Arizona	Coronado NF	2, 3, 4, 5	39
Devon	HLZ	Nogales, Arizona	Coronado NF	2, 4, 5	38
Mesa	HLZ	San Pedro Valley, Arizona	Coronado NF	2, 4, 5	37
Mount Lemon	Technical Rope Work	Tucson, Arizona	Coronado NF	2, 4, 5, 6, 7	36
Ranger	DZ/HLZ	Coronado NF	Coronado NF	2, 3, 4, 5, 6, 7	41
Saddle Mountain East	DZ/HLZ	Sonoita, Arizona	Coronado NF	2, 3, 4, 5	39
Saddle Mountain South	DZ/HLZ	Sonoita, Arizona	Coronado NF	2, 3, 4, 5	39
Saddle Mountain West	DZ/HLZ	Sonoita, Arizona	Coronado NF	2, 3, 4, 5	39
Southern Arizona – Miscellaneous					
Bisbee Douglas IAP	DZ/HLZ/LZ/FARP	Douglas, Arizona	Cochise County	1, 2, 3, 4, 5, 6, 7, 8	41
Coolidge Airport	DZ/HLZ/LZ/FARP	Coolidge, Arizona	City of Coolidge	1, 2, 3, 4, 5, 6, 7, 8	34
Eloy North	DZ/HLZ	Eloy, Arizona	Skydive Arizona	3, 4, 5, 7	34
Eloy South	DZ/HLZ	Eloy, Arizona	Skydive Arizona	3, 4, 5, 7	34
Highway 80 Paladins (TW 2 Paladins)	DZ/HLZ	Douglas, Arizona		2, 3, 4, 5	41
Little Outfit	DZ/HLZ	Sonoita, Arizona	Pete Robbins	1, 2, 3, 4, 5, 6, 7	39
Phoenix Sky Harbor IAP	LZ	Phoenix, Arizona	City of Phoenix	1, 6, 7	27
Pima County Emergency Operations Center	Operations Center	Tucson, Arizona	Pima County Sheriff	6	36
Pima County Regional Training Center	Classrooms/MOUT	Tucson, Arizona	Pima County Sheriff	4	36
Ruby Fuzzy Paladins	DZ/HLZ/Observation Point	Arivaca, Arizona	State of Arizona	2, 3, 4, 5	38
Scottsdale Osborne	HLZ	Scottsdale, Arizona	Scottsdale Healthcare	2	27
Three Points Public Shooting Range	Shooting Range	Three Points, Arizona	Tucson Rifle Club, Inc.	4	35
Tombstone Paladins	DZ/HLZ	Elfrida, Arizona	State of Arizona	2, 3, 4, 5	41

Name	Type	Location	Controlling Agency	Training Activity *Key below	Map Book Page Index Number
Southern Arizona – Miscellaneous (continued)					
University of Arizona Medical Center	HLZ	Tucson, Arizona	University of Arizona Medical Center	2	36
Salt River High	HLZ	White River, Arizona	White Mountain Apache	2, 4, 5	21
Salt River Low	HLZ/Water Area	San Carlos, Arizona	White Mountain Apache	2, 4, 5	21
Saguaro Lake Ranch	Water Area	Mesa, Arizona	Arizona Department of Public Safety (DPS)	2, 4, 5	19
Verde River	Water Area	Mesa, Arizona	Arizona DPS	2, 4, 5	19
Northern Arizona – Military Installations					
Camp Navajo Army Base	MOUT	Camp Navajo, Arizona	Camp Navajo	2, 3, 4, 5, 6, 7	8
Fort Tuthill	Operation Center/Billeting	Flagstaff, Arizona	Fort Tuthill	7	8
L Tank	DZ/HLZ/MOUT	Camp Navajo, Arizona	Camp Navajo	2, 3, 4, 5, 6, 7	8
Metz Tank	DZ/HLZ	Camp Navajo, Arizona	Camp Navajo	2, 3, 4, 5, 6, 7	8
Navajo East	DZ/HLZ	Camp Navajo, Arizona	Camp Navajo	2, 3, 4, 5, 6, 7	8
Navajo Railroad	DZ/HLZ	Camp Navajo, Arizona	Camp Navajo	2, 3, 4, 5, 6, 7	8
Navajo West	DZ/HLZ	Camp Navajo, Arizona	Camp Navajo	2, 3, 4, 5, 6, 7	8
Neill Flat	DZ/HLZ	Camp Navajo, Arizona	Camp Navajo	2, 3, 4, 5, 6, 7	8
Rogers Lake (Logger Camp)	DZ/HLZ/MOUT	Camp Navajo, Arizona	Camp Navajo	2, 3, 4, 5, 6, 7	8
Rodgers Napier	HLZ	Camp Navajo, Arizona	Camp Navajo	2, 4, 5, 6, 7	8
Rodgers Wren	HLZ	Camp Navajo, Arizona	Camp Navajo	2, 4, 5, 6, 7	8
Northern Arizona – USFS					
Black Mesa - USFS Helitack Base	DZ/HLZ	Overgaard, Arizona	Apache-Sitgreaves NF	2, 3, 4, 5, 6, 7	11
Comanche	DZ	Flagstaff, Arizona	Coconino NF	2, 3, 4, 5	8, 10
Elk	DZ	Flagstaff, Arizona	Coconino NF	2, 3, 4, 5	8

Name	Type	Location	Controlling Agency	Training Activity *Key below	Map Book Page Index Number
Northern Arizona – USFS (continued)					
Flagstaff Hotshot – USFS Helitack Base	DZ/HLZ	Flagstaff, Arizona	Coconino NF	2, 3, 4, 5, 6, 7	8
Hannagan Meadow – USFS Helitack Base	HLZ	Alpine, Arizona	Apache-Sitgreaves NF	2, 3, 4, 5, 6, 7	22
Helibase Circular	DZ	Alpine, Arizona	Apache-Sitgreaves NF	2, 3, 4, 5, 6, 7	22
Jacks Canyon	HLZ	Happy Jack, Arizona	Coconino NF	2, 4, 5	11
KP Circular	DZ	Alpine, Arizona	Apache-Sitgreaves NF	2, 3, 4, 5	22
KP Tank	HLZ	Alpine, Arizona	Apache-Sitgreaves NF	2, 3, 4, 5	22
Longview - USFS Helitack Base	DZ/HLZ	Flagstaff, Arizona	Coconino NF	2, 3, 4, 5, 6, 7	13
Mogollon Rim (General Crook)	HLZ/Technical Rope Work	Strawberry, Arizona	Apache-Sitgreaves NF	2, 4, 5	13
Mohawk	DZ	Tusayan, Arizona	Kaibab NF	2, 3, 4, 5	3
Mormon Lake – USFS Helitack Base	DZ/HLZ	Flagstaff, Arizona	Coconino NF	2, 3, 4, 5, 6, 7	10
Overgaard – USFS Helitack Base	DZ/HLZ	Overgaard, Arizona	Apache-Sitgreaves NF	2, 3, 4, 5, 6, 7	14
Payson-RimSide	DZ	Payson, Arizona	Tonto NF	2, 3, 4, 5	13
Pittman Valley	DZ/HLZ	Flagstaff, Arizona	Kaibab NF	2, 3, 4, 5, 6, 7	7
Roosevelt Lake	Water DZ/Water HLZ	Roosevelt, Arizona	Tonto NF	2, 3, 4, 5	20
Rough Rider	HLZ	Oak Creek Village, Arizona	Coconino NF	2, 4, 5	10
Tribeland	DZ	Tusayan, Arizona	Kaibab NF	2, 3, 4, 5	3
Northern Arizona – Miscellaneous					
Babbitt Ranch 1	HLZ	Flagstaff, Arizona	Private	2, 4, 5, 6, 7	4
Babbitt Ranch 2	HLZ	Flagstaff, Arizona	Private	2, 4, 5, 6, 7	4
Babbitt Ranch 3	HLZ	Flagstaff, Arizona	Private	2, 4, 5, 6, 7	4
Bone Crusher	HLZ	Flagstaff, Arizona	Private	2, 4, 5, 6, 7	3
Caldwell Meadows	DZ/HLZ	Alpine, Arizona	AGFD	2, 3, 4, 5, 6	22
Cattle	HLZ/DZ	Flagstaff, Arizona	Private	2, 3, 4, 5, 6, 7	8
Cattle LTFW	HLZ/LZ	Flagstaff, Arizona	Private	1, 2, 4, 5, 6, 7	4
Colorado River	Water Area	Bullhead City, Arizona	Arizona DPS	4, 5	5
Flagstaff Pulliam Airport	HLZ/LZ	Flagstaff, Arizona	City of Flagstaff	1, 2, 4, 5, 6, 7	7
FR 320/311	DZ/HLZ/LZ	Flagstaff, Arizona	Private	1, 2, 3, 4, 5, 6, 7	3, 4
Gerbil	HLZ/DZ	Flagstaff, Arizona	Private	2, 3, 4, 5, 6, 7	4

Name	Type	Location	Controlling Agency	Training Activity *Key below	Map Book Page Index Number
Northern Arizona – Miscellaneous (continued)					
Gila County Sheriff Roosevelt Substation	HLZ	Roosevelt, Arizona	Gila County Sheriff	2, 3, 4, 5, 6, 7	20
Grand Canyon National Park Airport	LZ	Tusayan, Arizona	State of Arizona	1, 2, 4, 5, 6, 7	3
Grand Canyon Valle Airport	DZ/HLZ/LZ	Valle, Arizona	Grand Canyon Valley Corp	1, 2, 3, 4, 5, 6, 7	3
H. A. Clark Memorial Field	DZ/HLZ/LZ	Williams, Arizona	City of Williams	1, 2, 3, 4, 5, 6, 7	7
HLZ 5	HLZ	Flagstaff, Arizona	Private	2, 4, 5, 6, 7	8
HLZ 6	HLZ	Flagstaff, Arizona	Private	2, 4, 5, 6, 7	8
HLZ 7	HLZ	Flagstaff, Arizona	Private	2, 4, 5, 6, 7	8
HLZ 8	HLZ	Flagstaff, Arizona	Private	2, 4, 5, 6, 7	8
Kingman Airport	DZ/HLZ/LZ	Kingman, Arizona	City of Kingman	1, 2, 3, 4, 5, 6, 7	6
Lee's Ferry	DZ/HLZ/LZ	Marble Canyon, Arizona	National Park Service	1, 2, 3, 4, 5, 6, 7	1
Panda	HLZ	Flagstaff, Arizona	Private	2, 4, 5, 6, 7	4
Powerline	HLZ	Flagstaff, Arizona	Private	2, 4, 5, 6, 7	
Sage	HLZ/DZ	Flagstaff, Arizona	Private	2, 3, 4, 5, 6, 7	3
Sinkhole	HLZ	Flagstaff, Arizona	Private	2, 4, 5, 6, 7	4
Springerville Airport	DZ/HLZ/LZ	Springerville, Arizona	City of Springerville	1, 2, 3, 4, 5, 6, 7	15
Sprucedale Guest Ranch	Billeting/Operation Center	Alpine, Arizona	Whitney Wiltbank	2, 3, 4, 5, 6, 7	22
Squirrel	HLZ/DZ	Flagstaff, Arizona	Private	2, 3, 4, 5, 6, 7	4
St. Johns Industrial Air Park	DZ/HLZ/LZ/FARP	St. Johns, Arizona	City of St. Johns	1,2,3,4,5,6,7,8	12
Winslow-Lindbergh Regional Airport (Wiseman Aviation)	DZ/HLZ/LZ/FARP/ Austere Logistics Base/Operation Center	Winslow, Arizona	City of Winslow	1, 2, 3, 4, 5, 6, 7, 8	9
New Mexico – Military Installations					
Melrose Air Force Range	DZ/HLZ.MOUT/ Shooting Range	Clovis, New Mexico	USAF	1, 2, 3, 4, 5. 6, 7	16
White Sands Missile Range	DZ/HLZ.MOUT/ Shooting Range	Las Cruces, New Mexico	Army	1, 2, 3, 4, 5, 6, 7	29

Name	Type	Location	Controlling Agency	Training Activity *Key below	Map Book Page Index Number
New Mexico – USFS					
Glenwood Ranger Station	DZ/HLZ	Glenwood, New Mexico	Gila NF	2, 3, 4, 5, 6, 7	28
Negrito Airstrip	DZ/HLZ/LZ	Reserve, New Mexico	Gila NF	1, 2, 3, 4, 5, 6, 7	23
Negrito Center	DZ/HLZ	Reserve, New Mexico	Gila NF	2, 3, 4, 5, 6, 7	23
Negrito Helibase	HLZ	Reserve, New Mexico	Gila NF	2, 4, 5, 6, 7	23
Negrito North	DZ/HLZ	Reserve, New Mexico	Gila NF	2, 3, 4, 5, 6, 7	23
Negrito South	DZ/HLZ	Reserve, New Mexico	Gila NF	2, 3, 4, 5, 6, 7	23
Rainy Mesa	HLZ	Reserve, New Mexico	Gila NF	2, 3, 4, 5	23
Reserve Ranger Station	DZ/HLZ	Reserve, New Mexico	Gila NF	2, 4, 5, 6, 7	23
Catron County Fairgrounds	HLZ	Reserve, New Mexico	Gila NF	2, 4, 5, 6, 7	23
Reserve Airport	DZ/HLZ/LZ	Reserve, New Mexico	Gila NF	1, 2, 3, 4, 5, 6, 7	23
New Mexico – Miscellaneous					
Playas Training and Research Center	DZ/HLZ/LZ/MOUT/ Driving/Billeting	Playas, New Mexico	New Mexico Institute of Mining and Technology	1, 2, 3, 4, 5, 6, 7	42
California Military Installations					
Camp Pendleton Cartwright Water	DZ/HLZ/Water Area	Camp Pendleton, California	Camp Pendleton	2, 3, 4, 5	26
Camp Pendleton HOLF	DZ/HLZ/MOUT	Camp Pendleton, California	Camp Pendleton	2, 3, 4, 5, 6, 7	26
Camp Pendleton NFG	DZ/HLZ/LZ	Camp Pendleton, California	Camp Pendleton	2, 3, 4, 5, 6, 7	26
Camp Pendleton Off-Road Trail	Off-Road	Camp Pendleton, California	Camp Pendleton	2, 4, 5	26
Camp Pendleton PDL	DZ/HLZ/MOUT	Camp Pendleton, California	Camp Pendleton	2, 3, 4, 5, 6, 7	26
Camp Pendleton Red Beach	DZ/HLZ/Austere HLZ/Water	Camp Pendleton, California	Camp Pendleton	2, 3, 4, 5, 6, 7	26

Name	Type	Location	Controlling Agency	Training Activity *Key below	Map Book Page Index Number
California Military Installations (continued)					
El Centro	DZ/HLZ/LZ/FARP	El Centro, California	Naval Air Facility El Centro	1, 2, 3, 4, 5, 6, 7, 8	31
Knots Circular Water	DZ/HLZ Water	San Clemente Island, California	NAS North Island	2, 3, 4, 5	25
Leon	DZ/HLZ	San Diego, California	NAS North Island	2, 3, 4, 5	30
March Air Reserve Base (ARB)	HLZ/LZ/FARP	March ARB, California	March ARB	1, 2, 4, 5, 6, 7, 8	17
NAS North Island NZY	HLZ/LZ/FARP	Coronado, California	NAS North Island	1, 2, 4, 5, 6, 7	30
Nautica Circular Water	DZ/HLZ Water	San Clemente Island, California	NAS North Island	2, 3, 4, 5	25
San Clemente Island Naval Auxiliary Landing Field	HLZ/LZ/FARP	San Clemente Island, California	NAS North Island	1, 2, 4, 5, 6, 7	25
San Clemente Island West	DZ/HLZ	San Clemente Island, California	NAS North Island	1, 2, 4, 5, 6, 7	25
San Nicolas Island	HLZ/LZ	San Nicolas Island	NAS North Island	1, 2, 4, 5, 6, 7	24
Nevada – Military Installation					
Nellis AFB	n/a	Nellis AFB, Nevada	Nellis AFB	6	2

Training Activity Notations:

1. Fixed-Wing Terminal Area Operations
2. Rotary-Wing Terminal Area Operations
3. Parachute Operations
4. Dismounted Ground / Water Operations
5. Dismounted Ground / Water Movement
6. Command, Control, Communications, Computers, and Intelligence Operations Location
7. Logistical / Beddown location
8. Forward Aircraft Refueling Point

Key:

BMGR – Barry M. Goldwater Range
DZ – drop zone
HLZ – helicopter landing zone
LZ – landing zone
FARP – forward aircraft refueling point
MOUT - military operations in urban terrain
NAS – Naval Air Station
NF – National Forest

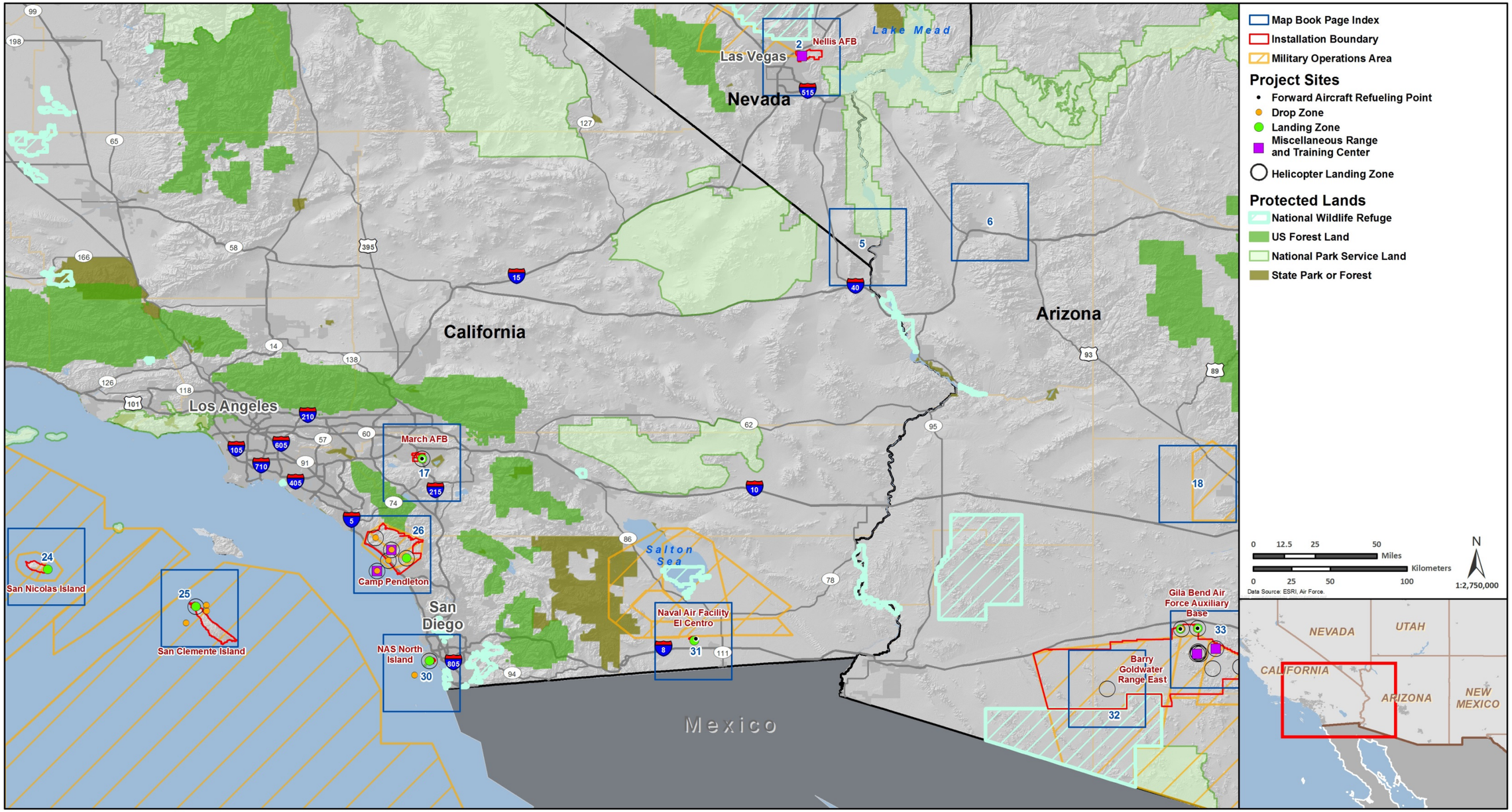

Figure 2-1. Proposed Western Military Sites to be used during Biannual Angel Thunder Training Exercises

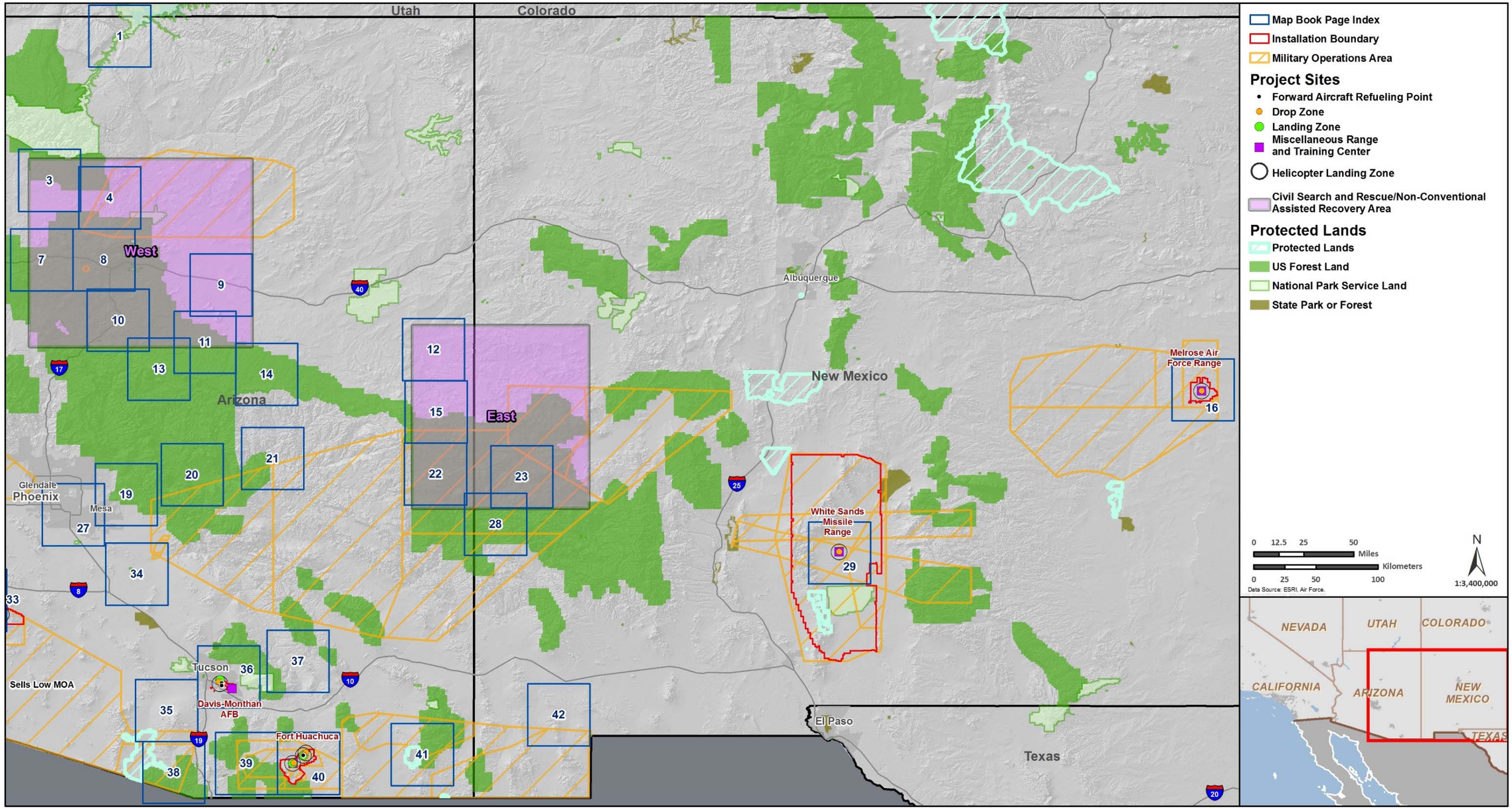

Figure 2-2. Proposed Eastern Military Sites to be used during Biannual Angel Thunder Training Exercises

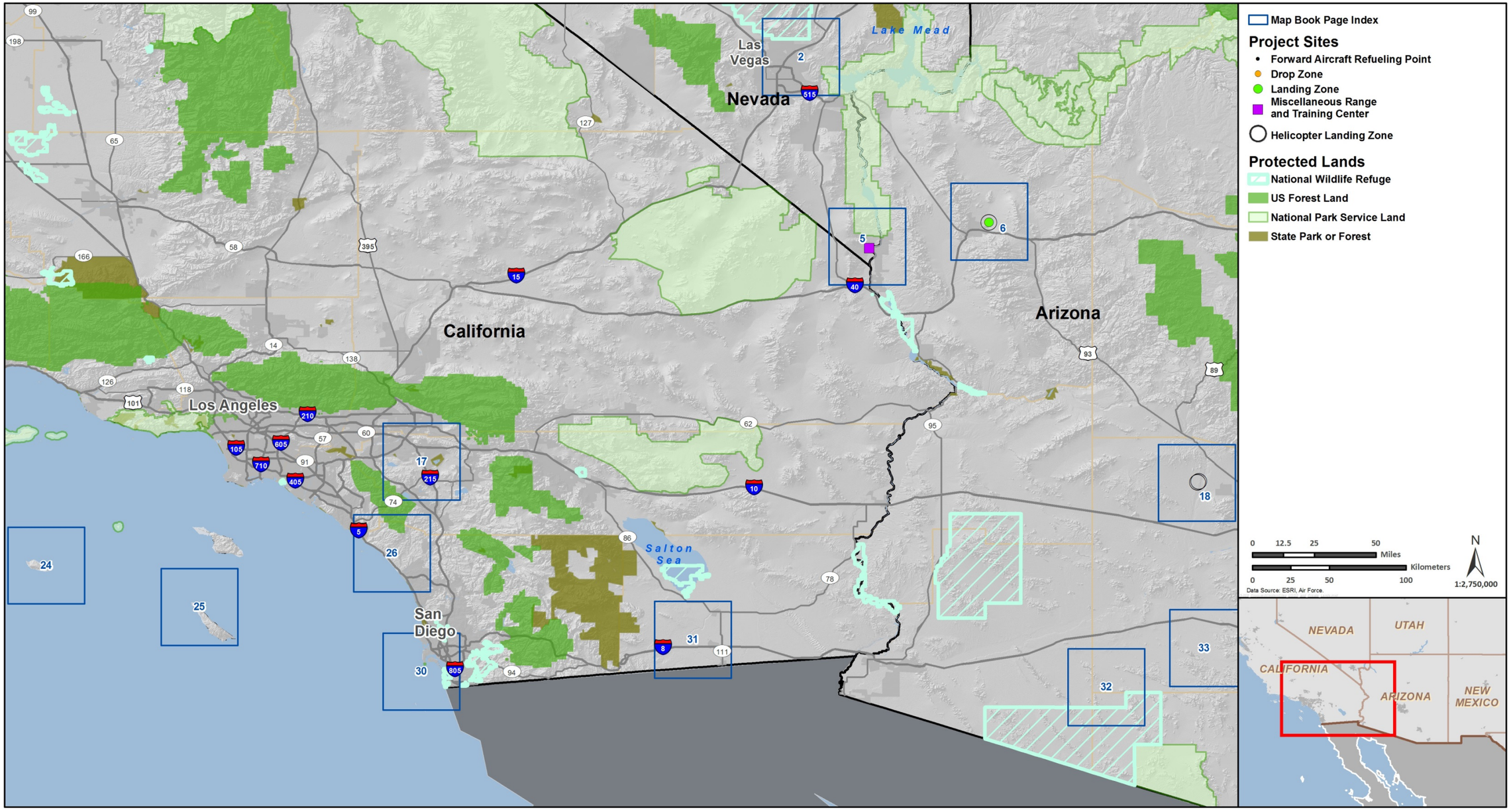

Figure 2-3. Proposed Western USFS and Private Sites to be used during Biannual Angel Thunder Training Exercises

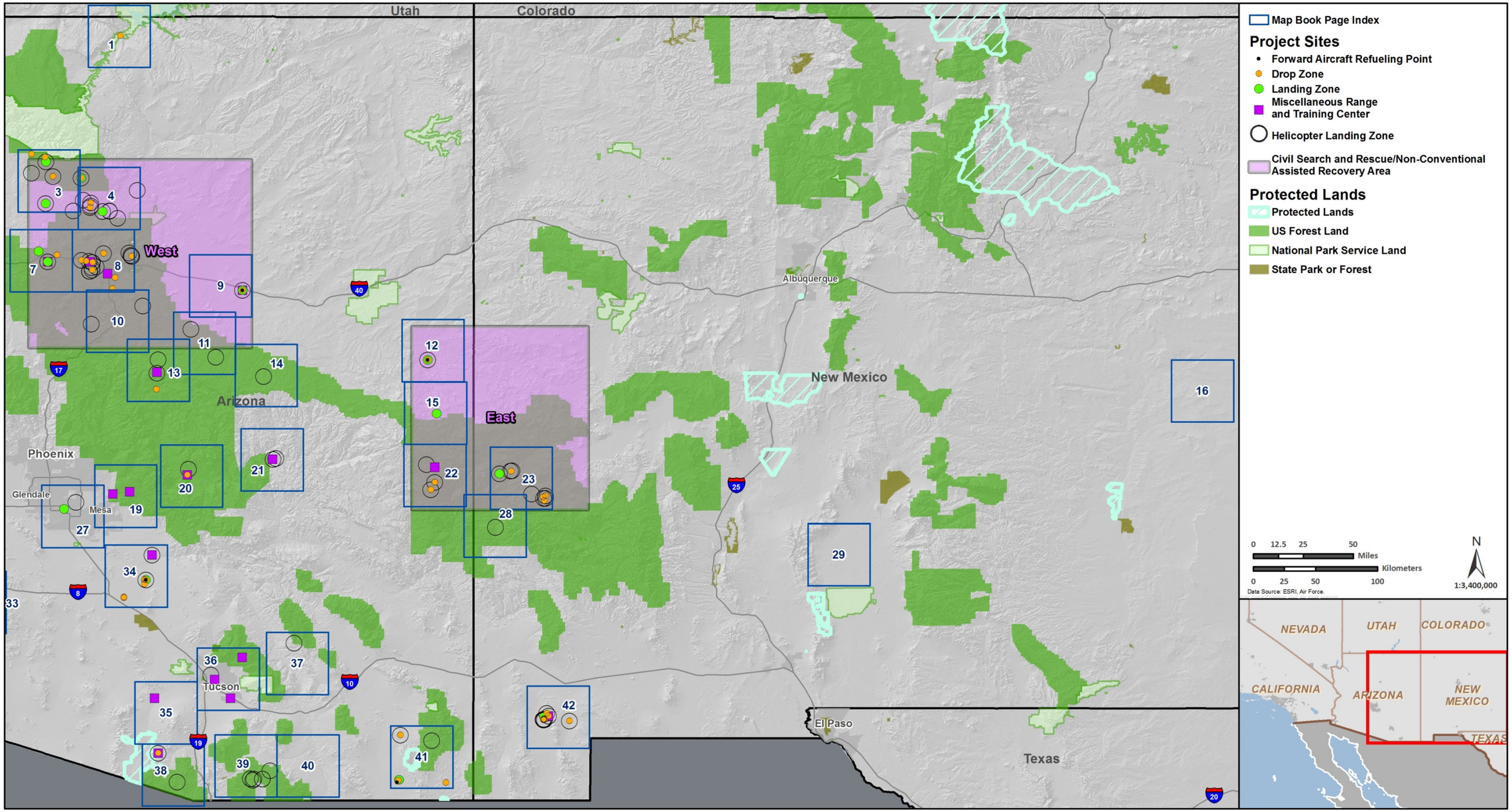

Figure 2-4. Proposed Eastern USFS and Private Sites to be used during Biannual Angel Thunder Training Exercises

Preparation of the environment would occur five to six times before each exercise for several days at a time. Preparation would primarily consist of site surveys using approximately 10 to 20 personnel to assess the safety of specific locations for intended exercise execution.

Training missions would include fully integrated large force scenarios during designated vulnerability windows or "VUL" periods (when all units are engaged in the prescribed active training scenario) and non-scenario based part-task training (e.g., training not associated with the active training scenario, such as weapons training on installation small arms ranges). Although up to 3,000 personnel could be engaged in an AT exercise, a more realistic event would typically engage approximately 1,000 personnel, with international participation normally limited to five nations per training event. **Appendix B** includes a complete list of potential training partners and potential aircraft types. Training would include day and night extractions and day and night infiltration, evasion, and exfiltration training performed by small units of four to six soldiers operating on foot in permitted locations. Examples of activities could include the following:

- Parachute USAF pararescue personnel into a remote location to rescue simulated injured personnel. Once secured, arrange for retrieval of the injured and pararescue personnel by helicopter at an approved HLZ.
- Insert by helicopter or parachute a small unit that must then proceed to a designated location for extraction by vehicle or helicopter while avoiding detection by a similarly sized opposing force.
- Conduct similar types of operations in an urban setting modifying insertion and extraction to vehicular use or designated HLZs or DZs, if available.

Aerial training activities would include aircraft refueling; tactical combat maneuvering by fixed- and rotary-wing aircraft; abrupt, unpredictable changes in altitude and direction of flight; airdrops of personnel and equipment (i.e., freefall- and static line-parachute operations from all altitudes); water hoists; and landing on unimproved surfaces.

2.1.1.1 CSAR TRAINING ACTIVITIES INCORPORATED INTO THIS ANALYSIS

All activities described in the 2002 CSAR EA would continue to be an integral part of any AT exercise, namely:

- Overwater training operations (i.e., carrying out of a strategic, operational, tactical, training, or administrative military mission) would occur at an existing Water Training Area (WTA) off the coast of San Diego, California, utilizing sea dye markers, lightsticks, and marine flares (see **Figure 2-1**);
- Sortie operations would typically consist of rotary-wing assets to include variants of the HH-60 (e.g., UH-60, SH-60), AH-64, and CH-47, fixed-wing aircraft to include HC-130, A-10, KC-135, and unmanned aircraft within the Sells Low Military Operations Area (MOA), Jackal Low MOA, 305 East and West Low Altitude Tactical Navigation (LATN) areas, Barry M. Goldwater Range (BMGR) East and associated Restricted Areas (RAs) (i.e., R-2301E, R-2305, and R-2304), and the Yuma Tactical Aircrew

Combat Training System Range (R-2301W) (see **Figure 2-2**). R-2301E, R-2305, and R 2304 are managed and scheduled by the 56th FW at Luke AFB, Arizona. AFI 12-212v1 identifies 24 units as assigned users of BMGR East. The controlling agency for R-2301E is the Federal Aviation Administration (FAA) though the Albuquerque (ZAB) Air Route Traffic Control Center (ARTCC) and the controlling agency for both R-2305 and R 2304 is the Albuquerque Center. R-2301W is managed by Commanding Officer, USMC Air Station, Yuma, Arizona and its controlling agency is the FAA though the Los Angeles (ZLA) ARTCC (FAA 2014). Sortie-operations would occur within approved areas at BMGR East and Yuma Tactical Aircrew Combat Training System Range that use chaff and self-protection flares:

- HH-60 weapons training operations within previously approved target areas would be conducted at BMGR East (including the northeastern corner of the North Tactical Range, Range 3 [specifically the area called the Rescue Range] and the East Tactical Range) involving M-18 smoke grenades and aircraft-mounted 7.62-millimeter and 0.50-caliber machine guns:
- Aerial refueling operations between HH-60 and HC-130 aircraft would occur north of Sells Low (AR135V) and Jackal Low MOAs: and
- Ground and parachute training for CSAR personnel would occur within previously approved ranges, DZs, LZs, and Davis-Monthan AFB Combat Arms Training and Maintenance Support areas.

2.1.1.2 ADDITIONAL PROPOSED TRAINING ACTIVITIES

In addition to the CSAR training activities incorporated into this analysis, part of the action would include SERE and Intelligence Surveillance and Reconnaissance (ISR) training. SERE training would be conducted at the various types of training areas described in **Section 2.1.2** with isolated personnel being recovered by various means (e.g., helicopter, HC-130, Guardian/Angel Special Forces ground evacuation). Participating sites would be determined in advance and consultation with controlling agencies would occur prior to the exercise. All vehicular ground operations would be conducted using existing paved and unpaved roads. No off-road vehicular activity is proposed.

A maximum of 800 sorties per exercise would be flown as part of the biannual AT exercise; 600 sorties would be flown out of Davis-Monthan AFB and 200 sorties would be flown from the respective unit's home station to the exercise site and return to home station.

In addition, unmanned aircraft, such as the MQ-1 Predator or MQ-9 Reaper, would participate in restricted airspaces or under other conditions deemed allowable by the FAA noted in **Section 3.3.2**. These aircraft would be critical to the PR mission because they enable eyes on areas in a high-threat environment and would allow for training for real-world combat situations. Operations centers would be set up at one or more forward operating airfields such as Bisbee Douglas International Airport (IAP), Pulliam Airport (Flagstaff), Winslow-Linbergh Regional Airport, and Fort Huachuca's Libby Army Airfield. Operations centers would provide a centralized location for the command and control of training operations and serve as the focal point for planning, executing, and assessing air component operations (i.e., logistical, beddown

locations) (USAF 2014). The present mobility concept would rapidly deploy a force; provide beddown for aircraft, support equipment, and forces at a forward operating bare base for rescue; and would provide aeromedical evacuation, security, and reconnaissance missions in support of a global contingency scenario (i.e., dismounted ground and water operations and movement). The purpose would be to give the Combat Air Forces PR Forces increased mobility and strike capability and to emphasize its critical role in the Expeditionary Air Force. The bare base would have the minimum essential facilities to house, sustain, and support operations. The nucleus of the bare base Command, Control, Communications, Computers, and Intelligence operations would center on the Air Operations Center at Davis-Monthan AFB, Arizona with a forward Operations Center at Camp Navajo, Arizona.

Depending upon location and suitability, a few tents could be set up to support exercise activities. Alternatively, a similar number of conex shipping containers or recreational vehicles may be used to achieve the same objective. The mission objective would be to leave sites in the same condition they were in prior to the exercise. Surface and subsurface conditions such as sensitive resources or utility lines would determine whether tents or conexes would be used. In either situation, appropriate coordination would be completed with the specific airfield prior to execution. Additionally, when needed, the participating maintenance unit would use supporting Fixed-Base Operator at the Flagstaff Pulliam Airport and the Winslow Regional Airport. Forward operating bases are ideal to train PR forces in a Global Response Force posture.

All airspace utilized during AT exercises would be governed by the AT Airspace Control Plan (ACP). The ACP outlines procedures and designates airspace for AT operations within the temporary Playas MOA/Air Traffic Control (ATC) Assigned Airspace and the BMGR East (the “Exercise Area”), and other identified restricted airspace. Responsibilities and procedures described in the ACP would be applicable to all participating aircraft and would be adhered to unless prior coordination was conducted. The document is supplementary to the procedures in FAA Orders 7110.65, *Air Traffic Control*, and 7610.4, *Special Military Operations*, and would not replace any standing Letters of Agreement for the BMGR East or any other range or airspace associated with AT. The ACP would not replace airfield or airspace local operating procedures, the Flight Information Publication, or Service and national flight operations regulations. AT participants would conduct required mission planning using the ACP; Flight Information Publications, including AP-1A and AP-1B; applicable Letters of Agreement and regulations; Air Tasking Order; Airspace Control Order; and Special Instructions.

2.1.2 Training Sites

The proposed training sites are located on federal, tribal, state, municipal, and private land in areas of Nevada, New Mexico, Arizona, and California. The proposed training sites have been previously disturbed or they are currently or were previously used for the activities conducted under the Proposed Action. There are 53 sites used as HLZs, LZs, and DZs that would be located on current military installations, 37 on USFS land, and 50 on miscellaneous non-DOD land. The locations would be selected in consultation with the appropriate range and other installation personnel and would be permitted sites already governed by the installations’ environmental policies and procedures. Specific locations for these training sites are detailed in **Appendix C**.

In other cases, such as HLZs on USFS lands, special-use permits would be required on an annual basis from the affected land managers for use of the proposed sites; and, it would be the responsibility of the proponent to ensure all such permits were current. No training activity would occur unless the appropriate current permit is obtained. See **Appendix D** for examples of Special Use Permits from previous AT events.

The training activities that would occur at each of the proposed training sites are included in **Table 2-1**. Numerous sites could serve multiple training purposes and not all of the proposed sites would be used every year. It is anticipated that under most training scenarios, 30 to 40 sites (21 to 28 percent) would be used during a single AT event with non-military sites being used on only one or two occasions during the training cycle. The nature and location of sites would vary from training cycle to training cycle depending on the scenario developed for the exercise. Through the use of varying training scenarios, overuse of specific sites would be avoided.

Helicopter Landing Zones. Most HLZs would consist of dedicated helicopter landing pads currently under use by other DOD, federal, state and local agencies. In more austere (plain) locations where no pad exists, HLZs would meet all requirements identified in AFI 13-217, *Drop Zone and Landing Zone Operations.* AFI 13-217 outlines DZ size and marking criteria, aerial delivery methods and parameters, operating procedures for qualified personnel, and LZ survey and HLZ survey requests and review processes. All HLZs would be surveyed in accordance with AFI 13-217 (e.g., trainers would survey a site to determine if there is a physical barrier preventing the helicopter from landing) prior to their use (USAF 2007a). During the course of the biannual three-week exercises, up to 300 rotary-wing sorties could be conducted, of which up to 250 would derive from Davis-Monthan AFB, and the remainder could fly to the HLZs and return to their respective home station. The HLZs are listed within **Table 2-1**. Rotary-wing assets would consist primarily of variants of the UH-60 Black Hawk (e.g., HH-60 Pave Hawk, SH-60 Sea Hawk), AH-64 Apache, and CH-47 Chinook.

Landing Zones. LZs for fixed-wing aircraft would use established military, USFS, and municipally-owned airfields. Airfields would be subject to surveys prior to use in accordance with AFI 13-217 (USAF 2007a). During the course of the biannual three-week exercises, up to 100 fixed-wing sorties would be conducted, of which up to 80 would derive from Davis-Monthan AFB, and the remainder would fly to the LZ and return to their respective home station. The LZs are listed within **Table 2-1.** The majority of fixed-wing sorties would be conducted by various models of the Hercules C-130 transporter with additional flights conducted by A-10s (low-altitude close air support aircraft), KC-135 aerial refueling aircraft, and unmanned aircraft.

Drop Zones. DZs would occur in areas currently under use by other DOD, federal, state and local agencies. DZs would also meet the requirements of AFI 13-217 (USAF 2007a). With noted exceptions in **Table 2-1**, the use of a DZ would be for the insertion of pararescuemen in small squad units normally around eight to 12 personnel. Exceptions to this would be equipment drops (e.g., rubber dinghies) in amphibious training scenarios over water.

Forward Aircraft Refueling Points. All airfields proposed for refueling activities currently have appropriate fuel storage on site and are managed in accordance with facility Spill Prevention Control, Countermeasure, and Contingency Plans. All AT refueling of fixed and rotary-wing

aircraft would occur within designated areas of the airfields and in accordance with airfield policies and procedures. Hot refueling (fueling an aircraft with the engines on) and aircraft-to-aircraft ground refueling operations would be limited to existing approved locations on municipal airports and military installations. The airfields proposed for use as forward aircraft refueling points (FARP) are labeled in **Table 2-1**.

Civil Search and Rescue/Non-Conventional Assisted Recovery. There are two regions designated as areas where non-conventional assisted recovery (NAR) training would occur (labeled as East and West in **Figure 2-2** and **2-4**). An example NAR training mission could be a rescue performed somewhere in an urban setting in conjunction with local law enforcement. The East region surrounds Springerville and Alpine in Arizona and Reserve in New Mexico. The West region encompasses the surrounding areas of Flagstaff, Winslow, and Camp Navajo in Arizona only. Fixed-wing aircraft would train in close air support on existing military ranges and air refueling within existing designated military training routes (MTRs).

Miscellaneous. Other important training components that would be necessary to fulfill biannual AT exercise objectives include classroom training, technical rope work, small arms qualification, military operations in urban terrain (MOUT) training, and preparation of the environment. Locations that adequately support MOUT training are primarily manmade structures that allow for personnel to master the combat and maneuvering skills (e.g., weapon carries, firing techniques, and crossing open areas) required to successfully conduct missions in urban environments (USMC 1998). The locations proposed to conduct these training components are listed in **Table 2-1**.

2.1.3 Training Site Locations

Additional Military Installations. There are 53 sites used as HLZs, LZs, and DZs that would be located on current military installations (see **Table 2-1**). The locations would be selected in consultation with the appropriate range and other installation personnel and would be permitted sites already governed by the installations' environmental policies and procedures. Under installation environmental programs (summarized in **Table 2-2**), range control managers are required to ensure that all training activities on approved range site are in compliance with the goals and objectives of all environmental management plans and any associated conditions relating to their use resulting from consultation efforts with federal, state and local agencies. If AT training needs meet these objectives, the requests would be placed on the training calendars for the specific ranges.

Lands under the Control of the U.S. Forest Service. AT proposes to use 37 sites within the Kaibab, Coconino, Apache-Sitgreaves, Tonto, Coronado, and Gila National Forests of Arizona and New Mexico (see **Table 2-1**). Additionally, **Appendix C** contains more detailed maps for these locations. All USFS HLZ sites in **Table 2-1** are currently or formerly used by their personnel or contractors in helicopter operations for fire suppression and pest control activities. The proposed sites were identified in this EA based on past AT exercises. However, the USAF would coordinate with each district ranger to provide the necessary project information, understand the limitations of the areas that would be involved, and ensure that all USFS procedures would be followed (e.g., review of vehicle access, notification protocol, wildlife avoidance).

Table 2-2. Document Review and Consultations for Training Locations on Military Installations

Installation	Document/Consultation	Citation
BMGR East	• 2012 Integrated Natural Resources Management Plan • Pathways to Preservation: A Research Design and Heritage Management Plan for the Barry M. Goldwater Range East, Arizona. • Personal Communication with Adrianne Rankin, January 5, 2017, April 4, 2017	BMGR 2012; Heilen and Vanderpot 2013
Camp Navajo	• Personal Communication with Hannah Tell, February 16, 2015	
Davis-Monthan AFB	• Environmental Assessment for the West Coast CSAR Beddown. United States Headquarters Air Combat Command.	Davis-Monthan 2002
Florence Military Reservation	• Updated Information for the Florence Military Reservation Integrated Cultural Resource Management Plan	Kirvan and Rogge 2009.
Fort Huachuca	• 2010 Integrated Natural Resources Management Plan • Personal Communication with Martyn Tagg, July 16, 2015	Fort Huachuca 2010
Gila Bend Air Force Auxiliary Base	• Pathways to Preservation: A Research Design and Heritage Management Plan for the Barry M. Goldwater Range East, Arizona.	Heilen and Vanderpot 2013
Melrose AFB	• 2009 Integrated Cultural Resources Management Plan • 2010 Integrated Natural Resources Management Plan	Melrose AFB 2009 Melrose AFB 2010
White Sands Missile Range	• 2009 Final Environmental Impact Statement for Development and Implementation of Range-Wide Mission and Major Capabilities • at White Sands Missile Range, New Mexico • 2015-2019 Integrated Natural and Cultural Resources Management Plan and Environmental Assessment	WSMR 2009 WSMR 2015
Camp Pendleton	• 2008 Integrated Cultural Resources Management Plan • 2012 Integrated Natural Resources Management Plan • Personal Communication with Joe Vaineharrison, May 1, 2015.	CPEN 2008 CPEN 2012
March ARB	• 2011 Integrated Cultural Resources Management Plan	JRP Historical Consulting 2011
Naval Base Coronado	• 2013 Integrated Natural Resources Management Plan • 2013 Integrated Natural Resources Management Plan for San Clemente Island • 2012 Integrated Cultural Resources Management Plan for San Clemente Island, Southern California Range Complex	NBC 2013

Use of any site would require a current special use permit that would be consistent with appropriate USFS Plans, specify the area to be used, nature of the activity to be conducted, designated trails to be used for foot traffic and availability of the road network as well as any seasonal restrictions to use. Sites would be permitted for use subject to availability and the results of this EA. If the USFS determines that a USFS site would not be suitable for training (e.g., due to site-specific seasonal restrictions), special use permits would not be issued and alternative sites would be chosen.

Tribal, State, and Municipal Lands. These properties would offer a variety of training opportunities to AT. There are 10 municipal airports that would provide for HLZs, LZs, and DZs as well as in some instances FARPs. Other properties consist of tribal and state recreation areas that allow for water training at locations in closer proximity to Davis-Monthan AFB than proposed Pacific coast sites associated with military installation training areas in California (see **Table 2-1**). Additionally, **Appendix C** contains more detailed maps for these locations. All activities at all locations would be coordinated and approved in conjunction with the appropriate Tribal, state, and local permitting authorities.

Private Property. There are 17 sites proposed as DZ or HLZs that are on private ranches (see "Private" under Controlling Agency in **Table 2-1** and **Appendix C** for a detailed location). The use of these sites would be subject to terms and agreements prepared between the USAF and the property owner.

Airspace. Training airspace used by AT would largely cover Arizona, southern New Mexico, and off the coast of San Diego, California, using established MOAs (**Figures 2-1** and **2-2**). No new MTRs are proposed. In addition, AT would include training at the Playas Training and Research Center and would control temporary MOAs and stationary Altitude Reservations granted by FAA that would be activated during training.

2.2 Selection Standards

To identify locations and training requirements to be incorporated into the AT exercise, the following selection standards were identified:

1. The USAF must be able to host a biannual training exercise for PR forces that covers PR skill sets, and provides a realistic geographical setting for current and expected global operations in contested and non-contested scenarios in order to be prepared for real life scenarios that require these skills. Realistic geographical settings include desert and mountain landscapes, forested and vegetated areas, open water, and rural and urban environments.
2. The training exercise must include the ability to practice joint operations with sister services and foreign PR and special operations units who might act as coalition partners on actual PR missions.
3. The exercise locations need to enable all Combat Air Forces, Joint, Interagency, and International PR agencies to identify problems in their operational processes in order to increase operational effectiveness. Therefore, the exercise location and training sites

have to expose personnel to varying environmental conditions to provide a thorough and realistic understanding of combat scenarios.

4. The training location must provide the best optimization of PR fiscal resources by being in close proximity (100 nautical miles [NM]) to mountainous, high-altitude training areas, urban training centers (300 NM), unimproved landing areas (100 NM), multiple MOAs (100 NM times five MOAs), and restricted airspace (100 NM) in order to allow for utilization of ISR assets.
5. The training location must be within 10 NM of a regional U.S. Customs and Border Patrol office for training on high angle recoveries of personnel (e.g., rope training to extract individuals stranded at the bottom of a ravine) along the border between the U.S. and Mexico.
6. The training location must be within 300 NM of a rural area to conduct NAR operations to expand SERE training.
7. The training must provide realistic personnel search and rescue training for USAF PR forces, Joint Services, local and state agencies, DOD Interagencies, and Foreign Partner Nations. In order to provide realistic training, a variety of terrain must be used during the AT exercise. DOD properties alone would not provide the variety of terrain necessary (i.e., the realistic geographical settings described above). This would require the use of both DOD and non-DOD properties and the inclusion of the non-USAF partners listed in **Appendix B**.
8. The training requires that an adequate number of HLZs, LZs, and DZs are available during training events in order to support the complete training of all personnel that would need experience at these locations. While these numbers are variable, the exercises would require the use of DOD and non-DOD properties for the reasons discussed above.
9. The training must ensure that a wide variety of terrain types and elevations are available to provide realistic training. This would require the use of both DOD- and non-DOD properties for the reasons discussed above.
10. The training needs to continue to develop Building Partnership Capacities with foreign participants, which is a core function of USAF.
11. Training locations must avoid or minimize impacts to natural, cultural and historic resources.

2.3 Alternatives Considered but Eliminated from Detailed Analysis

Under NEPA, reasonable alternatives must be considered in the EA. Two alternatives were considered; however, they did not meet all the selection standards of a reasonable alternative, and were therefore eliminated from detailed analysis. The two alternatives are described below.

2.3.1 Alternative 1

Under this alternative, AT would still include SERE training, but would eliminate ISR training. SERE training would be conducted at the various military training areas identified in **Table 2-1** with isolated personnel being recovered by various means (e.g., helicopter, C-130, Guardian Angel Special Forces, ground evacuation). The reduction in the number of outside agencies (noted in **Appendix B**) and training area locations would significantly impact the USAF PR community's ability to train to the full spectrum of PR, specifically failing to meet Selection Standards 7 and 9. Participating agencies would not be able to practice joint operations with foreign PR and special operations units, failing to meet Selection Standard 2. Additionally, USAF PR forces would not be trained to the current tactics, techniques, and procedures of the entire PR community. The use of DOD-only airspace and training areas would limit the flexibility of HLZs, LZs, and DZs necessary to plan training events. Since there would be no foreign participation in the exercise, Building Partnership Capacities (Selection Standard 10) would not be realized.

2.3.2 Alternative 2

Under Alternative 2, only USAF PR personnel, local law enforcement, and local emergency responders would train in DOD airspace and training areas alone. This would fail to meet Selection Standards 2, 6, 7, 8, 9, and 10.

Under this alternative, there would not be any Joint, DOD interagency, or foreign participants. This would significantly impact the USAF PR community's ability to train to the full spectrum of PR. USAF PR forces would not be trained to the current tactics, techniques, and procedures of the entire PR community.

2.3.3 Training Sites Considered but Eliminated from Detailed Analysis

As part of the initial scoping process, proposed training sites were discussed with the various agencies for use during the bi-annual AT training exercises. The information collected during these discussions and observations made during site visits resulted in the determination that sites identified in **Table 2-3** currently failed to meet the requirements of Selection Standard 11. Should the AF wish to pursue the future use of these sites additional NEPA and subsequent consultation would be required.

Table 2-3 Proposed Angel Thunder Training Locations requiring additional NEPA and or consultation

Name	Type	Location	Controlling Agency
Anita Station	DZ/HLZ	Anita Station, Arizona	Kaibab NF
Caldwell Cabins	DZ/HLZ	Alpine, Arizona	Apache-Sitgreaves NF
Meteor Crater	HLZ	Flagstaff, Arizona	Private
Old Grand Canyon Airport (Red Butte)	DZ/HLZ	Kaibab NF	Kaibab NF
Rucker	DZ/HLZ	Coronado NF	Coronado NF

Key: DZ – drop zone; HLZ – helicopter landing zone; NF – National Forest

2.4 No Action Alternative

This alternative is carried forward for analysis as a baseline against which the impacts of the Proposed Action and the potential action alternatives can be evaluated.

Under the No Action Alternative, the AT exercise would not be developed and would result in the absence of valuable training under realistic and varied environments for combat aircrews and PR forces expecting to deploy to real world combat zones, while reducing the opportunity to train with Joint Services; local, state, and DOD Interagencies; and Foreign Partner Nations. Biannual PR training capabilities would not be developed beyond the baseline established in the 2002 CSAR EA (described in **Section 2.1.1.1**), including the number of biannual sorties and additional training airspace and training areas.

2.5 Identification of the Preferred Alternative

The Preferred Alternative of the 57th Wing is to implement the Proposed Action, as described in **Section 2.1** of this EA.

3. Affected Environment

All potentially relevant resource areas were initially considered for analysis in this EA. In compliance with NEPA, CEQ, and EIAP 32 CFR § 989 guidelines, the following discussion of the affected environment and environmental consequences focuses only on those resource areas considered potentially subject to impacts and with potentially significant environmental issues. This section includes noise, air quality, airspace management, biological resources, cultural resources, health and safety, and hazardous materials and wastes. Some resource areas would not be affected by the Proposed Action or No Action Alternative. Resource areas that have been eliminated from further detailed study in this document and the rationale for eliminating them are presented below:

- **Land Use:** Implementing the Proposed Action or No Action Alternative would not result in changes to existing land use designations or coastal zone management practices. While some sites are more remote and austere, there would be no construction on any of the proposed sites. USFS-controlled lands would remain open to the public for recreational activities during the biannual AT exercise, and activities would be coordinated in order to avoid conflict with recreational users in the area.
- **Geological Resources and Soils:** The Proposed Action does not include any ground-disturbing activities other than the potential to set up tents, conex shipping containers, or recreational vehicles as operations centers at select locations. Setting up tents would disturb the ground surface, but not below the ground surface. All of the proposed sites would comply with existing uses and no construction would occur. Therefore, impacts on geological resources and soils are not expected.
- **Water Resources:** Implementing the Proposed Action or No Action Alternative would result in little to no impacts on water resources. Activities that would occur in or around water bodies are designed to avoid any intentional or unintentional consequences to the resource. There are only six HLZs (Caldwell Meadows, Gila County Roosevelt Station, KP Tank, Mongollon Rim, Salt River, and Canelo) within 1,000 feet of a water body. Given the infrequent use of these sites and minimal fugitive PM emissions (estimated to be 3.3 pounds per LTO), no impact on these water resources would be expected from fugitive dust. No ground-disturbing activities are planned, thus avoiding any potential sediment run-off, and all refueling activities would be conducted at facilities designed for such activities and in strict accordance with Air Force standard operating procedures.
- **Utilities and Infrastructure:** Biannual AT exercise activities under the Proposed Action would not require the use of utilities or infrastructure other than those at established areas. Because this is a biannual three-week exercise, impacts on utilities and infrastructure are not expected.
- **Transportation:** Transportation associated with the Proposed Action would be minimal and only occurring for three weeks twice per year. This activity would not disrupt transportation or exclude transportation use of others. Therefore, impacts on transportation are not expected.
- **Socioeconomics:** Biannual AT exercise activities under the Proposed Action would not occur in one place long enough to influence local socioeconomics. Socioeconomics comprises the basic attributes and resources associated with the human environment,

particularly population and economic activity. Population levels are subject to fluctuations from regional birth and death rates and immigration and emigration of people. Economic activity typically encompasses employment, personal income, and economic growth. Impacts on these socioeconomic components also influence other issues such as housing availability and the provision of public services (e.g., schools, roads, and other infrastructure). Socioeconomic impacts would be considered significant if the Proposed Action resulted in a substantial shift in population trends or notably affected regional employment, earnings, or community resources. The exercise would be self-contained and supplied by the USAF. Personnel would not be expected to spend locally as a result. If local spending were to occur, it would be widely dispersed and would not result in an appreciable increase to any specific local economy. No personnel would be permanently relocated under the Proposed Action.

- **Environmental Justice.** EO 12898, *Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations*, stipulates that "…each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations…". Minority populations are populations identified in census data as Hispanic or Latino, Black or African American, Asian, Native Hawaiian and other Pacific Islander, some other race, or two or more races. Low-income populations are families that are living below the U.S. poverty level.

  The environmental justice region of influence (ROI) consists of census blocks that encompass proposed training site locations because they represent the broadest areas within which potential effects could occur on minority or low-income populations. To ensure the potential for effects on communities along the ROI were adequately reviewed, all available census population and demographics data were considered. Details on community demographics for communities surrounding the proposed training sites were analyzed using federal census tract data.

  Census block groups are small, uniquely numbered areas that typically encompass between 600 and 3,000 inhabitants. Census block group data may be used to indicate population statistics for each block group, or may be combined to provide population statistics for an entire census tract, county, state or the country. The U.S. Census Bureau collects, maintains and publishes demographics data for the populations within each block group. Demographics data describing minority and low-income populations are presented for the census block groups encompassing training site locations in **Table 3-1**.

  There are low-income and minority populations within some of the proposed sites (see **Table 3-1**); however, as discussed in **Chapter 4**, no significant impacts would occur to any resource as a result of the AT exercise. This includes noise, which would only occur on a transitory, intermittent schedule. It is anticipated that under most training scenarios, 30 to 40 sites (21 to 28 percent of the total allotment) would be used during a single AT event with non-military sites being used on only one or two occasions during the training cycle. This means that most activities would occur on military ranges in areas that are not populated. There would be 10 to 11 days of field training per exercise, primarily

Table 3-1. Low-income and Minority Populations near Proposed Training Sites

Block Group	County	Locations	Minority Population	Low-Income Population
Southern Arizona				
40139801001	Maricopa	Aux 6; Aux 6 Circular; Aux 6 Rectangular; Gila Bend Air Force Auxiliary Base; NATO Hill (WPT 74); OP Charlie; Range 3 – HLZ 1; Range 3 – HLZ 3; Range 3 – HLZ 4; Range 3 – HLZ 6; Range 3 – Tower Helipad; South Tactical Range; Target 333	N/A[1]	N/A[1]
40190036003	Pima	Davis-Monthan AFB	65.4%	0[2]
40190036002	Pima	Davis-Monthan AFB CATM	8.6%	40.7%
40210023001	Pinal	Florence	38%	40.8%
40030014013	Cochise	Hubbard; Hubbard (Tombstone); Humor; Libby Army Airfield; Tombstone Circular; Tombstone Rectangular	25.2%	46.9%
40130405161	Maricopa	Range 3 – HLZ 2; Range 3 – HLZ 5	23.7%	23.8%
40239660001	Santa Cruz	Canelo; Saddle Mountain East; Saddle Mountain South; Saddle Mountain West; Little Outfit	16.3%	42.6%
40239661051	Santa Cruz	Devon	92.1%	65.3%
40099616001	Graham	Mesa	12.8%	35%
40190040521	Pima	Mount Lemon	17.3%	13.9%
40030005001	Cochise	Ranger; Highway 80 Paladins (TW 2 Paladins); Tombstone Paladins	19.3%	43.8%
40030005004	Cochise	Bisbee Douglas IAP	58.7%	15.8%
40210008021	Pinal	Coolidge Airport	36.7%	42.8%
40210020011	Pinal	Eloy North; Eloy South	56.1%	57.9%
40131138021	Maricopa	Phoenix Sky Harbor IAP	N/A[3]	N/A[3]
40190020004	Pima	Pima County Emergency Operations Center	74.9%	52.2%
40190041091	Pima	Pima County Regional Training Center	11.8%	36.3%
40190043163	Pima	Ruby Fuzzy Paladins	65.3%	33.4%
40132172012	Maricopa	Scottsdale Osborne	33.9%	48.7%
40190044241	Pima	Three Points Public Shooting Range	69.2%	29.3%
40190015001	Pima	University of Arizona Medical Center	17.8%	83.9%
40079402001	Gila	Salt River High; Salt River Low	98.4%	83.2%
40130101021	Maricopa	Saguaro Lake Ranch; Verde River	18.7%	13.5%
Northern Arizona				
40050022001	Coconino	Camp Navajo Army Base; Fort Tuthill; L Tank; Metz Tank; Navajo East; Navajo Railroad; Navajo West; Neill Flat; Rogers Lake (Logger Camp); Rodgers Napier; Rodgers Wren	12.8%	35.8%

Block Group	County	Locations	Minority Population	Low-Income Population
Northern Arizona (continued)				
40050023001	Coconino	Mohawk; Tribeland; Grand Canyon National Park Airport; Sage	53.6%	29.5%
40050015004	Coconino	Black Mesa – USFS Helitack Base; Jacks Canyon; Longview – USFS Helitack Base; Mogollon Rim (General Crook)	5.2%	22.7%
40019705021	Apache	Caldwell Meadows	17.3%	40.2%
40050015002	Coconino	Comanche	68.3%	28.4%
40050015003	Coconino	Elk; Mormon Lake – USFS Helitack Base	41.8%	60.5%
40050022004	Coconino	Flagstaff Hotshot – USFS Helitack Base; Babbitt Ranch 1; Babbitt Ranch 2; Babbitt Ranch 3; Bone Crusher; Cattle LTFW; FR 320/311; Gerbil; Grand Canyon Valle Airport; Panda; Powerline; Sinkhole; Squirrel	45.5%	54.4%
40119601001	Greenlee	Hannagan Meadow – USFS Helitack Base; Helibase Circular; KP Circular; KP Tank; Sprucedale Guest Ranch	62%	23.2%
40179642012	Navajo	Overgaard – USFS Helitack Base	38.6%	93.1%
40070002003	Gila	Payson-RimSide	51.1%	53.8%
40050023002	Coconino	Pittman Valley	25.7%	27.1%
40070007001	Gila	Roosevelt Lake; Gila County Sheriff Roosevelt Substation	0.2%	47.1%
40250017022	Yavapai	Rough Rider	8%	7.2%
40050013011	Coconino	Cattle; HLZ 5; HLZ 6; HLZ 7	29.8%	12.2%
40159517005	Mohave	Colorado River	34.3%	21.2%
40050017004	Coconino	Flagstaff Pulliam Airport	10.4%	20.7%
40050017001	Coconino	H. A. Clark Memorial Field	39%	59.2%
40050013023	Coconino	HLZ 8	29.3%	26.4%
40159539002	Mohave	Kingman Airport	8.7%	50.1%
40050020002	Coconino	Lee's Ferry	6%	37.1%
40019705022	Apache	Springerville Airport	17.8%	16.4%
40019702003	Apache	St. Johns Industrial Air Park	29.1%	19.7%
40179605002	Navajo	Winslow-Lindbergh Regional Airport	73.5%	64.3%
New Mexico				
350410004011	Roosevelt	Melrose Air Force Range	25.2%	40.5%
350519624011	Sierra	White Sands Missile Range	21.6%	28.8%
350039764002	Catron	Glenwood Ranger Station; Negrito Airstrip; Negrito Center; Negrito Helibase; Negrito North; Negrito South; Rainy Mesa; Reserve Airport	11.3%	20.6%
350039764003	Catron	Reserve Ranger Station; Catron County Fairgrounds	25.4%	53.5%
350179648001	Grant	Playas Training and Research Center	31.2%	26.6%

Block Group	County	Locations	Minority Population	Low-Income Population
California				
N/A	N/A	Camp Pendleton Cartwright Water; Leon; San Clemente Island West	N/A[4]	N/A[4]
60730187001	San Diego	Camp Pendleton HOLF; Camp Pendleton NFG; Camp Pendleton Off-Road Trail; Camp Pendleton PDL; Camp Pendleton Red Beach	40.8%	48.8%
60250111002	Imperial	El Centro	55.4%	48.4%
60375991001	Los Angeles	Knots Circular Water; Nautica Circular Water; San Clemente Island Naval Auxiliary Landing Field	23%	0[5]
60650467001	Riverside	March ARB	41.7%	23.3%
60730113001	San Diego	NAS North Island NZY	52.5%	12.1%
61119800001	Ventura	San Nicolas Island	56%	0[6]
Nellis				
320030078002	Clark	Nellis AFB	38.3%	29.4%

Source: USEPA 2016a

*Notes:

1. These sites are in a remote area that does not have a representable population.
2. This census block only encompasses Davis-Monthan AFB, which has military housing. As a result, none of the families on the installation live below the poverty line.
3. This census block only encompasses the Sky Harbor Airport and does not have a representable population.
4. These sites occur in remote areas that do not have a representable population.
5. San Clemente Island is the only site with a population of individuals; however, they are all military personnel and contractors living above the poverty level.
6. San Nicolas Island only houses military personnel and contractors living above the poverty level.

Key: HLZ – helicopter landing zone; IAP – international airport; USFS – U.S. Forest Service

during the spring or fall. Sites proposed for use would be coordinated with the controlling agency of the property and site preparation of the environment would occur five to six times before each exercise for several days at a time. Preparation would primarily consist of site surveys using approximately 10 to 20 personnel to assess the safety of specific locations for intended exercise execution. Additionally, these training activities would not likely occur in the same location two years in a row, further reducing any potential impacts. There are also no significant cumulative effects on any resource as a result of this action (see **Chapter 5**). Therefore, no disproportionally high and adverse human health or environmental effects on low-income and minority populations would occur from this exercise.

3.1 Noise

3.1.1 Definition of Resource

Sound is a physical phenomenon consisting of vibrations that travel through a medium, such as air, and are sensed by the human ear. Noise is defined as any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, or is otherwise

intrusive. Human response to noise varies depending on the type and characteristics of the noise, distance between the noise source and the receptor, receptor sensitivity, and time of day. Noise is often generated by activities essential to a community's quality of life, such as aircraft operations, construction or vehicular traffic. AFI 32-7070 *Air Force Noise Program* directs the use of noise models and metrics, provides information to manage and explain noise exposure to off-base populations, and details analyzing the effects of noise on the natural and human environments when conducting environmental impact analysis.

Sound varies by both intensity and frequency. Sound pressure level, described in decibels (dB), quantifies sound intensity. The dB is a logarithmic unit that expresses the ratio of a sound pressure level to a standard reference level. Hertz quantifies sound frequency. The human ear responds differently to different frequencies. "A-weighing", measured in A-weighted decibels (dBA), approximates a frequency response expressing the perception of sound by humans. With A-weighting, low and high frequencies are de-emphasized because the human ear does not respond equally to sounds of all frequencies, and is less efficient at low and high frequencies than it is at medium or speech range frequencies. **Table 3-2** provides sounds encountered in daily life and their sound levels.

Table 3-2. Common Sounds and Their Levels

Outdoor	Sound Level (dBA)	Indoor
Jet flyover at 1,000 feet	100	Rock band
Gas lawnmower at 3 feet	90	Food blender at 3 feet
Diesel truck at 50 feet at 50 mph	85	Garbage disposal
Downtown (large city)	80	Garbage disposal
Heavy traffic at 150 feet	70	Vacuum cleaner at 10 feet
Normal conversation	60	Normal speech at 3 feet
Quiet urban daytime	50	Dishwasher in next room
Quiet urban nighttime	40	Theater, large conference room

Source: CALTRANS 2009

The dBA noise metric describes steady noise levels, although very few noises are, in fact, constant; therefore, Day-Night Sound Level (DNL) has been developed. DNL is defined as the average sound energy in a 24-hour period with a 10-dB penalty added to the nighttime levels (10 p.m. to 7 a.m.). DNL is a useful descriptor for noise because: (A) it averages ongoing yet intermittent noise and (B) it measures total sound energy over a 24-hour period. The 10-dB nighttime penalty is used to account for the increased sensitivity of humans to nighttime noises, because nighttime ambient sound levels are lower than daytime levels. The USAF uses the DNL metric in assessing the amount of aircraft noise exposure, and as a metric for community response to the various levels of exposure. In addition, Equivalent Sound Level (L_{eq}), the average sound level in dBA, is often used to describe the overall noise environment. L_{eq} is not necessarily a 24-hour cumulative noise metric but does represent the average sound level over a specific period of time. L_{eq} does not include a penalty for nighttime events.

3.1.2 Affected Environment

This section discusses the sources of noise throughout the proposed AT training areas.

3.1.2.1 SOUTHERN ARIZONA

Military Installations

***Davis-Monthan AFB and Vicinity*.** Sources of noise near Davis-Monthan AFB include military aircraft overflights, commercial and private aircraft overflights, road traffic, and other noises associated with suburban residential neighborhoods such as lawn maintenance equipment, construction noise, and bird and animal vocalizations. Background noise levels without aircraft operations (L_{eq} and DNL) were estimated for the surrounding areas using the techniques specified in the *American National Standard Institute – Quantities and Procedures for Description and Measurement of Environmental Sound Part 3: Short-term measurements with an observer present*. **Table 3-3** provides the land use category and the estimated background noise levels for nearby noise sensitive areas (ANSI 2013).

Table 3-3. Estimated Background Noise Levels

Example Land Use Category	Average Residential Intensity (people per acre)	DNL	L_{eq} (dBA)	
			Daytime	Nighttime
Rural or remote areas	<2	<49	<48	<42
Quiet suburban residential	2	49	48	42
	4	52	53	47
	4.5	52	53	47
Quiet urban residential	9	55	56	50
Quiet commercial, industrial, and normal urban residential	16	58	58	52
	20	59	60	54

Source: ANSI 2013

The USAF's land use guidelines for noise exposure are outlined in AFI 32-7063 *Air Installations Compatible Use Zone Program*. **Table 3-4** provides a general overview of recommended noise limits from aircraft operations for land use planning purposes. Detailed guidelines for the compatibility of various land uses with noise exposure levels are included in **Appendix E**.

Table 3-4. Recommended Noise Limits for Land Use Planning

General Level of Noise	Aircraft Noise (DNL)	General Recommended Uses
Low	< 65 dBA	noise-sensitive land uses acceptable
Moderate	65–75 dBA	noise-sensitive land uses normally not recommended
High	> 75 dBA	noise-sensitive land uses not recommended

Source: USAF 2015

Note: This table provides a general overview of land use guidelines. Detailed guidelines for the compatibility of various land uses with noise exposure levels are included in **Appendix E.**

NOISEMAP is a suite of computer programs adopted by the USAF that predict noise exposure in the vicinity of an airfield due to aircraft, maintenance, and ground run-up operations. NOISEMAP Version 7.3 was used to calculate baseline DNL noise contours at Davis-Monthan AFB based on the average daily aircraft operations. These noise contours were developed based on the 2008 Davis-Monthan AFB Draft Air Installation Compatible Use Zone Study, to provide a comparative baseline for which to determine the potential for effects under NEPA.

Noise associated with activities at Davis-Monthan AFB is characteristic of noise associated with most Air Force installations with a flying mission. The noise environment surrounding Davis-Monthan AFB is dominated by military based aircraft, primarily A-10s and F-16s. **Figure 3-1** shows the baseline DNL average annual day noise contours plotted in 5 dBA increments, ranging from 65 to 80 dBA DNL. The noise contours, as shown, depict 2008 operational conditions and are consistent with the most recent Air Installation Compatible Use Zone (AICUZ) study at the base. Davis-Monthan AFB operates at near to its maximum allowable daily throughput (number of aircraft operations passing through the airfield). This is the best available information at this time and has been carried forward as a comparative baseline to determine the effects of future actions under NEPA. The introduction of any additional aircraft types, increased sorties, or temporary transient operations would have little effect on the DNL noise contours due to the operational tempo and loudness of based military aircraft, including the A-10 and F-16. The baseline 65 dBA DNL noise contour extends approximately one and one-half miles from both ends of the runway. The 65 dBA DNL is the noise level below which generally all land uses are compatible with noise from aircraft operations. There are two assisted living facilities to the south east of Davis-Monthan AFB near the intersection of South Kolb Road and East Valencia Road; however, these noise sensitive receptors are beyond the 65 dBA DNL noise contour. **Table 3-5** presents the land acreage (both on- and off-installation) exposed to noise levels 65 dBA DNL or greater. A technical description of the noise modeling, the operational information used to model the noise footprints, and maps of the footprints are provided in **Appendix E**.

Table 3-5. Baseline Area within Noise Contours in the Vicinity of Davis-Monthan Air Force Base

Noise Contour (DNL)	Area (Acres)
65 dBA or greater	4,126.5
70 dBA or greater	2,106.5
75 dBA or greater	1,090.6
85 dBA or greater	576.7

Landing Zones. Military and non-military landing zones are designated in **Table 2-1.** The larger and more active military airfields in southern Arizona that act as LZs include Gila Bend Air Force Auxiliary Base and Libby Army Airfield. Existing sources of noise at these larger LZs are consistent with active military airfields. The LZs are currently used by fixed-wing aircraft including those used for current AT touch-and-go training, such as A-10s, A-29s, and C-130s. The exact number of aircraft operations at each LZ is not known; however, for larger LZs it is expected to be as many as several hundred operation per day. Exact aircraft operations for non-military LZs are unknown but are expected to be lower than operations at military LZs. Background noise levels in areas surrounding the LZs typically range from 48 to 60 dBA in the

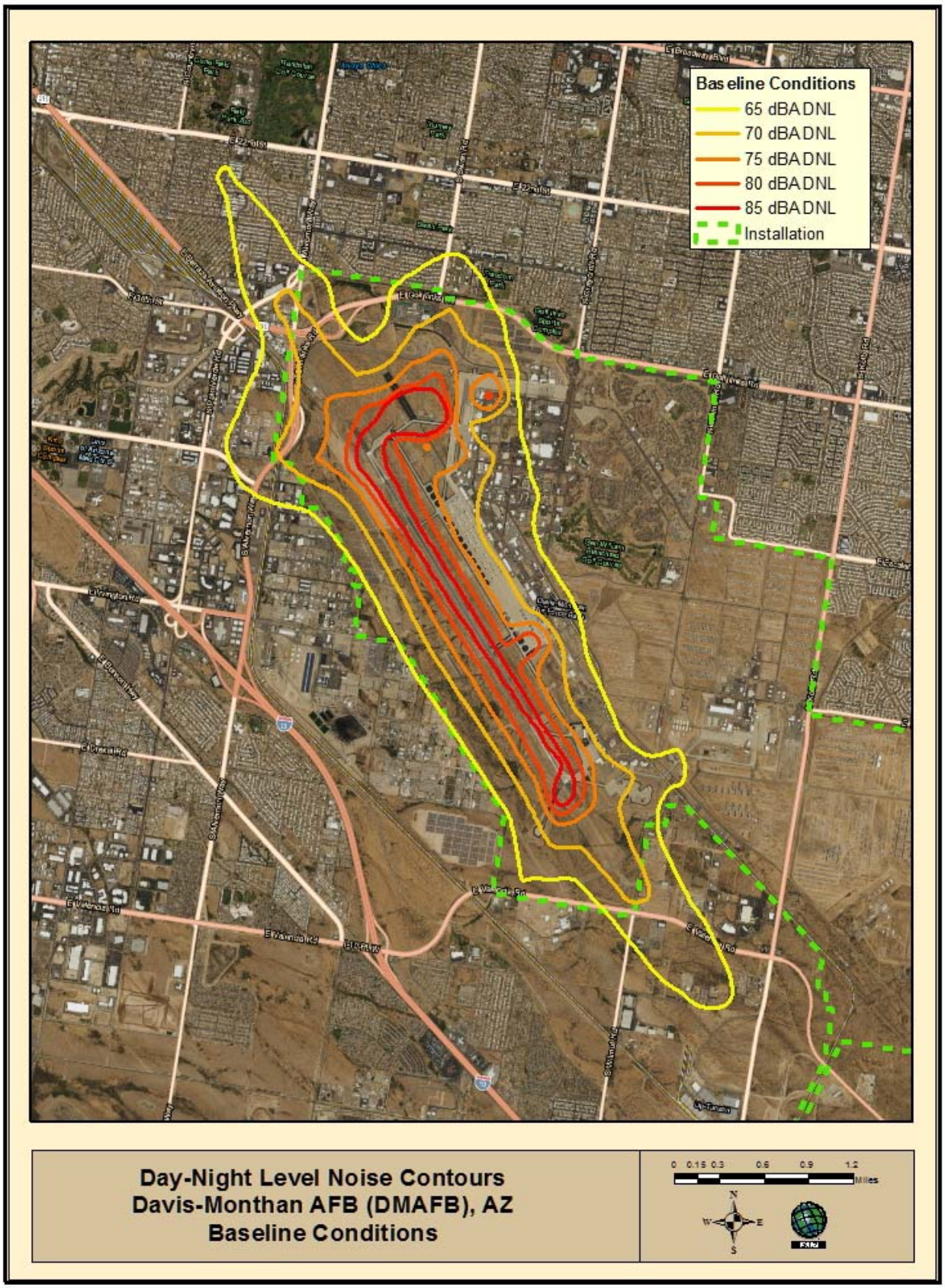

Figure 3-1. Average Daily Noise Contours at Davis-Monthan AFB – 2008 Baseline Conditions

daytime and 42 to 54 dBA at night (see **Table 3-3**). Aircraft operations due to fixed-wing military aircraft are loud to individuals under the flight path and air operations are normally sufficient to generate greater than 65 dBA DNL beyond the immediate area. In general, noise sensitive land uses are not recommended adjacent to airfields, particularly along the aircraft approach and departure flight paths.

Other than these larger airfields, the LZs are either small in size, remote, or both. They are expected to have fewer than 100 air operations per day, many with fewer than 20 per day (AirNav 2013). Existing sources of noise at the smaller military LZs are consistent with small outlying airfields and auxiliary fields and consist primarily of military aircraft activities (i.e., landing and takeoff cycles [LTOs]). Background noise in areas surrounding the small LZs range from 48 to 60 dBA in the daytime and 42 to 54 dBA at night (see **Table 3-3**). Aircraft operations are clearly audible to individuals under the flight path, particularly at night and in remote areas. However, due to the lower number of air activities at smaller LZs compared to activities at larger LZs, aircraft operations are normally not sufficient enough in quantity to generate greater than 65 dBA DNL beyond the immediate area at smaller LZs. In general, aircraft activities at these smaller LZs are compatible with existing land uses.

Helicopter Landing Zones. Military and non-military helicopter landing zones are designated in **Table 2-1.** Existing sources of noise at military HLZs in southern Arizona are consistent with active military installations and aviation training areas. In the immediate area surrounding HLZs, the noise is dominated by intermittent helicopter takeoff and landing activities. Aircraft operations at non-military HLZs are unknown but are expected to be lower than operations at military HLZs. Depending on the location of the HLZ, the number of sorties can range from a few per year to several per day. The HLZs are used by rotary aircraft including those used for current AT touch-and-go training, such as UH-60s and CH-47s. Background noise in areas surrounding the HLZs ranges from 48 to 60 dBA in the daytime and 42 to 54 dBA at night (see **Table 3-3**). In general, aircraft operations at military airfields can be loud to individuals under the flight path and sufficient to generate greater than 65 dBA DNL beyond the immediate area for larger airfields; however, the contribution of helicopter noise at HLZs that are within or adjacent to airports with fixed-wing aircraft is either (A) so small when compared to fixed-wing air operations that they do not contribute appreciably to the overall noise levels, or (B) not sufficient to generate areas of incompatible land use with or without HLZ operations.

Drop Zones. Military and non-military drop zones are designated in **Table 2-1.** Existing sources of noise at military DZs in southern Arizona are consistent with active military installations and aviation training areas. Specific operations at non-military DZs are unknown but are expected to be lower than operations at military DZs. In the immediate area surrounding the DZ, noise is dominated by overflights when present. The DZs are used by both fixed-wing and rotary aircraft including those used for current AT training, such as C-130s and HH-60s. Depending on the location of the DZ, the number of overflights can range from a few per year to several per day. Operations in the DZs typically include pararescuemen insertion from aircraft and dismounted ground operations. Background noise in areas surrounding the DZs range from 48 to 60 dBA in the daytime and 42 to 54 dBA at night (see **Table 3-3**). In general, aircraft operations at DZs can be loud to individuals under the flight path, but not sufficient to generate greater than 65

dBA DNL beyond the immediate area. In general, aircraft activities at DZs are completely compatible with existing land uses.

Forward Aircraft Refueling Points. Military and non-military forward aircraft refueling points are designated in **Table 2-1.** FARPs consist of numerous small, previously established, military and publicly operated airfields used by both fixed-wing and rotary aircraft. Similar to the smaller LZs, the proposed FARPs in southern Arizona are either small in size, remote, or both. The exact number of sorties at each FARPs is not known; however, they are expected to have fewer than 100 air operations per day, and many with fewer than 20 per day (AirNav 2013). Existing sources of noise are consistent with small outlying airfields and auxiliary fields and would consist primarily of military aircraft activities (i.e., LTOs). Background noise in areas surrounding the FARPs range from 48 to 60 dBA in the daytime and 42 to 54 dBA at night (see **Table 3-3**). Aircraft operations would be clearly audible to individuals under the flight path, particularly at night; however, air operations normally are not sufficient to generate greater than 65 dBA DNL beyond the immediate area surrounding the FARPs. In general, aircraft activities at FARPs are completely compatible with existing land uses.

Restricted Airspace. Existing sources of noise within military restricted air space in southern Arizona (i.e., R-2301E, R-2304, and R-2305) consist of flight activities primarily involving F-16s and A-10s flying at a range of altitudes and speeds. Examples of specific flight activities include air combat maneuvering above 25,000 feet above ground level (AGL); flights of two or four aircraft flying low-altitude (200 to 5,000 feet AGL) bombing operations delivering inert weapons on tactical and conventional targets; and helicopters performing very low-altitude flight training. Although individual overflights within the restricted airspace can be loud, they are relatively infrequent and not concentrated at any single location. The highest noise level on BMGR is 62 dBA DNL under R-2301E (the East Tactical Range), and the lowest noise level is less than 45 dBA DNL under the MOAs. These levels of noise are compatible with existing land uses (NGA 2008, USAF 2010, and USAF 2007b).

U.S. Forest Service

Training sites in southern Arizona controlled by USFS are primarily DZ and HLZs. The nature and overall levels of noise at USFS DZ and HLZs is similar to that of military HLZs outlined above. However, they would normally support less helicopter and fixed-wing training activities. These sites are not on military installations, but are currently used for military flight training. The exact number of sorties at each site is not known; however, depending on the location of the DZ or HLZ, the number of overflights can range from a few per year to several per day. In addition, these sites are often very remote and background noise levels can be substantially lower than those outlined in **Table 3-3**, especially at night and during other periods of extreme quiet.

Miscellaneous

Other miscellaneous training sites in southern Arizona primarily consist of LZs, HLZs, DZs, FARPs, and small arms ranges. The nature and overall levels of noise at these locations is similar to that of military LZs, HLZs, DZs, and FARPs outlined above; however, aircraft activities would be a mix of private; local, state, or other federal agency; and military aircraft. Existing sources of noise at the non-military LZs are consistent with small municipal airports, outlying airfields, private airstrips, and auxiliary fields and consist primarily of private and military aircraft

activities (i.e., LTOs). The small arms range in Three Points, Arizona, has noise consistent with a large public shooting range. It has eight individual firing ranges, is approximately two miles east of the corporate limits, and supports weaponry less than 0.50 calibers. The operations center, classrooms, observation point, and water areas have no appreciable sources of noise.

3.1.2.2 NORTHERN ARIZONA

Military Installations

Military training sites in northern Arizona primarily consist of HLZs and DZs. The nature and overall levels of noise at these locations is similar to that of military HLZs and DZs outlined in **Section 3.1.2.1** addressing southern Arizona. The MOUT training area at the Camp Navajo Army Installation has no appreciable sources of noise.

U.S. Forest Service

USFS-controlled training sites in northern Arizona primarily consist of HLZs and DZs. The nature and overall levels of noise at these locations is similar to that of USFS-controlled HLZs and DZs described in **Section 3.1.2.1** addressing southern Arizona. The technical rope training course at Mogollon Rim has no appreciable sources of noise.

Miscellaneous

Other miscellaneous training sites in northern Arizona primarily consist of LZs, HLZs, and DZs. The nature and overall levels of noise at these locations is similar to that of military LZs, HLZs, and DZs described in **Section 3.1.2.1** addressing southern Arizona. The operations center, logistics center, and water areas have no appreciable sources of noise.

3.1.2.3 NEW MEXICO

This section includes a discussion of the existing sources of noise at USFS-controlled lands and other miscellaneous training areas in New Mexico.

Military Installations

Military training sites in New Mexico at WSMR primarily consist of HLZs and DZs. The nature and overall levels of noise at these locations is similar to that of military HLZs and DZs outlined in **Section 3.1.2.1** addressing southern Arizona. The MOUT training area at the WSMR has no appreciable sources of noise; however, the shooting range(s) at WSMR do have noise level consistent with small arms range(s) located on a military installation.

U.S. Forest Service

USFS-controlled training sites in New Mexico primarily consist of HLZs and DZs. The nature and overall levels of noise at these locations is similar to that of USFS-controlled HLZs and DZs described in **Section 3.1.2.1** addressing southern Arizona.

Miscellaneous

The miscellaneous training site in New Mexico consists of LZs, HLZs, and DZs. The nature and overall levels of noise at these locations is similar to that of military LZs, HLZs, and DZs described in **Section 3.1.2.1** addressing southern Arizona. The MOUT training area at the Playas Training and Research Center has no appreciable sources of noise.

3.1.2.4 CALIFORNIA

This section includes a discussion of the existing sources of noise at military installations and other miscellaneous training areas in California.

Military Installations

Military training sites in California primarily consist of LZs, HLZs, DZs, and FARPs. The nature and overall levels of noise at land-based locations is similar to that of military LZs, HLZs, DZs, and FARPs outlined above. The off-road training area would support maneuvers training and have a variety of heavy vehicle activities and associated noise. Water training activities in established and designated military coastal training areas, such as Camp Pendleton, have localized and periodic increased noise activity.

3.2 Air Quality

3.2.1 Definition of Resource

In accordance with federal Clean Air Act (CAA) requirements, the air quality in a given region or area is measured by the concentration of criteria pollutants in the atmosphere. The measurements of these "criteria pollutants" in ambient air are expressed in units of parts per million (ppm), milligrams per cubic meter (mg/m^3), or micrograms per cubic meter ($\mu g/m^3$). The air quality in a region is a result of not only the types and quantities of atmospheric pollutants and pollutant sources in an area, but also surface topography, the size of the topological "air basin," and the prevailing meteorological conditions.

Ambient Air Quality Standards. Under the CAA, the U.S. Environmental Protection Agency (USEPA) developed numerical concentration-based standards, or National Ambient Air Quality Standards (NAAQS) to protect public health and welfare. These standards represent the maximum allowable ambient concentrations for ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), respirable particulate matter (including particulate matter equal to or less than 10 microns in aerodynamic diameter [PM_{10}] and particulate matter equal to or less than 2.5 microns in aerodynamic diameter [$PM_{2.5}$]), and lead (Pb) (40 CFR § 50). The states of Arizona and New Mexico have adopted all federal NAAQS by reference. California and New Mexico recognize the federal NAAQS and have also implemented several state-only AAQS (USEPA 2011, CARB 2016, NMED 2006). **Table 3-6** presents the USEPA NAAQS for federally listed criteria pollutants and the additional state-only standards.

Although O_3 is considered a criteria pollutant and is measureable in the atmosphere, its emissions are not often calculated because it is typically not emitted directly from most emissions sources. Ozone is formed in the atmosphere by photochemical reactions involving sunlight and previously emitted pollutants or O_3 precursors. The O_3 precursors consist primarily of nitrogen oxides (NO_x) and volatile organic compounds (VOCs) that are directly emitted from a wide range of emissions sources. For this reason, regulatory agencies attempt to limit atmospheric O_3 concentrations by controlling NO_x and VOC pollutants.

Table 3-6. National and State Ambient Air Quality Standards

Pollutant	Averaging Time	Primary Standard		Secondary Standard
		Federal	Arizona / New Mexico / California	
CO	8-hour (1)	9 ppm (10 mg/m^3)	Same / 8.7 ppm / Same	None
	1-hour (1)	35 ppm (40 mg/m^3)	Same / 13.1 ppm / 20 ppm	None
Pb	Rolling 3-Month Average (2)	0.15 µg/m^3 (3)	Same / Same / 0.15 µg/m^3	Same as Primary
NO_2	Annual (4)	53 ppb (5)	Same / 0.05 ppm / 0.030 ppm	Same as Primary
	1-hour (6)	100 ppb	Same / Same / 0.18 ppm	None
	24-hour (7)	--	-- / 0.10 ppm / --	
PM_{10}	Annual (8)	--	-- / -- / 20 µg/m^3	--
	24-hour (9)	150 µg/m^3	Same / Same / 50 µg/m^3	Same as Primary
$PM_{2.5}$	Annual (10)	12.0 µg/m^3	15 µg/m^3 / Same / 12 µg/m^3	15 µg/m^3
	24-hour (6)	35 µg/m^3	Same / Same / Same	Same as Primary
O_3	1-hour (11)	Revoked	Same / Same / 0.09 ppm	Revoked
	8-hour (12)	0.070 ppm (13)	0.075 ppm / Same / Same	Same as Primary
SO_2	Annual	0.030 ppm	Same / 0.02 ppm / Same	None
	1-hour (14)	75 ppb (14)	Same / Same / 0.25 ppm	None
	3-hour (15)	--	-- / -- / --	0.5 ppm
	24-Hour	0.14 ppm	Same / 0.10 ppm / 0.04 ppm	None
VRP(16)	8-hour	--	-- / -- / 10 miles	--
Sulfates(17)	24-hour	--	-- / -- / 25 µg/m^3	--
H_2S(18)	1-hour	--	-- / 0.100 ppm / 0.03 ppm	--
Vinyl Chloride(19)	24-hour	--	-- / -- / 0.01 ppm	--
TSP(20)	Annual	--	-- / 60 µg/m^3 / --	--
	24-hour	--	-- / 150 µg/m^3 / --	--
	7-day	--	-- / 110 µg/m^3 / --	--
	30-day	--	-- / 90 µg/m^3 / --	--
TRS(21)	0.5-hour	--	-- / 0.003 ppm / --	--

Sources: USEPA 2016b, CARB 2016, AZDEQ 2015, NMED 2006

Notes: Parenthetical values are approximate equivalent concentrations.

1. Not to be exceeded more than once per year.
2. Not to be exceeded.
3. Final rule signed 15 October 2008. The 1978 lead standard (1.5 µg/m^3 as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved. The USEPA designated areas for the new 2008 standard on 8 November 2011. California's standard is based on a 30-day average.
4. Annual Mean.
5. 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 cleaner comparison to the 1-hour standard.
6. 98th percentile, averaged over 3 years.
7. New Mexico has a 24-hour AAQS for NO_2 that is equivalent to the 1-hour standard. Compliance with the 1-hour standard is assumed to equate to compliance with the 24-hour standard.

8. Annual arithmetic mean.
9. Not to be exceeded more than once per year on average over 3 years.
10. Annual mean, averaged over 3 years. Standard proposed by EPA to be reduced to between 12 and 13 $\mu g/m^3$
11. The 1-hour ozone standard was revoked federally in April 2009. However, California retains a 1-hour standard.
12. Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years. The 8-hour standard was lowered from 0.075 ppm to 0.070 ppm in October 2015, effective December 2015.
13. Final rule signed 12 March 2008, but has been vacated by federal court. The 1997 ozone standard (0.08 ppm, annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years) and related implementation rules remain in place. In 1997, EPA revoked the 1-hour ozone standard (0.12 ppm, not to be exceeded more than once per year) in all areas, although some areas have continued obligations under that standard ("anti-backsliding"). The 1-hour ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is less than or equal to 1.
14. 99^{th} percentile of 1-hour daily maximum concentrations, averaged over 3 years.
15. Final rule signed 2 June 2010. The 1971 annual (0.3 ppm) and 24-hour (0.14 ppm) SO_2 standards were revoked in that same rulemaking. However, these standards remain in effect until one year after an area is designated for the 2010 standard, except in areas designated nonattainment for the 1971 standards, where the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standard are approved. The USEPA expects to designate areas for the new 2010 standard by 2 June 2012.
16. Visibility Reducing Particles. California has a state-only AAQS for VRPs, in units of extinction per xx kilometers. The statewide standard, with the exception of the Lake Tahoe area, is "extinction of 0.23 per kilometer" which is equivalent to 10 mile visibilty.
17. Sulfates (SO_4^{2}-) are the full oxidized ionic form of Sulfur. They are generally formed from SO_2 after being emitted into the air. California has a state-onlly AAQS for sulfates.
18. Hydrogen sulfide is a HAP.
19. Vinyl Chloride is a HAP and is considered by California to be a toxic air contaminant.
20. Total suspended particulates, TSP, is considered equivalent to total PM. PM_{10} and $PM_{2.5}$ are subsets of TSP. New Mexico has AAQS for TSP over 4 averaging periods, which are considerably less stringent than the corresponding PM_{10} and $PM_{2.5}$ standards.
21. Total Reduced Sulfur. Excludes H_2S.

Key: ppm = parts per million; ppb = parts per billion; mg/m^3 = milligrams per cubic meter; $\mu g/m^3$ = micrograms per cubic meter

Attainment Versus Nonattainment. The USEPA classifies the air quality in an air quality control region (AQCR), or in subareas of an AQCR (e.g. counties), according to whether the concentrations of criteria pollutants in ambient air exceed the NAAQS. Areas within each AQCR are therefore designated as either "attainment," "nonattainment," "maintenance," or "unclassified" for each of the six criteria pollutants. Attainment means that the air quality within an area is better than the NAAQS; nonattainment indicates that criteria pollutant levels exceed NAAQS; maintenance indicates that an area was previously designated nonattainment but is now attainment; and an unclassified air quality designation by USEPA means that there is not enough information to appropriately classify an area, so the area is considered attainment. In accordance with the CAA, each state or commonwealth must develop a State Implementation Plan, which is a compilation of regulations, strategies, schedules, and enforcement actions designed to move the state or commonwealth into compliance with all NAAQS.

General Conformity. The General Conformity Rule (40 CFR Part 93) applies to federal actions in nonattainment or maintenance areas that are:

- Not deemed exempt from, or presumed to conform to, the subject requirements
- Not governed under the Transportation Conformity Rule
- Above the de minimis criteria pollutant emissions thresholds.

The General Conformity rule requires that any federal action meet the requirements of a State Implementation Plan or Federal Implementation Plan. More specifically, CAA conformity is

ensured when a federal action does not cause a new violation of the NAAQS; contribute to an increase in the frequency or severity of violations of NAAQS; or delay the timely attainment of any NAAQS, interim progress milestones, or other milestones toward achieving compliance with the NAAQS.

Federal Prevention of Significant Deterioration. Federal Prevention of Significant Deterioration (PSD) regulations apply in attainment areas to a major stationary source, (i.e., source with the potential to emit 250 tons per year [tpy] of any criteria pollutant, or 100 tpy for special types of sources), and a significant modification to a major stationary source, (i.e., change that has a net increase of 0.6 tpy for lead, or 10 tpy to 100 tpy depending on the criteria pollutant). Additional PSD permitting thresholds apply to increases in stationary source greenhouse gas emissions. PSD permitting can also apply to a proposed project that is a modification with a net emissions increase to an existing PSD major source and (1) the proposed project is within 6.2 miles (10 kilometers) of national parks or wilderness areas (i.e., Class I Areas), and (2) regulated stationary source pollutant emissions would cause an increase in the 24 hour average concentration of any regulated pollutant in the Class I area of 1 microgram per cubic meter (µg/m3) or more (40 CFR § 52.21[b][23][iii]). PSD regulations also define ambient air increments, limiting the allowable increases to any area's baseline air contaminant concentrations, based on the area's class designation (40 CFR § 52.21[c]).

Title V Requirements. Title V of the CAA Amendments of 1990 requires states and local agencies to permit major stationary sources. A Title V major stationary source has the potential to emit criteria air pollutants and hazardous air pollutants at levels equal to or greater than Major Source Thresholds. Major Source Thresholds vary depending on the attainment status of an ACQR. The purpose of the permitting rule is to establish regulatory control over large, industrial-type activities and monitor their impact on air quality. Section 112 of the CAA lists hazardous air pollutants and identifies source categories that are subject to emission control requirements.

Greenhouse Gas Emissions. Greenhouse gases are primarily produced by the burning of fossil fuels and through other industrial and biological processes. EO 13693, *Planning for Federal Sustainability in the Next Decade*, was signed in March 2015 and required federal agencies to set goals for reducing Greenhouse Gas (GHG) emissions. This order revoked a number of previous EOs and memorandums and established a simplified set of energy sustainability and greenhouse gas reductions to be met through fiscal year 2025. On August 26, 2010, DOD released its first implementation plan describing specific actions it would take to achieve its GHG reduction targets, reduce long-term costs, and meet the full range of goals of previous EOs. The plan segregated GHG emissions into three categories: Scope 1, Scope 2, and Scope 3 emissions. Scope 1 GHG emissions are those directly occurring from sources that are owned or controlled by the agency. Scope 2 emissions are indirect emissions generated in the production of electricity, heat, or steam purchased by the agency. Scope 3 emissions are other indirect GHG emissions that result from agency activities but from sources that are not owned or directly controlled by the agency. The GHG goals in the current DOD plan include reducing Scope 1 and Scope 2 GHG emissions by 34 percent by 2020, relative to Fiscal Year 2008 emissions, and reducing Scope 3 GHG emissions by 13.5 percent by 2020, relative to

Fiscal Year 2008 emissions. The DOD plan is expected to be revised to better correlate with the EO 13693 directives.

In addition, CEQ recently finalized guidance on when and how federal agencies should consider GHG emissions and climate change in NEPA analyses. The guidance does not specifically identify a GHG emissions levels or thresholds at which specific actions must be taken (CEQ 2016). The guidance does recommend that direct and indirect GHG emissions be estimated using available data and tools, if possible, and that estimated GHG emissions be used as a proxy for assessing the impact a proposed action would have on global climate change. Because greenhouse gases remain in the atmosphere over long periods of time, and because climate change is a long duration phenomenon, the cumulative impacts of GHG emissions on climate change are to be considered over an extended time frame.

3.2.2 Affected Environment

The biannual three-week AT training exercises would consist of operations conducted in up to three states — Arizona, New Mexico and California — over a period of 14 days (three mobilization days and 11 field days) twice per year. Some command and control operations would also take place at Nellis AFB in Nevada. Training would include day and night extractions and day and night infiltration, evasion, and exfiltration training. Aerial training activities would include aircraft refueling; tactical combat maneuvering by fixed- and rotary-wing aircraft; abrupt, unpredictable changes in altitude and direction of flight; airdrops of personnel and equipment; water hoists; and landing on unimproved surfaces.

These training locations would be spread across a number of different air quality regions and regulatory agencies. Each state establishes ambient air quality standards that are either equal to, or more stringent than, the federal NAAQS. The majority of the AT activity would be based out of Davis-Monthan AFB, which is located in Tucson, Pima County, Arizona, under the regulatory guidance of the Air Quality Control District of the Pima County Department of Environmental Quality. The state of Arizona has two other county-level air pollution control programs in the counties of Maricopa and Pinal. The remainder of the state is under the jurisdiction of the Arizona Department of Environmental Quality. The New Mexico areas involved in the AT exercise are all within the jurisdiction of the New Mexico Environment Department. California is divided into a large number of Air Pollution Control Districts (APCDs) and Air Quality Management Districts. AT exercises would potentially occur in four districts: Imperial APCD, San Diego APCD, South Coast Air Quality Management District, and Ventura County APCD.

All emissions generated from the AT activities analyzed in this EA are exclusively mobile source emissions from aircraft and ground vehicles. No stationary sources would be added or included as part of this exercise. Therefore, stationary source air permitting under state and local air quality agencies, including PSD and Title V, are not impacted by this Proposed Action and are not discussed further in this EA.

The Federal Conformity Rule, as described above, mandates that a conformity analysis be performed when a federal action generates air pollutants in a region that has been designated a nonattainment or maintenance area for one or more NAAQS. If the direct and indirect emissions

(includes mobile source emissions) from the Proposed Action 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. Compliance with General Conformity can be achieved by demonstrating that emissions are below the *de minimis* thresholds provided in **Table 3-7**, below (USEPA 2010).

Table 3-7. General Conformity *de minimis* Emissions Thresholds

Pollutant	Status	Classification	*de minimis* Limit (tpy)
O_3 (measured as NO_x or VOC)	Nonattainment	Extreme	10
		Severe	25
		Serious	50
		Moderate/marginal (inside ozone transport region)	50 (VOC)/100 (NO_x)
		All others (Subpart 1)	100
	Maintenance	Inside ozone transport region	50 (VOC)/100 (NO_x)
		Outside ozone transport region	100
CO	Nonattainment/ maintenance	All	100
PM_{10}	Nonattainment/ maintenance	Serious	70
		Moderate	100
		Not Applicable	100
$PM_{2.5}$ (measured directly, as SO_2, or as NO_x)	Nonattainment/ maintenance	All	100
SO_2	Nonattainment/ maintenance	All	100
Pb	Nonattainment/maintenance	All	25
NO_2	Nonattainment/ maintenance	All	100

Source: 40 CFR § 93.153

The USEPA and the local and state air programs monitor air emissions by county. The listed AT exercise sites are located in 19 counties in Arizona, New Mexico and California. **Table 3-8** lists which of the 19 counties are in nonattainment or maintenance and which pollutants the nonattainment or maintenance status is designated for. This table also provides the specific General Conformity thresholds that apply in that county (USEPA 2015). In general, to be conservative, if a county had regions that are in nonattainment for a specific pollutant, the county-level emissions for this analysis were assumed to take place in the nonattainment area, even if some or all of the training sites in that county were not actually within the respective nonattainment area boundaries.

Table 3-8. Nonattainment Areas and Maintenance Areas

County	Nonattainment Pollutants (with Severity)	Maintenance Area Pollutants	Pollutant *De Minimis* Levels (tons per year)	
Arizona Counties				
Cochise	1987 PM_{10} (Mod)	1971 SO_2	PM_{10} SO_2	100 100
Gila	2008 Pb (N/A), 1987 PM_{10} (Mod), 2010 SO_2 (N/A)	1971 SO_2	Pb PM_{10} SO_2	25 100 100
Greenlee		1971 SO_2	SO_2	100
Maricopa	2008 8-hr Ozone (Mar), 1987 PM_{10} (Ser)	1971 CO	VOC NO_X PM_{10} CO	100 100 70 100
Mohave		1987 PM_{10}	PM_{10}	100
Pima	1987 PM_{10} (Mod)	1971 SO_2, CO	PM_{10} SO_2 CO	100 100 100
Pinal	2008 Pb (N/A), 2008 8-hr Ozone (Mar)[1], 1987 PM_{10} (Mod)[1], 2006 $PM_{2.5}$ (Mod), 1971 and 2010 SO_2 (N/A)	1971 SO_2	Pb PM_{10} $PM_{2.5}$ SO_2	25 100 100 100
Santa Cruz	1987 PM_{10} (Mod), 2006 $PM_{2.5}$ (Mod)		PM_{10} $PM_{2.5}$	100 100
California Counties				
Imperial	California 1-hr Ozone (N/A), 2008 8-hr Ozone (Mar), 1987 PM_{10} (Ser), 2012 $PM_{2.5}$ (Mod)		VOC NO_X PM_{10} $PM_{2.5}$	100 100 70 100
Los Angeles	2008 Pb (N/A), California 1-hr Ozone (N/A), 2008 8-hr Ozone (Ext), 2012 $PM_{2.5}$ (Mod)	1971 NO_2, 1971 CO, 1987 PM_{10}	Pb VOC NO_X $PM_{2.5}$ NO_2 CO PM_{10}	25 10 10 100 100 100 100
Orange	California 1-hr Ozone (N/A), 2008 8-hr Ozone (Ext), 2012 $PM_{2.5}$ (Mod)	1971 NO_2, 1971 CO, 1987 PM_{10}	VOC NO_X $PM_{2.5}$ NO_2 CO PM_{10}	10 10 100 100 100 100
Riverside[2]	2008 Pb (N/A), California 1-hr Ozone (N/A), 2008 8-hr Ozone (Ext), 2012 $PM_{2.5}$ (Mod)	1971 NO_2, 1971 CO, 1987 PM_{10}	Pb VOC NO_X $PM_{2.5}$ NO_2 CO PM_{10}	25 10 10 100 100 100 100

County	Nonattainment Pollutants (with Severity)	Maintenance Area Pollutants	Pollutant *De Minimis* Levels (tons per year)	
California Counties (continued)				
San Diego	2008 8-hr Ozone (Mar)	1971 CO	VOC NO_X CO	100 100 100
Ventura	California 1-hr Ozone (N/A), 2008 8-hr Ozone (Ser),		VOC NO_X	50 50
New Mexico Counties				
Doña Ana[3]	1979 1-hr Ozone (Mar)1987 PM_{10} (Mod)		VOC NO_X PM_{10}	100 100 100

Notes: No counties in New Mexico where AT exercises are proposed to occur are classified as nonattainment or maintenance areas.

[1] Pinal County has areas in the Serious PM_{10} and marginal ozone nonattainment classification of the Phoenix metro area. Pinal County also contains parts of the West Pinal, Hayden Planning Area and Miami Planning Area moderate PM_{10} nonattainment areas. None of the proposed exercise areas are in the Phoenix metro nonattainment area, so only the moderate PM_{10} nonattainment areas were applicable to this analysis.

[2] Riverside County has differing nonattainment classifications. The only proposed exercise site is located at March AFB which is located within the Los Angeles South Coast Air Basin.

[3] Doña Ana County in New Mexico has separate areas in ozone and PM_{10} nonattainment. The exercise areas in this county are not in the nonattainment areas.

Key: (N/A) = No severity given. Mar = Marginal. Mod = Moderate. Ser = Serious. Ext = Extreme.

3.2.2.1 SOUTHERN ARIZONA

The southern Arizona region contains 47 of the identified AT training sites at which air emissions are expected to occur. Southern Arizona would also be the starting location for the majority of the sorties proposed as part of the expanded AT as Davis-Monthan AFB is located in this region in Pima County. Training sites, and the expected activities within each, are detailed in **Table 2-1** and in **Appendix F**. The following nonattainment and maintenance area counties are located in southern Arizona: Cochise, Gila, Maricopa, Pima, Pinal and Santa Cruz. Due to operations occurring in nonattainment and maintenance areas, a General Conformity screening analysis of the Proposed Action is required for all nonattainment and maintenance pollutants.

Military Installations

Twenty-three of the 47 training sites in southern Arizona are located at military facilities or locations designated for military activities. This includes Davis-Monthan AFB as well as Fort Huachuca. The majority of sorties in this region would most likely originate from these two locations. None of the military sites are situated in any nonattainment areas.

U.S. Forest Service

Eight of the 47 training sites in southern Arizona are located at USFS locations. These sites consist of only HLZs and are located in rural or remote areas. While several of these sites are located in counties that are classified as nonattainment, none of the actual sites are located within the specified nonattainment area boundaries.

Miscellaneous

The remaining 16 training sites in southern Arizona are located at miscellaneous locations. These sites consist of a variety of training site types and include the Bisbee Douglass Airport and the Gila Bend Airbase. Two of these sites are situated in moderate PM_{10} nonattainment areas in Pinal County.

3.2.2.2 NORTHERN ARIZONA

Military Installations

Eleven of the 61 training sites in northern Arizona are military installations. Six of the military sites are located at Camp Navajo. These sites would be used as HLZs and DZs. None of these sites are located in nonattainment areas. Training sites, and the expected activities within each, are detailed in **Table 2-1** and **Appendix F**.

U.S. Forest Service

Twenty of the 61 training sites in northern Arizona are at USFS locations. These sites consist primarily of HLZs and are located in rural or remote areas. A few of the sites would also be used as DZs. None of these sites are located in nonattainment areas.

Miscellaneous

Thirty of the 61 training sites in northern Arizona are located at miscellaneous locations. These sites consist of the municipal and regional airports in the region and are expected to see nearly all of the fixed-wing LZ activity. None of these sites are located in nonattainment areas.

3.2.2.3 NEW MEXICO

Training sites, and the expected activities within each, are detailed in **Table 2-1** and **Appendix F** of this document.

Military Installations

Two sites in New Mexico are on a military installation, within Melrose Air Force Range and the White Sands Missile Range. These sites would be used as a DZ and HLZ. They are not located within either of the nonattainment areas in Doña Ana or Curry counties.

U.S. Forest Service

Ten of the 13 sites in New Mexico are on USFS property, mostly in Catron County. These sites would be used primarily for HLZs or for DZs. None of these sites are located in nonattainment areas.

Miscellaneous

The remaining site in New Mexico is a cluster of at miscellaneous locations associated with the Playas Training and Research Center in Playas, New Mexico. None of these sites are located in nonattainment areas.

3.2.2.4 CALIFORNIA

Training sites, and the expected activities within each, are detailed in **Table 2-1** and **Appendix F** of this document.

Military Installations

Fifteen of the 19 identified California sites would be at military facilities or would be offshore in military training areas. All of these sites, with the exception of water locations at least five miles offshore, are located in nonattainment areas, and include the full range of exercise activity types.

The affected environment, with respect to greenhouse gas emissions, is global in nature and not specific to the project area.

3.3 Airspace Management

3.3.1 Definition of Resource

Airspace management is defined by USAF as the coordination, integration, and regulation of the use of airspace. The objective of airspace management is to meet military training requirements through the safe and efficient use of available navigable airspace in a peacetime environment while minimizing the impact on other aviation users and the public (AFI 13-201, *Air Force Airspace Management*). This is accomplished through the use of Special Use Airspace (SUA) (i.e., restricted military airspace) that separates military and civilian aircraft and provides designated airspace where training operations can be conducted safely. Additionally, adherence to FAA Federal Aviation Regulations (FARs) allows both military and civilian aircraft to operate in shared airspace safely. Airspace management procedures assist in preventing potential conflicts or aircraft accidents associated with aircraft using designated airspace in the U.S., including restricted military airspace.

FAA has overall responsibility for managing airspace through a system of flight rules and regulations, airspace management actions, and ATC procedures. All military and civilian aircraft are subject to 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.

***Controlled Airspace*.** Controlled airspace encompasses airspace (Class A, B, C, D, and E) within which the FAA provides ATC services for flights. When overlapping airspace designations apply for the same airspace, the operating rules associated with the more restrictive airspace would apply. The following airspace classes are discussed in order from most restrictive to least restrictive (FAA 2015).

- Class A airspace includes airspace from 18,000 feet above mean sea level (MSL) up to and including 60,000 feet above MSL (any altitude over 30,000 feet above MSL is considered high altitude) . (FAA 2008, SKYbrary 2011).
- Class B airspace typically extends from the surface up to 10,000 feet above MSL. Class B airspace is often associated with major airport complexes (Davis-Monthan AFB 2002).
- Generally, Class C airspace extends from the surface up to 4,000 feet above MSL. Class C airspace is designed to provide additional ATC into and out of primary airports

where aircraft operations are periodically at high-density levels and military airports (AC 2003)**.**

- Class D Airspace is generally from the surface to 2,500 feet above MSL. All traffic must maintain radio communication or have prior arrangements for operating within Class D airspace (AC 2003).
- Class E airspace can be described as general controlled airspace where more stringent airspace control has not been established up to 18,000 feet above MSL. Unless the floor of Class E airspace is designated as a lower altitude, Class E airspace begins at 14,500 feet MSL and extends up to, but not including, 18,000 feet MSL overlying the 48 contiguous U.S. and waters within 12 miles of the coast (FAA 2008).

Victor Airways serve general and commercial aviation between 700 feet AGL and 18,000 feet above MSL. These routes frequently intersect with the approach and departure paths of military and civilian airfields (Davis-Monthan AFB 2002). The low-altitude system is defined by the same radio navigation aids that establish the jet route system above 18,000 feet above MSL.

In addition to Victor Airways, the FAA has established low altitude RNAV routes (denoted by a "T"). These routes were created to provide more direct routes for pilots operating under meteorological conditions that require the use of instruments rather than visual reference (FAA 2014a).

***Uncontrolled Airspace*.** Uncontrolled airspace (Class G) is the portion of airspace that is not subject to FAA or ATC control. Class G airspace extends from the surface to the base of the overlying Class E airspace. The base of the overlying Class E airspace typically begins at 700 feet or 1,200 feet AGL, but can be up to 14,500 feet MSL (Davis-Monthan AFB 2002). Primary users of uncontrolled airspace are general aviation aircraft operating under visual meteorological conditions. Although uncontrolled airspace is not subject to FAA or ATC control, all military and civilian pilots must adhere to visual flight rules (VFRs) while operating in this airspace (FAA 2008).

Special Use Airspace. SUA consists of airspace within which specific activities must be confined, or wherein limitations are imposed on aircraft not participating in those activities. SUAs were established, in a coordinated effort with FAA, to maintain safety by separating military and civilian flights. SUAs potentially affected by the Proposed Action include RAs, Alert Areas (AAs), MOAs, and Warning Areas (WAs All SUA descriptions, including their vertical and lateral limits, are contained in FAA Joint Order 7400.8, *Special Use Airspace*.

RAs are reserved for military operations and cannot be entered by private or commercial aircraft without permission from the controlling agency when that RA is active. RAs may be scheduled as active at other times by issuing a Notice to Airmen (NOTAM) or the controlling agency at least 24 hours in advance (FAA 2014b).

- AAs are designated for areas where a high level of pilot training or unusual flight activities take place. As stated in Joint Order 7400.2H, *Chapter 26. Alert Areas*, AAs should avoid federal airways, major terminal areas, and high volume VFR routes.

- MOAs are established outside of Class A airspace (starting at 18,000 feet above MSL) where there would be a high density of military aircraft conducting nonhazardous operations. Private and commercial aircraft may also use this airspace with permission from the controlling agency.
- WAs are similar to RAs but are located offshore over domestic and international waters and typically begin three miles from the shoreline (AC 2003).

Other Airspace. Other airspace includes both controlled and uncontrolled airspace. Military missions may also use airspace that is not categorized as SUA, but where limitations may still be imposed on nonparticipating aircraft. MTRs are slightly less restrictive than SUAs; however, their purpose is also to minimize negative interactions between a military mission and nonparticipating aircraft.

MTRs are military air traffic corridors designated by FAA for low-altitude, high-speed military operations. Visual Routes (VRs) are MTRs that are typically flown at or below 1,500 feet AGL (CFI 2016, AC 2003). VRs can be utilized for flight training and entry into MOAs and RAs. Instrument Routes (IRs) are MTRs that are typically flown above 1,500 feet AGL and ATC entry clearance is required (CFI 2016). IR or VR routes without a segment above 1,500 feet AGL are identified with four numbers (i.e., VR 1233). Slow Routes (SRs) are DoD-controlled MTRs that are typically flown at or below 1,500 feet AGL at speeds of 250 knots (288 miles per hour) or less. Aerial Refueling Tracks (ARs) provide an area for military pilots to conduct aerial refueling after obtaining ATC clearance. SRs and ARs are not included on FAA VFR Sectional maps; however, IR, VR, SR, and AR coordinates, vertical and lateral limits, and controlling agencies are listed in the DoD Flight Information Publication AP/1B, *Area Planning Military Training Routes North and South America* (AP/1B). The controlling agency of a MTR must be notified before conducting flight-training activities (DoD 2016). MTRs pose flight hazards to any uncoordinated aviation within their perimeters (AC 2003).

LATN airspace is designated for conducting random low-altitude (100 to 1,500 feet AGL) navigation training and is defined by local military operations. LATN airspace is not included on FAA VFR Sectional maps. Military aircraft are required to follow all existing FARs while flying within an LATN area. After approval from the controlling agency is received, other nonparticipating civil and military aircraft may fly within an LATN area but are required to maintain visual separation from other aircraft. Military and civilian pilots must use the “see and avoid” technique while operating in a LATN area (Davis-Monthan AFB 2002).

Additionally, Control Areas are areas that exist between specified altitudes in the vicinity of airports to provide protection to aircraft climbing to higher altitudes after take-off (IVAO Undated).

3.3.2 Affected Environment

DoD, commercial, and private aircraft operate within the airspace types and associated altitudes described in **Section 3.3.1** throughout the project area. The Proposed Action training activities would occur at various altitudes due to the use of several types of aircraft. HH-60, HH-130, A-10, KC-135, and unmanned aircraft would be used as needed at the proposed training locations

based on the training activities discussed in **Table 2-1**. HH-60, HC-130, and A-10 aircraft would fly below 3,000 feet AGL on training flights; however, KC-135 aerial refueling aircraft flights and unmanned aircraft flights would occur below 50,000 feet AGL (USAF 2004). Unmanned aircraft originating from Luke AFB and BMGR would operate in RAs R-2304 and R-2305 at 24,000 feet above MSL. Unmanned aircraft originating from Fort Huachuca and Libby Army Airfield would operate in RAs R-2303A at 150,000 feet above MSL, R-2303B at 30,000 feet above MSL, and in R-2303C at 30,000 feet above MSL. Jet operations typically fly at altitudes ranging between 1,700 and approximately 2,200 feet above MSL. During parachute training, troops would deploy from the helicopter between altitudes of 2,000 and 10,000 feet AGL into the DZ. A majority of the high altitude sorties would occur within SUA or in Class A airspace where the most stringent ATC restrictions apply. Therefore, civilian aircraft at altitudes of 18,000 feet above MSL and above operating outside of SUAs would be heavily monitored. General descriptions of the regional airspaces, military airspace, and the airspace surrounding active airports are included below. Military installations and airports are discussed in detail because the airspaces associated with these locations are more complex than those associated with the other proposed training sites. More detailed descriptions of the airspace above the proposed AT training exercise locations are shown in **Tables G-1** through **G-4** of **Appendix G**.

3.3.2.1 SOUTHERN ARIZONA

The proposed training locations throughout southern Arizona are on military installations; USFS lands; and miscellaneous state, county, city, and privately-owned lands (see **Table 2-1**). All controlled airspace and RAs in southern Arizona within the project area are controlled by the ZAB ARTCC. The airspace classes above these training locations vary from Class B to Class G. If a training location is within a RA or MOA, the airspace surrounding the training area is controlled by ZAB ARTCC when that RA or MOA is inactive. There are multiple Victor Airways, MTRs, MOAs, and RAs within the airspace surrounding the proposed training locations. Additionally, there are two RNAV routes (T306 and T310) and one AA (A-231) present. Pilots must establish two-way communication with Luke AFB prior to entering A-231 and maintain communication while in the area. The Phoenix Sky Harbor IAP is the only major airport (i.e., airport with Class B airspace) in the vicinity of the proposed training locations (see **Table G-1** in **Appendix G** for a full list of the airspace classes, Victor Airways, MTRs, MOAs, and RAs in the vicinity of each training location in southern Arizona).

The A-10 and CSAR LATN Areas cover southern Arizona. The northern portion of the A-10 LATN Area is under a low altitude airway. The southern portion of the A-10 LATN Area covers airspace from 100 feet AGL to 3,000 feet AGL. The CSAR LATN Area covers airspace from 100 feet AGL to 1,500 feet AGL. Airspace excluded from the CSAR LATN Area includes populated or congested areas; SUA, MTRs, or other LATN areas; Class B, C, or D airspace; airspace within three NM of charted airports; environmentally sensitive areas (state and local parks, wilderness areas, etc.) and noise sensitive areas; Special Federal Aviation Regulation (SFAR) areas; and Temporary Flight Restriction areas. It is stated in Davis-Monthan AFB Instruction 11-250, *Airfield Operations Instruction*, that “crews are responsible for scheduling any conflicting SUA or MTR as necessary. Traffic deconfliction calls are made on the appropriate frequency prior to entering or transiting SUA, MTR, or another LATN area.”

There are various airspace warnings and hazards present throughout southern Arizona. Those in the vicinity of proposed training locations include military and emergency aircraft only areas, military parachute operations, unmarked cables and balloons, concentrated student jet transition training, the Tucson IAP Approach Area, and intensive student training near Casa Grande and Coolidge Airports (VFR 2016).

Military Installations

Davis-Monthan AFB. There are two LATN areas to the northwest and southwest of the installation defined from 100 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 Davis-Monthan AFB. The 305 RQS has also established two LATN areas designated for HH-60 helicopters to the west (which overlaps the A/OA-10 LATN areas) and east of the installation from 100 to 1,500 feet AGL (Davis-Monthan AFB 2002).

Currently, the 305 RQS uses the BMGR, primarily RAs R-2304 and R-2305, and Sells MOA for HH- 60 training. The BMGR (including the Marine Corps Air Station Yuma portion or R-2301W) contains 56 areas of SUA and ATC Assigned Airspace. 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 (Davis-Monthan AFB 2002).

Florence Military Reservation. Florence Military Reservation airspace is within R-2310A, near R-2310A/B2, and near R-2310SA/C; however, only R-2313A and R-2313B are used regularly. Florence Military Reservation is also within the Outlaw MOA, which is used regularly.

Fort Huachuca and *Libby Army Airfield.* Fort Huachuca and Libby Army Airfield are within R-2303 A & B and near R- 2303B, R- 2312, and R- 2303C. Each of these RAs are used regularly. Fort Huachuca and Libby Army Airfield are near the Tombstone A & C, Tombstone C, Tombstone B & C, Ruby 1, and Fuzzy MOAs; however, none of these MOAs are regularly used.

Gila Bend Air Force Auxiliary Base. Activities that currently occur on the Gila Bend Air Force Auxiliary Base include fixed-wing aircraft and helicopter training operations and emergency or precautionary recovery for aircraft that experience malfunctions or damage while operating on the BMGR. The RA and VRs in the vicinity of Gila Bend AFAB are the same as though described under Luke AFB below (USAF 2010).

Luke AFB. The RA in the vicinity of the BMGR includes R-2301E, R-2301W, R-2304, and R-2305; however, only R-2304 and R-2305 are used regularly. Activities that occur within the RA include bombing and strafing by aircraft that fly in prescribed patterns against standardized targets, simulated and live-fire training in air-to-air gunnery, and low-level overflights (with floors of 200 feet AGL for fixed-wing aircraft and 50 feet AGL for helicopters) (USAF 2010). The BMGR is partially located within Sells 1 MOA and is near the Sells Low and Gladden 1 MOAs; however, only Sells 1 and Sells Low MOAs are used regularly. Activities that take place on the VRs include low-level overflights (with a floor of 500 feet AGL) (USAF 2010).

Miscellaneous

Bisbee-Douglas International Airport. Aerial refueling occurs above the airport and could be scheduled independently of Tombstone MOA activation (VFR 2016; BDIAP 2014).

Phoenix Sky Harbor International Airport. The Phoenix Sky Harbor IAP Class B airspace is surrounded by Mode C airspace for 30 NM (VFR 2016). Within this 30 NM area, aircraft must be equipped with a mode C transponder with altitude reporting (FAA Undated) has a Control Zone that consists of the area within five miles (4.3 NM) of the IAP and extends to 14,500 feet MSL (PSHIAP 1989).

3.3.2.2 NORTHERN ARIZONA

The proposed training locations throughout northern Arizona are on military installations; USFS lands; and miscellaneous federal, state, county, city, and privately-owned lands (see **Table 2-1**). All controlled airspace and RAs in northern Arizona within the project area are controlled by ZAB ARTCC or the ZLA ARTCC. The airspace classes above these training locations vary from Class D to Class G (VFR 2016). If a training location is within a RA or MOA, the airspace surrounding the training area is controlled by ZAB ARTCC or ZLA ARTCC when that RA or MOA is inactive. There are multiple Victor Airways, MTRs, MOAs, and RAs within airspace surrounding the proposed training locations. Additionally, in areas near the Grand Canyon National Park, Special Regulations (SFAR 50-2) apply to aircraft flying below 18,000 feet MSL. SFAR 50-2 applies unless there is an emergency situation or an operation has been approved by the Las Vegas Flight Standards District Office, otherwise aircraft must remain at or above certain altitudes (VFR 2016; GCAP 2005). Although there is no major airport present within the northern Arizona project area, some proposed training locations are within the Phoenix Sky Harbor IAP Terminal Area. Additionally, the CSAR LATN Area discussed above covers northern Arizona (see **Table G-2** in **Appendix G** for a full list of the airspace classes, Victor Airways, MTRs, MOAs, and RAs in the vicinity of each training location in northern Arizona).

There are various airspace warnings and hazards present throughout northern Arizona. Those present in the vicinity of proposed training locations include unmarked cables, aerial cableways, stacks and towers, and parachuting. Additionally, the Salt River Bad Eagle Breeding Area is in the vicinity of the training locations (VFR 2016). Additional airspace information is provided below.

Military Installations

Camp Navajo. Camp Navajo is near R-2302 and uses the RA regularly. Camp Navajo is near Sunny MOA; however, only the Sells 1 and Sells Low MOAs are used regularly.

Miscellaneous

Flagstaff Pulliam Airport. The Flagstaff Pulliam Airport airspace is designated as Class G between the surface and 1,200 feet AGL, which is the base of Class E airspace. The airspace above the Airport is Class D rather than Class G from April 1 to September 30 between the hours of 6 a.m. and 9 a.m. and from October 1 to March 31 between the hours of 7 a.m. and 7 p.m. (VFR 2016; FPAP 2007).

Grand Canyon National Park Airport. When the Airport's ATC Tower is not in operation, Class D airspace reverts to Class E airspace. Class E airspace extends from 700 feet AGL and extends up to, but not including, 18,000 feet AGL. Aircrew and aircraft are not required to be in contact with ATC services and are recommended to follow traffic advisory practices while maintaining an aircraft speed of 250 knots when operating below 10,000 feet MSL.

Springerville Airport. Intermittent use of the Reserve MOA occurs and a NOTAM is published (SMA 2007).

3.3.2.3 NEW MEXICO

The proposed training locations throughout New Mexico are on military installations, USFS lands, and miscellaneous county and privately-owned lands (see **Table 2-1**). There are no miscellaneous airports within the New Mexico project area; therefore, these sites are not discussed further in this section. All controlled airspace and RAs in New Mexico within the project area are controlled by ZAB ARTCC. The airspace classes above these training locations vary from Class D to Class G. If a training location is within a RA or MOA, the airspace surrounding the training area is controlled by ZAB ARTCC when that RA or MOA is inactive. There are multiple Victor Airways, MTRs, MOAs, and RAs within airspace surrounding the proposed training locations. Additionally, there are is one RNAV route (T306) present (see **Table G-3** in **Appendix G** for a full list of the airspace classes, Victor Airways, MTRs, MOAs, and RAs in the vicinity of each training location in New Mexico).

There are various airspace warnings and hazards present throughout New Mexico. The only warning near the proposed training locations is that unmanned aircraft operations occur between Cannon AFB and R-5104A. Cannon AFB should be contacted for advisories (VFR 2016).

Military Installations

Melrose Air Force Range. RAs R-5104A and R-5105 support training activities on Melrose Air Force Range. R-5104A overlies Melrose Air Force Range and provides maneuvering area for air-to-ground activities. Various training activities occur within nearby R-5105 (USAF 2011). Nearby MOAs include Pecos North High and Taiban, Pecos North High and Low, and Pecos South. *White Sands Missile Range*. R-5107B is the primary RA used by White Sands Missile Range. Sub-sets of this RA include R-5107D, R-5107F, and R-1507G. RAs R-5107F and R-5107G are specially designated to allow non-participating aircraft to transit the White Sands Missile Range airspace while other portions of the range are active. Surrounding RAs (see **Table G-3** in **Appendix G**) can also be used for White Sands Missile Range activities (WSMR 2009). Nearby MOAs include Beak A, Beak B, and Beak C.

U.S. Forest Service

Reserve Airport. Reserve Airport is located within the Reserve MOA and is proximate to the Morenci, Cato, Smitty, and Jackal MOAs. When the Reserve MOA is inactive, the surrounding airspace is controlled by ZAB ARTCC.

3.3.2.4 CALIFORNIA

The proposed training locations throughout California are only on military installations (see **Table 2-1**). All controlled airspace and RAs in California within the project area are controlled by ZLA ARTCC. The airspace classes above these training locations vary from Class B to Class G. If a training location is within a RA or MOA, the airspace surrounding the training area is controlled by ZLA ARTCC when that RA or MOA is inactive. There are multiple Victor Airways, MTRs, MOAs, and RAs within airspace surrounding the proposed training locations. Additionally, there are nine WAs (W-291, W-292E, W-292W, CA-1318L, CA- 1156L, CA-1177L, W-289S, W-289W, and CA- Pacific Low) present. Two major airports, the Los Angeles IAP and the San Diego IAP, are in the vicinity of the training locations (see **Table G-4** in **Appendix G** for a full list of the airspace classes, Victor Airways, MTRs, MOAs, and RAs in the vicinity of each training location in California).

There are various airspace warnings and hazards present throughout California. Those present in the vicinity of proposed training locations include intensive jet traffic, balloon activity, parachute activity, towers, intensive flight and aerobatic training, magnetic disturbances at sea level, special military activity areas, and National Defense Operations Areas. Additionally, protected areas such as sensitive nesting areas and National Oceanic and Atmospheric Administration Regulated National Marine Sanctuary Designated Areas are in the vicinity of the training areas. Lastly, Naval Air Station (NAS) North Island arrivals should not descend prematurely so that surrounding class D airspace is not infringed upon (VFR 2016). Additional airspace information is provided below.

Military Installations

Camp Pendleton. Camp Pendleton is partially located within R-2503 A & D and R-2503 B & C, both of which are used regularly. Additionally, Camp Pendleton is located within the vicinity of Disneyland Theme Park. Public Law 108-199, Section 521 states that aircraft flight operations are prohibited at and below 3,000 feet AGL within a three-NM radius of Disneyland Theme Park (VFR 2016).

Naval Air Station North Island. There are no RAs or MOAs near NAS North Island and none are regularly used; however, the installation is partially within and in the vicinity of multiple WAs listed above.

Water Training Area. The WTA proposed for use under the Proposed Action is comprised of two near shore areas (A1 and A2) that are a portion of a larger U.S. Navy administered training complex that extends to 24 NM offshore. The airspace surrounding the WTA is uncontrolled airspace and is located on the western edge of Imperial Beach Ground Control Radar coverage. The area has multiple military (Navy, Air Force Reserve helicopters), the U.S. Coast Guard, and civilian users (Davis-Monthan AFB 2002).

3.3.2.5 NEVADA

Nellis AFB. The only proposed training location within Nevada is Nellis AFB (see **Table 2-1**). AT training activities at Nellis AFB would consist of command and control-type activities in existing facilities and would not have potential to impact airspace; therefore, airspace is not evaluated further for Nellis AFB.

3.4 Biological Resources

3.4.1 Definition of Resource

Biological resources include native or naturalized plants and animals and the habitats (e.g., grasslands, forests, and wetlands) in which they exist. Protected and sensitive biological resources include species listed as threatened, endangered or proposed under the ESA as designated by the USFWS, migratory birds, bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*), and species that are protected by laws or programs of states or other agencies. Sensitive habitats include areas designated by USFWS as critical habitat protected by the ESA and as sensitive ecological areas designated by state or other federal rulings. Sensitive habitats also include wetlands, plant communities that are unusual or limited in distribution, and important seasonal use areas for wildlife (e.g., migration routes, breeding areas, crucial summer and winter habitats). Implementing the Proposed Action or No Action Alternative would have no impacts on wetlands or other waters of the U.S.; therefore, no analysis of water resources is included in this EA.

Endangered Species Act. The ESA (16 U.S.C. § 1531 et seq.) establishes a federal program to protect and recover imperiled species and the ecosystems upon which they depend. The ESA requires federal agencies, in consultation with USFWS, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat of such species. Under the ESA, "jeopardy" occurs when an action is reasonably expected, directly or indirectly, to diminish the number, reproduction, or distribution of a species so that the likelihood of survival and recovery in the wild is appreciably reduced. An "endangered species" is defined by the ESA as any species in danger of extinction throughout all or a significant portion of its range. A "threatened species" is defined by the ESA as any species likely to become an endangered species in the foreseeable future. The ESA also prohibits any action that causes a "take" of any listed species. "Take" is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct." Federal species of concern are not protected by law; however, these species could become listed and, therefore, are given consideration when addressing impacts from a proposed action. Listed plants are not protected from take, although it is illegal to collect or maliciously harm them on federal land. The USFWS has primary responsibility for terrestrial and freshwater organisms.

Under the ESA, critical habitat is designated if USFWS determines that the habitat is essential to the conservation of a federally threatened or endangered species. In consultation for those species with critical habitat, federal agencies must ensure that their activities do not adversely modify critical habitat to the point that it would no longer aid in the species' recovery. For the purposes of this EA, it was conservatively assumed that all potential direct and indirect impacts at each training area would be confined to a one-half mile radius. Since training areas would range from 0.3 to 2.7 acres around the proposed sites, this would equate to an impact area of 480 acres. This impact area is much larger than the size of the sites and the direct effects associated with the Proposed Action. Therefore, all habitat and critical habitat more than one-half mile from the proposed sites were eliminated from consideration.

Migratory Bird Treaty Act. The MBTA was enacted to protect migratory birds and their parts (i.e., eggs, nest, and feathers). A Memorandum of Understanding (MOU) was executed in July 2006 between DOD and USFWS to promote the conservation of migratory birds. Migratory birds are protected under the MBTA of 1918 (16 U.S.C. § 703–712) as amended, and EO 13186, Responsibilities of Federal Agencies to Protect Migratory Birds. Military readiness activities are exempt from incidental taking of migratory birds pursuant to Section 315 of the Authorization Act for Fiscal Year 2003 (Public Law 107-314, 116 Stat. 2458). Military readiness activities, as defined in the Authorization Act (50 CFR § 21), includes all training and operations of the Armed Forces that relate to combat, and the adequate and realistic testing of military equipment, vehicles, weapons, and sensors for proper operation and suitability for combat use.

Bald and Golden Eagle Protection Act. Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act of 1940 (16 U.S.C. § 668–668c), as amended. The Bald and Golden Eagle Protection Act prohibits the take, possession, or transport of bald eagles; golden eagles; and the parts (e.g., feathers, body parts), nests, or eggs of bald and golden eagles without authorization from USFWS. This includes inactive and active nests. “Take” according to the Act means to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, destroy, molest, or disturb. Activities that directly or indirectly lead to a “take” are prohibited without a permit from USFWS.

Other State and Federal Programs. The USFS manages their Threatened, Endangered and Sensitive Species Program in order to conserve and recover plant and animal species that need special management attention and to restore NF and Grassland ecosystems and habitats. The USFS uses the term *Sensitive Species* to denote those species that fall under the Threatened, Endangered and Sensitive Species Program.

There are 145 USFS sensitive species in Arizona, and 166 in New Mexico (USDA 2007). Because of the large number of species across multiple NFs in both Arizona and New Mexico, the effect of the Proposed Action on USFS sensitive species is included in the general vegetation and wildlife sections below.

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. The State of New Mexico uses the designation *State of New Mexico threatened, endangered, or sensitive* as designated by the New Mexico Wildlife Conservation Act. The State of California uses the designation *Species of Special Concern* to identify animals that need conservation in order to avoid the need to list them under the California ESA.

There are 687 state-listed wildlife of special concern in Arizona, over 900 species of special concern in California, and 58 in Catron County, New Mexico (AGFD 2016a, CDFW 2016, NMGFD 2016). Because of the large number of species across many habitats in Arizona, California, and New Mexico, the effect of the Proposed Action on Arizona, California, and New Mexico state-listed species is included in the general vegetation and wildlife sections below.

3.4.2 Affected Environment

The description of the affected environment is grouped by region (i.e., southern Arizona, northern Arizona, etc.) and land ownership (i.e. USFS land and miscellaneously-owned land). Land other than federally-owned property such as state, private, and tribal lands is collectively referred to as miscellaneous properties.

3.4.2.1 SOUTHERN ARIZONA

There are 32 proposed sites located in southern Arizona on federally-owned property, 24 of which are located on military installations, while 8 of the sites are on property managed by the USFS (**Table 2-1**). In addition, there are 18 proposed sites that are located on miscellaneously-owned lands.

Military Installations

There are 24 proposed sites that occur entirely within four military installations in southern Arizona: Davis-Monthan AFB, Lorence Military Reservation, Fort Huachuca, and Luke AFB (**Table 2-1**). These use installation-specific Integrated Natural Resource Management Plans (INRMPs) to manage their biological resources and additionally, obtain all appropriate environmental clearances for their training ranges, including NEPA coverage and ESA Section 7 consultation. As described in **Section 2.1.3**, all locations would be selected in coordination with the appropriate range and other installation personnel to make sure that exercises comply with all environmental requirements. The selected ranges would be already governed by the installations' environmental policies, procedures, and requirements, including existing NEPA coverage and ESA Section 7 consultation conducted for the range and any associated requirements. All current USAF regulations and requirements concerning sensitive biological resources within the ranges would be adhered to under the Proposed Action. There would be 53 sites used as HLZs, LZs, and DZs that would occur on current military installations and would meet all requirements identified in AFI 13-217, *Drop Zone and Landing Zone Operations* (USAF 2007a). All airfields proposed for refueling activities currently have appropriate fuel storage on site and are managed in accordance with facility Spill Prevention Control, Countermeasure, and Contingency Plans. The Proposed Action would result in a negligible increase in already existing operations at these training sites; therefore, impacts on biological resources (vegetation, wildlife, and threatened and endangered species) associated with the Proposed Action would not be evaluated further for these sites.

U.S. Forest Service

There are eight proposed training sites in southern Arizona within the USFS Coronado NF (**Table 2-1**). These sites occur in Cochise, Graham, Pima, and Santa Cruz Counties. Except for the Mount Lemon site, which is a proposed Technical Rope Work training site, all of the proposed training sites would be used as HLZ and DZ sites; Devon and Mesa would only be used as HLZ sites.

Vegetation. An assessment of vegetation communities at each of the USFS sites was undertaken using a combination of the Arizona Game and Fish Department online HabiMap tool (AGFD 2016b) and site visit observations. Vegetation communities were assigned based on broad scale descriptions of vegetation at the proposed sites; however, in some cases,

vegetation communities were mapped on a more fine-scale level and in those cases, a more specific community description is provided (e.g., Arizona Upland subdivision of Sonoran Desertscrub). Based upon this assessment, four vegetation communities were identified within the proposed southern Arizona training sites on USFS lands, including Arizona Upland Subdivision of the Sonoran Desertscrub, Madrean Evergreen Woodland, Plains and Great Basin Grasslands, and Semi-desert Grasslands (AGFD 2016b). The vegetation community for each site is provided in **Table 3-9**, and the descriptions of each of those communities are below.

Table 3-9. Vegetation Communities within the Southern Arizona Proposed Training Sites of USFS Land

Site	Type	County	Elevation (feet)	Vegetation Community
Canelo	DZ/HLZ	Santa Cruz	5,000	Madrean Evergreen Woodland
Devon	HLZ	Santa Cruz	4,233	Madrean Evergreen Woodland
Mesa	HLZ	Graham	4,750	Semi-desert Grassland
Mount Lemon	Technical Rope Work	Pima	6,132	Arizona Upland – Sonoran Desertscrub
Ranger	DZ/HLZ	Cochise	5,781	Madrean Evergreen Woodland
Saddle Mountain East	DZ/HLZ	Santa Cruz	5,078	Plains and Great Basin Grassland
Saddle Mountain South	DZ/HLZ	Santa Cruz	5,146	Plains and Great Basin Grassland
Saddle Mountain West	DZ/HLZ	Santa Cruz	5,460	Madrean Evergreen Woodland

Key: DZ = Drop Zone, HLZ = Helicopter Landing Zone

Arizona Upland Subdivision of Sonoran Desertscrub. Arizona Upland Subdivision of Sonoran Desertscrub is located in south-central Arizona and northern Sonora, Mexico. It is one of two subdivisions of Sonoran Desertscrub, the other being the Lower Colorado Valley Subdivision. The terrain of Arizona Upland Subdivision of Sonoran Desertscrub contains numerous mountain ranges, and valleys, which are narrower than those of the Lower Colorado River Valley Subdivision (Dimmitt 2015). The Arizona Upland Sonoran Desertscrub vegetation is at times referred to as the Arizona Desert or Paloverde-Cacti Desert and occurs at elevations ranging from 980 to 3,300 feet. Cacti are characteristic of this desertscrub community and include buckhorn cholla (*Cylindropuntia acanthocarpa*), cane cholla (*C. imbricata*), chain fruit cholla (*C. fulgida*), teddy bear cholla (*Opuntia bigelovii*), fishhook pincushion (*Mammillaria grahamii microcarpa*), fishhook barrel cactus (*Ferocactus wislizeni*), and saguaro (*Carnegiea gigantea*). Dominant non-cactus woody plants include blue paloverde (*Parkinsonia florida*), foothill paloverde (*P. microphylla*), creosotebush (*Larrea tridentata*), white bursage (*Ambrosia dumosa*), and whitethorn acacia (*Acacia constricta*) (Brown 1994).

Plains and Great Basin Grassland. The Plains and Great Basin Grassland vegetation occurs mainly in eastern Arizona at 4,900 to 7,500 feet in elevation, and is associated with Great Basin Pinyon-Juniper Woodland vegetation at higher elevations and Semi-desert Grasslands or Great Basin Desertscrub at lower elevations. These grasslands are altered now but were once a continuous cover, dominated by various grass species and interspersed with shrubs and forbs.

The Plains Grassland vegetation can be divided into tall, medium, and short grassland fractions depending on general grass height. Tall grasses occur on sandy hills and are dominated by big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium*), Indiangrass (*Sorghastrum nutans*), switchgrass (*Panicum virgatum*), galleta (*Pleuraphis jamesii*), and sand dropseed (*Sporobolus cryptandrus*). The short grass areas are dominated by blue grama (*Bouteloua gracilis*), Indian ricegrass (*Achnatherum hymenoides*), galleta, plains lovegrass (*Eragrostis intermedia*), and alkali sacaton (*Sporobolus airoides*). Associated shrubs in both the tall and short grass vegetation may include fourwing saltbush (*Atriplex canescens*), big sagebrush (*Artemisia tridentata*), and snakeweed (*Gutierrezia* spp.) depending on the degree of past grazing and other disturbances (Brown 1994).

Semi-desert Grassland. The Semi-desert Grassland is located mainly in east-central and southeast Arizona and occurs at elevations from 3,600 to 6,200 feet. This vegetation type is associated with Plains and Great Basin Grassland, Madrean Evergreen Woodland, and Chihuahuan Desertscrub. Tobosagrass (*Pleuraphis mutica*) and black grama (*Bouteloua eriopoda*) are the most dominant species in Semi-desert Grasslands. The other grasses are numerous and include sideoats grama (*Bouteloua curtipendula*), blue grama, slender grama (*B. repens*), bush muhly (*Muhlenbergia porteri*), threeawn species (*Aristida* sp.), Arizona cottontop (*Digitaria californica*), plains lovegrass, and little bluestem. The assorted shrubs that are intermixed among the grasses include mesquite (*Prosopis* spp.), one-seed juniper (*Juniperus monosperma*), Mormon tea (*Ephedra* spp.), false mesquite (*Calliandra conferta*), catclaw acacia (*Acacia greggii*), and ocotillo (*Fouquieria splendens*). Cacti and other succulents are important in this vegetation type, they include several yucca species (*Yucca* spp.), sotol (*Dasylirion wheeleri*), beargrass (*Nolina microcarpa*), several agave species (*Agave* spp.), barrel cactus (*Ferocactus* spp.), and several prickly pear (*Opuntia* sp.) and hedgehog species (*Echinocereus* sp.) (Brown 1994).

Madrean Evergreen Woodland. The Madrean Evergreen Woodland is a warm–temperate forest located in the southeast and west-central Arizona. This vegetation type is associated with Semi-desert Grassland and interior chaparral at low elevations and Montane Conifer Forests at higher elevations. Elevations for this vegetation community range from 3,940 to 7,220 feet. Trees at lower elevations include Emory oak (*Quercus emoryi*), Arizona white oak (*Q. arizonica*), alligator bark juniper (*Juniperus deppeana*), one-seeded juniper, and Mexican pinyon (*Pinus cembroides*). At the higher elevations Apache pine (*P. engelmannii*), Arizona pine (*P. arizonica*), and Durango pine (*P. durangensis*) become prevalent along with the oaks. The grasses present include several muhly species (*Muhlenbergia* sp.), cane bluestem (*Bothriochloa barbinodis*), little bluestem, plains lovegrass, blue grama, sideoats grama, hairy grama (*Bouteloua hirsuta*), and green sprangletop (*Leptochloa dubia*). The common shrubs are indigobush (*Dalea* sp.), buckwheats (*Eriogonum* sp.), and Louisiana sage (*Artemisia ludoviciana*) (Brown 1994).

Wildlife. The Arizona Upland Subdivision of the Sonoran Desertscrub, Plains and Great Basin Grassland, Semi-desert Grassland, and Madrean Evergreen Woodland vegetation communities provide habitat for a diverse set of wildlife, specific to each community. The following section lists wildlife species that are common to each of the communities and discusses any species or habitats that are protected.

Arizona Upland Subdivision of Sonoran Desertscrub. Mammals that commonly occupy the Arizona Upland – Sonoran Desertscrub, include mule deer (*Odocoileus hemionus*), desert bighorn sheep (*Ovis canadensis*), javelina (*Tayassu tajacu*), mountain lion (*Felis concolor*), ringtail cat (*Bassariscus astutus*), California leaf-nosed bat (*Macrotus californicus*), California myotis (*Myotis californicus*), black-tailed jack-rabbit (*Lepus californicus*), spotted skunk (*Spilogale gracilis*), gray fox (*Urocyon cinereoargenteus*), mesquite mouse (*Peromuscus merriami*), and the endemic Harris antelope squirrel (*Ammospermophilus harrisii*). Bird species include typical thornscrub species such as Harris's hawk (*Parabuteo unicinctus*), white-winged dove (*Zenaida asiatica*), elf owl (*Micrathene whitneyi*), pyrrhuloxia (*Cardinalis sinuatus*), gila woodpecker (*Melanerpes uropygialis*), curve-billed thrasher (*Toxostoma curvirostre*), cactus wren (*Campylorhynchus brunneicapillus*), and black-tailed gnatcatcher (*Polioptila melanura*). Reptiles species include western whiptail (*Cnemidophorus tigris*), gila monster (*Heloderma suspectum*), tiger rattlesnake (*Crotalus tigris*), desert tortoise (*Gopherus morafkai*), Mojave green rattlesnake (*Crotalus scutulatus scutulatus*), regal horned lizard (*Phrynosoma solare*), and ornate tree lizard (*Urosaurus ornatus*) (Brown 1994).

Plains and Great Basin Grassland. Plains and Great Basin Grasslands provide a beneficial food source for larger grazing mammals such as the pronghorn antelope (*Antilocapra americana*), as well as habitat for smaller burrowing mammals including plains pocket gopher (*Geomys bursarius*), striped skunk (*Mephitis mephitis*), and northern grasshopper mouse (*Onychomys leucogaster*). The open landscape of the grasslands provides suitable habitat for bird species such as the western meadowlark (*Sturnella neglecta*), prairie falcon (*Falco mexicanus*), vesper sparrow (*Pooecetes gramineus*), western kingbird (*Tyrannus verticalis*), Swainson's hawk (*Buteo swainsoni*), burrowing owl (*Athene cunicularia*), common raven (*Corvus corax*), American kestrel (*Falco sparverius*), horned lark (*Eremophila aepestris*), red-tailed hawk (*Buteo jamaicensis*), loggerhead shrike (*Lanius ludovicianus*), and black-throated sparrow (*Amphispiza bilineata*). The burrows created by small mammals are often co-habited by reptiles such as the gophersnake (*Pituophis melanoleucus*), coachwhip (*Masticophis flagellum*), and western rattlesnake (*Crotalus viridis*) (Brown 1994).

Semi-desert Grassland. The pronghorn antelope and white-tailed deer (*Odocoileus virginianus*) are the common large grazing mammals associated with the Semi-desert Grassland community. Small burrowing mammals are primarily represented by the black-tailed jackrabbit and various burrowing rodents, including the spotted ground squirrel (*Spermophilus spilosoma*), hispid pocket mouse (*Perognathus hispidus*), antelope jackrabbit (*Lepus alleni*), and northern grasshopper mouse. Numerous bird species inhabit this community including Swainson's hawk, mourning dove (*Zenaida mocroura*), greater roadrunner (*Geococcyx californianus*), Say's phoebe (*Sayornis saya*), cactus wren, Gambel's quail (*Callipepla gambelii*), scaled quail (*C. squamata*), and burrowing owl. Reptiles present include the desert box turtle (*Terrapene ornata luteola*), western hognose snake (*Heterodon nasicus*), desert-grassland whiptail (*Aspidoscelis uniparens*), and common earless lizard (*Holbrookia texana scitula*) (Brown 1994).

Madrean Evergreen Woodland. Common wildlife species in Madrean Evergreen Woodland includes white-tailed deer, small mammals such as the southern pocket gopher (*Thomomys umbrinus*), and Mexican fox squirrel (*Sciurus nayaritensis*). A number of bird species are characteristic of this community, including Montezuma quail (*Cyrtonyx montezumae*), acorn

woodpecker (*Melanerpes formicivorus*), Mexican jay (*Aphelocoma wollweberi*), bridled titmouse (*Baeolophus wollweberi*), bushtit (*Psaltriparus minimus*), and Hutton's vireo (*Vireo huttoni*). The elegant trogon (*Trogon elegans*) is uncommon but typically found in this habitat adjacent to sycamore drainages. The Madrean Evergreen Woodland also has a variety of reptilian species, including rock rattlesnake (*Crotalus lepidus*), mountain skink (*Plestiodon callicephalus*), Sonoran mountain kingsnake (*Lampropeltis pyromelana*), and black-tailed rattlesnake (*Crotalus molossus*) (Brown 1994).

Federally Threatened and Endangered Species. A desktop analysis was conducted of all federally-listed species to determine if they have the potential to occur within or near proposed training sites based on habitat at the site, elevation, and the species known range and distribution. Reconnaissance-level surveys and aerial imagery were used to assess habitat at the proposed sites. Species were excluded from analysis if the habitat, range, or occurrences of individuals did not occur near or at the training sites. There are six federally threatened or endangered species that have the potential to occur within the southern Arizona proposed training sites on USFS land (**Table 3-10**). There are three federally threatened species, the Chiricahua leopard frog (*Lithobates chiricahuensis*), northern Mexican gartersnake (*Thamnophis eques megalops*), and Mexican spotted owl (*Strix occidentalis lucida*); and three federally endangered species, Gila chub (*Gila intermedia*), jaguar (*Panthera onca*), and lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*).

Designated or proposed critical habitat within five miles of the training sites proposed on USFS land is presented in **Table 3-11**. The distance from the given coordinates of each site to the critical habitat is also included in the table. The Gila chub, northern Mexican gartersnake, Mexican spotted owl, and jaguar have designated or proposed critical habitat within one-half mile of the eight southern Arizona USFS proposed training sites (**Table 3-11**). The Sonora chub (*Gila ditaenia*) is not discussed in this document because it is an aquatic species with the nearest critical habitat being two and one-half miles from the Devon proposed site. Therefore, it would not be affected by the Proposed Action.

Gila chub. The Gila chub was listed as federally endangered with designated critical habitat on November 02, 2005 (70 Federal Register [FR] 66664). The Gila chub is small finned, deep-bodied, chunky, and darkly colored. Adult males average approximately 6 inches in total length; females can exceed 8 inches. Their scales are coarse, thick, and broadly overlapped, and radiate out from the base (USFWS 2005).

Gila chub commonly inhabit pools in smaller streams, springs, and cienegas (a desert wetland), and can survive in small artificial impoundments, such as manmade ponds. This species is highly secretive, preferring quiet, deeper waters, especially pools, or remaining near cover including terrestrial vegetation, boulders, and fallen logs (USFWS 2005).

This species is currently known from Cienega Creek, Sabino Canyon, Sheehy Spring in the Santa Cruz River, Middle Gila River (Eagle, Bonita and Harden Cienega Creeks and San Carlos and Blue Rivers), San Pedro River (Bass O'Donnell and Redfield Canyons, Babocomari River and Turkey Creek), Agua Fria River (Silver and Sycamore Creeks), Verde River (Spring and Walker Creeks). It is likely extirpated from Monkey Spring (Santa Cruz River), and Fish and Cave Creeks (Salt River) (AGFD 2002a). The Canelo site is within 0.20 mile from Turkey Creek

Table 3-10. Special Status Species that have the Potential to Occur within the Southern Arizona USFS Sites

Species	Federal Status	Critical Habitat Designated or Proposed	State Status	Proposed Training Sites with Potential Species Occurrence	Site Concerns
Fish					
Gila chub (*Gila intermedia*)	E	Yes	S2	Canelo	Not applicable
Amphibians					
Chiricahua leopard frog (*Lithobates chiricahuensis*)	T	Yes	S2	Devon, Saddle Mountain East[1], Saddle Mountain South[1]	Eggs are typically laid March through June at elevations below 5,900 feet
Reptiles					
Northern Mexican gartersnake (*Thamnophis eques megalops*)	T	Yes	S1	Canelo, Saddle Mountain East, Saddle Mountain West, Saddle Mountain South	Mates in spring and young are born in June and July.
Birds					
Mexican spotted owl (*Strix occidentalis lucida*)	T	Yes	S3	Canelo, Devon, Mesa, Mount Lemon, Ranger, Saddle Mountain West	Breeding season: March- June
Mammals					
Jaguar (*Panthera onca*)	E	Yes	S1	Devon, Saddle Mountain East, Saddle Mountain South, Saddle Mountain West	Not applicable
Lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*)	E	No	S2	Devon, Mesa, Mount Lemon, Ranger, Saddle Mountain West	Present in the U.S. from April to September

Key: E = Endangered, T = Threatened, S = State Rank
Source: USFWS 2015
Note: [1] No adequate overland vegetation between water sources at these sites.

in the San Pedro River. The rest of the sites do not occur near any of the other creeks or rivers where the Gila chub occurs.

Threats to the Gila chub include aquifer pumping; stream diversion; reduction in stream flows; habitat alteration and competition by nonnative crayfishes; and predation by and competition with nonnative fishes (AGFD 2002a).

Table 3-11. Designated Proposed Critical Habitat within Five Miles of the Southern Arizona Training Sites on USFS Lands

Species	Federal Status	Proposed Training Site	Distance from the Site to Critical Habitat (miles)[1]
Fish			
Gila chub (*Gila intermedia*)	E	Canelo	0.19
		Mesa	2.16
		Mount Lemon	3.82
Sonora chub (*Gila ditaenia*)	T	Devon	2.51
Amphibians			
Chiricahua leopard frog (*Lithobates chiricahuensis*)	T	Devon	2.83
Reptiles			
Northern Mexican gartersnake (*Thamnophis eques megalops*)[2]	T	Canelo	0.12
		Saddle Mountain East	0.00
		Saddle Mountain South	0.00
		Saddle Mountain West	0.14
Birds			
Mexican spotted owl (*Strix occidentalis lucida*)	T	Canelo	3.88
		Devon	0.24
		Mesa	0.00
		Mount Lemon	0.00
		Ranger	0.00
		Saddle Mountain East	1.85
		Saddle Mountain South	1.44
		Saddle Mountain West	0.20
Mammals			
Jaguar (*Panthera onca*)	E	Canelo	1.84
		Devon	0.70
		Saddle Mountain East	0.89
		Saddle Mountain South	0.38
		Saddle Mountain West	0.00

Notes:
[1] Distance based on coordinates given by the USAF
[2] Critical habitat is proposed for this species.

Gila chub critical habitat. Critical habitat was designated on November 2, 2005. As presented in 70 FR 66664–66721, the primary constituent elements (PCEs) of critical habitat for Gila chub include the habitat components that provide the following:

- "Perennial pools, areas of higher velocity between pool areas, and areas of shallow water among plants or eddies all found in small segments of headwaters, springs, or cienegas of smaller tributaries."

- "Water temperatures for spawning ranging from 62.6 to 75.2 degrees Fahrenheit and seasonally appropriate temperatures for all life states, from 50 to 86 degrees Fahrenheit."
- "Water quality with reduced levels of contaminants or any other water quality characteristics, including excessive levels of sediments, adverse to Gila chub health, and adequate levels of pH (6.5 to 9.5), dissolved oxygen (3.0 to 10.0), and conductivity (100 to 1,000 milliohms)."
- "Food base consisting of invertebrates, filamentous (threadlike) algae, aquatic plants, and insects."
- "Sufficient cover consisting of downed logs in the water channel, submerged aquatic vegetation, submerged large tree root wads, undercut banks with sufficient overhanging vegetation, large rocks and boulders with overhangs, and a high degree of streambank stability and healthy, intact, riparian vegetation community."
- "Habitat devoid of nonnative aquatic species detrimental to Gila chub or habitat in which detrimental nonnatives are kept at a level that allows Gila chub to continue to survive and reproduce."
- "Streams that maintain a natural unregulated flow pattern including periodic natural flooding."

Critical habitat areas were designated to provide for the conservation of the Gila chub throughout the remaining portion of its geographic range in the U.S. Several areas of critical habitat have been proposed in Arizona and New Mexico; however, only one of these areas is located near or within proposed training sites, Turkey Creek, and a buffer zone adjacent to those reaches. The Canelo site is within 0.19 mile of Turkey Creek.

Chiricahua leopard frog. The Chiricahua leopard frog was listed as federally threatened on June 13, 2002 (67 FR 40790), with critical habitat designated on March 20, 2012 (77 FR 14126). This is a medium to large, stocky frog with adult lengths from 2.0 to 5.4 inches. A distinctive pattern on the rear of the thigh consists of small, raised, cream-colored spots on a dark background; the dorsal spots are generally smaller and more numerous than in other leopard frogs. The eyes are higher on the head and more upturned than other Arizona leopard frogs. The groin and lower abdomen are often yellow (AGFD 2011a). The breeding season of Chiricahua leopard frogs, as indicated by egg laying, varies with elevation (SWESA 2008) and differs from year to year (USFWS 2007). Eggs are typically laid March through June at elevations below 5,900 feet (USFWS Undated-a).

This species is primarily limited to headwater streams and springs, and livestock tanks into which nonnative fish, bullfrogs (*Lithobates catesbeianus*), crayfish (*Orconectes virilis*), and barred tiger salamanders (*Ambystoma mavortium mavortium*) have not yet invaded or been introduced, or where the numbers of nonnative predators are low and habitats are complex, allowing Chiricahua leopard frogs to coexist with these species (USFWS 2012a). They are usually found at elevations ranging from 3,281 to 8,890 feet (AGFD 2011a).

The range of the Chiricahua leopard frog includes central and southeastern Arizona; west-central and southwestern New Mexico; and in Mexico, northeastern Sonora, the Sierra Madre Occidental of northwestern and west-central Chihuahua, and possibly as far south as northern Durango (USFWS 2012a). In Arizona, the range is divided into two areas, the northern population (Mogollon Rim population), which extends from montane areas in central Arizona, east and south along the Mogollon Rim to montane parts of west-southwestern New Mexico. The second population is located in the mountains and valleys south of the Gila River in southeastern Arizona and southwestern New Mexico, and extends into Mexico (adjacent Sonora) along the eastern slopes of the Sierra Madre Occidental (AGFD 2011a). None of the southern Arizona USFS sites occur within one-half mile of Chiricahua leopard frog known distribution.

Threats to this species include an introduced fungal skin disease (*Chytridomycosis* [chytrid]), predation by nonnative species, especially bullfrogs, fishes (e.g. sport fish) and crayfish. Other threats include drought, floods, wildfires, degradation and destruction of habitat, water diversions and groundwater pumping, an increased chance of extirpation resulting from small numbers of populations and individuals, and environmental contamination (AGFD 2011a).

Northern Mexican gartersnake. The northern Mexican gartersnake was listed as federally threatened on July 08, 2014 (79 FR 38677), with critical habitat proposed on July 10, 2013 (78 FR 41549). It is a stout-bodied snake that reaches a maximum length of 44 inches, with females larger than males. The background color ranges from olive to olive-brown to olive gray with three lighter colored stripes that run the length of the body, the middle of which darkens toward the tail. A pair of large brown spots extends along the dorsolateral fields, and a light-colored crescent extends behind the corners of the mouth (AGFD 2012).

The northern Mexican gartersnake occurs at elevations from 130 to 8,497 feet and is considered a terrestrial-aquatic generalist. This species is generally found in riparian areas when not engaged in dispersal, gestation, or hibernation behaviors and occurs chiefly in the following general habitat types: 1). Small, often isolated wetlands (e.g., cienegas [mid-elevation wetlands with highly organic, basic or alkaline soils], or stock tanks [small earthen impoundment]); 2). Large river riparian woodlands and forests; and 3). Streamside gallery forests (as defined by well-developed broadleaf deciduous riparian forests with limited, if any, herbaceous groundcover or dense grass) (USFWS 2014a).

Currently, there are only five known northern Mexican gartersnake populations in the U.S., where the subspecies remains reliably detected and is considered viable; all are located in Arizona. The five known populations are: the Page Springs and Bubbling Ponds State Fish Hatcheries along Oak Creek, lower Tonto Creek, upper Santa Cruz River in the San Rafael Valley, the Bill Williams River, and the upper and middle Verde River. In New Mexico, the northern Mexican gartersnake was last documented in 2013 along the Gila River in the vicinity of the Highway 180 crossing and is considered to occur in extremely low population densities within its historical distribution along the Gila River and Mule Creek (USFWS 2014a). The Saddle Mountain East and South sites are near the Santa Cruz River in the San Rafael Valley.

Threats to this species include destruction and modification of its habitat, predation from nonnative bullfrogs, significant reductions in its native prey base from predation and competition

associations with nonnative species, and genetic effects from fragmentation of populations cause by the previous three threats listed (USFWS 2014a).

Northern Mexican gartersnake critical habitat. Critical habitat for the northern Mexican gartersnake was proposed on July 10, 2013 (78 FR 41549). The PCEs specific to northern Mexican gartersnakes are as follows:

- Aquatic or riparian habitat that includes: 1). Perennial or spatially intermittent streams of low to moderate gradient that possess appropriate amounts of inchannel pools, off-channel pools, or backwater habitat, and that possess a natural, unregulated flow regime that allows for periodic flooding or, if flows are modified or regulated, a flow regime that allows for adequate river functions, such as flows capable of processing sediment loads; or 2). Lentic wetlands such as livestock tanks, springs, and cienegas; and 3). Shoreline habitat with adequate organic and inorganic structural complexity to allow for thermoregulation, gestation, shelter, protection from predators, and foraging opportunities (e.g., boulders, rocks, organic debris such as downed trees or logs, debris jams, small mammal burrows, or leaf litter); and 4). Aquatic habitat with characteristics that support a native amphibian prey base, such as salinities less than 5 parts per thousand, pH greater than or equal to 5.6, and pollutants absent or minimally present at levels that do not affect survival of any age class of the northern Mexican gartersnake or the maintenance of prey populations.
- Adequate terrestrial space (600 feet lateral extent to either side of bankfull stage) adjacent to designated stream systems with sufficient structural characteristics to support life-history functions such as gestation, immigration, emigration, and brumation (extended inactivity).
- A prey base consisting of viable populations of native amphibian and native fish species.
- An absence of nonnative fish species of the families Centrarchidae and Ictaluridae, bullfrogs, and crayfish (*Orconectes virilis*, *Procambarus clarki*, etc.), or occurrence of these nonnative species at low enough levels such that recruitment of northern Mexican gartersnakes and maintenance of viable native fish or soft-rayed, nonnative fish populations (prey) is still occurring.

Critical habitat areas were proposed to provide for the conservation of the northern Mexican gartersnake throughout the remaining portion of its geographic range in the U.S. Several areas of critical habitat have been proposed in Arizona; however, only one of these areas is located near proposed training sites. That area of critical habitat includes the San Pedro River basin, and a buffer zone adjacent to those reaches. The proposed sites within the San Pedro River basin include Saddle Mountain East, South, and West, and Canelo.

Mexican spotted owl. The Mexican spotted owl was listed as federally threatened on March 16, 1993 (58 FR 14248) with critical habitat designated on August 31, 2004 (69 FR 53182). It has large, dark eyes, an overall dark to chestnut brown coloring, whitish spots on the head and neck, and white mottling on the abdomen and breast (USFWS 1995).

The Mexican spotted owl inhabits canyon and forest habitats across its range and is frequently associated with mature mixed-conifer, pine-oak, and riparian forests. Owls are usually found in areas with some type of water source such as perennial streams, creeks, and springs. Home range calculations for a single owl average 1,600 acres, while a mating pair's home range averages 2,000 acres (USFWS 2004). Mexican spotted owls use a variety of habitats for foraging, including multi-layered forests with many potential patches. In areas within Arizona and New Mexico, forests used for roosting and nesting often contain mature or old-growth stands with complex structure. The breeding period for Mexican spotted owls is generally February through August (USFWS 1995, AGFD 2017).

The range of the Mexican spotted owl extends from the southern Rocky Mountains in Colorado and the Colorado Plateau in southern Utah southward through Arizona, New Mexico, and far western Texas, through the Sierra Madre Occidental and Oriental, to the mountains at the southern end of the Mexican Plateau. Approximately 91 percent of known Mexican spotted owls existing in the U.S. between 1990 and 1993 were identified on land administered by USFS (USFWS 1995). Most owls occur within the 11 NFs of Arizona and New Mexico (USFWS 2004). The Ranger and Mount Lemon sites are the only southern Arizona USFS sites that contain suitable habitat for the Mexican spotted owl.

The primary threats to the Mexican spotted owl are even-aged timber harvest and the threat of catastrophic wildfire. Additional threats include development from oil, gas, and mining; and recreation (USFWS 1995).

Mexican spotted owl critical habitat. Critical habitat was designated for the Mexican spotted owl on August 31, 2004, in 69 FR 53182. The PCEs of critical habitat for this species include the habitat components that provide the following:

PCEs related to forest structure are as follows:

- "A range of tree species, including mixed conifer, pine-oak, and riparian forest types, composed of different tree sizes reflecting different ages of trees, 30 percent to 45 percent of which are large trees with a trunk diameter of 12 inches or more when measured at 4.5 feet from the ground"
- "A shade canopy created by the tree branches covering 40 percent or more of the ground"
- "Large dead trees (snags) with a trunk diameter of at least 12 inches when measured at 4.5 feet from the ground."

PCEs related to maintenance of adequate prey species are as follows:

- "High volumes of fallen trees and other woody debris"
- "A wide range of tree and plant species, including hardwoods"
- "Adequate levels of residual plant cover to maintain fruits, seeds, and allow plant regeneration."

PCEs related to canyon habitat include one or more of the following:

- "Presence of water (often providing cooler and often higher humidity than the surrounding areas)"
- "Clumps or stringers of mixed conifer, pine-oak, pinyon-juniper, and riparian vegetation"
- "Canyon wall containing crevices, ledges, or caves"
- "High percent of ground litter and woody debris."

Critical habitat areas were selected to provide for the conservation of the Mexican spotted owl throughout the remaining portion of its geographic range in the U.S. The designated critical habitat for this species consists of 8.6 million acres in Arizona, Colorado, New Mexico, and Utah, all of which are located on federal lands. There are two designated critical habitat units located wholly or partially within or near proposed training sites in southern Arizona on USFS land. These include the Huachuca Mountains Area (53,845 acres) located south of Sierra Vista, Arizona, and centered on the Huachuca Mountains; and the Chiricahua Mountains Area (186,842 acres) located northeast of Douglas, Arizona, and centered on the Chiricahua Mountains (69 FR 53182–53230). The proposed sites within one-half mile of critical habitat include the Devon, Mesa, Mount Lemon, and Ranger sites.

Jaguar. The Unites States population of jaguar was listed as federally endangered on July 22, 1997 (62 FR 39147), with critical habitat designated on March 05, 2014 (79 FR 12654). The jaguar is the largest species of cat native to the western hemisphere. It has a cinnamon-buff color with many black spots and has a muscular, deep-chested body with relatively short, massive limbs. Its weight ranges widely from 90 to 300 pounds and its length is typically 7.8 feet from head to tail tip (USFWS 2000).

Individuals in Arizona have been found in Sonoran desertscrub up through subalpine conifer forest. Most jaguar detections occurred in Madrean oak woodland communities; however, jaguars were also documented in open mesquite grasslands and desertscrub and grasslands on the desert valley floor (USFWS 2000).

The historic range included California, Arizona, New Mexico, Louisiana, south through Texas, and into central South America. In Arizona, the species was found in mountainous parts of eastern Arizona to the Grand Canyon. The current range includes central Mexico and into central South America as far south as northern Argentina. There are no known breeding populations in the U.S. (USFWS 2000). In Arizona, potential habitat includes areas of forest, woodland, and grassland vegetation in the Baboquivari Mountains, the southern portion of the Altar Valley, a portion of the southern Santa Cruz River basin, and the San Pedro River basin south of Aravaipa Creek. This species is found near water in the warm tropical climate of savannah and forest and is rarely found in extensive arid areas (USFWS 2000). There is a resident male jaguar in the Santa Rita Mountains that was documented in 2013 and again in 2015.

Threats to the jaguar include illegal shooting; overhunting of jaguar prey species; and habitat loss, fragmentation, and modification. Large-scale changes in jaguar habitat have affected not only habitat for breeding and foraging, but also movement corridors (USFWS 2000).

Jaguar critical habitat. The physical or biological features identified for the jaguar is: expansive open spaces in the southwestern U.S. with adequate connectivity to Mexico that contain a sufficient native prey base and available surface water, have suitable vegetative cover and rugged topography to provide sites for resting, and have minimal human impact. Because habitat in the U.S. is at the edge of the species' northern range, and is marginal compared to known habitat throughout the range, it was determined that all of the PCEs discussed, below, must be present in each specific area to constitute high quality jaguar habitat in the U.S., including connectivity to Mexico (but that connectivity may be provided either through a direct connection to the border or by other areas essential for the conservation of the species; see ''Areas Essential for the Conservation of Jaguars Outside of Occupied Areas'').

Based on current knowledge of the physical or biological feature and habitat characteristics required to sustain the jaguar's vital life-history functions in the Northwestern Management Unit and the U.S., the PCEs specific to jaguars are expansive open spaces in the southwestern U.S. of at least 32 to 37 square miles in size which:

- Provide connectivity to Mexico
- Contain adequate levels of native prey species, including deer and javelina, as well as medium-sized prey such as coatis, skunks, raccoons, or jackrabbits
- Include surface water sources available within 12.4 miles of each other
- Contain 3 to 40 percent canopy cover within Madrean evergreen woodland, generally recognized by a mixture of oak, juniper, and pine trees on the landscape, or semidesert grassland vegetation communities, usually characterized by tobosagrass or black grama along with other grasses
- Are characterized by intermediately, moderately, or highly rugged terrain
- Are characterized by minimal to no human population density, no major roads, or no stable nighttime lighting over any 0.4 square-mile area.

The proposed sites within one-half mile of jaguar critical habitat include the Devon, Saddle Mountain East, Saddle Mountain South, and Saddle Mountain West sites.

Lesser long-nosed bat. The lesser long-nosed bat was listed as federally endangered without critical habitat on September 30, 1988 (53 FR 38456). This bat is yellow-brown or cinnamon gray in color, with a total head and body measurement of approximately 3 inches. The tongue measures approximately the same length as the body. This species also has a small nose leaf (USFWS 2001a).

Habitat for the species includes mainly desertscrub habitat in the U.S. portion of its range. In Mexico, the species occurs up into high elevation pine-oak and ponderosa pine forests. Altitudinal range is from 1,600 to 11,500 feet. Within the U.S., this species forages at night on nectar, pollen from columnar cacti (such as saguaros), and agaves with branched flower clusters (USFWS 2001a). Considerable evidence exists for the interdependence of *Leptonycteris* bat species and certain agaves and cacti (USFWS 2001a). During daylight, lesser long-nosed bats roost in caves or abandoned mines.

The species historically ranged from southern Arizona in the Picacho, Agua Dulce, and the Chiricahua Mountains to southwestern New Mexico in the Animas and Peloncillo Mountains through much of Baja California, Mexico (USFWS 1994). These bats are seasonal residents of southeastern Arizona, and possibly extreme western Arizona (i.e., Cochise, Pima, Santa Cruz, Graham, Pinal and Maricopa counties, Arizona), present from April to September (USFWS 2001a). This species could occur at proposed training sites is suitable habitat including Devon, Mesa, Mount Lemon, Ranger, and Saddle Mountain West.

Excess harvest of agaves in Mexico; the collection of saguaro and organ pipe cactus (*Stenocereus thurberi*) in the U.S.; and the conversion of habitat for agricultural uses, livestock grazing, woodcutting, and other development might contribute to the decline of long-nosed bat populations. In addition, occupancy of communal roost sites by illegal border crossers and recreational users are a potential threat. These bats are particularly vulnerable due to many individuals using only a small number of communal roosts (USFWS 2001a).

Miscellaneous

There are 18 proposed training sites in southern Arizona on miscellaneously-owned lands (**Table 3-12**). The sites occur in Cochise, Graham, Maricopa, Pima, and Santa Cruz Counties on Arizona state land, privately-owned land, and the White Mountain Apache tribal land.

Of the 18 miscellaneous southern Arizona sites, 11 of the proposed training sites are within city limits or are considered developed urban areas (**Table 3-12**). Because these areas do not contain native or naturalized vegetation, and naturalized habitats (e.g., grasslands, forests, and wetlands) they are not analyzed further for an impact on biological resources. There are seven miscellaneous southern Arizona proposed training sites that occur in naturalized habitats, Little Outfit, Ruby Fuzzy Paladins, Tombstone Paladins, Salt River High, Salt River Low, Saguaro Lake Ranch, and Verde River.

Vegetation. Based on the process described under **Section 3.4.2.1**, the southern Arizona USFS vegetation section and site visits to some of the proposed sites, five vegetation communities occur in the region at seven of the proposed sites (**Table 3-12**). The vegetation associated with Plains and Great Basin Grassland, Semi-desert Grassland, and Arizona Upland Subdivision of the Sonoran Desertscrub are described under the southern Arizona USFS vegetation section. The Interior Chaparral and Riparian vegetation communities are described below.

Interior Chaparral. Interior Chaparral occurs mainly in western Arizona at elevations ranging from 3,445 to 6,070 feet. It is associated with Upland Sonoran Desertscrub, Lower Sonoran Desertscrub, Mohave Desertscrub, and Great Basin Pinyon-Juniper Woodland vegetation. The vegetation is dominated by shrubs with small, thick, evergreen leaves and wide-spreading, deep root systems. The dominant plant in this community is shrub live oak (*Quercus turbinella*); other shrubs include birchleaf mountain mahogany (*Cercocarpus betuloides*), skunkbush sumac (*Rhus trilobata*), silktassel (*Garrya* sp.), desert ceanothus (*Ceanothus greggii*), cliffrose (*Purshia* sp.), and Arizona rosewood (*Vauquelinia californica*). Grasses such as sideoats grama, hairy grama, cane bluestem, plains lovegrass, and threeawn grow in the interstitial space between shrubs. Occasionally, one-seed juniper, emory oak, or pinyon pine (*Pinus edulis*) may occur (Brown 1994).

Table 3-12. Southern Arizona Proposed Training Sites on Miscellaneous Land

Site	Type	County	Elevation (feet)	Vegetation Community or Land Cover
Bisbee Douglas IAP	DZ/HLZ/LZ/FARP	Cochise	4,113	Developed/Urban
Coolidge Airport	HLZ/DZ/LZ/FARP	Maricopa	1,576	Developed/Urban
Eloy North	DZ/HLZ	Maricopa	1,500	Developed/Urban
Eloy South	DZ/HLZ	Maricopa	1,500	Developed/Urban
Highway 80 Paladins (TW 2 Paladins)	DZ/HLZ	Cochise	4,330	Developed/Urban
Little Outfit	DZ/HLZ	Santa Cruz	5,105	Plains and Great Basin Grassland
Phoenix Sky Harbor IAP	LZ	Maricopa	1,119	Developed/Urban
Pima County Emergency Operations Center	Operations Center	Pima	2,520	Developed/Urban
Pima County Regional Training Center	Classrooms/MOUT	Pima	2,955	Developed/Urban
Ruby Fuzzy Paladins	DZ/HLZ/Observation Point	Pima	3,952	Semi-desert Grassland
Scottsdale Osborne	HLZ	Maricopa	1,247	Developed/Urban
Three Points Public Shooting Range	Firing Ranges	Pima	2,563	Developed/Urban
Tombstone Paladins	DZ/HLZ	Cochise	4,163	Semi-desert Grassland
University of Arizona Medical Center	HLZ	Pima	2,442	Developed/Urban
Salt River High	HLZ	Gila	4,367	Interior Chaparral
Salt River Low	HLZ/Water Area	Gila	3,364	Riparian/Open Water-River
Saguaro Lake Ranch	Water Area	Maricopa	1,401	Arizona Upland Subdivision of Sonoran Desertscrub
Verde River	Water Area	Maricopa	1,328	Arizona Upland Subdivision of Sonoran Desertscrub/Open Water-River

Key: DZ = Drop Zone, FARP= Forward Aircraft Refueling Point, HLZ = Helicopter Landing Zone, LZ= Landing Zone, MOUT= military operations in urban terrain

Riparian. Riparian vegetation is found in association with open water such as streams and rivers. The area occupied by riparian vegetation is relatively small in relationship with other vegetation types but their biological and ecological importance is larger than their limited geographic occurrence. Riparian vegetation is important to wildlife as forage, cover, breeding, and migration corridors. The nature and species composition of the riparian vegetation changes depending on elevation and associated upland vegetation community. For example, at high

elevations stream gradients are steep with relatively high precipitation and cool temperatures, while at low elevations stream gradients are gentle, low precipitation, and warm temperatures. At the higher elevations Pacific willow (*Salix lucida*), bigtooth maple (*Acer grandidentatum*), narrowleaf cottonwood (*Populus angustifolia*), box elder (*Acer negundo*), sycamore (*Platanus* sp.), Arizona walnut (*Juglans major*), velvet ash (*Fraxinus velutina*) and western soapberry (*Sapindus saponaria* var. *drummondii*) are the woody plants present. At lower elevations mesquite, Goodding's willow (*Salix gooddingii*), netleaf hackberry (*Celtis reticulata*), western soapberry, velvet ash, and Wright's Sycamore (*Platanus wrightii*) characterize the riparian vegetation. Russian olive (*Elaeagnus angustifolia*) and saltcedar (*Tamarix* spp.) are two invasive woody plants that have colonized large expanses of low- to mid-elevation riparian corridors (Brown 1994).

Wildlife. The wildlife associated with Plains and Great Basin Grassland, Semi-desert Grassland, and Arizona Upland Subdivision of the Sonoran Desertscrub is described under the southern Arizona USFS wildlife section. The Interior Chaparral and Riparian vegetation communities provide habitat for a diverse set of wildlife, specific to each community. The following section lists wildlife species that are common to each of the communities and discusses any species or habitats that are protected.

Interior Chaparral. Small mammals associated with the Interior Chaparral include the cliff chipmunk (*Tamias dorsalis*), white-footed mouse (*Peromyscus leucopus*), white-throated woodrat (*Neotoma albigula*), and eastern cottontail (*Sylviligus floridanus*). Birds include the spotted towhee (*Pipilo maculatus*), western scrub jay (*Aphelocoma californica*), crissal thrasher (*Toxostoma crissale*), black-chinned sparrow (*Spizella atrogularis*), rufous-crowned sparrow (*Aimophila ruficeps*), bushtit, blue-gray gnatcatcher (*Polioptila caerulea*), Scott's oriole (*Icterus parisorum*), rock wren (*Salpinctes obsoletus*), and canyon wren (*Catherpes mexicanus*). Amphibians common to this vegetation community include Woodhouse's toad (*Bufo woodhousii*) and Arizona toad (*Anaxyrus microscaphus*). Reptile species include the western threadsnake (*Leptotyphlops humilis*), glossy snake (*Arizona elegans*), western rattlesnake, western fence lizard (*Sceloporus occidentalis*), Arizona alligator lizard (*Elgaria kingii*), and Sonoran mountain kingsnake (Brown 1994).

Riparian. Wildlife common in riparian areas include large mammals like white-tailed deer and black bear (*Ursus americanus*). Small rodents include Arizona gray squirrel (*Sciurus arizonesis*). Small carnivores such as ring-tailed cat and various species of skunk (*Mephitus* spp.) are also found in woodlands containing streams. Riparian habitats typically host the greatest variety, and often numbers, of birds in Arizona, with many being riparian obligate species. Examples of bird species inhabiting riparian woodlands include the zone-tailed hawk (*Buteo albonotatus*), Bullock's oriole (*Icterus bullockii*), the federally threatened yellow-billed cuckoo (*Coccyzus americanus*), black phoebe (*Sayornis nigricans*), the federally endangered southwestern willow flycatcher (*Empidonax traillii extimus*), Bell's vireo (*Vireo bellii*), Lucy's warbler (*Oreothlypis luciae*), black-chinned hummingbird (*Archilochus alexandri*), summer tanager (*Piranga rubra*), and Costa's hummingbird (*Calypte costae*). Canyon treefrog (*Hyla arenicolor*), Woodhouse's toad, tiger salamander (*Ambystoma tigrinum*), and leopard frogs (*Lithobates* spp.) are common amphibian species found in interior forest more often. Ring-necked snake (*Diadophis punctatus*), black-necked gartersnake (*Thamnophis cyrtopsis*), checkered gartersnake

(*T. marcianus*), Arizona mud turtle (*Kinosternon arizonense*), and yellow mud turtle (*K. flavescens*) are common reptile species found in riparian woodlands (Brown 1994).

Federally Threatened and Endangered Species. A desktop analysis was conducted of all federally-listed species to determine if they have the potential to occur within or near proposed training sites based on habitat at the site, elevation, and the species known range and distribution. Reconnaissance-level surveys and aerial imagery were used to assess habitat at the sites. There are 12 federally threatened or endangered species that have the potential to occur within the vicinity of the southern Arizona proposed training sites on miscellaneously-owned land (**Table 3-13**). The Chiricahua leopard frog, northern Mexican gartersnake, jaguar, and lesser long-nosed bat have been described in the southern Arizona USFS sites section (**Section 3.4.2.1**). There are four additional federally endangered species, including the razorback sucker (*Xyrauchen texanus*), sonora tiger salamander (*Ambystoma tigrinum stebbinsi*), southwestern willow flycatcher (*Empidonax traillii extimus*), and Yuma clapper rail (*Rallus longirostris yumanensis*); two additional federally threatened species, narrow-headed gartersnake (*Thamnophis rufipunctatus*), and yellow-billed cuckoo (*Coccyzus americanus*); and two proposed threatened species, the headwater chub (*Gila nigra*) and roundtail chub (*G. robusta*).

Critical habitat within five miles of the training sites proposed on miscellaneously-owned land is presented in **Table 3-14**. The distance from the given coordinates of each site to the critical habitat is also included in the table. There are four proposed sites within one-half miles of designated or proposed critical habitat for five federally-listed species on miscellaneous properties in southern Arizona (**Table 3-14**). Critical habitat for northern Mexican gartersnake and jaguar are described under the southern Arizona USFS Federally Threatened and Endangered Species Subsection. Critical habitat for razorback sucker and narrow-headed gartersnake are described in the paragraphs below. The Gila chub is not mentioned for this region because it is aquatic species with critical habitat occurring over three and one-half miles from any proposed training sites.

Headwater chub. The headwater chub was listed as a proposed threatened species on October 07, 2016 (80 FR 60753). It has a streamlined to thick body shape with olive gray or brown upper coloration, with silver sides and white underparts. Headwater chubs are generally 10 to 18 inches in length but can reach 20 inches (AGFD 2003).

Headwater chubs occur in the middle to upper reaches of medium- to large sized streams that are considered cool to warm water streams. Habitats in the Gila River containing headwater chubs consist of tributary and mainstem habitats at elevations of 4,347 feet to 6,562 feet. Typical adult headwater chub habitats consists of nearshore pools (greater than 6 feet), adjacent to swifter riffles and runs over sand and gravel substrate, with young and juveniles using smaller pools and areas with undercut banks and low velocity (USFWS 2015b).

Historically, the Headwater chub occupied 26 streams, approximately 554 miles, in the Gila, Salt and Verde Rivers in Arizona. Currently this species has been documented in Ash Creek of San Carlos River (Lower Gila River), Three Forks (Upper Gila River), Lower Tonto Creek, Upper Gunn Creek, and Upper Tonto Creek (Salt River), and the East Fork Verde River, Upper Fossil Creek, Upper Wet Bottom Creek (Verde River) (AGFD 2003; USFWS 2015b).

Table 3-13. Special Status Species that have the Potential to Occur within the Southern Arizona Miscellaneous Sites

Species	Federal Status	Critical Habitat Designated or Proposed	State Status	Proposed Training Sites with Potential Species Occurrence	Site Concerns
Fish					
Headwater chub (*Gila nigra*)	PT	No	S2	Salt River Low, Saguaro Lake Ranch, Verde River	Not applicable
Razorback sucker (*Xyrauchen texanus*)	E	Yes	S1	Salt River Low	Not applicable
Roundtail chub (*Gila robusta*)	PT	No	S2	Salt River Low, Saguaro Lake Ranch, Verde River	Not applicable
Amphibians					
Chiricahua leopard frog (*Lithobates chiricahuensis*)	T	Yes	S2	Little Outfit, Salt River High, Salt River Low	Eggs are typically laid March through June at elevations below 5,900 feet
Sonora tiger salamander (*Ambystoma tigrinum stebbinsi*)	E	No	S1	Little Outfit	Breeding from January through June
Reptiles					
Narrow-headed gartersnake (*Thamnophis rufipunctatus*)	T	Yes	S1	Salt River High, Salt River Low	Not applicable
Northern Mexican gartersnake (*Thamnophis eques megalops*)	T	Yes	S1	Little Outfit, Salt River High, Salt River Low	Mates in spring and young are born in June and July.
Birds					
Southwestern willow flycatcher (*Empidonax traillii extimus*)	E	Yes	S1	Salt River Low, Saguaro Lake Ranch, Verde River	Breeds late April to early May. Nests late May and early June. Fledges late June to mid-August.
Yellow-billed cuckoo (*Coccyzus americanus*)	T	Yes	S3	Salt River Low, Saguaro Lake Ranch, Verde River	Breeds late May to early June. Nests between late June and late July. In the Lower Colorado River region, nests late June to early August.
Yuma clapper rail (*Rallus longirostris yumanensis*)	E	No	S3	Salt River Low, Saguaro Lake Ranch, Verde River	Breeding begins in February and will nest from March through June, peaks mid-May.

Species	Federal Status	Critical Habitat Designated or Proposed	State Status	Proposed Training Sites with Potential Species Occurrence	Site Concerns
Mammals					
Jaguar (*Panthera onca*)	E	Yes	S1	Little Outfit[1]	Not applicable
Lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*)	E	No	S2	Little Outfit	Present in the U.S. from April to September

Key: E = Endangered, PT = Proposed Threatened, T = Threatened, S = State Rank
Source: USFWS 2015
Note: [1] The site occurs on a ranch near human activity; therefore, jaguar are not expected.

Table 3-14. Designated or Proposed Critical Habitat within Five Miles of the Southern Arizona Miscellaneous Sites

Species	Federal Status	Proposed Training Site	Distance from Critical Habitat (miles)[1]
Fish			
Gila Chub (*Gila intermedia*)	E	Little Outfit	3.78
Razorback sucker (*Xyrauchen texanus*)	E	Salt River High	1.91
		Salt River Low	0.47
Reptiles			
Narrow-headed gartersnake (*Thamnophis rufipunctatus*)[2]	T	Salt River High	0.19
		Salt River Low	0.0
Northern Mexican gartersnake (*Thamnophis eques megalops*)	T	Little Outfit	0.0
		Ruby Fuzzy Paladins	3.10
Mammals			
Jaguar (*Panthera onca*)	E	Little Outfit[3]	0.0

Key: E = Endangered, T = Threatened,
Notes:
[1] Distance is based on coordinates provided by USAF.
[2] Critical habitat is proposed for this species.
[3] Does not contain PCEs for species' critical habitat.

Threats to the headwater chub include competition with, predation from, and harassment by nonnative aquatic species; a lack of sufficient water to support the physical and biological components needed for all life stages; and changes in the timing and amount of snowmelt runoff in the spring and precipitation from monsoons in the fall, reduction in hydrologic connectivity within and between streams, and the reduction in the length of flowing reaches) (USFWS 2015b)

Razorback sucker. The razorback sucker was listed as federally endangered on October 23, 1991 (56 FR 54957), with critical habitat designated on March 21, 1994 (59 FR 13374). This fish can attain lengths of 3.3 feet and weights of 13.2 pounds. It is an olive to brownish-black color

above, lighter below (often yellow). Its sides are brown or pinkish to reddish-brown stripes. Breeding males are black or dark brown on dorsum and upper sides, orange laterally, and bright yellow on belly (AGFD 2002b).

This species uses a variety of habitat types from main stem channels to slow backwaters of medium and large streams and rivers, sometimes around cover. In impoundments they prefer depths of 3 feet or more over sand, mud, or gravel substrates (AGFD 2002b).The razorback sucker is endemic to large rivers of the Colorado River Basin from Wyoming to Mexico. Present distribution of natural populations is limited to Lake Mohave, Green River Basin and the Upper Colorado River Basin. Presently natural adult populations exist only in Lake Mohave, Lake Mead, and Lake Havasu (AGFD 2002b). This species could occur in the Salt River, near the Salt River Low proposed training site.

Threats to this species include altered flow hydrology and cold tail water releases from reservoirs; diversion; predation by and competition with nonnative fishes; and possibly parasites (AGFD 2002b).

Razorback sucker critical habitat. Critical habitat was designated for the razorback sucker on March 21, 1994 (59 FR 13374). The PCEs for critical habitat include:

- Space for individual end population growth, and for normal behavior
- Food, water, air, light, minerals, or other nutritional or physiological requirements
- Cover or shelter
- Sites for breeding, reproduction, rearing of offspring, germination, or seed dispersal and generally
- Habitats that are protected from disturbance or are representative of the historical geographical and ecological distributions of a species.

Critical habitat areas were designated to provide for the conservation of the razorback sucker throughout the remaining portion of its geographic range in the U.S. Several areas of critical habitat have been proposed in Arizona, California, Utah, Nevada, and New Mexico; however, only one of these areas is located near a proposed training site. That area of critical habitat includes Salt River, and a buffer zone adjacent to those reaches. The Salt River Low proposed site is the only site within one-half mile of razorback sucker critical habitat.

Roundtail chub. The roundtail chub was listed as proposed threatened on October 07, 2016 (80 FR 60753). It has a streamlined body shape with olive gray to silvery coloration. It has a lighter belly, and occasionally with dark blotches on the sides. Roundtail chubs are generally 9 to 12 inches in length but can reach 20 inches (USFWS 2013a).

In the Lower Colorado River Basin, roundtail chubs occupy cool to warm water, mid-elevation streams and rivers where typical adult microhabitat consists of pools up to 6.6 feet deep adjacent to swifter riffles and runs. Cover is usually present and consists of large boulders, submerged large trees and branches, undercut cliff walls, or deep water. Smaller chubs generally occupy shallower, low velocity water adjacent to overhead bank cover (AGFD 2002c).

In the Lower Colorado River Basin in Arizona, the roundtail chub currently occurs in two tributaries of the Little Colorado River (Chevelon and East Clear Creeks); eight tributaries of the Bill Williams River (Boulder, Burro, Conger, Francis, Kirkland, Sycamore, Trout, and Wilder Creeks); the Salt River and 10 of its tributaries (Ash Creek, Black River, Canyon, Carrizo, Cedar, Cherry, Cibecue, Corduroy, and Salome Creeks and the White River); the Verde River and five of its tributaries (Fossil, Gap, Oak, Roundtree Canyon, West Clear, and Wet Beaver Creeks); Aravaipa Creek (a tributary of the San Pedro River); and Eagle Creek (a tributary of the Gila River). Roundtail chubs were introduced into Ash, Gap, and Roundtree Creeks and the Blue River as conservation measures; however self-sustaining populations have not yet been established as of 2013. The Salt and Verde Rivers are occupied in several reaches that are fragmented and separated by two large dams and reservoirs on the Verde River, and four large dams and reservoirs on the Salt River. Roundtail chubs also occur in canals in Phoenix that are fed by the lower Salt and Verde Rivers (USFWS 2013a). The Salt River Low and Verde River sites are located within the range of the roundtail chub in the Salt River and lower Verde River, respectively; the rest of the sites do not occur within range.

Threats to this species include dewatering, impoundment, channelization, and channel changes caused by alteration of riparian vegetation and watershed degradation (USFWS 2013a).

Sonora tiger salamander. The Sonora tiger salamander was listed as federally endangered without critical habitat on January 6, 1997 (62 FR 665). Sonora tiger salamanders have a color pattern with an irregular network of light coloration, often coupled with light spots, on a dark background color to a pattern of large, well-defined light or yellow spots or bars. Larvae are gray on the back of the head and tail with a light-colored belly (USFWS 2002a).

Cattle ponds or tanks are the primary habitat for Sonora tiger salamanders. The most important habitat requirement for Sonora tiger salamanders is the availability of standing water for breeding from January through June. Mammal burrows provide refuge for terrestrial salamanders in the terrestrial environment, enabling them to avoid extreme environmental conditions (USFWS 2002a).

Most known Sonora tiger salamander populations exist in the San Rafael Valley, where they have been found in more than 50 ponds (USFWS 2002a). This species has been collected in the plains grasslands and adjacent Madrean evergreen woodlands of Arizona (NatureServe 2010a). The range of the subspecies and potentially occupied habitat is thought to extend from the crest of the Huachuca Mountains west to the crest of the Patagonia Mountains, including the San Rafael Valley and adjacent foothills from its origins in Sonora north to the Canelo Hills. Tiger salamanders have also been found in areas just outside the San Rafael Valley, such as Fort Huachuca, Harshaw Canyon, Copper Canyon, and Coronado Memorial (USFWS 2002a). The Little Outfit site occurs on the western edge of the Canelo Hills in suitable habitat. This is the only southern Arizona miscellaneously-owned site where this species has the potential to occur.

The Sonora tiger salamander faces a number of threats, including disease and predation by nonnative fish, crayfish, and bullfrogs (Davidson et al. 2003). Habitat destruction and the increased probability of small populations being extirpated due to local random events (such as

drought or disease) are also significant threats to the continued existence of the Sonora tiger salamander (USFWS 2001b).

Narrow-headed gartersnake. The narrow-headed gartersnake was listed as federally threated on July 08, 2014 (79 FR 38746 with critical habitat proposed on July 10, 2013 (78 FR 41549). This species is a small to medium-sized gartersnake with a maximum total length of 44 inches. Its eyes are set high on its unusually elongated head, which narrows to the snout, and it lacks striping on the top and sides, which distinguishes its appearance from other gartersnake species that occupy similar habitat and have overlapping ranges. The base color is usually tan or grey-brown (but may darken) with conspicuous brown, black, or reddish spots that become indistinct towards the tail (USFWS 2014a).

This species is strongly associated with clear, rocky streams, using predominantly pool and riffle habitat that includes cobbles and boulders at elevations from approximately 2,300 to 8,000 feet, inhabiting Petran Montane Conifer Forest, Great Basin Conifer Woodland, Interior Chaparral, and the Arizona Upland subdivision of Sonoran Desertscrub communities (USFWS 2014a).

The only remaining narrow-headed gartersnake populations where the species could reliably be found are Whitewater Creek, Tularosa River, Diamond Creek, and Middle Fork Gila River in New Mexico, and Oak Creek Canyon, in Arizona. However, populations found in Whitewater Creek and the Middle Fork Gila River were likely significantly affected by the large Whitewater–Baldy Complex Fire, which occurred in June 2012 (USFWS 2014a). None of these rivers or creeks occurs near the proposed training sites, though critical habitat has been proposed along the Salt River where the Salt River Low site occurs.

Threats to this species include the presence of harmful nonnative species, lowering the water table, habitat modification, grazing along streambeds and increased recreational use in riparian areas as well as habitat fragmentation (USFWS 2014a).

Narrow-headed gartersnake critical habitat. Critical habitat for the narrow-headed gartersnake was proposed on July 10, 2013 (78 FR 41549). The PCEs specific to narrow-headed gartersnakes are as follows:

- Stream habitat, which includes: 1). Perennial or spatially intermittent streams with sand, cobble, and boulder substrate and low or moderate amounts of fine sediment and substrate embeddedness, and that possess appropriate amounts of pool, riffle, and run habitat to sustain native fish populations; 2). A natural, unregulated flow regime that allows for periodic flooding or, if flows are modified or regulated, a flow regime that allows for adequate river functions, such as flows capable of processing sediment loads; 3). Shoreline habitat with adequate organic and inorganic structural complexity (e.g., boulders, cobble bars, vegetation, and organic debris such as downed trees or logs, debris jams), with appropriate amounts of shrub- and sapling-sized plants to allow for thermoregulation, gestation, shelter, protection from predators, and foraging opportunities; and 4). Aquatic habitat with no pollutants or, if pollutants are present, levels that do not affect survival of any age class of the narrow-headed gartersnake or the maintenance of prey populations.

- Adequate terrestrial space (600 feet lateral extent to either side of bankfull stage) adjacent to designated stream systems with sufficient structural characteristics to support life-history functions such as gestation, immigration, emigration, and brumation.
- A prey base consisting of viable populations of native fish species or soft-rayed, nonnative fish species.
- An absence of nonnative fish species of the families Centrarchidae and Ictaluridae, bullfrogs, and crayfish, or occurrence of these nonnative species at low enough levels such that recruitment of narrow-headed gartersnakes and maintenance of viable native fish or soft-rayed, nonnative fish populations (prey) is still occurring.

Critical habitat areas have been proposed to provide for the conservation of the narrow-headed gartersnake throughout the remaining portion of its geographic range in the U.S. Several areas of critical habitat have been proposed in Arizona; however, only one of these areas is located in the Action Area. That area of critical habitat includes the San Pedro River and the Salt River basin, and a buffer zone adjacent to those reaches. The Salt River Low and High sites occur in within one-half mile of proposed critical habitat.

Southwestern willow flycatcher. The southwestern willow flycatcher was listed as federally endangered on February 27, 1995 (60 FR 10694), with critical habitat designated on October 19, 2005 (50 CFR § 60886). Southwestern willow flycatcher is a small bird, typically less than 6 inches in length with conspicuous light-colored wing bars (USFWS 2002b).

The habitat requirements of the southwestern willow flycatcher include areas of dense riparian foliage and nesting habitat with trees and shrubs that include cottonwoods (*Populus* sp.), willows (*Salix* spp.), box elder, and even invasive species such as Tamarisk (USFWS 2002b). The breeding period for this species is April through September (USFWS 2002b). Southwestern willow flycatchers also use riparian habitat or patches, unsuitable for nest placement (the vegetation structure is too short or sparse, or the patch of vegetation is too small), along major drainages in the Southwest for migration stopovers (USFWS 2002b). The southwestern willow flycatcher arrives on breeding grounds in late April to early May. Nesting begins in late May and early June, with fledging from late June to mid-August (USFWS 2002).

The southwestern willow flycatcher breeding range extends from southern and central California through southeastern Utah to southwestern New Mexico. The winter range includes areas from central Mexico to northwestern Colombia (NatureServe 2010b). Southwestern willow flycatcher territories have been detected in Arizona on the following rivers: Agua Fria, Gila, Little Colorado, Salt, San Pedro, Colorado, San Francisco, Hassayampa, Verde, Big Sandy, Santa Maria, Virgin, and Bill Williams; and on the following creeks: Pinal, Tonto, Cherry and Cienaga (USFWS 2012b). Currently, population stability in Arizona is believed to be largely dependent on the presence of two large subpopulations (the Roosevelt Lake and San Pedro/Gila River confluence subpopulations). The Roosevelt Lake and Salt River Low sites are located near the large subpopulations of Arizona. The rest of the southern Arizona miscellaneous sites do not contain suitable habitat, or occur in the range of the southwestern willow flycatcher.

This species is threatened by the loss and degradation of cottonwood-willow riparian habitat and structurally similar riparian habitats. Increased irrigated agriculture and livestock grazing have aided brown-headed cowbird (*Molothrus ater*) populations that, in turn, impact the southwestern willow flycatcher by parasitizing their nests. The current population exists in small, fragmented subpopulations, which increases the risk of local extirpation (NatureServe 2010b).

Yellow-billed cuckoo. The yellow-billed cuckoo was listed as federally threatened on November 03, 2014 (79 FR 60038), with critical habitat proposed December 02, 2014 (79 FR 71375). The yellow-billed cuckoo has a fairly stout and slightly down-curved bill; a slender, elongated body with a long-tailed look; and a narrow yellow ring of colored, bare skin around the eye. The plumage is loose and grayish brown above and white below, with reddish primary flight feathers. The tail feathers are boldly patterned with black and white below. They are a medium-sized bird approximately 12 inches in length, and approximately 2 ounces in weight (USFWS 2014b).

Suitable habitat west of the Continental Divide is usually found at elevations less than 6,600 feet and is limited to narrow, and often widely separated, riparian cottonwood-willow galleries; salt cedar is also used by cuckoos. Dense understory foliage appears to be an important factor in nest site selection, while in California, cottonwood trees are an important foraging habitat. In addition to cottonwood-willow galleries, cuckoos in Arizona can be found in larger mesquite bosques. They are rarely observed as transients in xeric desert or urban settings (AGFD 2011b). Yellow-billed cuckoos arrive on their breeding grounds in Arizona in late May to early June. Breeding often coincides with the appearance of massive numbers of cicadas, caterpillars, or other large insects (Ehrlich et al. 1992 as cited in NatureServe 2015). Nesting typically occurs between late June and late July. In the Lower Colorado River region, nesting occurs primarily from late June to early August and peaking mid- to late-July (McNeil et al. 2013).

The Western Distinct Population Segment, nests west of the Rocky Mountains in North America south to southern Baja California and winters in South America to central Argentina and Uruguay (USFWS 2014b). In Arizona, they are generally found in southern and central Arizona, and extreme northeast portion of state. Despite losses of riparian habitats from historic levels, the cuckoo is still found in all counties in Arizona (AGFD 2011b). Suitable habitat only occurs at the Salt River Low site in the southern Arizona miscellaneous sites.

Loss of riparian habitat as a result of over grazing, increased development activities, and invasion of nonnative species are the major threats to this species (USFWS 2014b).

Yuma clapper rail. The Yuma clapper rail was listed as federally endangered without critical habitat on March 11, 1967 (32 FR 4001). The Yuma clapper rail is a small marsh bird with an average height of 8 inches. This species begins breeding in February and nests from March through June, with a peak in mid-May. Nests are made on stable substrates and are typically near shore in shallow water or in the interior of marshes over deeper water (USFWS 1983).

The Yuma clapper rail occurs in freshwater marshes dominated by cattail (*Typha* sp.) and bulrush (*Scirpus* sp.) with a mix of riparian trees and shrubs. These habitats are commonly backwaters, in the impoundments behind small dams or marsh habitats that are created in fields or cells with managed water levels (USFWS 1983).

The Yuma clapper rail is known to occur in Arizona, California, and Nevada. Occupied habitat in California exists in the Imperial Valley and Salton Sea area (USFWS 1983). Additionally, Yuma clapper rails are known to nest along the Colorado River, in wetlands surrounding the Coachella Canal, within the Imperial Valley, and the upper end of the Salton Sea at the Whitewater River delta and Salt Creek (NatureServe 2016). The Saguaro Ranch Lake and Verde River contains suitable habitat and occurs within range of the Yuma clapper rail.

Populations of the Yuma clapper rail are threatened by destruction, modification, and curtailment of its habitat and range. Increased development along the Lower Colorado River and interior Arizona rivers could have direct and indirect effects on clapper rail habitat through water management regimes (USFWS 1983). In addition, the presence and increase of selenium in clapper rail habitat has been identified as a potential threat to the survival and recovery of the clapper rail (USFWS 2006).

3.4.2.2 NORTHERN ARIZONA

There are 32 proposed sites located in northern Arizona on federal property, 11 of the 32 sites occur on military installations, while the remaining 21 sites are located on USFS managed property (**Table 2-1**). In addition, there are 29 proposed sites that are on miscellaneous properties. The biological resources on the USFS-managed properties are discussed below, followed by the discussion of the miscellaneous properties.

Military Installations

There are 11 proposed training sites within two military installations in northern Arizona, including Camp Navajo and Fort Tuthill (**Table 2-1**). As described in **Section 2.1.3**, all locations would be selected in coordination with the appropriate range and other installation personnel to make sure that exercises comply with all environmental requirements. The selected ranges would be already governed by the installations' environmental policies, procedures, and requirements, including existing NEPA coverage and ESA Section 7 consultation conducted for the range and any associated requirements. All current USAF regulations and requirements concerning sensitive biological resources within the ranges would be adhered to under the Proposed Action. There would be 53 sites used as the HLZs, LZs, and DZs that would be located on current military installations and would meet all requirements identified in AFI 13-217, *Drop Zone and Landing Zone Operations* (USAF 2007a). All airfields proposed for refueling activities currently have appropriate fuel storage on site and are managed in accordance with facility Spill Prevention Control, Countermeasure, and Contingency Plans. The Proposed Action would result in a negligible increase in already existing operations at these training sites; therefore, impacts on biological resources (vegetation, wildlife, and threatened and endangered species) associated with the Proposed Action will not be evaluated further for these sites.

U.S. Forest Service

There are 21 proposed training sites in northern Arizona on USFS lands (**Table 3-15**). The proposed sites occur in four USFS NFs, including the Kaibab, Apaches-Sitgreaves, Coconino, and Tonto in Apache, Coconino, Gila, Greenlee, Navajo, and Yavapai Counties in Arizona.

Vegetation. Based on the process described under **Section 3.4.2.1** under the southern Arizona USFS, four vegetation communities occur in the region of the 21 proposed training sites (**Table 3-15**). The vegetation associated with the Arizona Upland Subdivision of the Sonoran

Table 3-15. Northern Arizona Proposed Training Sites on USFS Land

Site	Type	County	Elevation (feet)	Vegetation Community
Black Mesa	DZ/HLZ	Navajo	7,000	Petran Montane Conifer Forest
Comanche	DZ	Coconino	7,017	Petran Montane Conifer Forest
Elk	DZ	Coconino	7,004	Petran Montane Conifer Forest
Flagstaff Hotshot	DZ/HLZ	Coconino	7,483	Petran Montane Conifer Forest
Hannagan Meadow	DZ/HLZ	Greenlee	9,100	Petran Montane Conifer Forest
Helibase Circular	DZ/HLZ	Greenlee	9,100	Petran Montane Conifer Forest
Jacks Canyon	HLZ	Coconino	6,170	Great Basin Conifer Woodland
KP Circular	DZ/HLZ	Apache	8,896	Petran Montane Conifer Forest
KP Tank	DZ/HLZ	Apache	8,896	Petran Montane Conifer Forest
Longview	DZ/HLZ	Coconino	7,185	Petran Montane Conifer Forest
Mogollon Rim	HLZ/Technical Rope Work	Coconino	7,610	Petran Montane Conifer Forest
Mohawk	DZ	Coconino	6,193	Great Basin Conifer Woodland
Mormon Lake	DZ/HLZ	Coconino	7,129	Petran Montane Conifer Forest
Old Grand Canyon Airport	DZ/HLZ	Coconino	6,379	Petran Montane Conifer Forest
Overgaard	DZ/HLZ	Navajo	6,640	Petran Montane Conifer Forest
Payson-Rimside	DZ	Gila	4,575	Interior Chaparral
Pittman Valley	DZ/HLZ	Coconino	6,925	Petran Montane Conifer Forest
Roosevelt Lake	Water DZ/ Water HLZ	Gila	2,077	Arizona Upland Subdivision of Sonoran Desertscrub/Open Water-Lake
Rough Rider	HLZ	Yavapai	4,750	Great Basin Conifer Woodland
Tribeland	DZ	Coconino	6,598	Petran Montane Conifer Forest

Key: DZ = Drop Zone, HLZ = Helicopter Landing Zone

Desertscrub is described in southern Arizona USFS vegetation **Section 3.4.2.1** and the vegetation associated with the Interior Chaparral in the southern Arizona miscellaneous sites vegetation section. Great Basin Conifer Woodland vegetation community and Petran Montane Conifer Forest community are described below.

Great Basin Conifer Woodland. The Great Basin Conifer Woodland occurs at elevations ranging from 4,920 to 7,550 feet and is characterized by the unequal dominance of two conifers, juniper (*Juniperus* sp.) and pinyon (*Pinus* sp.). These trees rarely exceed 40 feet in height and are typically openly spaced. In northwestern New Mexico, western Colorado, Utah, and northern Arizona, Utah juniper (*J. osteosperma*) and one-seed juniper may be more common. In the central and eastern areas of the southwest, the principal contact with Great Basin Conifer Woodland is grassland, and extensive landscapes that are characterized by parkland and savanna-like mosaics. The understory is typically composed of grasses and shrubs; shrubs include mountain mahoganies (*Cercocarpus* spp.), cliffrose, apache plume (*Fallugia paradoxa*), fourwing saltbush, small soapweed (*Yucca glauca*), and antelope bitterbrush (*Purshia*

tridentata). Common grasses include galleta grass, Indian ricegrass, western wheatgrass (*Pascopyrum smithii*), several muhley species, dropseeds (*Sporobolus* spp.), and junegrass (*Koeleria cristata*). Several cacti are well represented in Great Basin Conifer Woodland, species such as red hedgehog cactus (*Echinocereus triglochidiatus* var. *melanacanthus*), prickly pears, and various cholla species (Brown 1994).

Petran Montane Conifer Forest. The Petran Montane Conifer Forest is a cold-temperate forest occurring at an elevation range of 6,560 to 9,840 feet on mountain slopes and ridge tops. Ponderosa pine (*Pinus ponderosa*) forest is located at the lower elevations and Douglas fir (*Pseudotsuga menziesii*), white pine (*Pinus monticola*), limber pine (*P. flexilis*), and aspen (*Populus tremuloides*) grow at the higher elevations in canyons and north-facing slopes. Gambel oak (*Quercus gambelii*) and New Mexico locust (*Robinia neomexicana*) are common and may dominate rocky lower locations. At the lower limit, this vegetation is associated with Madrean Evergreen Woodland and Great Basin Pinyon-Juniper Woodland vegetation. Understory shrubs are few, rarely dense, and uncommon but may include Fendler's ceanothus (*Ceanothus fendleri*), creeping barberry (*Mahonia repens*), currants (*Ribes* spp.), and Arizona rose (*Rosa arizonica*). Under more open stands, grasses and grass-like plants might be dominant. Some grass species that may be present include mountain muhly (*Muhlenbergia montana*), pine dropseed (*Blepharneuron tricholepis*), Arizona fescue (*Festuca arizonica*) and bluegrasses (*Poa* sp.) (Brown 1994).

Wildlife. The wildlife associated with the Arizona Upland Subdivision of the Sonoran Desertscrub and Interior Chaparral are described in the wildlife section under the southern Arizona USFS and miscellaneous land, respectively, in **Section 3.4.2.1**. The Great Basin Conifer Woodland and Petran Montane Conifer Forest vegetation communities provide habitat for a diverse set of wildlife, specific to each community. The following section lists wildlife species that are common to each of the communities and discusses any species or habitats that are protected.

Great Basin Conifer Woodland. Few vertebrates are closely tied to the Great Basin Conifer Woodland community. Mammals include the pinyon mouse (*Peromyscus truei*), bushy-tailed woodrat (*Neotoma cinerea*), mule deer, and Rocky Mountain elk (*Cervus canadensis nelsoni*). Birds inhabiting this community include pinyon jay (*Gymnorhinus cyanocephalus*), gray flycatcher (*Empidonax wrightii*), gray vireo (*Vireo vicinior*), and Scott's oriole (Brown 1994).

Petran Montane Conifer Forest. Wildlife species found in Petran Montane Conifer Forest include such mammals as the southwestern myotis (*Myotis auriculus*), long-eared myotis (*M. evotis*), porcupine (*Erethizon dorsatum*), deer mouse (*Peromyscus maniculatus*), mule deer, elk, and big brown bat (*Eptesicus fuscus*). Bird species include northern goshawk (*Accipiter gentilis*), flammulated owl (*Psiloscops flammeolus*), Steller's jay (*Cyanocitta stelleri*), pygmy nuthatch (*Sitta pygmaea*), western bluebird (*Sialia mexicana*), wild turkey (*Meleagris gallopavo*), and Mexican chickadee (*Poecile sclateri*). Amphibians are limited to the tiger salamander, many-lined skink (*Eumeces multivirgatus*), and mountain skink. Reptiles found in this community include the short-horned lizard (*Phrynosoma hernandesi*), Arizona alligator lizard, ring-necked snake, and western rattlesnake (Brown 1994).

Federally Threatened and Endangered Species. A desktop analysis was conducted of all federally-listed species to determine if they have the potential to occur within or near proposed training sites based on habitat at the site, elevation, and the known range and distribution of the species. Reconnaissance-level surveys and aerial imagery were used to assess habitat at the sites. Nine federally-listed species have the potential to occur within the area of the northern Arizona proposed training sites on USFS land (**Table 3-16**). Five federally threatened species, the Chiricahua leopard frog, narrow-headed gartersnake, northern Mexican gartersnake, Mexican spotted owl, and yellow-billed cuckoo; one federally endangered species, the southwestern willow flycatcher; and two proposed threatened species, the headwater chub and roundtail chub, have the potential to occur within or near proposed training sites on northern Arizona USFS land. There are nine species that have designated or proposed critical habitat within five miles of the northern Arizona USFS proposed training sites. Eight of the species have been described in previous region sections (**Section 3.4.2.1**); the federally endangered New Mexico meadow jumping mouse (*Zapus hudsonius luteus*) is not described in this section because critical habitat is greater than one and one-half miles from any proposed Northern Arizona USFS training sites.

Critical habitat within five miles of the training sites proposed in northern Arizona on USFS land is presented in **Table 3-17**. The distance from the given coordinates of each site to the critical habitat is also included in the table. There are 18 proposed sites within five miles of designated or proposed critical habitat for eight federally-listed species. There are 12 proposed training sites within one-half mile of designated or proposed critical habitat for federally threatened or

endangered species on USFS land in northern Arizona (**Table 3-17**). The Chiricahua leopard frog, Gila chub, and Little Colorado spinedace are not discussed because they are aquatic species with a restricted habitat requirement and critical habitat occurs more than one-half mile from any proposed sites.

Miscellaneous

As indicated in **Table 3-18**, there are 29 proposed training sites in northern Arizona on miscellaneously-owned lands in northern Arizona. Of the 29 miscellaneous northern Arizona sites, eight of the proposed training sites are within city limits or are considered developed urban areas. Because these areas do not contain native or naturalized plants and animals, and naturalized habitats (e.g., grasslands, forests, and wetlands) they are not analyzed further for an impact on biological resources. There are 21 miscellaneous northern Arizona proposed training sites that occur in naturalized habitats.

Vegetation. Based on the process described under the southern Arizona USFS vegetation section in **Section 3.4.2.1**, five vegetation communities occur in the region of 21 proposed training sites in naturalized habitat (**Table 3-18**). Plains and Great Basin Grassland, Great Basin Conifer Woodland, and Petran Montane Conifer Forest are described in previous sections. Mohave Desertscrub and Great Basin Desertscrub are described below.

Mohave Desertscrub. Mohave Desertscrub vegetation occurs at an elevation range between 2,000 and 6,000 feet. The Mohave Desertscrub vegetation mixture is intermediate between Great Basin Desertscrub and Sonoran Desertscrub. The characteristic shrubs include creosotebush, Joshua tree (*Yucca brevifolia*), all-scale (*Atriplex polycarpa*), brittlebush

Table 3-16. Special Status Species that have the Potential to Occur near the Northern Arizona USFS Sites

Species	Federal Status	Critical Habitat Designated or Proposed	State Status	Proposed Training Sites with Potential Species Occurrence	Site Concerns
Fish					
Headwater chub (*Gila nigra*)	PT	No	S2	Lake Roosevelt	Not applicable
Roundtail chub (*Gila robusta*)	PT	No	S2	Lake Roosevelt	Not applicable
Amphibians					
Chiricahua leopard frog (*Lithobates chiricahuensis*)	T	Yes	S2	Jacks Canyon, Longview	Eggs are typically laid March to June below 5,900 feet
Reptiles					
Narrow-headed gartersnake (*Thamnophis rufipunctatus*)	T	Yes	S1	Payson-Rimside	Mates in spring and young are born in June and July.
Northern Mexican gartersnake (*Thamnophis eques megalops*)	T	Yes	S1	Jacks Canyon, Lake Roosevelt, Longview, Mogollon Rim[1], Payson-Rimside	Mates in spring and young are born in June and July.
Birds					
Mexican spotted owl (*Strix occidentalis lucida*)	T	Yes	S3	Black Mesa, Comanche, Elk, Flagstaff Hotshot, Hannagan Meadow, KP Tank, KP Circ., Helibase Circ., Jacks Canyon, Longview, Mogollon Rim, Mormon Lake	Breeding season is March through June.
Southwestern willow flycatcher (*Empidonax traillii extimus*)	E	Yes	S1	Jacks Canyon, Lake Roosevelt	Breeds late April to early May. Nests late May and early June. Fledges late June to August.
Yellow-billed cuckoo (*Coccyzus americanus*)	T	Yes	S3	Jacks Canyon[2], Lake Roosevelt	Breeds late May to early June. Nests between late June and early August.

Key: E = Endangered, PT = Proposed Threatened, T = Threatened, S = State Rank

Source: USFWS 2015

Notes:

[1] Site is greater than 500 feet from a permanent water source.

[2] Does not contain dense, under-thicket vegetation required by the species.

Table 3-17. Designated or Proposed Critical Habitat within Five Miles of the Northern Arizona USFS Sites

Species	Federal Status	Proposed Training Site	Distance from Critical Habitat (miles) [1]
Plant			
San Francisco Peaks Ragwort (*Packera franciscana*) [2]	T	Flagstaff Hotshot	3.60
Fish			
Gila Chub (Gila intermedia)	E	Hannagan Meadow	4.46
		Helibase Circular	4.43
		KP Circular	4.46
		KP Tank	4.46
Little Colorado spinedace (*Lepidomeda vittata*)	T	Longview	2.30
		Mogollon Rim	2.88
Reptiles			
Narrow-headed gartersnake (*Thamnophis rufipunctatus*)[2]	T	Mogollon Rim	4.62
		Payson-Rimside	0.0
Northern Mexican gartersnake (*Thamnophis eques megalops*) [2]	T	Helibase Circular	1.57
		Mogollon Rim[3]	0.07
		Rough Rider	2.21
Birds			
Mexican spotted owl (*Strix occidentalis lucida*)	T	Black Mesa	0.0
		Comanche	0.0
		Elk	1.85
		Flagstaff Hotshot	0.0
		Hannagan Meadow	0.0
		Helibase Circular	0.0
		Jacks Canyon	1.01
		KP Circular	0.0
		KP Tank	0.0
		Longview	0.0
		Mogollon Rim	0.0
		Mohawk	3.43
		Mormon Lake	0.47
		Overgaard	3.77
		Pittman Valley	3.51
Southwestern willow flycatcher (*Empidonax traillii extimus*)	E	Roosevelt Lake	4.36
Mammals			
New Mexico meadow jumping mouse (*Zapus hudsonius luteus*)	E	KP Circular	1.57
		KP Tank	1.57
		Hannagan Meadow	1.57
		Helibase Circular	1.57

Key: E = Endangered, T = Threatened

Notes:

[1] Distance is based on coordinates provided by USAF

[2] Critical habitat is proposed for this species.

[3] Site is greater than 500 feet from a permanent water source and does not contain the PCEs for this species.

Table 3-18. Northern Arizona Proposed Training Sites on Miscellaneous Land

Site	Type	County	Elevation (feet)	Vegetation Community
Babbitt Ranch 1	HLZ	Coconino	6,014	Plains and Great Basin Grassland
Babbitt Ranch 2	HLZ	Coconino	6,540	Great Basin Conifer Woodland
Babbitt Ranch 3	HLZ	Coconino	6,472	Great Basin Conifer Woodland
Bone Crusher	HLZ	Coconino	6,474	Great Basin Conifer Woodland
Caldwell Meadows	DZ/HLZ	Apache	7,610	Petran Montane Conifer Forest
Cattle	DZ/HLZ	Coconino	6,558	Petran Montane Conifer Forest
Cattle LTFW	HLZ/LZ	Coconino	6,111	Plains and Great Basin Grassland
Colorado River	Water Area	Mohave	496	River/Mohave Desertscrub
Flagstaff Pulliam Airport	HLZ/LZ	Coconino	7,010	Developed, open space
FR 320/311	DZ/HLZ/LZ	Coconino	6,725	Great Basin Conifer Woodland
Gerbil	DZ/HLZ	Coconino	6,466	Great Basin Conifer Woodland
Gila County Sheriff Roosevelt Substation	HLZ	Gila	2,078	Developed/Urban
Grand Canyon National Park Airport	LZ	Coconino	6,609	Developed/Urban
Grand Canyon Valle Airport	DZ/HLZ/LZ	Coconino	6,609	Developed/Urban
H. A. Clark Memorial Field	DZ/HLZ/LZ	Coconino	8,676	Developed/Urban
HLZ 5	HLZ	Coconino	6,558	Petran Montane Conifer Forest
HLZ 6	HLZ	Coconino	6,583	Petran Montane Conifer Forest
HLZ 7	HLZ	Coconino	6,652	Petran Montane Conifer Forest
HLZ 8	HLZ	Coconino	6,719	Petran Montane Conifer Forest
Kingman Airport	DZ/HLZ/LZ	Coconino	3,449	Developed/Urban
Lee's Ferry	DZ/HLZ/LZ	Coconino	3,257	Great Basin Desertscrub
Panda	HLZ	Coconino	6,015	Plains and Great Basin Grassland
Powerline	HLZ	Coconino	6,434	Great Basin Conifer Woodland
Sage	HLZ/DZ	Coconino	6,342	Great Basin Conifer Woodland
Sinkhole	HLZ	Coconino	5,027	Great Basin Desertscrub
Springerville Airport	DZ/HLZ/LZ	Apache	7,055	Developed/Urban
Sprucedale Guest Ranch	Billeting/Operation Center	Apache	7,547	Petran Montane Conifer Forest
Squirrel	HLZ/DZ	Coconino	6,461	Great Basin Conifer Woodland
Winslow-Lindbergh Regional Airport	HLZ/LZ/FARP/ Austere DZ/LZ/HLZ/ Logistics Base/ Operation Center	Navajo	4,892	Developed/Urban

Key: DZ = Drop Zone, FARP= Forward Aircraft Refueling Point, HLZ = Helicopter Landing Zone, LZ= Landing Zone

(*Encelia farinosa*), desert holly (*A. hymenelytra*), white burrobrush (*Ambrosia salsola*), shadscale (*Atriplex confertifolia*), and blackbrush (*Coleogyne ramosissima*). Cacti are well represented and include Engelmann hedgehog (*Echinocereus engelmannii*), silver cholla (*Cylindropuntia echinocarpa*), Mohave pricklypear (*Opuntia erinacea*), beavertail cactus (*O. basilaris*), and many-headed barrel cactus (*Echinocactus polycephalus*) (Brown 1994).

Great Basin Desertscrub. Great Basin Desertscrub occurs at an elevation range between 3,930 and 7,220 feet and is associated with Arizona Upland Sonoran Desertscrub and Great Basin Pinyon-Juniper Woodland vegetation. Species diversity is low with dominant shrubs occupying vast tracts of land. Characteristic vegetation is low-growing, widely space hemispherical, non-sprouting shrubs with widely spaced bunchgrasses. Dominant shrubs include big sagebrush, black sagebrush (*Artemisia nova*), Bigelow sagebrush (*A. bigelovii*), shadscale, fourwing saltbush, rabbitbrush, winterfat (*Krascheninnikovia lanata*), hopsage (*Grayia* spp.), horsebrush (*Tetradymia* sp.), and greasewood (*Sarcobatus vermiculatus*). Associated grasses may include blue grama, galleta grass, Indian ricegrass, western wheatgrass, Junegrass, and several muhleys or dropseeds (Brown 1994).

Wildlife. The wildlife associated with the Plains and Great Basin Grassland is described under the wildlife section under **Section 3.4.2.1**, and the wildlife associated with Great Basin Conifer Woodland and Petran Montane Conifer Forest are described under the Northern Arizona USFS land in **Section 3.1.2.2**. The Mohave Desertscrub and Great Basin Desertscrub vegetation communities provide habitat for a diverse set of wildlife, specific to each community. The following section lists wildlife species that are common to each of the communities and discusses any species or habitats that are protected.

Mohave Desertscrub. Mule deer, desert bighorn sheep, javelina, mountain lion, and coyote (*Canis latrans*) are large mammals that occupy this vegetation community, while smaller, less wide-ranging mammals include, including Merriam's kangaroo rat (*Dipodomys merriami*), little pocket mouse (*Perognathus longimembris*), white-tailed antelope squirrel (*Ammospermophilus leucurus*), desert woodrat (*Neotoma lepida*), cactus mouse (*Peromyscus eremicus*), and canyon mouse (*P. crinitus*). Many of the bird and reptile species typical of this vegetation community are subspecies or subpopulations of species found in other desert vegetation communities in Arizona. Bird species include black-tailed gnatcatcher, great horned owl (*Bubo virginianus*), phainipepla (*Phainopepla nitens*), cactus wren, red-tailed hawk, house finch (*Haemorhous mexicanus*), and black-throated sparrow. Reptiles include desert spiny lizard (*Sceloporus magister*), Mojave desert tortoise (*Gopherus agassizii*), zebra-tailed lizard (*Callisaurus draconoides*), side-blotched lizard (*Uta stansburiana*), long-nosed leopard lizard (*Gambelia wislizenii*), Mojave rattlesnake (*Crotalus scutulatus scutulatus*), coachwhip, and Mojave fringe-toed lizard (*Uma scoparia*) (Brown 1994).

Great Basin Desertscrub. A distinct fauna is centered in Great Basin Desertscrub. Mule deer, bighorn sheep, Townsend's ground squirrel (*Urocitellus townsendii*), badger (*Taxidea taxus*), long-tailed pocket mouse (*Chaetodipus formosus*), and northern grasshopper mouse are associated with sagebrush communities of this biome. Several birds are represented here such as the golden eagle, burrowing owl, sage thrasher (*Oreoscoptes montanus*), sagebrush sparrow (*Artemisiospiza nevadensis)*, vesper sparrow, common raven, rock wren, horned lark, Say's phoebe, western meadowlark, and Brewer's sparrow (*Spizella breweri*). The sagebrush lizard

(*Sceloporus graciosus*) and Great Basin spadefoot toad (*Spea intermontana*) are common representative species. A number of reptilian subspecies such as desert horned lizard, and Great Basin and plateau tiger whiptail (*Aspidoscelis tigris tigris*) are indicative of Great Basin Desertscrub (Brown 1994).

Federally Threatened and Endangered Species. A desktop analysis was conducted of all federally-listed species to determine if they have the potential to occur within or near proposed training sites based on habitat at the site, elevation, and the species known range and distribution. Reconnaissance-level surveys and aerial imagery were used to assess habitat at the sites. Six federally-listed species have the potential to occur near the northern Arizona proposed training sites on miscellaneously-owned land (**Table 3-19**). The seven species include the four federally threatened species, the Chiricahua leopard frog, northern Mexican gartersnake, Mexican spotted owl, and the yellow-billed cuckoo; and three federally endangered species, the Fickeisen plains cactus (*Pediocactus peeblesianus fickeiseniae*), and the southwestern willow flycatcher. All species have been described in previous region sections (**Section 3.4.2.1**), except for the Fickeisen plains cactus and New Mexico meadow jumping mouse, which are described below.

Critical habitat within five miles of the proposed training sites in northern Arizona on miscellaneously-owned land is presented in **Table 3-20**. The distance from the given coordinates of each site to the critical habitat is also included in the table. There are seven proposed training sites within five miles of federally threatened or endangered species designated critical habitat on miscellaneously-owned land in northern Arizona; three of these are less than one-half mile from critical habitat for more than one species (**Table 3-20**).

Fickeisen Plains Cactus. The Fickeisen plains cactus was listed as federally endangered on October 01, 2013 (78 FR 60607), with critical habitat designated on August 18, 2016 (81 FR 55265). The Fickeisen plains cactus is a small globular cactus that at maturity reaches 1.0 to 2.6 inches in height. The spines are soft and spongy, and the flowers are cream-yellow to yellowish-green in color (USFWS 2013b).

This cactus is a narrow endemic restricted to exposed layers of Kaibab limestone on the Colorado Plateau. They are found in shallow, well-draining, gravelly loam soils formed from alluvium, colluvium, or Aeolian deposits derived from limestone of the Harrisburg Member of the Kaibab Formation and Toroweap Formation; Coconino Sandstone; and the Moenkopi Formation. Most populations are found on the margins of canyon rims, flat terraces, limestone benches, or on the toe of well-drained hills in Plains and Great Basin Grasslands and Great Basin Desertscrub communities at elevations ranging from 4,200 to 5,950 feet (USFWS 2013b).

The Fickeisen plains cactus is endemic to the Colorado Plateau in Coconino and Mohave Counties. The current range of the Fickeisen plains cactus includes areas from Mainstreet Valley of the Arizona Strip to House Rock Valley; along the canyon rims of the Colorado River and Little Colorado River; the area of Gray Mountain; and along the canyon rims of Cataract Canyon on the Coconino Plateau (USFWS 2013b). The Sinkhole proposed training site occurs in the Gray Mountain area and contains suitable habitat for this species.

Table 3-19. Special Status Species that have the Potential to Occur near the Northern Arizona Miscellaneous Sites

Species	Federal Status	Critical Habitat Designated or Proposed	State Status	Proposed Training Sites with Potential Species Occurrence	Site Concerns
Plants					
Fickeisen plains cactus (*Pediocactus peeblesianus fickeiseniae*)	E	Yes	S2	Sinkhole	Not applicable
Amphibians					
Chiricahua leopard frog (*Lithobates chiricahuensis*)	T	Yes	S2	Caldwell Meadows, Sprucedale Guest Ranch	Eggs laid March through June below 5,900 feet
Reptiles					
Northern Mexican gartersnake (*Thamnophis eques megalops*)	T	Yes	S1	Caldwell Meadows[1], Lee's Ferry[2], Sprucedale Guest Ranch[2]	Mates in spring and young are born in June and July.
Narrow-headed gartersnake (*Thamnophis rufipunctatu)*	T	Yes	S1	Caldwell Meadows[2]	Mates in spring and young are born in June and July
Birds					
Mexican spotted owl (*Strix occidentalis lucida*)	T	Yes	S3	Caldwell Meadows, Sprucedale Guest Ranch	Breeding season is March through June.
Southwestern willow flycatcher (*Empidonax traillii extimus*)	E	Yes	S1	Lee's Ferry[3]	Breeds late April to early May. Nests late May and early June. Fledges late June to August.
Yellow-billed cuckoo (*Coccyzus americanus*)	T	Yes	S3	Lee's Ferry[3]	Breeds late May to early June. Nests between late June and early August.
Mammals					
New Mexico meadow jumping mouse (*Zapus hudsonius luteus*)	E	Yes	S1	Caldwell Meadows	Not applicable

Key: E = Endangered, T = Threatened, S = State Rank

Source: USFWS 2015

Notes:

[1] Site is not within current range of the species.

[2] Sites are greater than 500 feet from a water source

[3] Site does not contain suitable vegetation for these species.

Table 3-20. Designated or Proposed Critical Habitat within Five Miles of the Northern Arizona Miscellaneous Sites

Species	Federal Status	Proposed Training Site	Distance from Critical Habitat (miles) [1]
Fish			
Razorback sucker (*Xyrauchen texanus*)	E	Lee's Ferry	0.35
Amphibians			
Chiricahua leopard frog (*Lithobates chiricahuensis*) [2]	T	Caldwell Meadows	4.97
Reptiles			
Narrow-headed gartersnake (*Thamnophis rufipunctatus*) [2]	T	Sprucedale Guest Ranch	1.87
		Caldwell Meadows	1.66
Northern Mexican gartersnake (*Thamnophis eques megalops*) [2]	T	Caldwell Meadows[3]	0.16
Birds			
Mexican spotted owl (*Strix occidentalis lucida*)	T	Caldwell Meadows	0.0
		Cattle	3.07
		HLZ 5	3.07
		HLZ 6	2.87
		HLZ 7	2.55
		HLZ 8	2.16
		Sprucedale Guest Ranch	0.0
Mammals			
New Mexico meadow jumping mouse (*Zapus hudsonius luteus*)	E	Sprucedale Guest Ranch	2.44
		Caldwell Meadows	0.16

Key: E = Endangered, T = Threatened

Notes:

[1] Distance is based on coordinates provided by USAF

[2] Critical habitat is proposed for this species.

[3] Site is greater than 500 feet from a permanent water source; therefore, does not contain PCEs for this species.

Threats to this species include off-road vehicle use, livestock grazing (cattle, sheep and horses), mining (e.g. uranium), recreational activities, road construction and maintenance, illegal collection, and herbivory by rodents, nonnative invasive species as well as natural environmental variability and climate conditions such as drought (USFWS 2013b).

New Mexico meadow jumping mouse. The New Mexico meadow jumping mouse was listed as federally endangered on July 10, 2014 (79 FR 331119), with critical habitat designated on March 16, 2016 (81 FR 14263). The New Mexico meadow jumping mouse is grayish-brown on the back, yellowish-brown on the sides, and white underneath. The species is approximately 7.4 to 10 inches in total length, with elongated feet (1.2 inch) and an extremely long, bicolored tail (5.1 inches) (USFWS 2014c).

This species prefers habitat with permanent running water, and moist to dry soils at elevations ranging from 6,600 to 8,880 feet (AGFD 2007). Moist meadows near streams with willow or

alder; moist grassland is preferred, and heavily wooded areas are avoided. Habitat requirements for this species are characterized by tall (averaging at least 24 inches), dense riparian non-woody vegetation primarily composed of sedges and forbs (broad-leafed herbaceous plants). This suitable habitat is found only when wetland vegetation achieves full growth potential associated with perennial flowing water (USFWS 2014c).

New Mexico meadow jumping mouse ranges through portions of New Mexico, eastern Arizona, and southern Colorado. In New Mexico, they have been found in the San Juan, Sangre de Cristo, Jemez, and Sacramento Mountains, Rio Grande Valley, and lower Rio Chama Valley. In Arizona, populations occupy the White Mountains in southern Apache County, and in northern Greenlee County (AGFD 2007). Caldwell Meadows occurs in the White Mountains in Greenlee County, Arizona and contains suitable meadow habitat for this species.

Threats to this species include habitat loss from grazing pressure (which removes the needed vegetation) and water management and use (which causes vegetation loss from mowing and drying of soils), lack of water due to drought (exacerbated by climate change), and wildfires (also exacerbated by climate change). Additional sources of habitat loss are likely to occur from scouring floods, loss of beaver (*Castor canadensis*), highway reconstruction, residential and commercial development, coal bed methane development, and unregulated recreation (USFWS 2014d).

3.4.2.3 NEW MEXICO

There are 10 proposed sites located in New Mexico on federally-owned property, eight of which are located in the Gila NF on USFS managed lands, and the two remaining sites located on military installations (**Table 2-1**). In addition, there are three proposed sites located on property other than federally-owned such as state and private lands. These properties are collectively referred to as miscellaneous properties. The biological resources of the USFS-managed properties are discussed below, followed by the discussion of the miscellaneous properties.

Military Installations

There are two proposed training sites within two military installations, Melrose Air Force Range and White Sands Missile Range, in New Mexico (**Table 2-1**). As described in **Section 2.1.3**, all locations would be selected in coordination with the appropriate range and other installation personnel to make sure that exercises comply with all environmental requirements. The selected ranges would be already governed by the installations' environmental policies, procedures, and requirements, including existing NEPA coverage and ESA Section 7 consultation conducted for the range and any associated requirements. All current USAF regulations and requirements concerning sensitive biological resources within the ranges would be adhered to under the Proposed Action. There would be 53 sites used as HLZs, LZs, and DZs that would be located on current military installations and would meet all requirements identified in AFI 13-217, *Drop Zone and Landing Zone Operations* (USAF 2007a). All airfields proposed for refueling activities currently have appropriate fuel storage on site and are managed in accordance with facility Spill Prevention Control, Countermeasure, and Contingency Plans. The Proposed Action would result in a negligible increase in already existing operations at these training sites; therefore, impacts on biological resources (vegetation, wildlife, and threatened and endangered species) associated with the Proposed Action will not be evaluated further for these sites.

U.S. Forest Service

There are ten proposed training sites in New Mexico on USFS land in the Gila NF in Catron County (**Table 2-1**). The ten proposed training sites are all either HLZ, DZ, LZ, or a combination of all types.

Vegetation. There are two proposed training sites in New Mexico on USFS land, Catron County Fairgrounds and Reserve Airport (**Table 2-1**), that are within city limits or are considered developed urban areas. Because these areas do not contain native or naturalized plants and animals, and naturalized habitats (e.g., grasslands, forests, and wetlands) they are not analyzed further for an effect on biological resources. Based on the process described under **Section 3.4.2.1** under the southern Arizona USFS, three vegetation communities occur in the region of eight proposed training sites (**Table 3-21**). The vegetation associated with the Madrean Evergreen Woodland is described under southern Arizona USFS vegetation section (**Section 3.4.2.1**) and Petran Montane Conifer Forest is described in the northern Arizona USFS vegetation section (**Section 3.4.2.2**). The Inter-Mountain Basins Semi-desert Grassland is described below.

Table 3-21. New Mexico Proposed Training Sites on USFS Land

Site	Type	County	Elevation (feet)	Vegetation Community
Glenwood Ranger Station	DZ/HLZ	Catron	4,800	Madrean Evergreen Woodland
Negrito Airstrip	DZ/HLZ/LZ	Catron	8,087	Inter-Mountain Basins Semi-desert Grassland
Negrito Center	DZ/HLZ	Catron	7,850	Petran Montane Conifer Forest
Negrito North	DZ/HLZ	Catron	7,847	Inter-Mountain Basins Semi-desert Grassland
Negrito South	DZ/HLZ	Catron	7,973	Inter-Mountain Basins Semi-desert Grassland
Negrito Helibase	HLZ	Catron	8,026	Inter-Mountain Basins Semi-desert Grassland
Rainy Mesa	HLZ	Catron	7,450	Inter-Mountain Basins Semi-desert Grassland
Reserve Ranger Station	DZ/HLZ	Catron	5,900	Madrean Evergreen Woodland

Key: DZ = Drop Zone, HLZ = Helicopter Landing Zone, LZ= Landing Zone

Inter-Mountain Basins Semi-desert Grassland. The Inter-Mountain Basin Semi-desert Grassland is a widespread ecological system includes the driest grasslands throughout the intermountain western U.S. It occurs on xeric sites over an elevation range of approximately 4,750 to 7,610 feet on a variety of landforms, including swales, playas, mesas, alluvial flats, and plains. This system may constitute the matrix over large areas of intermountain basins, and also may occur as large patches in mosaics with shrubland systems dominated by big basin sagebrush (*Artemisia tridentata* ssp*. Tridentata*)*, Atriplex* spp., *Coleogyne* spp., ephedra (*Ephedra* spp.), broom snakeweed (*Gutierrezia sarothrae*), or winterfat. The dominant perennial bunchgrasses and shrubs within this system are all drought-resistant plants. Dominant or codominant species are Indian ricegrass*,* threeawn grasses, blue grama*,* needle and thread grass (*Hesperostipa comata*)*,* muhley grasses, galleta, or dropseed grasses (NatureServe 2016).

Wildlife. The wildlife associated with Madrean Evergreen Woodland and Petran Montane Conifer Forest is described under the southern Arizona USFS section and northern Arizona USFS section, respectively. Inter-Mountain Basins Semi-desert Grassland vegetation community provides habitat for a diverse set of wildlife, specific to each community. The following section lists wildlife species that are common to each of the communities and discusses, in detail, any species or habitats that are protected.

Inter-Mountain Basins Semi-desert Grassland. Wildlife observed in Inter-Mountain Basins Semidesert Grassland include Great Basin pocket mouse (*Perognathus parvus*), Ord's kangaroo rat (*Dipodomys ordii*), cattle egret (*Bubulcus ibis*), greater sandhill crane (*Grus canadensis tabida*), long-billed curlew (*Numenius americanus*), vesper sparrow, mountain plover (*Charadrius montanus*), western toad (*Anaxyrus boreas*), western rattlesnake, desert horned lizard (*Phrynosoma platyrhinos*), gophersnake, and sagebrush lizard (NatureServe 2016).

Federally Threatened and Endangered Species. A desktop analysis was conducted of all federally-listed species to determine if they have the potential to occur within or near proposed training sites based on habitat at the site, elevation, and the species known range and distribution. Reconnaissance-level surveys and aerial imagery were used to assess habitat at the sites. The Mexican spotted owl and narrow-headed gartersnake are the two federally-listed species that have the potential to occur near five of the proposed training sites on USFS land in New Mexico, Negrito Center, Negrito North, Negrito South, Rainy Mesa, and Glenwood Ranger Station (**Table 3-22**). The Mexican spotted owl and narrow-headed gartersnake are described in **Section 3.4.2.1**.

Table 3-22. Special Status Species that have the Potential to Occur near the New Mexico USFS Sites

Species	Federal Status	Critical Habitat Designated or Proposed	State Status	Proposed Training Sites with Potential Species Occurrence	Site Concerns
Reptiles					
Narrow-headed gartersnake (*Thamnophis rufipunctatus*)	T	Yes	S2	Glenwood Ranger Station[1]	Mates in spring, young born in summer.
Birds					
Mexican spotted owl (*Strix occidentalis lucida*)	T	Yes	S2	Negrito Center, Negrito North, Negrito South, Rainy Mesa	Breeding season: March to June

Key: T = Threatened, S = State Rank
Source: USFWS 2015
Note: [1] Site is greater than 500 feet from a permanent water source.

Critical habitat within five miles of the proposed training sites in New Mexico on USFS land is presented in **Table 3-23**. The distance from the given coordinates of each site to the critical habitat is also included in the table. All eight of the New Mexico USFS sites are within five miles of critical habitat. There are four federally threatened or endangered species with designated or proposed critical habitat within five miles of the proposed training sites on USFS land in New Mexico (**Table 3-23**).

Table 3-23. Designated or Proposed Critical Habitat within Five Miles of the New Mexico USFS Sites

Species	Federal Status	Proposed Training Site	Distance from Critical Habitat (miles) [1]
Amphibian			
Chiricahua leopard frog (*Lithobates chiricahuensis*)	T	Rainy Mesa	1.68
Reptiles			
Narrow-headed gartersnake (*Thamnophis rufipunctatus*) [2]	T	Glenwood Ranger Station[3]	0.22
		Negrito Airstrip	1.16
		Negrito Center	1.17
		Negrito Helibase	2.19
		Negrito North	2.56
		Negrito South	1.63
		Rainy Mesa	0.26
		Reserve Ranger Station	0.99
Birds			
Mexican spotted owl (*Strix occidentalis lucida*)	T	Negrito Airstrip	0.0
		Negrito Center	0.0
		Negrito Helibase	0.57
		Negrito North	0.0
		Negrito South	0.14
		Rainy Mesa	0.0
Southwestern willow flycatcher (*Empidonax traillii extimus*)	E	Glenwood Ranger Station[4]	0.30

Key: E = Endangered, T = Threatened

Notes:

[1] Distance is based on coordinates provided by USAF

[2] Critical habitat is proposed for this species.

[3] Site is greater than 500 feet from a water source and does not contain PCEs for this species.

[4] This site does not contain PCEs for this species.

The USFS commented that Mexican gray wolves (*Canis lupus baileyi*) are present, especially in near the Negrito sites (USFS 2017). Mexican wolves are designated as an experimental population in portions of Arizona and New Mexico. Federal agencies are not required to consult with us under section 7(a)(2), but are required to confer with the USFWS on actions that are likely to jeopardize the continued existence of a species proposed to be listed under Section 7(a)(4). The Negrito sites occur in Zone 1 of the Mexican Wolf Experimental Population Area,

where Mexican wolves will be or have been released (80 FR 2512 - 2563). Mexican gray wolves have been released throughout in the Apache and Gila National Forests in Arizona and New Mexico since 1998 (Paquet et al. 2001). According to a USFWS map of recent wolf locations (USFWS 2017), wolves have been observed in the Beaverdam Canyon along South Fork Negrito Creek as well as to the east near Seven HL Canyon. These wolf sightings are within three miles of the proposed Negrito and Rainy Mesa sites. The reintroduction plan contains no land-use restrictions or prohibitions on private and tribal lands and no major restrictions on public lands (AGFD 2014).

Miscellaneous

The Playas Training and Research Center is the only miscellaneous site in New Mexico (**Table 2-1**). The center is within Playas city limits considered a developed urban area. Because this area does not contain native or naturalized plants and animals, and naturalized habitats (e.g., grasslands, forests, and wetlands) it is not analyzed further for an effect on biological resources.

3.4.2.4 CALIFORNIA

There are 15 proposed sites located in California on federally-owned property, all of which are located on four military installations (**Table 2-1**). In addition, there are two proposed sites that are located offshore. These two sites are referred to as miscellaneous properties.

Military Installations

There are 15 proposed training sites in California on four military installations (**Table 2-1**). The military installations include Camp Pendleton, Naval Air Facility (El Centro), NAS, North Island, and March ARB. As described in **Section 2.1.3**, all locations would be selected in coordination with the appropriate range and other installation personnel to make sure that exercises comply with all environmental requirements. The selected ranges would be already governed by the installations' environmental policies, procedures, and requirements, including existing NEPA coverage and ESA Section 7 consultation conducted for the range and any associated requirements. All current USAF regulations and requirements concerning sensitive biological resources within the ranges would be adhered to under the Proposed Action. There would be 53 sites used as HLZs, LZs, and DZs that would be located on current military installations and would meet all requirements identified in AFI 13-217, *Drop Zone and Landing Zone Operations* (USAF 2007a). All airfields proposed for refueling activities currently have appropriate fuel storage on site and are managed in accordance with facility Spill Prevention Control, Countermeasure, and Contingency Plans. The Proposed Action would result in a negligible increase in already existing operations at these training sites; therefore, impacts on biological resources (vegetation, wildlife, and threatened and endangered species) associated with the Proposed Action will not be evaluated further for these sites.

3.4.2.5 NEVADA

There is one proposed site located in Nevada on federally-owned property, on a military installation (**Table 2-1**). The proposed site would be used as an Operations Center.

Military Installations

There is one proposed site in Nevada on Nellis AFB (**Table 2-1**). It is assumed that the military installation has an INRMP to manage natural resources and all appropriate environmental clearances for their training ranges, including NEPA coverage and ESA Section 7 consultation. The Proposed Action does not include new types of operations within these military training lands. Therefore, the Proposed Action will not be evaluated further for these five military installations.

3.5 Cultural Resources

3.5.1 Definition of Resource

Cultural resources are any prehistoric or historic district, site, or building, structure, or object considered important to a culture or a community for scientific, traditional, religious, or other purposes. They include archaeological resources, historic architectural resources, and traditional resources. NHPA of 1966, as amended, establishes criteria for assessing the significance of cultural resources. Resources that are listed on, or eligible for listing on, the National Register of Historic Places (NRHP) are termed "historic properties." Section 106 of the NHPA requires federal agencies to assess the potential impact of their undertakings on historic properties in the APE in consultation with SHPOs or, where activities occur on tribal lands, Tribal Historic Preservation Officers (THPOs). The following federal laws and regulations govern protection of cultural resources:

- The Archaeological and Historic Preservation Act of 1974
- The American Indian Religious Freedom Act of 1978
- The Archaeological Resources Protection Act of 1979
- The Native American Graves Protection and Reparation Act of 1990
- AFI 32-7065, Cultural Resources Management
- Other applicable laws and regulations.

Consultation with federally-recognized tribes is required under the laws listed previously as well as EO 13175, Consultation and Coordination with Indian Tribal Governments; DOD Instruction 4710.02, DOD Interactions with Federally-Recognized Tribes; and AFI 90-2002, Air Force Interactions with Federally-Recognized Tribes. The USAF has invited 55 federally-recognized tribes in Arizona, New Mexico, California, Nevada, and Utah to consult on the Proposed Action. Consultation is discussed further in **Sections 1.6.2** and **4.5.1.1**.

3.5.2 Affected Environment

3.5.2.1 REGIONAL HISTORIC CONTEXTS

Arizona and New Mexico

Human occupation in the Southwest began approximately 12,000 years ago in a period known as the Paleoindian (circa 10,000 BC to 8,000 BC). People of the Paleoindian were highly mobile and formed nomadic groups that relied heavily on megafauna such as mammoth, bison, and camel. Paleoindian components are identifiable by the presence of high-quality lanceolate and fluted lanceolate projectile points such as Clovis and Folsom types.

Climatic changes and the extinction of megafauna coincide with the transition to the Archaic period (8,000 BC to AD 300). During this period, subsistence strategies shifted away from big-game mammals to a generalized hunting strategy that incorporated a range of large and small animals and more plant resources (Cordell 1997; Frison 1991). The Archaic is divided into the Early, Middle, and Late Archaic, with increasing reliance on plant foods and horticulture over time. Settled villages, farming, and pottery began to appear by the Late Archaic.

The Pithouse/Pueblo period (AD 200 – AD 1600) is defined by increasing and expanding farming populations, the introduction of new farming technologies such as irrigation, changes to architecture and pottery styles, and increasingly complex sociopolitical organization (Cordell 1997). Cultural transitions during this period differed among the four principal traditions present in the region: the Anasazi, Mogollon, Hohokam, and Salado. Whereas the Anasazi and Hohokam were strongly sedentary and used water management techniques such as irrigation to improve crop yields, the Mogollon remained semi-nomadic for several centuries, gradually transitioning to more sedentary subsistence. In the later part of the Pithouse/Pueblo period, climatic variations and drought precipitated broad changes to cultures of the Southwest and forced the abandonment of many pueblos, particularly between AD 1300 and AD 1500.

The Protohistoric Period (AD 1450-1700) represents the period of early European influence and colonization, from which few historic records are available. At the time of the Spanish arrival to New Mexico and Arizona, a mix of sedentary and nomadic groups remained in the Southwest. Sedentary groups included the Hopi, Zuni, Acoma-Laguna, Manso, Suma, Jano, and Jacome in New Mexico and the O'odham in Arizona. Nomadic groups were principally the Apache and Navajo. The Ute and Comanche also entered the region shortly after horses were introduced (Kessell 2002).

Spain sent exploration parties to the Southwest beginning in 1539, and established colonial rule in the region in the late 1500s in New Mexico and 1700s in Arizona. Increased immigration to New Mexico and Arizona in the 1600s and 1700s resulted in tense relations with Native Americans, leading to revolts such as the Pueblo Revolt in 1690, the Pima Revolt of 1751, and ongoing hostilities with the Apache. Aggressive military actions and negotiations resulted in tenuous peace. After Mexican Independence, the northern territories of Arizona and New Mexico became increasingly autonomous or reliant on the U.S., and ultimately joined the U.S. after the Mexican-American War and Treaty of Guadalupe Hidalgo in 1848.

The U.S. immediately established a presence in the region with exploration parties, military fortifications, and stage routes. Rural and industrial development progressed quickly after the Civil War, particularly ranching and mining. Construction of the railroad in the late 1880s further stimulated settlement and growth. The federal government invested in a number of reclamation projects in the early to mid-twentieth century, including dams and canals. Manufacturing, agriculture, oil and gas development, and DOD projects and installations remain important economic sectors for Arizona and New Mexico.

Southern California

The earliest documented occupation in coastal San Diego County and the surrounding area is known as the San Dieguito complex (7,000 to 5,500 BC), characterized by large, stemmed

projectile points and finely made tools used to hunt and process large game animals (Moratto 1984). The San Dieguito complex is comparable to the Paleoindian period described in the Southwest context above and is sometimes referred to as Paleoindian. The San Dieguito complex was followed by the La Jolla complex (5,500 BC to 0 AD), also referred to as the Archaic period. The La Jolla complex relied on a diverse, generalized subsistence strategy utilizing a wide range of environmental zones. Milling stones and shell middens are common remains from this period and are most prevalent around lagoons and sloughs (Moratto 1984). The Yuman complex (700 AD to circa 1700 AD) is typified by small projectile points, ceramic vessels, an increased use of mortars, and emergence of acorns as an important food source. During this period, which also known as the Late Prehistoric or Late Period, Yuman–speaking groups moved into the San Diego area from the eastern Colorado River. The people of the Late Prehistoric period were the ancestors of today's Kumeyaay and San Luiseño tribes.

The Channel Islands were used throughout the periods discussed above; however, cultural development on the islands was distinct from mainland patterns. The Early Holocene period (about 8,500 BC to 5,000 BC) was characterized by seasonal use with subsistence dependent on sea mammals, fish, and shellfish. The Middle Holocene (about 5,000 BC to 1500 BC) is marked by the appearance of small fishing villages, year-round habitation, and the appearance of mortars and pestles. The Late Holocene (1500 BC to AD 1769) was a period of increased population growth and social complexity. Year-round settlements were common and exotic materials found in sites of this period indicate extensive trade networks.

Euroamerican contact in the coastal region of Southern California began in 1542 when Juan Rodríguez Cabrillo landed near Point Loma. Expeditions along the California coast continued periodically over the next two centuries; however, Spain's primary interest remained in Mexico and Baja California. Increasing Russian influence from the north in the mid-1700s spurred Spanish colonization in California and several missions were established in the southern coastal region, including the San Diego and San Luis Rey de Francia missions (Rolle 2007). Native populations were gathered at the missions and forced to convert to Catholicism; many were also forced into labor while held captive.

Mission influence in the region remained strong after Mexican Independence until secularization in the early 1830s. During this period church holdings were redistributed as land grants where ranches, farms, and dairies were subsequently established. The U.S. gained control of the region in 1848 at the close of the Mexican-American war. Gold rushes, migration, and transportation development over the succeeding decades attracted settlers into the rapidly developing region. Despite this rapid growth, southern California remained rural until World War II, during which the military established Camp Pendleton to train Marines for combat in the Pacific. Increased migration and economic growth in the mid- to latter part of the twentieth century resulted in rapid urban expansion that continues to characterize the region today.

3.5.2.2 THE AREA OF POTENTIAL EFFECT

The USAF is conducting Section 106 consultation concurrent with the NEPA process. As part of the Section 106 process, the USAF has defined the Undertaking as the Proposed Action, and defined the APE as a 330-foot radius around proposed training locations in Arizona, New Mexico, and California. These training locations are depicted on maps in **Appendix C**. The APE

does not include the proposed Nellis AFB training location in Nevada, as activities here would consist of command and control-type activities in existing facilities and would not have potential to impact cultural resources.

Proposed locations on military installations are currently used and approved for training operations similar to the Proposed Action and are managed consistent with each installation's cultural resource policies and procedures. The USAF reviewed Integrated Cultural Resource Management Plans (ICRMPs) for 11 installations and consulted with installation personnel to determine whether proposed military locations have cultural resource concerns. These documents and consultations are summarized in **Table 2-2**. The review confirmed that 41 of the 52 training sites on military installations have been surveyed or are in disturbed, developed, or water areas where archaeological sites would not be expected (see **Tables H-1** and **H-2** in **Appendix H**). Survey status is unknown for the remaining sites; however, installation cultural resource managers did not identify any cultural resource concerns. Therefore, cultural resources on military installations will be confirmed during the environmental site preparation phase prior to the AT exercises.

For non-military training locations in Arizona and New Mexico, the USAF conducted searches of publicly available records, the NRHP, Arizona's Cultural Resource Inventory (AZSITE), and the New Mexico Cultural Resources Information System and consulted with the Arizona SHPO, New Mexico SHPO, and federally-recognized tribes to determine the extent of previous cultural resource inventories and to identify known cultural resources at proposed training locations on USFS and miscellaneous properties. The USAF also examined historic maps and aerial imagery to identify potential unrecorded architectural historic resources in the APE. Any properties identified in this manner were assumed to be eligible for NRHP listing for the purposes of Section 106 compliance. The USAF determined not all proposed training locations have been surveyed for cultural resources and that unidentified archaeological sites or properties of traditional religious or cultural significance could occur. Section 106 consultation is discussed further in **Section 4.5.1.1**.

3.5.2.3 SOUTHERN ARIZONA

Military Installations

Twenty-four training locations are proposed on five military installations in southern Arizona: Davis-Monthan AFB, Florence Military Reservation, Fort Huachuca, and Luke AFB (**Table 2-1, Table H-1**). The proposed locations are currently used and approved for training activities similar to the Proposed Action. The ICRMP review and consultation with installation personnel identified one cultural resource concern near the NATO Hill location on BMGR East, where two prehistoric sites would be near but outside of proposed activity areas (BMGR 2012; Davis-Monthan AFB 2002; Heilen and Vanderpot 2013; Kirvan and Rogge 2009; Pers. Comm. Martyn Tagg, July 16, 2015; Pers. Comm. Adrianne Rankin, January 5, 2017, April 4, 2017). As described in **Section 2.1.3**, ACC would select proposed locations in consultation with the appropriate range and other installation personnel to ensure additional use for an AT exercise is consistent with the installation's cultural resource policies and procedures. The Proposed Action would result in a negligible increase in existing operations at these training sites. Therefore,

cultural resources on military installations in southern Arizona will be confirmed during the environmental site preparation phase prior to the AT exercises.

U.S. Forest Service

Eight training locations are proposed on USFS property within the Coronado NF. Due in part to extremely steep terrain in the Coronado NF, only five percent of the forest has been surveyed for cultural resources (USFS 2013). However, more than 2,400 cultural sites have been recorded on the forest, of which 141 are listed on the NRHP. None of the eight proposed training locations have been previously surveyed for cultural resources and no cultural sites have been recorded in the APE. No structures or other above-ground features were noted in the APE during a review of historic topographic maps or aerial imagery. With the lack of previous investigation in these areas, it is possible unidentified cultural resources may occur. The USAF has not identified any properties of traditional religious or cultural significance at proposed training locations on USFS property in Southern Arizona.

Miscellaneous

Eighteen training locations are proposed on state, county, municipal, private, tribal, and other miscellaneous properties in southern Arizona, of which three have been completely surveyed for cultural resources, six have been partially surveyed, and nine have not been surveyed (see **Tables H-1** and **H-2** in **Appendix H** for site-specific survey data).

Twelve previously recorded sites were identified in the APE at four locations: a historic gas pipeline at the Eloy North location; prehistoric canals, a pueblo, a pithouse, a historic railroad, and an unidentified site at the Phoenix Sky Harbor IAP location; a historic road and telegraph and telephone lines at the Three Points Public Shooting Range location; and a construction camp and rock alignment with historic artifacts at the Saguaro Lake location. In addition, the Phoenix, Bisbee Douglas, and Coolidge airports are historic, but have not been recorded or evaluated for the NRHP. The Bisbee Douglas Airport's Master Plan indicates historic facilities are present and additional cultural resources may be present in the surrounding area (Cochise County 2015). Cultural resources within the APE for training locations on miscellaneous property in southern Arizona and their NRHP eligibility are summarized in **Table 3-24**. Where NRHP eligibility is unevaluated or unknown, the sites are considered eligible for the purposes of this analysis and for Section 106 consultation. The USAF has not identified any properties of traditional religious or cultural significance at proposed training locations on miscellaneous properties in Southern Arizona.

Unrecorded cultural resources are possible at five training locations that have not been completely surveyed. No structures or other above-ground features were noted in the APE at these locations during a review of historic topographic maps or aerial imagery. Ten additional locations have not been surveyed for cultural resources; however, these locations are heavily disturbed or developed, such as quarries and airports, and are highly unlikely to contain intact cultural resources (see **Tables H-1** and **H-2** in **Appendix H**).

Table 3-24. Cultural Resources within the APE of Proposed Locations on Southern Arizona Miscellaneous Lands

Site Number	Description	NRHP Eligibility	Training Location
Not applicable	Bisbee Douglas IAP (not recorded)	Unevaluated	Bisbee Douglas IAP
Not applicable	Coolidge Airport (not recorded)	Unevaluated	Coolidge Airport
AZ AA:12:875 (ASM)	El Paso Natural Gas Pipeline No. 1007	Eligible	Eloy North
AZ T:12:131 (ASM)	Canal Patricio System	Eligible	Phoenix Sky Harbor IAP
P:3:6 (GP)	Unidentified	Unknown	Phoenix Sky Harbor IAP
AZ T:12:62 (ASM)	Dutch Canal Ruin	Eligible	Phoenix Sky Harbor IAP
AZ T:12:47 (ASM)	Pueblo Salado	Eligible	Phoenix Sky Harbor IAP
AZ:U:9:237 (ASM)	Hohokam canals and artifacts	Eligible	Phoenix Sky Harbor IAP
AZ U:9:297 (ASM)	Possible pithouse	Unevaluated	Phoenix Sky Harbor IAP
AZ T:10:84 (ASM)	Southern Pacific Railroad: Welton-Phoenix-Eloy Spur	Eligible	Phoenix Sky Harbor IAP
Not applicable	Phoenix Sky Harbor IAP (not recorded)	Unevaluated	Phoenix Sky Harbor IAP
AZ AA:16:377 (ASM)	State Route 86	Eligible	Three Points Public Shooting Range
AZ Z:14:127 (ASM)	Telegraph and telephone lines	Not Eligible	Three Points Public Shooting Range
AZ U:6:194 (ASM)	Stewart Martin Dam Construction Camp	Eligible	Saguaro Lake
AZ U:6:195 (ASM)	Rock alignment and historic artifact scatters	Unevaluated	Saguaro Lake

The Salt River High and Salt River Low training locations are within the White Mountain Apache Reservation. The USAF has previously used locations along the Salt River for the AT exercise, at which times the USAF entered into a license agreement with the White Mountain Apache Tribe. A copy of an agreement executed for training in 2013 is included in **Appendix D**. The USAF has invited the White Mountain Apache Tribe to consult on the Proposed Action and continued use of the Salt River High and Salt River Low locations, as well as any concerns regarding cultural resources. The USAF is consulting with the White Mountain Apache THPO for the purposes of Section 106 compliance for proposed training activities on tribal land. The White Mountain Apache THPO concurred with the USAF's finding of no historic properties effected for training activities on the White Mountain Apache Reservation. Correspondence with the White Mountain Apache THPO is included in **Appendix A.**

3.5.2.4 NORTHERN ARIZONA

Military Installations

Eleven training locations are proposed on two military installations in northern Arizona: Camp Navajo and Fort Tuthill (**Table 2-1**, **Table H-1**). Fort Tuthill is a military recreation center adjacent to the historic Camp Tuthill, an NRHP-listed former National Guard summer training

camp that is currently owned by Coconino County and operated as part of the Fort Tuthill County Park (Ryden et al. 2004). Camp Tuthill is outside of the APE for the Fort Tuthill training location. The proposed training locations at Camp Navajo and Fort Tuthill are currently used and approved for activities similar to the Proposed Action. Consultation with installation personnel did not identify any cultural resource concerns (Pers. Comm. Hannah Telle, February 17, 2015). As described in **Section 2.1.3**, ACC would select proposed locations in consultation with the appropriate range and other installation personnel to ensure additional use for an AT exercise is consistent with the installation's cultural resource policies and procedures. The Proposed Action would result in a negligible increase in already existing operations at these training sites. Therefore, cultural resources on military installations in northern Arizona will be confirmed during the environmental site preparation phase prior to the AT exercises.

U.S. Forest Service

Nineteen training locations are proposed on USFS property in the Kaibab NF, Apache-Sitgreaves NF, and Coconino NF. Three locations have been partially surveyed and sixteen have not been surveyed (see **Tables H-1** and **H-2** in **Appendix H** for site-specific survey data).

Four sites were identified within the APEs of seven training locations: a historic railroad at the Comanche location; a prehistoric artifact scatter at the Mohawk location; historic cabins at the Longview – USFS Helitack Base location; and an unidentified site within the overlapping APEs of the Hannagan Meadow – USFS Helitack Base and Helibase Circular locations, which are adjacent to one another. In addition, unrecorded historic buildings may be present at the Black Mesa and Mormon Lake locations. Cultural resources within the APE for training locations on USFS property in Northern Arizona and their NRHP eligibility are summarized in **Table 3-25**. Where NRHP eligibility is unevaluated or unknown, the sites are considered eligible for the purposes of this analysis and for Section 106 consultation. The USAF has not identified any properties of traditional religious or cultural significance at proposed training locations on USFS property in Northern Arizona.

Table 3-25. Cultural Resources within the APE of Proposed Locations on Northern Arizona U.S. Forest Service Lands

Site Number	Description	NRHP Eligibility	Training Location
Not applicable	Unidentified, potentially historic buildings	Unevaluated	Black Mesa – USFS Helitack Base
36066	Flim-Flam Railroad	Unevaluated	Comanche
Not applicable	Unidentified	Unknown	Hannagan Meadow – USFS Helitack Base, Helibase Circular,
NA20311	Historic cabins	Unevaluated	Longview – USFS Helitack Base
AR-03-07-04-00461	Prehistoric artifact scatter	Unevaluated	Mohawk
Not applicable	Unidentified, potentially historic buildings	Unevaluated	Mormon Lake

Unrecorded cultural resources are possible at seventeen training locations that have not been completely surveyed. Two additional locations have not been surveyed for cultural resources; however, these locations are a highly disturbed helitack base (Pittman Valley) and a WTA (Roosevelt Lake) where intact archaeological sites or potential impacts on cultural resources would not be expected (see **Tables H-1** and **H-2** in **Appendix H**).

Miscellaneous

Thirty training locations are proposed on state, county, municipal, private, and other miscellaneous properties in northern Arizona. Four of these locations have been completely surveyed for cultural resources, five have been partially surveyed, and twenty-one have not been surveyed (see **Tables H-1** and **H-2** in **Appendix H** for site-specific survey data).

Three sites were identified within the APE of three locations: a prehistoric lithic quarry and scatter at the Flagstaff Pulliam Airport location, the Kingman Army Airfield at the Kingman Airport location, and a lithic quarry area known as the Gray Mountain Site at the Sinkhole location. In addition, the Flagstaff Pulliam Airport, Grand Canyon National Park Airport, Grand Canyon Valle Airport, H.A. Clark Memorial Field, Springerville Airport, and Winslow-Lindbergh Regional Airport are historic airports that have not been previously recorded or evaluated for the NRHP. Unrecorded historic structures were also identified near the FR 320/311 location. Cultural resources within the APE for training locations on USFS property in Northern Arizona and their NRHP eligibility are summarized in **Table 3-26**. Where NRHP eligibility is unevaluated or unknown, the sites are considered eligible for the purposes of this analysis and for Section 106 consultation. The USAF has not identified any properties of traditional religious or cultural significance at proposed training locations on miscellaneous properties in Northern Arizona.

Table 3-26. Cultural Resources within the APE of Proposed Locations on Northern Arizona Miscellaneous Lands

Site Number	Description	NRHP Eligibility	Training Location
Not applicable	Flagstaff Pulliam Airport (not recorded)	Unevaluated	Flagstaff Pulliam Airport
NA14166	Prehistoric lithic quarry and scatter	Unevaluated	Flagstaff Pulliam Airport
Not applicable	Unidentified historic buildings (not recorded)	Unevaluated	FR 320/311
Not applicable	Grand Canyon National Park Airport (not recorded)	Unevaluated	Grand Canyon National Park Airport
Not applicable	Grand Canyon Valle Airport (not recorded)	Unevaluated	Grand Canyon Valle Airport
Not applicable	H. A. Clark Memorial Field (not recorded)	Unevaluated	H.A. Clark Memorial Field
AZ G:9:8 (ASM)	Kingman Army Airfield 1942-1945	Eligible	Kingman Airport
AZ I:7:5	Gray Mountain Site (lithic quarry and reduction area)	Eligible	Sinkhole
Not applicable	Springerville Airport (not recorded)	Unevaluated	Springerville Airport
Not applicable	Winslow-Lindbergh Regional Airport (not recorded)	Unevaluated	Winslow-Lindbergh Regional Airport

Additional unrecorded cultural resources are possible at 16 proposed training locations that have not been completely surveyed for cultural resources. Ten additional locations have not been surveyed for cultural resources; however, these locations are heavily disturbed, developed, or are water locations where intact archaeological sites or potential impacts on cultural resources would not be expected (see **Tables H-1** and **H-2** in **Appendix H**).

3.5.2.5 NEW MEXICO

Military Installations

Two training locations are proposed at two military installations in New Mexico: Melrose Air Force Range and White Sands Missile Range (**Table 2-1**, **Table H-1**). These locations are currently used and approved for training activities similar to the Proposed Action. The ICRMP review and consultation with installation personnel did not identify any cultural resource concerns (Melrose AFB 2009; WSMR 2015). As described in **Section 2.1.3**, ACC would select proposed locations in consultation with the appropriate range and other installation personnel ensure additional use for an AT exercise is consistent with the installation's cultural resource policies and procedures. The Proposed Action would result in a negligible increase in already existing operations at these training sites; therefore, cultural resources will be confirmed during the environmental site preparation phase prior to the AT exercises.

U.S. Forest Service

Ten training locations are proposed on USFS property in the Gila NF in New Mexico. Six of these locations have been completely surveyed for cultural resources, two have been partially surveyed, and two have not been surveyed (see **Tables H-1** and **H-2** in **Appendix H** for site-specific survey data).

Six sites were identified within the APE of two training locations: three prehistoric archaeological sites, one historic site, and one multicomponent site at the Reserve Airport; and a prehistoric archaeological site at the Reserve Ranger Station. In addition, three unrecorded historic resources were identified at three proposed training locations during the map and document review and in consultation with the USFS: unrecorded administrative buildings and sites at the Glenwood Ranger Station; the Negrito Airfield at Negrito Center; and the Reserve Airport at the Reserve Airport location. Cultural resources within the APE for training locations on USFS property in New Mexico and their NRHP eligibility are summarized in **Table 3-27**. Where NRHP eligibility is unevaluated or unknown, the sites are considered eligible for the purposes of this analysis and for Section 106 consultation. The USAF has not identified any properties of traditional religious or cultural significance at proposed training locations on USFS property in New Mexico.

Additional unidentified cultural resources are possible at two locations that have not been completely surveyed. Two additional locations have not been completely surveyed for cultural resources; however, these locations are at the existing Negrito Airstrip and Negrito Work Center where intact cultural resources would not be expected (see **Tables H-1** and **H-2** in **Appendix H**).

Table 3-27. Cultural Resources within the APE of Proposed Locations on New Mexico U.S. Forest Service Lands

Site Number	Description	NRHP Eligibility	Training Location
Not applicable	Administrative buildings/sites (not recorded)	Unevaluated	Glenwood Ranger Station
Not applicable	Negrito Airfield (not recorded)	Unevaluated	Negrito Center
33974	Multicomponent archaeological site with artifacts and features	Eligible	Reserve Airport
39977	Prehistoric archaeological site with artifacts	Unevaluated	Reserve Airport
69064	Prehistoric archaeological site with artifacts	Unevaluated	Reserve Airport
70194	Prehistoric archaeological site with artifacts and features	Unknown	Reserve Airport
149438	Historic archaeological site with artifacts and features	Eligible	Reserve Airport
Not applicable	Reserve Airport (not recorded)	Unevaluated	Reserve Airport
33624	Prehistoric archaeological site with artifacts	Not Eligible	Reserve Ranger Station

Miscellaneous

One training location is proposed on miscellaneous property in New Mexico (the Playas Training and Research Center). No previous surveys were identified at the Playas location. The Playas Training and Research Center is currently used for training activities similar to the Proposed Action that were evaluated for cultural resource impacts in a Final EA and FONSI released in 2006 (New Mexico Tech 2006). All of the training areas at the Playas Training and Research Center that would be used in the AT exercise were included in the analysis area for the 2006 EA. The EA did not identify any previously recorded sites in the training area and concluded sites would be unlikely due to the development history at the training center (New Mexico Tech 2006). The USAF has not identified any properties of traditional religious or cultural significance at this location.

3.5.2.6 CALIFORNIA

Military Installations

Fifteen training locations are proposed on four military installations in California: Camp Pendleton, Naval Air Facility El Centro, NAS North Island, and March ARB (**Table 2-1**, **Table H-1**). The proposed locations are currently used and approved for training activities similar to the Proposed Action. The ICRMP review and consultation with installation personnel did not identify any cultural resource concerns (CPEN 2008; JRP Historical Consulting 2011; SCI 2012). As described in **Section 2.1.3**, ACC would select proposed locations in consultation with the appropriate range and other installation personnel to ensure additional use for an AT exercise is consistent with the installation's cultural resource policies and procedures. The Proposed Action would result in a negligible increase in already existing operations at these training sites;

therefore, cultural resources will be confirmed during the environmental site preparation phase prior to the AT exercises.

3.5.2.7 NEVADA

Military Installations

AT training activities at Nellis AFB would consist of command and control-type activities in existing facilities and would not have potential to impact cultural resources; therefore, cultural resources are not evaluated further for Nellis AFB.

3.6 Health and Safety

3.6.1 Definition of Resource

A safe environment is one in which there is no, or there is an optimally reduced, potential for death, serious bodily injury or illness, or property damage. Human health and safety addresses the safety of USAF personnel and the general public during training exercises.

Necessary elements for an accident-prone situation or environment include the presence of the hazard itself together with the exposed (and possibly susceptible) population. The degree of exposure depends primarily on the proximity of the hazard to the population. Activities that can be hazardous include transportation, rural training exercises, and the creation of extremely noisy environments. The proper operation, maintenance, fueling, and repair of vehicles, aircraft, and equipment carry important safety implications. Extremely noisy environments, such as helicopters, can also mask verbal or mechanical warning signals such as sirens, bells, or horns. An additional safety concern with regard to military training flights is the potential for aircraft mishaps (i.e., crashes), including those caused by adverse weather events and bird-aircraft strikes. The safe and efficient use of available navigable airspace to prevent aircraft mishaps is discussed further in **Section 3.3**.

AFI 91-301, *Air Force Occupational and Environmental Safety, Fire Protection, and Health (AFOSH) Program*, implements AFPD 91-3, *Occupational Safety and Health*, by outlining the AFOSH Program. The purpose of the AFOSH Program is to minimize loss of USAF resources and to protect USAF personnel from occupational deaths, injuries, or illnesses by managing risks. In conjunction with the USAF Mishap Prevention Program, which establishes mishap prevention program requirements (including Bird/Wildlife Aircraft Strike Hazards), these standards ensure all USAF workplaces meet federal safety and health requirements. This instruction applies to all USAF activities.

3.6.2 Affected Environment

3.6.2.1 SOUTHERN ARIZONA

Military Installations

Training sites on military installations in the southern Arizona area consist of existing LZs, HLZs, DZs, FARPs, MOUTs, and firing ranges. Each branch of the military has its own policies and regulations that act to protect its personnel and workers, despite their work locations. AFI 91-301 would apply to all personnel involved in the biannual AT exercise in the southern Arizona area.

U.S. Forest Service

Training sites controlled by USFS in the southern Arizona area consist of DZs, HLZs and a rope training area. These sites are located in natural areas that are not closed off to the public and have the potential to be used by recreationalists for camping, hiking, hunting, and other activities. All rules and regulations provided in special use permits would be followed when training in these areas.

Miscellaneous

Miscellaneous training sites in southern Arizona primarily consist of LZs, HLZs, DZs, FARPs, MOUTs, operations centers, classrooms, observation points and a shooting range. These sites are located at municipal airports and in natural areas that are not closed off to the public. The Three Points Shooting Range is also open to the public. There are numerous safety and operational policies that must be followed by all users of this range. All health and safety policies and procedures currently used by Davis-Monthan AFB would be followed when training in these areas. Additionally, all rules and regulations provided in any special use permits would be followed when training in these areas.

3.6.2.2 NORTHERN ARIZONA

Military Installations

Training sites on military installations in the northern Arizona area primarily consist of existing HLZs, DZs, MOUTs, and an operations center. Use of these training sites would be primarily the same as those described in **Section 3.6.2.1**, southern Arizona, and all health and safety policies and procedures currently used by Davis-Monthan AFB would be followed when training in these areas.

U.S. Forest Service

Training sites controlled by USFS in the northern Arizona area consist of HLZs and DZs. Use of these training sites would be primarily the same as those described in **Section 3.6.2.1** under southern Arizona.

Miscellaneous

Miscellaneous training sites in the northern Arizona area consist of LZs, HLZs, DZs, and operations centers. These sites are located at municipal airports and in natural areas that are not closed off to the public. Use of these sites would be primarily the same as those described in **Section 3.6.2.1** under southern Arizona.

3.6.2.3 NEW MEXICO

Military Installations

Training sites on military installations in the New Mexico area consist of existing HLZs, DZs, MOUTs, and shooting ranges. Each branch of the military has its own policies and regulations that act to protect its personnel and workers, despite their work locations. AFI 91-301 would apply to all personnel involved in the biannual AT exercise in the southern Arizona area.

U.S. Forest Service

Training sites controlled by USFS in the New Mexico area consist of LZs, HLZs and DZs and include a municipal airport. Use of these training areas would be primarily the same as those described in **Section 3.6.2.1** under southern Arizona.

Miscellaneous

The miscellaneous training sites in the New Mexico area consist of existing LZs, HLZs, DZs, and MOUTs associated with an established urban training area. Use of these sites would primarily be the same as those described in **Section 3.6.2.1** under southern Arizona.

3.6.2.4 CALIFORNIA

Military Installations

Training sites on military installations in California primarily consist of existing LZs, HLZs, DZs, FARPs, and MOUTs. Use of these training sites would be similar to those described in **Section 3.6.2.1** under southern Arizona, other than the offshore activities. All health and safety policies and procedures currently used by Davis-Monthan AFB would be followed when training in these areas.

3.7 Hazardous Materials and Wastes

3.7.1 Definition of Resource

Hazardous materials are defined by 49 CFR § 171.8 as “hazardous substances, hazardous wastes, marine pollutants, elevated temperature materials, materials designated as hazardous in the Hazardous Materials Table (49 CFR § 172.101), and materials that meet the defining criteria for hazard classes and divisions” in 49 CFR § 173. Transportation of hazardous materials is regulated by the U.S. Department of Transportation regulations within 49 CFR §§ 105–180. Under the Comprehensive Environmental Response, Compensation, and Liability Act and the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act (RCRA), “hazardous materials” refers to any item or agent (biological, chemical, or physical) that has the potential to cause harm to humans, animals, or the environment, either by itself or through interaction with other factors. A complete list of federally-recognized hazardous substances as well as their reportable quantities is provided in 40 CFR § 302.4.

Hazardous wastes are defined by RCRA at 42 U.S.C. § 6903(5), as amended by the Hazardous and Solid Waste Amendments, as “a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may (A) cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (B) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed.” Certain types of hazardous wastes are subject to special management provisions intended to ease the management burden and facilitate the recycling of such materials. These are called universal wastes and their associated regulatory requirements are specified in 40 CFR § 273. Four types of waste are currently covered under the universal waste regulations: hazardous waste batteries, hazardous waste pesticides that are either

recalled or collected in waste pesticide collection programs, hazardous waste thermostats, and hazardous waste lamps.

For USAF, AFPD 32-70, *Environmental Quality*, and the AFI 32-7000 series incorporate the requirements of all federal regulations, and other AFIs and DOD Directives for the management of hazardous materials, hazardous wastes, and special hazards. Evaluation extends to generation, storage, transportation, and disposal of hazardous wastes when such activity occurs at or near the project site of the Proposed Action.

3.7.2 Affected Environment

3.7.2.1 SOUTHERN ARIZONA

Military Installations

Training sites on military installations in the southern Arizona area consist of LZs, HLZs, DZs, FARPs, MOUTs, and a firing range. Fixed- and rotary-winged aircraft used during the AT exercise could develop leaks or require unscheduled maintenance and, therefore, the need for and use of petroleum, oil, and lubricants (POL) exist. Davis-Monthan AFB has developed and implemented an installation-wide Spill Prevention Control and Countermeasure (SPCC) Plan, Pollution Prevention Plan, and Hazardous Waste Management Plan and adherence to these plans would be applicable at all Proposed Action sites.

Military training and tactical aides would be used during exercise activities. These could include, but not be limited to flares, simulated marking ammunition, pyrotechnics, and small arms. Use of these items would only occur in areas previously cleared for their use and live-fire would only occur in designated ranges. All military training and tactical aides would be used in accordance with all applicable USAF plans and procedures. No significant impacts on hazardous materials and waste would be expected.

U.S. Forest Service

Training sites controlled by USFS in the southern Arizona area consist of HLZs, DZs, and a rope training area. Fixed- and rotary-winged aircraft used during the AT exercise could develop leaks or require unscheduled maintenance and, therefore, the need for and use of POL exist. Davis-Monthan AFB has developed and implemented an installation-wide SPCC Plan, Pollution Prevention Plan, and Hazardous Waste Management Plan. Adherence to these plans would be applicable at all Proposed Action sites. All military training and tactical aides would be used in accordance with all applicable USAF plans and procedures. Pack in/pack out maintenance procedures would be followed to the greatest extent practicable. Additionally, all rules and regulations provided in special use permits would be followed when training in these areas. No significant impacts on hazardous materials and waste would be expected.

Miscellaneous

Miscellaneous training sites in southern Arizona primarily consist of LZs, HLZs, DZs, FARPs, MOUTs, operations centers, classrooms, observation points and a shooting range. Fixed- and rotary-winged aircraft used during the AT exercise could develop leaks or require unscheduled maintenance and, therefore, the need for and use of POL exist. Davis-Monthan AFB has developed and implemented an installation-wide SPCC Plan, Pollution Prevention Plan, and Hazardous Waste Management Plan and adherence to these plans would be applicable at all

Proposed Action sites. Additionally, all rules and regulations provided in any special use permits would be followed when conducting training activities in these areas. No significant impacts on hazardous materials and waste would be expected.

3.7.2.2 NORTHERN ARIZONA

Military Installations

Training sites on military installations in the northern Arizona area primarily consist of existing HLZs, DZs, MOUTs, and an operations center. Use of these training sites would be primarily the same as those described in **Section 3.7.2.1** under southern Arizona, and all policies and procedures currently used by Davis-Monthan AFB would be followed when conducting training activities in these areas.

U.S. Forest Service

Training sites controlled by USFS in the northern Arizona area consist of HLZs and DZs. Use of these training sites would be primarily the same as those described in **Section 3.7.2.1** under southern Arizona.

Miscellaneous

Miscellaneous training sites in the northern Arizona area consist of LZs, HLZs, DZs, and operations centers. Use of these sites would be primarily the same as those described in **Section 3.7.2.1** under southern Arizona.

3.7.2.3 NEW MEXICO

Military Installations

Training sites on military installations in the New Mexico area consist of existing HLZs, DZs, MOUTs, and shooting ranges. Each branch of the military has its own policies and regulations that act to protect its personnel and workers, despite their work locations. AFI 91-301 would apply to all personnel involved in the biannual AT exercise in the southern Arizona area.

U.S. Forest Service

Training sites controlled by USFS in the New Mexico area consist of LZs, HLZs, and DZs and include a municipal airport. Use of these training areas would be primarily the same as those described in **Section 3.7.2.1** under southern Arizona.

Miscellaneous

The miscellaneous training sites in the New Mexico area consist of existing LZs, HLZs, DZs, and MOUTs associated with an established urban training area. Use of these sites would be primarily the same as those described in **Section 3.7.2.1** under southern Arizona.

3.7.2.4 CALIFORNIA

Military Installations

Training sites on military installations in California primarily consist of existing LZs, HLZs, DZs, FARPs, and MOUTs. Use of these training sites would be primarily the same as those described in **Section 3.7.2.1** under southern Arizona, other than the offshore activities. All procedures currently used by Davis-Monthan AFB would be followed when conducting training activities in these areas.

4. Environmental Consequences

This section presents a description of the environmental resources and baseline conditions that could be affected from implementing the Proposed Action. In addition, this section presents an analysis of the potential environmental consequences of implementing the Proposed Action, and the consequences of selecting the No Action Alternative.

The impact analyses include the following:

- The Proposed Action (described in **Section 2.1**)
- The No Action Alternative (described in **Section 2.4**).

Sections 4.1 through **4.7** discuss potential environmental impacts on the affected environment.

The following discussion elaborates on the nature of the characteristics that might relate to various impacts:

- ***Short-term or long-term*.** These characteristics are determined on a case-by-case basis and do not refer to any rigid time period. In general, short-term impacts would be those that would occur only with respect to a particular activity or for a finite period or only during the time required for construction or installation activities. Long-term impacts would be those that would be more likely to be persistent and chronic.
- ***Direct or indirect*.** A direct impact would be caused by and occurs contemporaneously at or near the location of the action. An indirect impact would be caused by a proposed action and might occur later in time or be farther removed in distance but could still be a reasonably foreseeable outcome of the action. For example, a direct impact of erosion on a stream might include sediment-laden waters in the vicinity of the action, whereas an indirect impact of the same erosion might lead to lack of spawning and result in lowered reproduction rates of indigenous fish downstream.
- ***Negligible, minor, moderate, or major*.** These relative terms are used to characterize the magnitude or intensity of an impact. Negligible impacts would generally be those that might be perceptible but would be at the lower level of detection. A minor effect would be slight, but detectable. A moderate impact would be readily apparent. A major impact would be one that would be severely adverse or exceptionally beneficial.
- ***Adverse or beneficial*.** An adverse impact would be one having unfavorable or undesirable outcomes on the man-made or natural environment. A beneficial impact would be one having positive outcomes on the man-made or natural environment. A single act might result in adverse impacts on one environmental resource and beneficial impacts on another resource.
- ***Context*.** The context of an impact could be localized or more widespread (e.g., regional, global).

4.1 Noise

4.1.1 Proposed Action

Long-term, minor, adverse impacts on the noise environment would be expected from an incremental increase in aircraft operations and associated noise as described in the following paragraphs. Although there would be no appreciable change in the overall noise environment at any training location, long-term impacts would be due to noise generated by additional individual overflights and training activities from the biannual AT exercise. Impacts could affect both Air Force personnel and other persons near the training locations. These incremental increases in noise would be confined to the period during the AT exercise itself, and in general, would not constitute a perceptible change in the overall noise environment. Therefore, there would be no significant impact on the noise environment from the Proposed Action.

4.1.1.1 SOUTHERN ARIZONA

Military Installations

Long-term, minor, adverse impacts on the noise environment would be expected. These impacts would be from an incremental increase in fixed-wing, helicopter, and unmanned aerial system (UAS) operations at LZs at military installations in southern Arizona (see **Table 2-1** for site-specific training activities). The additional operations would be consistent with the existing and historical sources of noise at these active military installations and aviation training areas.

Davis-Monthan AFB and Vicinity. NOISEMAP Version 7.3 was used to calculate and plot the DNL noise contours at Davis-Monthan AFB with the biannual AT exercise (**Figure 4-1**). The overall changes in noise at Davis-Monthan AFB due to the Proposed Action would be nearly indistinguishable from the baseline conditions (see **Figure 3-1**). The two assisted living facilities to the south east of Davis-Monthan AFB near the intersection of South Kolb Road and East Valencia Road still remain beyond the modeled 65 dBA DNL noise contour after the inclusion of AT activities. .The AT operations at Davis-Monthan AFB make up a small fraction (3.7 percent) of the overall base operations, and these additional intermittent aircraft operations would have a minute effect on the noise environment surrounding the base. Additional aircraft operations would occur twice per year for a limited time period for each occurrence of the AT exercise. Davis-Monthan AFB operates at near to its maximum allowable daily throughput (number of aircraft operations passing through the airfield). During each AT exercise, normal aircraft operations at Davis-Monthan AFB would have to be temporarily reduced in order to allow for AT aircraft to perform the scheduled exercise take-offs and landings. The overall number of aircraft operations during AT remains approximately the same as the baseline operational throughput of Davis-Monthan AFB. Additional data collection, or updates to the 2008 noise contours would not provide any additional information that would better clarify the incremental nature and minor effects of the proposed action. The introduction of any additional aircraft and operations due to the AT exercise would have little effect on the DNL noise contours due to the operational tempo and loudness of the military aircraft based at Davis-Monthan AFB that routinely operate from the airfield.

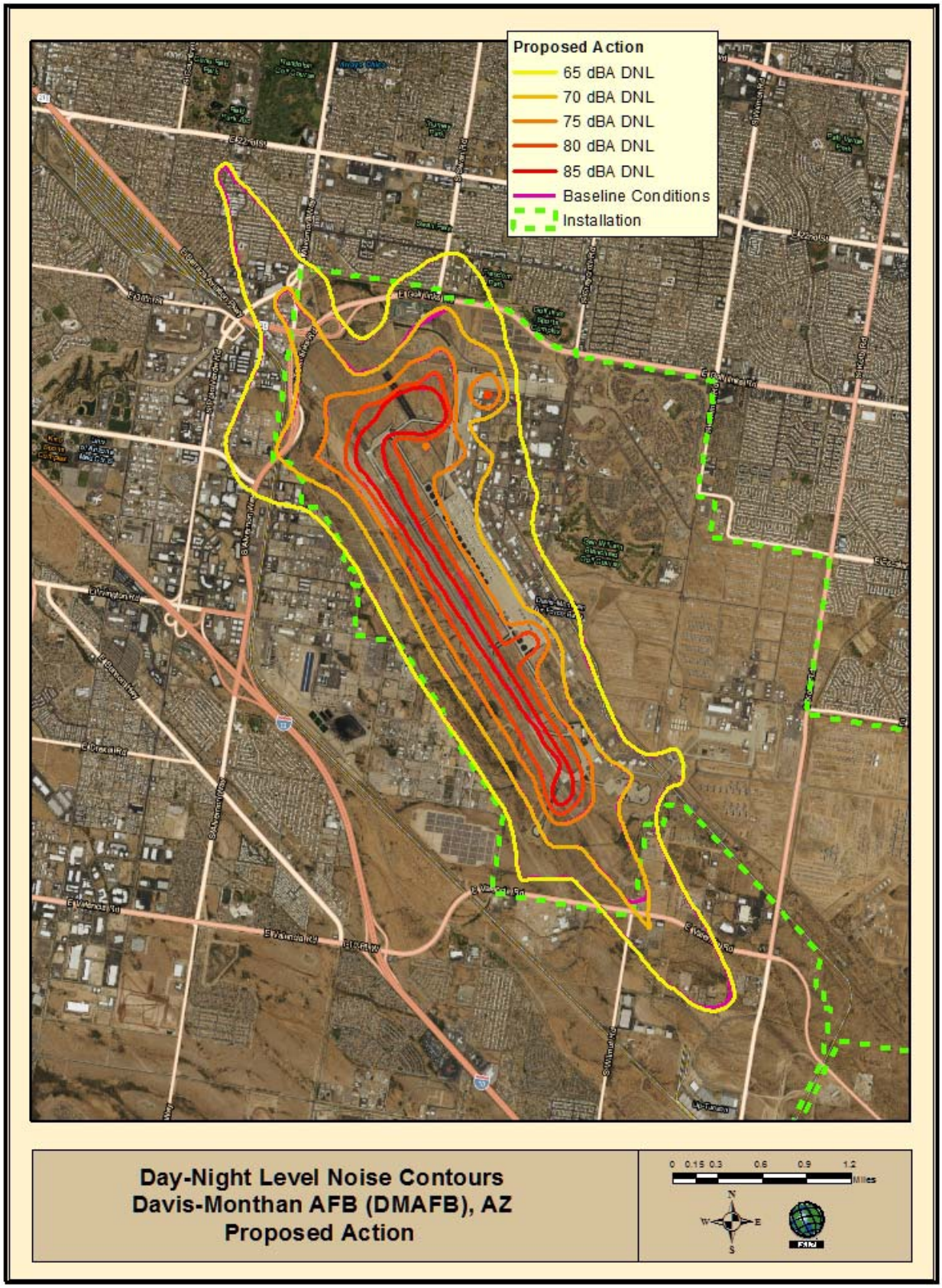

Figure 4-1. Noise Contours for Davis-Monthan AFB – Proposed Action

The addition of the proposed AT exercises would increase the average annual air operations at Davis-Monthan AFB by 6.6 operations per day or 3.7 percent over the baseline levels. These additional air operations for the twice per yearly AT exercise would have a minute, incremental impact on the noise surrounding Davis-Monthan AFB. These changes in noise would be less than significant and the change in the average annual day noise environment would not be perceptible when compared to baseline average annual day conditions. **Table 4-1** presents the land acreage (both on- and off-installation) exposed to noise levels greater than 65 dBA DNL with the biannual AT exercises. The noise contours would incrementally increase in size on all sides by a few feet. No new areas of noise sensitive land use would be exposed to noise greater than 65 dBA DNL. These impacts would be minor. Noise supporting documentation is provided in **Appendix E**.

Table 4-1. Area within Noise Contours in the Vicinity of Davis-Monthan AFB

Noise Contour (DNL)	Total Area (Acres)		Area Off Base (Acres)	
	Baseline Conditions	Proposed Action	Baseline Conditions	Proposed Action
65 dBA or greater	4,121.1	4,154.7	822.9	848.3
70 dBA or greater	2,110.1	2,130.2	31.5	42.7
75 dBA or greater	1,102.5	1,108.4	0.0	0.0
80 dBA or greater	588.5	591.7	0.0	0.0
85 dBA or greater	253.7	256.7	0.0	0.0

Note: Please see **Appendix E** for additional detail.

Because noise is measured on a logarithmic scale, two sources of equal value (e.g., takeoff and landing events along a runway) added together result in an increase of 3 dBA at all distances. Therefore, an air installation would require double the air operations in order to increase the noise level by 3 dBA in nearby areas. For example, air traffic generating 60 dBA plus the same amount of air traffic at the same location would yield a total noise level of 63 dBA. A 3 dBA change in noise level would be less than significant and barely perceptible to individuals with average hearing (FAA 2007).

Landing Zones. The noise environment in the immediate area surrounding military LZs in southern Arizona is dominated by fixed-wing, helicopter, and UAS takeoff and landing operations. Further information about noise levels associated with UAS aircraft used in AT training can be found in **Appendix E**.

Analysis of potential impacts in the vicinity of LZs due to the AT exercise is performed by examining those areas with a high volume of aircraft operations (100 or more sorties per day) and those with a low volume of aircraft operations (20 or fewer sorties per day) and assessing the potential impacts separately. Approximately 100 sorties would be flown to and from the LZs in addition to those at Davis-Monthan AFB. If AT operations were distributed evenly across all potential LZs, it would equate to 1.7 additional sorties per day at each military LZs and an additional 0.2 sorties per day at non-military LZs during the biannual exercise. It is likely that additional factors such as LZ size, operational tempo, and the distance the LZ is from Davis-Monthan AFB could cause additional AT operations, all of which would not be evenly distributed

between the individual LZ locations. For example, a larger military LZ with a high operational tempo near to Davis-Monthan AFB would likely receive a higher than average number of sorties as part of the AT exercise than a remote private LZ.

A larger military LZ with high existing operations would likely experience more than 1.7 average sorties per day during the AT exercise. Operations at this type of LZ site would be expected to be greater than 100 sorties per day. The additional 1.7 sorties per day due to the AT exercise would correspond to less than a two percent increase in total site operations at these LZs, and would cause a negligible change in the noise environment. Even if double the AT operations were to take place at this type of LZ, the additional operations would represent a less than four percent increase of the standard LZ operations and would not cause a significant impact to the existing noise environment. This would likely not be a noticeable increase in noise to the average human ear.

A larger non-military LZ with high existing operations would likely experience an additional 0.2 or more sorties per day due to the AT exercise. The standard operational tempo is not known for non-military LZs but is expected to be at least 100 sorties per day. An increase of 0.2 sorties per day (or one additional sortie per five days) would not constitute a significant increase in LZ operations if the site is experiencing a high level of daily operations. The additional 0.2 sorties per day at non-military LZs with high existing operations would not cause a significant impact to the existing noise environment. Similarly to the larger military LZs, there would not likely be a noticeable increase in noise to the average human ear.

A smaller military LZ with low existing operations (approximately 20 or fewer sorties per day) would likely experience 1.7 or fewer average sorties per day during the AT exercise. It would take a doubling in air operations at any LZ to have even a barely perceptible change to the noise environment. Therefore, this increase of less than 1.7 sorties per day would not change the overall noise environment assuming that there are at least a few aircraft operations per day at the LZ. Even if existing operations at military LZ sites are low, the addition of 1.7 or fewer sorties per day due to AT would not constitute a significant impact. This would likely not be a noticeable increase in noise to the average human ear.

A smaller non-military LZ with low existing operations (approximately 20 or fewer sorties per day) would likely experience an additional 0.2 or fewer sorties per day due to the AT exercise. A doubling in air operations would have to occur for even a barely perceptible change to happen to the noise environment. Assuming that the LZ experiences at least a few aircraft activities per week due to its standard operations, the addition of 0.2 or fewer AT sorties per day would not cause a significant impact to the noise environment. Similarly to the smaller military LZs, there would not likely be a noticeable increase in noise to the average human ear.

For LZs with high air traffic operations, the contribution of air operations due to the AT exercise would be so small when compared to existing conditions that it would not change the overall noise environment in surrounding areas. For LZs with low air traffic, the addition of air operations due to AT would not constitute a perceptible change to the overall noise in surrounding areas assuming that these LZs experience at last a few aircraft events per day under the existing conditions. At most, the additional aircraft operations due to AT would amount to an overall increase in noise of less than 1 dBA DNL at any existing LZ of any operational

size. Based on the marginal increases in noise levels, there would be no significant noise impacts as a result of the AT exercise at LZs air traffic between the high and low operational levels. Additionally, any changes in noise levels would not likely be noticeable to the average human ear.

Helicopter Landing Zones. Long-term, minor, adverse impacts on the noise environment would be expected. These impacts would be due to incremental increases in helicopter operations at HLZs at military installations in southern Arizona. Additional operations due to AT would be consistent with the existing and historical operational sources of noise at these active military installations and non-military aviation training areas. The assessed additional operations and associated noise would occur only during the biannual AT exercises.

Approximately 300 sorties would be flown to and from the HLZs other than Davis-Monthan AFB. If AT operations were distributed evenly across all potential HLZs, it would equate to an average of one additional sortie per day at military HLZs and an additional 0.1 sorties per day at non-military HLZs during the biannual AT exercise. It is likely that additional factors such as HLZ size, operational tempo, and the distance the HLZ is from Davis-Monthan AFB, could cause additional AT operations; all of which would not be evenly distributed between the individual HLZ locations. For example, a larger military HLZ with a high operational tempo near to Davis-Monthan AFB would likely receive a higher than average number of sorties as part of the AT exercise, than a remote private HLZ.

In the immediate area surrounding HLZs, the noise environment would continue to be dominated by intermittent helicopter takeoff and landing activities. Due to the limited number of new operations at any one location (approximately one sortie per day at military HLZs and 0.2 sorties per day at non-military HLZs), the overall noise environment in areas surrounding the HLZs would not change perceptibly. The contribution of helicopter noise at HLZs would continue to be either (A) so small when compared to fixed-wing air operations at adjacent airfields that they would not contribute appreciably to the overall noise levels or (B) the total aircraft operations would not be sufficient to generate noise levels resulting in incompatible land use on adjacent properties.

It would take double the aircraft operations at any HLZ to have even a barely perceptible change to the noise environment and hundreds of helicopter operations each year to generate a level of 65 dBA DNL. This incremental noise contribution of AT air operations would be so small when compared to existing conditions at any HLZ; it would not change the overall noise environment in areas surrounding the HLZs. The additional aircraft operations would amount to an overall increase in noise of less than 1 dBA DNL at any existing HLZ. Therefore, these impacts would be minor and imperceptible and any changes in noise levels would not likely be noticeable to the average human ear.

Although there would be only a minute change in the overall noise environment at HLZs, noise from individual helicopter overflights would generate distinct acoustical events and have the potential, from time-to-time, to annoy residents directly under their flight path. For helicopters, several hundred operations over a one-day period would be needed to generate 65 dBA DNL at a point directly below the flight track. Aircraft operations along flight tracks and at individual

HLZs would be far below the levels needed to generate greater than 65 dBA DNL; however, individual overflights could lead to complaints or generate annoyance.

General flight procedures outlined in AFI 11-202, Vol 3, para. 6.2.3 require aircraft to maintain altitude limitations of 500 feet above ground level in non-congested areas and 1,000 feet above the nearest obstacle in congested areas, which effectively contributes to the reduction of noise impacts and annoyances.

A good predictor of annoyance at airfields and training locations with fewer than 200 operations per day is the maximum A-weighted sound level. The maximum A-weighted sound level is the loudest average sound level over a 1-second period during an aircraft overflight. This metric provides a "snapshot" of the sound level experienced as the aircraft event is occurring rather than averaging a large number of operations over a specified period of time. The maximum A-weighted sound levels for the helicopters used during AT exercises are listed in **Table 4-2** and the percentage of the population highly annoyed from aircraft noise is outlined in **Table 4-3**. In general, helicopters flying at an altitude of 1,000 feet above ground level (AGL) would highly annoy between 13 to 25 percent of individuals directly under its flight path. Given the limited number of proposed operations due to the AT exercise, relatively low noise levels from helicopters (83 dBA or less at a 1,000 foot distance), and sporadic nature of air operations, impacts from helicopter overflights are expected to be minor and less than significant.

Table 4-2. Maximum Sound Level from Helicopters

Slant Distance (feet)	Maximum Sound Level (dBA)		
	AH-64	CH-47	HH-60/UH-60
200	92	97	91
500	83	89	82
1,000	77	83	76
2,000	70	76	69
5,000	59	67	58
10,000	50	59	48

Source: USAF 2003

Table 4-3. Percentage of Population Highly Annoyed from Aircraft Noise

Maximum Sound Level (dBA)	Percentage Highly Annoyed
70	5
75	13
80	20
85	28
90	35

Sources: Rylander 1974 and Rylander 1988

Drop Zones. Long-term, minor, adverse impacts on the noise environment would be expected. These impacts would be from an incremental increase in fixed-wing and helicopter operations at both military and non-military DZs in southern Arizona. For military DZs, sources of noise would remain consistent with active military installations and aviation training areas and the noise environment in areas surrounding DZs would continue to be dominated by intermittent fixed-wing and rotary aircraft overflights. The noise environment and existing aircraft operations are unknown for non-military DZs. The proposed additional operations and associated noise would only occur during the biannual AT exercises.

Approximately 800 sorties would be flown yearly during the biannual AT exercises. If all 800 aircraft utilize at least one DZ, this would equate to an average of one additional sortie every day during AT exercise. On a yearly scale, one operation per day at each DZ is less than 0.043 sorties per day at each of the 50 AT DZs. More active DZs would have more than one additional sortie per day with the less active DZs having less than one sortie per day during the exercise. Even if AT operations were to double over any DZ, it would only result in a marginally perceptible change to the noise environment of 3 dBA DNL. Therefore, the proposed increase of air operations would be so small when compared to existing conditions at any DZ, it would not change the overall noise environment in areas surrounding any DZ. Noise impacts would be minor and imperceptible and any changes in noise levels would not likely be noticeable to the average human ear. Although there would be only a minute change in the overall noise environment at DZs, noise from individual helicopter overflights would generate distinct acoustical events and have the potential from time-to-time to annoy residents directly under their flight path. These impacts would be identical to those outlined for HLZs and impacts would be minor.

Forward Aircraft Refueling Points. Long-term, minor, adverse impacts would be expected. These impacts would be from an incremental increase in fixed-wing, helicopter, and UAS operations at FARPs in southern Arizona. The additional operations would be consistent with the existing and historical sources of noise at these active military installations and non-military aviation training areas. Every FARP is also an LZ; therefore, as with LZs and for similar reasons. Impacts of the Proposed Action on the noise environment at FARPs would be minor.

Airspace. Long-term, minor, adverse impacts on the noise environment would be expected. These impacts would be from an incremental increase in fixed-wing, helicopter, and UAS operations within restricted airspace in southern Arizona. The additional operations and associated noise would be consistent with the existing and historical sources of noise at these restricted airspaces and would only occur during the biannual AT exercises.

Approximately 800 sorties would be flown yearly during the biannual AT exercises. Similar to DZs, as a reasonable upper bound of impacts, if all 800 aircraft utilize at least one restricted airspace, this would equate to an average of one additional sortie every day during the biannual AT exercises in any restricted airspace. More active restricted airspaces would have more than one additional sorties per day during the exercise with the less active airspaces having fewer. A doubling in aircraft operations over any location would result in a marginally perceptible change to the noise environment of 3 dBA DNL; therefore, the proposed increase of air operations would be so small when compared to existing conditions within any restricted airspace that it

would not change the background or overall noise in surrounding areas. These noise impacts to airspaces would be minor, and the change in noise levels would likely not be perceptible to the average human ear.

Although there would be only a minute change in the overall noise environment within restricted airspace, noise from individual helicopter overflights would generate distinct acoustical events, and have the potential from time-to-time to annoy residents directly under their flight path. These impacts would be the same as those outlined for HLZs and impacts would be minor.

U.S. Forest Service

Long-term, minor, adverse impacts on the noise environment would be expected. Training sites in southern Arizona controlled by USFS are primarily HLZs, with one rope training course at Mount Lemon (see **Table 2-1** for site-specific training activities). Current aircraft operations at USFS HLZs and other training sites are assumed to be minimal with no more than a few operations per month. Additional operations due to the AT exercise are also expected to be similarly low. As discussed in the HLZ analysis, the additional AT aircraft operations would not be expected to generate noise levels resulting in incompatible land use on adjacent properties. Impacts to the noise environment are expected to be minor and nonsignificant.

Although there would be only a minute change in the overall noise environment at USFS sites, noise from individual helicopter overflights would generate distinct acoustical events, and have the potential from time-to-time to annoy residents directly under their flight path. These impacts would be the same as those outlined for HLZs which would result in impacts that are minor and not significant

The Mount Lemon rope training course would continue to have no appreciable sources of noise.

Miscellaneous

Long-term, minor, adverse impacts on the noise environment would be expected. Other miscellaneous training sites in southern Arizona primarily consist of LZs, HLZs, DZs, and FARPs (see **Table 2-1** for site-specific training activities). The nature and overall levels of impacts at these locations would be similar to that of military LZs, HLZs, DZs, and FARPs outlined above. During the biannual AT exercise, there would be an increase in the use and overall levels of noise at the small arms range in Three Points, Arizona. Although there would be a limited increase in the use during the AT exercises, the overall operations at the range and associated noise would be consistent with the existing and historical conditions. The operations center, classrooms, observation point, and water areas would continue to have no appreciable sources of noise.

4.1.1.2 NORTHERN ARIZONA

Military training sites in northern Arizona primarily consist of HLZs and DZs (see **Table 2-1** for site-specific training activities). The nature and overall level of impacts at these locations would be similar to that of military HLZs and DZs described in **Section 4.1.1.1** addressing southern Arizona. The MOUT training area at the Camp Navajo Army Installation would continue to have no appreciable sources of noise.

U.S. Forest Service

USFS-controlled training sites in northern Arizona primarily consist of HLZs and DZs (see **Table 2-1** for site-specific training activities). The nature and overall levels of impacts at these locations would be similar to that of HLZs and DZs described in **Section 4.1.1.1** addressing southern Arizona. The technical ropes training course at Mogollon Rim would continue to have no appreciable sources of noise.

Miscellaneous

Other miscellaneous training sites in northern Arizona primarily consist of LZs, HLZs, and DZs (see **Table 2-1** for site-specific training activities). The nature and overall level of impacts at these locations would be similar to that of LZs, HLZs, and DZs described in **Section 4.1.1.1** addressing southern Arizona. The operations center, logistics center, and water areas would continue to have no appreciable sources of noise.

4.1.1.3 NEW MEXICO

Military Installations

Military training sites New Mexico primarily consist of HLZs and DZs. The nature and overall level of impacts at these locations would be similar to that of HLZs and DZs described in **Section 4.1.1.1** addressing southern Arizona. The MOUT training area at WSMR would continue to have no appreciable sources of noise. There would be an incremental increase in small arms noise at the shooting range at WSMR if were used during the AST exercise; however, the overall noise would remain consistent with the use of small arms at an establish range on a military installation. These effects would be minor.

U.S. Forest Service

USFS-controlled training sites in New Mexico primarily consist of HLZs and DZs (see **Table 2-1** for site-specific training activities). The nature and overall levels of impacts at these locations would be similar to that of HLZs and DZs described in **Section 4.1.1.1** addressing southern Arizona.

Miscellaneous

Other miscellaneous training sites in New Mexico primarily consist of LZs, HLZs, and DZs (see **Table 2-1** for site-specific training activities). The nature and overall level of impacts at these locations would be similar to that of LZs, HLZs, and DZs described in **Section 4.1.1.1** addressing southern Arizona. The MOUT training area at the Playas Training and Research Center would continue to have no appreciable sources of noise.

4.1.1.4 CALIFORNIA

Military Installations

Military training sites in California primarily consist of LZs, HLZs, DZs, and FARPs (see **Table 2-1** for site-specific training activities). The nature and overall level of impacts at these locations would be similar to that of LZs, HLZs, DZs, and FARPs described in **Section 4.1.1.1** addressing southern Arizona. There would be no appreciable change to the noise environment at the off-road training and water areas.

4.1.1.5 NEVADA

Military Installations

The proposed command and control operations that would take place at Nellis AFB would not result in noise impacts.

4.1.2 No Action Alternative

Implementing the No Action Alternative would result in no additional impact to the noise environment. There would be no changes in noise associated with current AT operations. Noise impacts would remain unchanged and consistent with those impacts forecasted in the 2002 CSAR EA, based off of the actions described in **Section 2.1.1.1**.

4.2 Air Quality

4.2.1 Proposed Action

Aircraft Operations Emissions. Biannually recurring but short-term minor adverse impacts would be expected from aircraft operations and related activities at the airfields and some training sites involved in the expanded AT exercise; however, these impacts would not be considered significant. The proposed preferred alternative would involve up to 800 total aircraft sorties traveling to up to 106 identified additional training sites. Aircraft related emissions are generated from four source operations. The majority of the emissions are combustion emissions generated by the onboard aircraft turbines or engines during takeoffs, landings and low-level training site operations. Smaller amounts of combustion emissions are generated by aerospace ground equipment as well as auxiliary power units at airfields before and after aircraft operations. In addition, helicopter LTOs are assumed to generate fugitive particulate emissions from the rotor blade downwash. Aircraft emissions were estimated using emission factors provided in the Air Emissions Guide for Air Force Mobile Sources, revised July 2016 (AFCEC 2016). Helicopter downwash fugitive dust emission factors were from a scientific paper prepared for the DOD by Gilles et al. in 2007 (Gilles 2007). Some of the identified aircraft participating in the expanded exercise did not have emission factors available. In these cases, emission factors for comparable aircraft or engines were used instead. All assumptions used for estimating emissions are provided in **Appendix F**.

Aircraft emissions were estimated assuming all sorties would involve one LTO. As noted in **Section 2.1.1**, 600 LTOs were assumed to occur from Davis-Monthan AFB and the remaining 200 non-Davis-Monthan AFB sorties would be conducted from three outlying airfields, which would be used as potential bases of operation during each biannual AT exercise. The types and number of aircraft operated from non-Davis-Monthan AFB locations are identified in the planning documents, but the locations from which these operations would be conducted were not described. Thus, in order to estimate the emissions, three outlying airfields were chosen for the analysis. The locations chosen were picked as representative locations, and the expected aircraft mix was assumed based on the location (e.g. Navy aircraft from NAS North Island, AH-64 aircraft from Libby Army Airfield).

Once airborne, certain classes of the identified aircraft (helicopters, fixed-wing cargo aircraft) are assumed to proceed to the identified expanded AT training sites where additional low-level emissions occur. Some aircraft are assumed to either not engage in low-level operations below 3,000 feet, and thus do not contribute to ground-level emissions estimated in this analysis (signals and electronic intelligence aircraft, tanker aircraft, unmanned aerial vehicles), or they are assumed to conduct training at sites not involved in the expanded AT exercise (close air support aircraft training at BMGR). As a result, the primary types of aircraft that were assumed to contribute low level emissions at training sites are the helicopters (primarily H-60 variants and international models) and fixed-wing cargo aircraft (primarily C-130 variants).

Because the exact details of the training exercises at each site are not fully defined, certain assumptions are made regarding the aircraft emissions. For HLZs, it is assumed that two helicopter LTOs occur for each sortie, simulating an insertion and an extraction landing. For fixed-wing LZs, a complete LTO is assumed but with no support equipment emissions. For DZs, the approach and climb out portions of a fixed-wing LTO are assumed to occur, unless there were not enough fixed-wing sorties available in a region, in which case a helicopter LTO (without support equipment) was assumed instead.

Additionally, since the exact number of sorties to each training site is not known in advance, emissions were estimated on a county-by-county basis based on the number of each type of training sites in the county, and the number and type of aircraft expected in that area. For example, the Flagstaff IAP was assumed to be the base of operations for all northern Arizona training sites. The training site emissions for each county were estimated based on the total number of training aircraft available and the proportion of the number of each site type in each county in relation to the region as a whole.

Total aircraft-related emissions for the expanded AT exercise are shown below in **Table 4-4**. Since the emissions are spread over a wide geographical area, the county-specific emissions are detailed in **Sections 4.2.1.1, 4.2.1.2, 4.2.1.3,** and **4.2.1.4** for each operating region.

Table 4-4. Estimated Emissions from Aircraft-Related Activities Associated with the Proposed Action

Angel Thunder Aircraft-Related Activities	Estimated Pollutant Emissions (Aircraft-Related Activities)						
	NO_x (tpy)	SO_2 (tpy)	CO (tpy)	VOC (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	CO_2e (Mgpy)
Operating Base LTO Emissions	58.38	3.09	47.45	15.51	4.88	4.24	4379.38
Training Site Emissions	2.47	0.33	5.57	1.61	4.90	4.02	926.62
TOTALS	**60.8**	**3.4**	**53.0**	**17.1**	**9.8**	**8.3**	**4813.5**

Note: GHG emissions are presented in terms of carbon dioxide equivalents in units of metric tons (or Megagrams) per year. Lead emissions are negligible and are not included in this table.

Ground Vehicle Operations Emissions. Biannually recurring but short-term minor adverse impacts would be expected from ground vehicle operations and related activities at the airfields and some training sites involved in the expanded AT exercise; however, these impacts would not be considered significant. The proposed preferred alternative would involve ground operations at certain training sites and would require vehicular support at operating bases.

Ground vehicle emissions are generated from two sources, combustion emissions from vehicle engines and fugitive particulate emissions from vehicle travel over roadways. Ground emissions were estimated using emission factors provided in the Air Emissions Guide for Air Force Mobile Sources, revised July 2016.

As with aircraft operations, because training exercise specifics are not available, and because manpower estimate for each site are not available, certain assumptions were made regarding ground vehicle emissions. Any training site capable of command and control activities (C4I) or logistical activities, with the exception of Nellis AFB, are assumed to have a minimal ground vehicle presence for each training event. To be conservative, each training site capable of those C4I or logistical activities is assumed to be visited twice per year by six diesel tactical vehicles in the light duty diesel truck emissions category. Each visit is conservatively assumed to consist of 1,200 total miles driven between the six vehicles. All vehicle emissions are assumed to occur at or near the training site and not in route. For the four operating airfields, a ground vehicle presence of 20 light duty diesel trucks and 12 heavy duty diesel trucks are assumed to be present for 14-days (three mobilization days and 11 field days) for each biannual AT exercise. These vehicles operate 12 hours per day and are assumed to have a total of 53,760 total miles driven and 3,584 hours of idling per exercise. Visiting exercise participants are assumed to be housed on base in already existing lodging facilities. No significant increase in commuting or other ground traffic is expected as part of the expanded AT event. All exercise participants are assumed to be staying on the installation or at the exercise location; therefore, no commuting emissions were estimated.

Total ground vehicle emissions for the expanded AT exercise are shown below in **Table 4-5**. Again, since the emissions are spread over a wide geographical area, the county-specific emissions are detailed below in **Section 4.2.1.1** for each operating region.

Table 4-5. Estimated Emissions from Ground Vehicle Activities Associated with the Proposed Action

Angel Thunder Ground Vehicle Activities	Estimated Pollutant Emissions (Ground Vehicle Activities)						
	NO_x (tpy)	SO_2 (tpy)	CO (tpy)	VOC (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	CO_2e (Mgpy)
Operating Base and Training Site Emissions	1.34	0.005	1.94	0.51	11.48	11.44	483.93
TOTALS	**1.34**	**0.005**	**1.94**	**0.51**	**11.48**	**11.44**	**483.93**

Note: GHG emissions are presented in terms of carbon dioxide equivalents in units of metric tons (or megagrams) per year. Lead emissions are negligible and are not included in this table.

Greenhouse Gas Emissions and the Effects on Climate Change. Biannually recurring long-term very minor adverse impacts would be expected from aircraft operations and ground operations at all training sites involved in the expanded AT exercise; and, these impacts would not be considered significant. The proposed preferred alternative would directly emit a total of 5,297.4 metric tons of carbon dioxide equivalent (CO2e) from all sources over the entire exercise area, primarily from the combustion of fossil fuels. Individual county-level emissions do not exceed 2,900 metric tons CO2e, in Pima County, Arizona. This is at a level well below the CEQ guidance reference threshold of 25,000 metric tons of CO2e, and even further below the

stationary source "significant increase rate" of 75,000 short tpy of CO2. It is equivalent to approximately 560 single-family homes' energy use for one year. While minor, these emissions will contribute in a small fashion to cumulative climate change impacts. Greenhouse gases tend to remain in the atmosphere at longer time frames than most other criteria pollutants or HAP, and therefor even minor greenhouse gas emissions increases present a longer-term impact.

4.2.1.1 SOUTHERN ARIZONA

Emissions in southern Arizona would be emitted from aircraft and ground vehicle activities at the 47 proposed training sites located in this region as well as the two operating bases assumed to be in this region, Davis-Monthan AFB and Libby Army Airfield at Fort Huachuca. The southern Arizona region contains nearly all of Arizona's nonattainment areas. **Table 4-6** identifies the estimated AT emissions for each county and the appropriate General Conformity analysis emissions threshold emissions based on that county's attainment status. The estimated emissions for each county do not exceed any county's General Conformity threshold. In fact, total estimated emissions for the entire expanded AT exercise are less than anyone county's General Conformity threshold level. Therefore, even if all AT exercises were to originate from Davis-Monthan AFB, no General Conformity analysis would be required. The expanded AT exercise would not represent a significant impact to air quality in the region.

Table 4-6. Estimated Southern Arizona Emissions from Aircraft and Ground Vehicle Activities Associated with the Proposed Action

County	Estimated Pollutant Emissions						
	NO_x (tpy)	SO_2 (tpy)	CO (tpy)	VOC (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	CO_2e (Mgpy)[a]
Cochise	6.50	0.351	4.24	0.934	0.88	0.84	540.32
De Minimis Threshold	*N/A*[b]	*100*	*N/A*[b]	*N/A*[b]	*100*	*N/A*[b]	*N/A*[c]
Gila	0.07	0.008	0.11	0.002	0.29	0.26	20.12
De Minimis Threshold	*N/A*[b]	*100*	*N/A*[b]	*N/A*[b]	*100*	*N/A*[b]	*N/A*[c]
Graham	0.03	0.004	0.05	0.001	0.26	0.24	10.06
De Minimis Threshold	*N/A*[b]	*N/A*[b]	*N/A*[b]	*N/A*[b]	*N/A*[b]	*N/A*[b]	*N/A*[c]
Maricopa	0.68	0.090	1.41	0.338	1.42	1.35	233.29
De Minimis Threshold	*100*	*N/A*[b]	*100*	*100*	*70*	*N/A*[b]	*N/A*[c]
Pima	40.13	2.085	37.55	13.611	4.77	4.15	2881.26
De Minimis Threshold	*N/A*[b]	*100*	*100*	*N/A*[b]	*100*	*N/A*[b]	*N/A*[c]
Pinal	0.10	0.014	0.23	0.079	0.56	0.54	36.95
De Minimis Threshold	*N/A*[b]	*100*	*100*	*N/A*[b]	*100*	*N/A*[b]	*N/A*[c]
Santa Cruz	0.23	0.030	0.45	0.089	0.55	0.51	77.59
De Minimis Threshold	*N/A*[b]	*N/A*[b]	*N/A*[b]	*N/A*[b]	*100*	*100*	*N/A*[c]

Notes:

[a] GHG emissions are presented here in megagrams per year (Mgpy) which is equivalent to metric tons per year.

[b] No General Conformity threshold applies for regions in attainment with NAAQS.

[c] No General Conformity threshold for greenhouse gas emissions currently exists. However, the CEQ guidance on treatment of GHG for NEPA purposes identifies 25,000 Mg as the threshold at which more data needs to be collected.

Lead emissions are negligible and are not included in this table.

Military Installations

All sorties in the southern Arizona region are assumed to originate at military installations, and the majority of training locations in this zone are also located at military sites (see **Table 2-1** for site-specific training activities). The majority of all emissions in this region occur at military locations, specifically Davis-Monthan AFB. Davis-Monthan AFB operates under a Title V stationary source permit, but all emissions resulting from the expanded AT exercise are from mobile or portable sources and therefore no impact to the permit or the Base's emissions status would be expected. Because there are no exceedances of general conformity thresholds for any county, no significant impact on air quality would occur on military installations or sites.

U.S. Forest Service

The emissions from the eight USFS training sites make up a very small percentage of the emissions in Southern Arizona and do not represent a significant impact (see **Table 2-1** for site-specific training activities).

Miscellaneous

Given the assumptions made in this analysis, the emissions from the 16 miscellaneous training sites make up a very small percentage of the emissions in southern Arizona and do not represent a significant impact (see **Table 2-1** on pages 2-3 and 2-4 for site-specific training activities). If Bisbee Douglas Airport, Sky Harbor Airport in Phoenix or Coolidge Airport in Pinal County act as bases of operation for the Southern Arizona region, higher emissions from these miscellaneous sites would be expected. However, no combination of activities in the region would be expected to result in significant impacts on air quality.

4.2.1.2 NORTHERN ARIZONA

Emissions in northern Arizona would be emitted from aircraft and ground vehicle activities at the 61 identified proposed training sites and the single assumed operating base. The northern Arizona region has two counties that are maintenance areas and two sites in Gila County (which also contains sites in the southern Arizona region), that is nonattainment. **Table 4-7** below identifies the estimated AT emissions for each county and the appropriate General Conformity analysis emissions threshold emissions based on that county's attainment status. The estimated emissions for the entire region do not exceed any county's General Conformity threshold. Therefore, the expanded AT exercise would not represent a significant impact on air quality in the region.

Military Installations

The 11 military training sites in northern Arizona are all HLZs or DZs and only small amounts of emissions are expected from these sites (see **Table 2-1** for site-specific training activities).

U.S. Forest Service

Twenty of the training sites in the northern Arizona region are owned by USFS. They are primarily HLZs or DZs, and only small amounts of emissions are expected from these sites (see **Table 2-1** for site-specific training activities).

Table 4-7. Estimated Northern Arizona Emissions from Aircraft and Ground Vehicle Activities Associated with the Proposed Action

County	Estimated Pollutant Emissions						
	NO_x (tpy)	SO_2 (tpy)	CO (tpy)	VOC (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	CO_2e (Mgpy)[a]
Apache	0.05	0.007	0.17	0.079	0.71	0.71	25.55
De Minimis Threshold	*N/A*[b]	*N/A*[b]	*N/A*[b]	*N/A*[b]	*N/A*[b]	*N/A*[b]	*N/A*[c]
Coconino	10.04	0.580	6.80	1.482	5.62	5.56	918.51
De Minimis Threshold	*N/A*[b]	*N/A*[b]	*N/A*[b]	*N/A*[b]	*N/A*[b]	*N/A*[b]	*N/A*[c]
Gila	0.02	0.002	0.03	0.001	0.16	0.15	6.36
De Minimis Threshold	*N/A*[b]	*100*	*N/A*[b]	*N/A*[b]	*100*	*N/A*[b]	*N/A*[c]
Greenlee	0.02	0.002	0.03	0.002	0.30	0.29	8.89
De Minimis Threshold	*N/A*[b]	*100*	*N/A*[b]	*N/A*[b]	*N/A*[b]	*N/A*[b]	*N/A*[c]
Mohave	0.02	0.004	0.08	0.038	0.15	0.15	10.35
De Minimis Threshold	*N/A*[b]	*N/A*[b]	*N/A*[b]	*N/A*[b]	*100*	*N/A*[b]	*N/A*[c]
Navajo	0.03	0.004	0.09	0.039	0.29	0.29	12.88
De Minimis Threshold	*N/A*[b]	*N/A*[b]	*N/A*[b]	*N/A*[b]	*N/A*[b]	*N/A*[b]	*N/A*[c]

Notes:
[a] GHG emissions are presented here in Mgpy, which is equivalent to metric tons per year.
[b] No General Conformity threshold applies for regions in attainment with NAAQS.
[c] No General Conformity threshold for greenhouse gas emissions currently exists. However, the CEQ guidance on treatment of GHG for NEPA purposes identifies 25,000 Mg as the threshold at which more data needs to be collected.
Lead emissions are negligible and are not included in this table

Miscellaneous

The bulk of the emissions in the northern Arizona region would be emitted from locations classified as miscellaneous (see **Table 2-1** for site-specific training activities). This is due to the fact that any sorties originating from the region would be based at one of the seven identified civilian airports or airfields. Emissions at these sites are below the *de minimis* levels for all counties in the region, and air emissions impact would be negligible to minimal.

4.2.1.3 NEW MEXICO

Emissions in New Mexico would be emitted from aircraft and ground vehicle activities at the 13 identified proposed training sites. There is one airport identified within the region that is capable of operations if needed; however, this analysis assumed no aircraft sorties would originate in New Mexico. This region has four counties in which operations may take place, one of which has two areas that are in nonattainment status. AT operations would not take place in either nonattainment area. **Table 4-8** below identifies the estimated AT emissions for each county. Although the General Conformity emissions thresholds do not apply to these counties, a comparison to the standard General Conformity *de minimis* thresholds is provided to demonstrate minimal impacts. The estimated emissions for the entire region are well below any General Conformity threshold. Therefore, the expanded AT exercise would not represent a significant impact to air quality in the region.

Table 4-8. Estimated New Mexico Emissions from Aircraft and Ground Vehicle Activities Associated with the Proposed Action

County	Estimated Pollutant Emissions						
	NO_x (tpy)	SO_2 (tpy)	CO (tpy)	VOC (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	CO_2e (Mgpy)[a]
Catron	0.17	0.022	0.36	0.091	0.69	0.68	67.68
De Minimis Threshold	*N/A*[b]	*N/A*[b]	*N/A*[b]	*N/A*[b]	*N/A*[b]	*N/A*[b]	*N/A*[b]
Curry	0.05	0.007	0.14	0.055	0.18	0.17	19.94
De Minimis Threshold	*N/A*[b]	*N/A*[b]	*N/A*[b]	*N/A*[b]	*N/A*[b]	*N/A*[b]	*N/A*[c]
Doña Ana	0.05	0.007	0.14	0.055	0.18	0.17	19.94
De Minimis Threshold	*100*	*N/A*[b]	*N/A*[b]	*100*	*100*	*N/A*[b]	*N/A*[c]
Hidalgo	0.02	0.003	0.06	0.023	0.08	0.08	9.09
De Minimis Threshold	*N/A*[b]	*N/A*[b]	*N/A*[b]	*N/A*[b]	*N/A*[b]	*N/A*[b]	*N/A*[b]

Notes:

[a] GHG emissions are presented here in Mgpy, which is equivalent to metric tons per year.

[b] No General Conformity threshold applies for regions in attainment with NAAQS.

[c] No General Conformity threshold for greenhouse gas emissions currently exists. However, the CEQ guidance on treatment of GHG for NEPA purposes identifies 25,000 Mg as the threshold at which more data needs to be collected.

Lead emissions are negligible and are not included in this table.

Military Installations

There are two sites in the New Mexico region that are on military installations (see **Table 2-1** for site-specific training activities). These sites can function as a DZ, HLZ and LZ. Emissions from training activities at these sites would be minimal.

U.S. Forest Service

The majority of the New Mexico training sites are on USFS land. They are for the most part HLZ or DZ sites, although a few would be capable for fixed-wing LZ operations (see **Table 2-1** for site-specific training activities). Emissions from training activities at these sites would be minimal.

Miscellaneous

One of the New Mexico sites is on miscellaneous property associated with an established urban training area and emissions from the site would be minimal (see **Table 2-1** for site-specific training activities). No exceedance of the General Conformity thresholds would be indicated and impacts would be minimal.

4.2.1.4 CALIFORNIA

Emissions in California would be emitted from aircraft and ground vehicle activities at the identified onshore and near-shore proposed training sites and the single assumed operating base. The California region has six counties in which training sites are present and all six counties are nonattainment or maintenance for multiple pollutants. **Table 4-9** below identifies the estimated AT emissions for each county and the appropriate General Conformity analysis emissions thresholds based on that county's attainment status. Based on the identified

Table 4-9. Estimated California Emissions from Aircraft and Ground Vehicle Activities Associated with the Proposed Action

County	Estimated Pollutant Emissions						
	NO_x (tpy)	SO_2 (tpy)	CO (tpy)	VOC (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	CO_2e (Mgpy)[a]
Imperial	0.01	0.001	0.02	0.0013	0.14	0.13	4.15
De Minimis Threshold	*100*	*N/A*[b]	*N/A*[b]	*100*	*70*	*100*	*N/A*[c]
Los Angeles, Orange, and Riverside[d]	0.06	0.01	0.10	0.00	1.15	0.93	21.93
De Minimis Threshold	*10*	*N/A*[b]	*100*	*10*	*100*	*100*	*N/A*[c]
San Diego	3.63	0.162	2.32	0.555	1.47	1.23	277.21
De Minimis Threshold	*100*	*N/A*[b]	*100*	*100*	*N/A*[b]	*N/A*[b]	*N/A*[c]
Ventura	0.01	0.001	0.02	0.001	0.42	0.31	4.15
De Minimis Threshold	*50*	*N/A*[b]	*N/A*[b]	*50*	*N/A*[b]	*N/A*[b]	*N/A*[b]

Notes:

[a] GHG emissions are presented here in Mgpy, which is equivalent to metric tons per year.

[b] No General Conformity threshold applies for regions in attainment with NAAQS.

[c] No General Conformity threshold for greenhouse gas emissions currently exists. However, the CEQ guidance on treatment of GHG for NEPA purposes identifies 25,000 Mg as the threshold at which more data needs to be collected.

[d] All proposed training sites within Los Angeles, Orange and Riverside Counties are within the South Coast Air Basin which is a single area for nonattainment purposes. Therefore, all emissions from the two counties are counted together when determining if General Conformity applies.

Lead emissions are negligible and are not included in this table.

assumptions, the estimated emissions for the entire region would not exceed any county's General Conformity threshold. Therefore, the expanded AT exercise would not represent a significant impact to air quality in the region.

Although not modeled for this analysis, it is noted that if more than 200 AT sorties were to originate from March ARB, General Conformity would require additional impact evaluation. To avoid the potential for impacts that would exceed General Conformity thresholds, AT exercise planners would ensure that no more than 200 AT sorties would originate from March ARB.

Military Installations

Emissions from exercises at the proposed military training sites are estimated to be below General Conformity *de minimis* levels and would not be anticipated to result in significant air quality impacts (see **Table 2-1** for site-specific training activities).

4.2.1.5 NEVADA

Military Installations

The proposed command and control operations that would take place at Nellis AFB would not result in air emissions impacts.

4.2.2 No Action Alternative

Under the no action alternative, no additional training sites would be utilized beyond those identified in the 2002 CSAR EA. The forecasted conditions identified in those documents and based off of the actions described in **Section 2.1.1.1** would remain unchanged. Implementation of the No Action Alternative would not change current training mission activities for the AT exercise; therefore, there would be no additional impacts on air quality.

4.3 Airspace Management

4.3.1 Proposed Action

Under the Proposed Action, a maximum of 800 sorties would be flown as part of the AT exercise. Of these sorties, 600 would be flown out of Davis-Monthan AFB and the remaining 200 would be flown from the respective unit's home station, fly to the exercise site, and return to home station.

The exercises would occur within a three-week period and are collectively analyzed for impacts to airspace management below. The proposed use of training locations would require coordination with all jurisdictional ARTCCs when necessary and follow all applicable FARs and USAF requirements. The Proposed Action would not result in impacts on FAA capabilities or commercial and general aviation activities; and, there would be no expected decrease in aviation safety. Additionally, all applicable FAA procedures would be followed. Such procedures include the following:

- Adhere to all applicable FAA flight rules when transition through Class A, B, C, D, and E airspace.
- Obtain two-way radio communication with the appropriate ATC controlling agency when transiting through airspace associated with the airports to be used during the AT exercise.
- Obtain permission to enter SUAs, MTRs, and ARs from the controlling ARTCC and notify the using agency prior to and while conducting operations within the vertical and lateral limits of these areas. Additionally, it is recommended that communications are established with the controlling agency of any MOA even if the MOA is not active (AC 2003).
- No person may make a parachute jump, and no pilot-in-command can allow a parachute jump to be made from the aircraft, in or into Class A, B, C, or D airspace without, or in violation of, the terms of an ATC authorization issued by the ATC facility with jurisdiction over that airspace (14 CFR 105) (FAA 2015).
- Obtain permission to use any LATN areas in the project area and coordinate with agencies whose local military operations could be temporarily interrupted.
- Aviators would be aware of all potential warnings and hazards present throughout their training routes and all routes would be reviewed for potential hazards before flying.

The capacity of the airspace associated with each proposed exercise location would not be exceeded and no changes would occur in the management, scheduling, or structure of any airspace unit, including SUAs and MTRs. Any changes to airport approach and departure patterns, Clear Zones, or Accident Potential Zones would be temporary and would not significantly impact airport function. Additionally, available navigable airspace would not be significantly reduced due to the use of established SUA and other military airspace; and, there would be no obstructions to air navigation introduced to the affected airspace under the Proposed Action.

All pilots would be aware of potential warnings and hazards present throughout their training routes. Examples of potential hazards include those discussed in **Section 3.3.2** and obstructions such as tall buildings and antennas. Additionally, all necessary precautions would be taken while conducting training activities in uncontrolled airspace to avoid potential impacts on recreational aviators or any other flights occurring within the airspace. No uncoordinated aviation would occur within MTRs. Pilots are encouraged to use increased vigilance when operating near MTRs, which would reduce the probability of conflicting airspace usage in these areas (AC 2003, SMA 2007). Additionally, the use of ARs would not impact regular airspace activities because they are typically located at altitudes that are above or below those frequently utilized by military and commercial aircraft (AC 2003). Within the WTA, military aircraft would provide a radio check-in when entering the area and an operations normal radio report to Imperial Beach Ground Control every 30 minutes until they leave the area. Imperial Beach Ground Control does not provide any other service for normal aircraft operations. There would be no impact to the workload or schedule on this facility or their current services (Davis-Monthan AFB 2002).

Despite the implementation of these practices and adherence to all applicable FAA regulations and FAA JO 7400.2, *Procedure for Handling Airspace Matters*, short-term, negligible to minor, adverse impacts would be expected on the airspace of the proposed AT Training exercise expansion locations due to a temporary increase in air traffic. This temporary increase in air traffic would require a slight increase in flight monitoring to ensure aircraft safety and reduce potential conflicting airspace usage. However, these impacts would not be significant.

These impacts would vary slightly in magnitude between the affected regions discussed in **Section 3.3.2** due to the different number of proposed exercise locations within each region. Overall, southern Arizona would experience the greatest increase in activity based on the concentration of proposed exercise locations within military installation airspace and miscellaneous airspace. USFS airspace within northern Arizona would see the greatest concentration of proposed exercise locations on USFS land. Affected airspaces in New Mexico and California have fewer proposed exercise locations than southern and northern Arizona. Within New Mexico, a majority of the proposed exercise locations would be on USFS land; therefore, airspace associated with these areas would experience greater increases in activity under the Proposed Action. In California, a majority of the proposed exercise locations are on military installations; therefore, the airspace associated with these installations would experience greater increases in activity under the Proposed Action. Impacts on airspace within the WTA would be mitigated by the Imperial Beach Ground Control monitors that would provide flight monitoring and conduct advisory activities. The proposed Command, Control,

Communications, Computers, and Intelligence Operations training at Nellis AFB would have no associated training flights and would have no impact on Nevada airspace. Therefore, impacts on airspace would not be significant.

4.3.2 No Action Alternative

Under the No Action Alternative, the AT exercise would not be expanded to the sites analyzed above. However, the sites currently being used for the AT exercise and analyzed in the 2002 CSAR EA would continue to be used based off of the actions described in **Section 2.1.1.1**. Therefore, no additional impacts to airspace would occur.

4.4 Biological Resources

This section describes the potential environmental consequences to terrestrial biological resources that have the potential to occur as a result of the Proposed Action. Potential direct and indirect impacts on vegetation, wildlife, and federally threatened and endangered species are addressed.

All proposed training areas would range from 0.3 to 2.7 acres around the proposed sites. It was conservatively assumed that all potential direct and indirect impacts at each training area would be confined to a one-half mile radius. This would equate to an impact area of 480 acres. This impact area is much larger than the size of the sites and the direct effects associated with the Proposed Action. Therefore, all habitat and critical habitat more than one-half mile from the proposed sites were eliminated from consideration.

In a letter dated March 2, 2017, USAF initiated informal consultation with the USFWS, Arizona Ecological Services, regarding the presence of threatened and endangered species in the geographic area of the Proposed Action pursuant to the requirements of Section 7(c) of the ESA (16 U.S.C. § 1536). The letter requested concurrence from USFWS that the proposed action was “not likely to adversely affect” listed species and included the *Draft EA Addressing the Angel Thunder Personnel Recovery/Rescue Training Exercise* as the Biological Assessment for threatened and endangered species that could be affected by the project. Consultation with USFWS for the May 2017 exercise has been completed with a determination that activities may affect but are not likely to adversely affect threatened or endangered species.

Informal consultation was not initiated for threatened and endangered species on military installations, as the species at these sites are already covered under existing NEPA and Section 7 consultation documents. If the threatened and endangered species lists or designated critical habitat changes from those in the existing documents, the installations would be responsible for reinitiating consultation. Results of the consultations and records of correspondence with the agencies are included in **Appendix A**.

4.4.1 Proposed Action

4.4.1.1 SOUTHERN ARIZONA

Military Installations

As mentioned in **Section 3.4.2.1**, the 24 proposed sites within Davis-Monthan AFB, Florence Military Reservation, Fort Huachuca, and Luke AFB in southern Arizona would be sites already governed by the installations' environmental policies, procedures, and requirements, including existing NEPA coverage and ESA Section 7 consultation conducted for the range and any associated requirements (see **Table 2-1** for site-specific training activities). The Proposed Action would result in a negligible increase in already existing operations at these training sites; therefore, impacts on biological resources (vegetation, wildlife, and threatened and endangered species) associated with the Proposed Action will not be evaluated further for these sites.

U.S. Forest Service

Vegetation. Under the Proposed Action, negligible, temporary, adverse direct impacts on vegetation would occur during the activities at the proposed training sites (see **Table 2-1** for site-specific training activities). During the course of the biannual three-week exercises, up to 300 rotary-wing sorties could be conducted for HLZ and DZ sites, with 8 to 12 personnel per squad units. The proposed activities could increase the potential for the establishment of nonnative and invasive species and erosion and sedimentation in vegetated areas due to ground disturbance. Under normal conditions, the soils that are prevalent at these sites are relatively stable and typically not prone to erosion if covered with vegetation. However, vegetation removal could increase the potential for erosion. Trampling of vegetation and soil erosion from personnel and training-related equipment and soil compaction from military vehicles and equipment could occur as a result of the Proposed Action. The HLZ and DZ sites have been previously disturbed; therefore, removal of vegetation is not expected. Impacts on vegetation associated with light foot traffic would be minimal and no different than the regular use of the HLZ sites on USFS land from USFS employees and Search and Rescue Teams. No unique habitats or vegetation occurs near the southern Arizona USFS proposed training sites.

All of the proposed training sites in southern Arizona on USFS land are unmaintained sites that have been previously disturbed with unpaved roads or been cleared in the past by USFS. Because there are no concrete pads at southern Arizona sites, effects on vegetation would be greater than other sites in Arizona. Saddle Mountain East and Saddle Mountain South occur in Plains and Great Basin Grasslands in areas where leased grazing occurs. The impacts that would occur from the Proposed Action would be similar to that of livestock grazing.

The Mesa site occurs in the Semi-desert Grassland in Graham County, Arizona within the Galiuro Wilderness Area. During a site visit on February 25, 2015, it was determined that the Mesa site is on top of a mesa in undisturbed vegetation, with limited access. Impacts on vegetation would be greater at this site than other sites with previous disturbance. Impacts on vegetation associated with light foot traffic would be minimal and best management practices would be implemented to minimize potential adverse impacts associated with soil erosion and the spread of nonnative vegetation.

Canelo site occurs within Madrean Evergreen Woodland in an area with previous disturbance from livestock grazing, but Turkey Creek, a riparian area with designated critical habitat for multiple federally-listed species occurs less than one-quarter mile east of the site. If personnel were to traverse through the riparian area, destruction of this habitat may occur. To avoid impacts on riparian vegetation and consequently federally-listed species and their critical habitat, avoidance of this area during training activities should be implemented. There would be no significant impacts on vegetation.

Wildlife. Negligible to minor, temporary, adverse direct impacts on wildlife species would occur during the activities at the proposed training sites. During the course of the biannual three-week exercises, up to 300 rotary-wing sorties could be conducted for HLZ and DZ sites, with eight to 12 personnel per squad units. Training activities would likely disturb resident wildlife species and cause individuals to leave or temporarily avoid the area. Mobile wildlife species that might use these sites would temporarily use similar, adjacent habitats and would not be permanently displaced. Injury or mortality of small less-mobile terrestrial species (e.g., reptiles, rodents, small mammals) could occur from direct physical impact (e.g., vehicles, training equipment, etc.); however, wildlife would generally avoid the regularly used HLZ, LZ, and DZ sites and military personnel would be instructed to avoid direct physical impacts where possible. As a result, population-level impacts would not occur.

Bird-helicopter strikes would have a potential impact; however, standard operating procedures would be used to minimize any potential effects of collisions with wildlife. USAF is authorized for incidental takes of migratory birds provided that USAF adheres to the regulations set forth in the MBTA (Authorization of take incidental to military readiness activities, 50 CFR § 21.15 [authorization] and § 21.3 [definitions]). Many of the HLZ, LZ, and DZ sites have been previously disturbed and are already used for helicopter operations. Therefore, impacts on wildlife would be minimal and no different than the effects from regular use of the HLZ sites on USFS land from USFS employees and Search and Rescue Teams.

As mentioned in the vegetation section, the Mesa site is undisturbed and occurs within the Galiuro Wilderness Area. This proposed site occurs on a mesa top surrounded by cliffs. Various birds and bat species likely use these cliffs for nesting and roosting and would likely temporarily avoid the area as a result of the Proposed Action. The Mesa site is in close proximity to documented golden eagle nests (AGFD 2017). To avoid adverse impacts on wildlife in this area, no training activities would occur during the MBTA nesting season, February 1 to August 31.

Although individuals may temporarily avoid the areas as a result of the Proposed Action, no impacts on wildlife populations would be expected to occur.

***Threatened and Endangered Species*.** This section discusses potential impacts resulting from the Proposed Action on the species listed in **Table 3-10**. In general, potential impacts that would result from the Proposed Action on threatened and endangered species range from no effect to short-term negligible adverse effects. **Table 4-10** summarizes the Proposed Action's effect determination on these species at the southern Arizona sites. Species that will not be affected by the Proposed Action will not be discussed further.

Table 4-10. Federal Threatened and Endangered Species in Southern Arizona USFS Land Effect Determination

Species	Federal Status	Species Effect Determination	Critical Habitat Effect Determination
Fish			
Gila Chub (*Gila intermedia*)	E	May affect, not likely to adversely affect	No effect
Amphibians			
Chiricahua leopard frog (*Lithobates chiricahuensis*)	T	May affect, not likely to adversely affect	No effect
Reptiles			
Northern Mexican gartersnake (*Thamnophis eques megalops*)	T	May affect, not likely to adversely affect	No effect
Birds			
Mexican spotted owl (*Strix occidentalis lucida*)	T	May affect, not likely to adversely affect	No effect
Mammals			
Jaguar (*Panthera onca*)	E	May affect, not likely to adversely affect	No effect
Lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*)	E	May affect, not likely to adversely affect	Not applicable

Key: E = Endangered, T = Threatened

Gila chub. Short-term, negligible, direct adverse impacts on the Gila chub may occur as a result of the Proposed Action. This species has the potential to occur near the Canelo site in Turkey Creek, a small creek less than one-quarter mile to the east of the proposed site. The Proposed Action would consist of training area of 0.3 to 2.7 acres around the proposed sites, depending on the activities. However, with the exception of light foot traffic, training would be restricted to already disturbed areas. Minor foot-traffic would not occur in streams or riparian areas.

Gila chub Critical Habitat. No impacts on Gila chub critical habitat are expected to occur as a result of the Proposed Action. The Gila chub has designated critical habitat in Turkey Creek, 0.19 miles east of the Canelo site. However, with the exception of light foot traffic, training activities would be restricted to already disturbed areas. Minor foot-traffic would not occur in streams or riparian areas. Critical habitat also occurs within five miles of the Mesa and Mount Lemon site; however because the training activities would occur within 0.3 to 2.7 acres around the proposed sites the Proposed Action would have no effect on Gila chub critical habitat at the Mesa and Mount Lemon sites.

Chiricahua leopard frog. Short term, negligible, direct adverse impacts on this species may occur as a result of the Proposed Action. The Chiricahua leopard frog has the potential to occur near the Devon site. The Proposed Action would consist of training activities in an area of 0.3 to 2.7 acres around the proposed site, depending on the activities, if personnel were to traverse through the riparian area, destruction of this species' habitat may occur as well as temporary avoidance of the area. To avoid impacts on this species, personnel involved in the training activities would avoid all riparian areas, especially during the breeding season. The breeding season of Chiricahua leopard frogs, as indicated by egg laying, varies with elevation (SWESA

2008) and differs year-to-year (USFWS 2007). Eggs are typically laid March through June at elevations below 5,900 feet (USFWS Undated-a).

Chiricahua leopard frog Critical Habitat. No impact on designated Chiricahua leopard frog critical habitat is expected to occur as a result of the Proposed Action. The Devon site is approximately 3 miles from Chiricahua leopard frog critical habitat (**Table 3-11**).

Northern Mexican gartersnake. Short-term, negligible, direct adverse impacts on the northern Mexican gartersnake may occur as a result of the Proposed Action. This species has the potential to occur near the Canelo, Saddle Mountain East, South and West sites. The Canelo site has a riparian area less than one-quarter mile to the east of the proposed HLZ site, in Turkey Creek. The Proposed Action would consist of training activities in an area of 0.3 to 2.7 acres around the proposed sites, depending on the activities, if personnel were to traverse through the riparian area, destruction of this species' habitat may occur as well as temporary avoidance of the area. To avoid impacts on this species, personnel involved in the training activities would avoid all riparian areas at the Canelo, Saddle Mountain East, South and West sites.

Northern Mexican gartersnake Critical Habitat. No impacts on northern Mexican gartersnake critical habitat would occur as a result of the Proposed Action. The northern Mexican gartersnake has proposed critical habitat in Turkey Creek, 0.12 mile east of the Canelo site. However, with the exception of light foot traffic, training activities would be restricted to already disturbed areas. Minor foot-traffic would not occur in streams or riparian areas. Saddle Mountain East and South occur within proposed critical habitat and Saddle Mountain West is 0.14 mile west of proposed critical habitat. The training activities would occur within 0.3 to 2.7 acres around the proposed sites in previously disturbed areas; therefore, it was determined that the Proposed Action would have no impact on the proposed critical habitat of the northern Mexican gartersnake.

Mexican spotted owl. Short-term, negligible, direct adverse impacts on the Mexican spotted owl may occur as a result of the Proposed Action. This species has the potential to occur near the Canelo, Devon, Mesa, Mount Lemon, Ranger, and Saddle Mountain West sites. Noise and human activity would temporarily exceed typical disturbance levels within the proposed training sites. However, with the exception of light foot traffic, training activities would be restricted to already disturbed areas, the Canelo, Mount Lemon, and Ranger sites already experience high recreational use. If any owls were present during the proposed training exercises, they might temporarily flush from their roost, avoid the training area, or otherwise temporarily modify their behavior. The temporary and infrequent noise by people, vehicles, and helicopters would be expected to have short-term negligible impact (USFWS 2012c). Many of the HLZ and DZ sites have been previously disturbed or have a permanent concrete pad for helicopter landings and are already used for helicopter operations. Therefore, impacts on wildlife would be minimal and no different than the effects from regular use of the HLZ sites on USFS properties from USFS employees and Search and Rescue Teams.

Delaney et al. (1999) found that ground-based disturbances elicited a greater flush response than aerial disturbance and reported a one-quarter mile threshold for alert responses to helicopter flights. In addition, Delaney et al. (1999) found that Mexican spotted owl did not flee

from helicopters when caring for young at the nest, but fled readily during the post-fledging period. To avoid impacts on this species, training activities at the Canelo, Devon, Mesa, Mount Lemon, Ranger, and Saddle Mountain West sites would be avoided from February 1 through August 31 to avoid breeding and nesting season, when owls are most vulnerable.

Mexican spotted owl Critical Habitat. No effect on designated Mexican spotted owl critical habitat would be expected to occur as a result of the Proposed Action. **Table 3-11** shows which sites occur within five miles of designated Mexican spotted owl habitat. Because activities would have no vegetation removal and a short duration (hour – few hours) implementing the Proposed Action would not have an effect on the critical habitat.

Jaguar. Short term, negligible, direct adverse impacts on the jaguar may occur as a result of the Proposed Action. This species has the potential to occur near the Devon, Saddle Mountain East, South, and West sites. Noise and human activity would temporarily exceed typical disturbance levels within the proposed training sites. If any jaguars were present during the Proposed Action, they might temporarily avoid the training area, or otherwise temporarily modify their behavior. Jaguars are uncommon and infrequent in these areas. The temporary and infrequent noise by people, vehicles, and helicopters would be expected to not likely adversely affect or possibly have short term, negligible impact due to the jaguar being a rare occurrence. Furthermore, with the exception of light foot traffic, training activities would be restricted to already disturbed areas.

Jaguar Critical Habitat. No effect on designated jaguar critical habitat would be expected to occur as a result of the Proposed Action. **Table 3-11** shows which sites occur within five miles of designated jaguar critical habitat. Because no vegetation removal would be expected for the Proposed Action, and training activities would occur within 0.3- to 2.7-acres of the proposed sites, any activities would not occur in critical habitat.

Lesser long-nosed bat. Short-term, negligible, direct adverse impacts on this species may occur as a result of the Proposed Action. The lesser long-nosed bat has the potential to occur near the Devon, Mesa, Mount Lemon, Ranger, and Saddle Mountain West sites. The species may temporarily avoid these areas as result of the human activity and helicopter noise. However, with the exception of light foot traffic, training activities would be restricted to already disturbed areas. The lesser long-nosed bat is a migrant species in Arizona occurring from late April to late September, coinciding with the flowering columnar cacti and agave species. Because no vegetation removal would be expected and the lesser long-nosed bat is mostly active at night, this species would not likely be impacted by the Proposed Action.

Miscellaneous

***Vegetation*.** Under the Proposed Action, negligible, temporary, adverse direct impacts on vegetation would occur during the activities at the proposed training sites (see **Table 2-1** for site-specific training activities). During the course of the biannual three-week exercises, up to 300 rotary-wing sorties would be conducted for HLZ and DZ sites, with eight to 12 personnel per squad units. Trampling of vegetation and soil erosion from personnel and training-related equipment and soil compaction from military vehicles and equipment could occur as a result of the Proposed Action. Many of the HLZ and DZ sites have been previously disturbed or have a

permanent concrete pad for helicopter landings; therefore, removal of vegetation would not be expected. Impacts on vegetation associated with light foot traffic would be minimal and no different than the regular use of the HLZ sites on USFS land from USFS employees and Search and Rescue Teams. No unique habitats or vegetation occurs near the southern Arizona miscellaneously-owned proposed training sites.

Plains and Great Basin Grassland, Semi-desert Grassland, Arizona Upland Subdivision of Sonoran Desertscrub, Interior Chaparral, and Riparian vegetation occur in the region of southern Arizona miscellaneously-owned proposed training sites. All seven of the proposed training sites have been previously disturbed or are in a developed area. Effects on vegetation at these disturbed sites would be minimal. The Salt River Low site would have the potential for greatest impact on vegetation due to the type of training activity and it being in an area with riparian vegetation. The Salt River Low site would be used for water training exercises. Water trainings include the use of rubber dinghies, which would be dropped onto the water. Trampling of vegetation and erosion of the riverbanks could occur as a result of the movement of equipment and the activity from the personnel involved in training, though activities would likely be restricted to recreational areas along the Salt River. There would be no significant impacts on vegetation.

***Wildlife*.** Negligible to minor, temporary, adverse direct impacts on wildlife species would occur during the activities at the proposed training sites. During the course of the biannual three-week exercises, up to 300 rotary-wing sorties would be conducted for HLZ and DZ sites, with eight to 12 personnel per squad units. Training activities would likely disturb resident wildlife species and cause individuals to leave or temporarily avoid the area. These species would likely return after the disturbance has ended. Bird-helicopter strikes are a potential impact; however, standard operating procedures would be used to minimize any potential effects of collisions with wildlife. USAF is authorized for incidental takes of migratory birds provided that USAF adheres to the regulations set forth in the MBTA (Authorization of take incidental to military readiness activities, 50 CFR § 21.15 [authorization] and § 21.3 [definitions]). Many of the HLZ and DZ sites have been previously disturbed or have a permanent concrete pad for helicopter landings and are already used for helicopter operations. Therefore, impacts on wildlife would be minimal and no different than the effects from regular use of the HLZ sites on miscellaneously-owned lands from recreational use and Search and Rescue Teams.

The greatest impacts on wildlife would occur at the Salt River Low site due to the unique riparian habitat. Riparian obligate species may temporarily avoid this section of the Salt River because of the increased human activity and noise from the helicopters. As mentioned previously, activities would be restricted to areas along the Salt River where there is heavy recreational use; therefore, impacts on wildlife would be minimal and no different than the effects from regular recreational use of the Salt River.

The Saguaro Lake Ranch site is near bald eagle nesting sites and a bat colony (AGFD 2017). However, the avoidance period for this site from February through August, would be sufficient to avoid any impacts to the nesting eagles and the bat colony. This avoidance period was based on the breeding seasons for federally listed bird species discussed below.

Threatened and Endangered Species. This section discusses potential impacts resulting from the Proposed Action to the species listed in **Table 3-13**. In general, potential impacts resulting from the Proposed Action on threatened and endangered species would range from no effect to short-term negligible adverse effects. **Table 4-11** summarizes the Proposed Action's effect determination on these species. Species that would not be affected by the Proposed Action will not be discussed further.

Table 4-11. Federal Threatened and Endangered Species in Southern Arizona Miscellaneous Land Effect Determination

Species	Federal Status	Species Effect Determination	Critical Habitat Effect Determination
Fish			
Headwater chub (*Gila nigra*)	PT	May affect, not likely to adversely affect	Not applicable
Razorback sucker (*Xyrauchen texanus*)	E	May affect, not likely to adversely affect	May affect, not likely to adversely affect
Roundtail chub (*Gila robusta*)	PT	May affect, not likely to adversely affect	Not applicable
Amphibians			
Chiricahua leopard frog (*Lithobates chiricahuensis*)	T	May affect, not likely to adversely affect	No effect
Sonora tiger salamander (*Ambystoma tigrinum stebbinsi*)	E	May affect, not likely to adversely affect	Not applicable
Reptiles			
Narrow-headed gartersnake (*Thamnophis rufipunctatus*)	T	May affect, not likely to adversely affect	May affect, not likely to adversely affect
Northern Mexican gartersnake (*Thamnophis eques megalops*)	T	May affect, not likely to adversely affect	No effect
Birds			
Southwestern willow flycatcher (*Empidonax traillii extimus*)	E	May affect, not likely to adversely affect	No effect
Yellow-billed cuckoo (*Coccyzus americanus*)	T	May affect, not likely to adversely affect	No effect
Yuma clapper rail (*Rallus longirostris yumanensis*)	E	May affect, not likely to adversely affect	Not applicable
Mammals			
Jaguar (*Panthera onca*)	E	No effect	No effect
Lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*)	E	May affect, not likely to adversely affect	Not applicable

Key: E = Endangered, PT = Proposed Threatened, T = Threatened

Headwater chub. Short-term, negligible, direct adverse impacts on this species may occur as a result of the Proposed Action. The headwater chub has the potential to occur near the Saguaro Lake, Verde River and Salt River Low sites. The Proposed Action would consist of water training activities 0.3 to 2.7 acres around the proposed sites, including the use of rubber

dinghies. However, with the exception of light foot traffic, training activities would be restricted to already disturbed areas. Headwater chub could potentially avoid the area during the water training activities; however, effects are expected to be negligible.

Razorback sucker. Short-term, negligible, direct adverse impacts on the razorback sucker may occur as a result of the Proposed Action. This species has the potential to occur near the Salt River Low site. The Proposed Action would consist of training activities 0.3 to 2.7 acres around the proposed sites, depending on the activities. However, with the exception of light foot traffic, training activities would be restricted to already disturbed areas. Minor foot-traffic would be restricted to areas along the Salt River where high recreational use already occurs. Impacts on this species would be minimal and no different than the effects from regular recreational use of the Salt River.

Razorback sucker Critical Habitat. No impacts on razorback sucker critical habitat would occur as a result of the Proposed Action. The razorback sucker has designated critical habitat in the Salt River, 0.47 miles upstream from the Salt River Low. However, with the exception of light foot traffic, training activities would be restricted to already disturbed areas. Minor foot-traffic would not occur in streams or riparian areas. Critical habitat also occurs within five miles of the Salt River High site. However because training activities would occur within 0.3 to 2.7 acres around the proposed sites and direct and indirect impacts would not expected beyond one-half mile in any direction from the site, the Proposed Action would have no effect on razorback sucker critical habitat at the Salt River High site.

Roundtail chub. Short-term, negligible, direct adverse impacts on this species may occur as a result of the Proposed Action. The roundtail chub has the potential to occur near the Saguaro Lake, Verde River and Salt River Low sites. The Proposed Action would consist of water training activities 0.3 to 2.7 acres around the proposed sites, including the use of rubber dinghies. Impacts on this species from the training activities would include temporary avoidance of the area. However, with the exception of light foot traffic, training would be restricted to already disturbed areas. Impacts on the roundtail chub would be minimal and no different than the effects from regular recreational use of the riparian areas.

Chiricahua leopard frog. Short term, negligible, direct adverse impacts on this species may occur as a result of the Proposed Action. The Chiricahua leopard frog has the potential to occur near the Little Outfit, Salt River High and Salt River Low sites. Because the proposed training activities would avoid the riparian areas where the species is known to occur, no impacts would be expected at the Salt River High site. The Proposed Action would consist of water training activities 0.3 to 2.7 acres around the proposed site, including the use of rubber dinghies. Impacts on this species from the training activities would include temporary avoidance of the area. However, with the exception of light foot traffic, training activities would be restricted to already disturbed areas. To avoid adverse impacts on the Chiricahua leopard frog, personnel would limit their training activities at these sites to areas where human activity is more prevalent, so as to not disturb suitable habitat for this species, as well as avoid this species' breeding season, when possible. The breeding season of Chiricahua leopard frogs, as indicated by egg laying, varies with elevation (SWESA 2008) and differs year-to-year (USFWS 2007). Eggs are typically laid March through June at elevations below 5,900 feet (USFWS Undated-a).

Chiricahua leopard frog Critical Habitat. No impact on designated Chiricahua leopard frog critical habitat is expected to occur as a result of the Proposed Action. None of the southern Arizona miscellaneous proposed training sites occur within five miles of Chiricahua leopard frog critical habitat (**Table 3-14**).

Sonora tiger salamander. Short-term, negligible, direct adverse impacts on this species may occur as a result of the Proposed Action. The Sonora tiger salamander has the potential to occur near the Little Outfit site. Based on a site visit on February 25, 2015, livestock are present in the surrounding area near Little Outfit. There is a stock pond and an ephemeral stream less than one-quarter mile from the site. However, with the exception of light foot traffic, training activities would be restricted to already disturbed areas. To avoid adverse impacts on the Sonora tiger salamander, personnel would avoid areas with permanent waters and the stream when running at this site.

Narrow-headed gartersnake. Short-term, negligible, direct adverse impacts on the narrow-headed gartersnake may occur as a result of the Proposed Action. This species has the potential to occur near the Salt River High and Salt River Low sites. The narrow-headed gartersnakes only occur up to 650 feet away from stream channels (USFWS 2014a). The Salt River High site is at least 1,000 feet away from the Salt River channel. Because the proposed training activities would avoid riparian areas, no impacts would be expected at the Salt River High site. The Proposed Action would consist of water training activities 0.3 to 2.7 acres around the proposed site, including the use of rubber dinghies. Individuals would temporarily avoid the area at the Salt River Low site due to personnel traffic and equipment movement. However, with the exception of light foot traffic, training activities would be restricted to already disturbed areas. To avoid adverse impacts on the narrow-headed gartersnake, personnel would limit their training activities at the Salt River sites to areas where human activity is more prevalent.

Narrow-headed gartersnake Critical Habitat. Short-term, negligible, direct adverse impacts on narrow-headed gartersnake proposed critical habitat may occur as a result of the Proposed Action. This species has critical habitat in the Salt River, 0.19 mile south of the Salt River High site, and the Salt River Low site occurs within critical habitat. Due to location, distance from the stream channel, and that no training activity would occur in or near the river; no impact on critical habitat would be expected to occur at the Salt River High site. During water training, personnel movement could result in the trampling of aquatic vegetation and increased stream sedimentation at the Salt River Low site. To avoid impacts on this species, personnel involved in the training activities would avoid entering the Salt River in riparian areas with heavy vegetation and unstable stream banks.

Northern Mexican gartersnake. Short-term, negligible, direct adverse impacts on the northern Mexican gartersnake may occur as a result of the Proposed Action. This species has the potential to occur near the Little Outfit, Salt River High, and Salt River Low sites. Similar to the narrow-headed gartersnake, the Salt River High site is over 1000 feet from the Salt River stream channel, and the northern Mexican gartersnake has been found up to only 330 feet from permanent water (USFWS 2014a). The Little Outfit site has a stock pond and ephemeral drainage less than one-quarter mile to the east of the proposed HLZ site, while the Salt River Low is a WTA within the Salt River. The Proposed Action would consist of water training

activities 0.3 to 2.7 acres around the proposed sites, including the use of rubber dinghies. Individuals at the Salt River Low and Little Outfit sites would temporarily avoid the area due to personnel traffic and equipment movement. However, with the exception of light foot traffic, training would be restricted to already disturbed areas.

Northern Mexican gartersnake Critical Habitat. No impacts on northern Mexican gartersnake critical habitat would occur as a result of the Proposed Action. The northern Mexican gartersnake has proposed critical habitat in 3.10 miles from the Ruby Fuzzy Paladins site; and the Little Outfit site occurs within proposed critical habitat. However, with the exception of light foot traffic, training activities would be restricted to already disturbed areas. Minor foot-traffic would not occur in streams or riparian areas. The Proposed Action would have no impact on northern Mexican gartersnake proposed critical habitat. Because the training activities would occur within 0.3- to 2.7-acres at the proposed sites, any activities would not occur in proposed critical habitat.

Southwestern willow flycatcher. Short-term, negligible, direct adverse impacts on the southwestern willow flycatcher may occur as a result of the Proposed Action. This species has the potential to occur near the Saguaro Lake Ranch, Verde River, and Salt River Low sites. Water activities and other training actions over or along riparian areas could cause temporary avoidance of riparian vegetation as a result of the helicopter noise, and increased human activity in the riparian areas. However, with the exception of light foot traffic, training activities would be restricted to already disturbed areas. To avoid impacts on this species, training activities at these sites would be scheduled outside of the breeding season (April through September) for this species, and avoid areas of heavy riparian vegetation.

Southwestern willow flycatcher Critical Habitat. No impacts on designated southwestern willow flycatcher critical habitat are expected to occur as a result of the Proposed Action. None of the southern Arizona miscellaneously-owned proposed training sites occur within five miles of critical habitat.

Yellow-billed cuckoo. Short-term, negligible, direct adverse impacts on the yellow-billed cuckoo may occur as a result of the Proposed Action. This species has the potential to occur near the Saguaro Lake Ranch, Verde River, and Salt River Low sites. Water activities and other training actions over or along riparian areas could cause temporary avoidance of riparian vegetation as a result of the helicopter noise, and increased human activity in the riparian areas. However, with the exception of light foot traffic, training activities would be restricted to already disturbed areas. To avoid impacts on this species, training activities at these sites would be scheduled outside of the breeding season for this species, and avoid areas of heavy riparian vegetation. Yellow-billed cuckoos arrive on their breeding grounds in Arizona in late May to early June. Nesting typically occurs between late June and late July. In the Lower Colorado River region nesting occurs primarily from late June to early August and peaking mid- to late-July (McNeil et al. 2013).

Yellow-billed cuckoo Critical Habitat. No impacts on designated yellow-billed cuckoo critical habitat would be expected to occur as a result of the Proposed Action. None of the southern Arizona miscellaneously-owned proposed training sites occur within five miles of critical habitat.

Yuma clapper rail. Short-term, negligible, direct adverse impacts on the Yuma clapper rail may occur as a result of the Proposed Action. This species has the potential to occur near the Salt River Low, Saguaro Lake Ranch, and Verde River sites. Water activities and other training actions over or along riparian areas could cause temporary avoidance of riparian vegetation as a result of the helicopter noise, and increased human activity in the riparian areas. However, with the exception of light foot traffic, training activities would be restricted to already disturbed areas. To avoid impacts on this species, training activities at these sites would be scheduled outside of the breeding season (February through August) for this species, and personnel would avoid areas of heavy riparian vegetation.

Lesser long-nosed bat. Short-term, negligible, direct adverse impacts on this species may occur as a result of the Proposed Action. The lesser long-nosed bat has the potential to occur near the Little Outfit site. The species may temporarily avoid these areas as result of the human activity and helicopter noise. However, with the exception of light foot traffic, training would be restricted to already disturbed areas. The lesser long-nosed bat is a migrant species in Arizona occurring from late April to late September, coinciding with the flowering columnar cacti and agave species. Because no vegetation removal is expected, this species would not likely to be affected by the Proposed Action.

4.4.1.2 NORTHERN ARIZONA

Military Installations

As mentioned in **Section 3.4.2.2**, the 11 proposed training sites within Camp Navajo and Fort Tuthill in northern Arizona would be permitted sites already governed by the installations' environmental policies and procedures, including existing ESA Section 7 conducted for the range and any associated requirements (see **Table 2-1** for site-specific training activities). The Proposed Action would result in a negligible increase in already existing operations at these training sites; therefore, impacts on biological resources (vegetation, wildlife, and threatened and endangered species) associated with the Proposed Action will not be evaluated further for these sites.

U.S. Forest Service

Vegetation. Under the Proposed Action, negligible, temporary, adverse direct impacts on vegetation would occur during the activities at the proposed training sites (see **Table 2-1** for site-specific training activities). During the course of the biannual three-week exercises, up to 300 rotary-wing sorties could be conducted for HLZ and DZ sites, with eight to 12 personnel per squad units. Trampling of vegetation and soil erosion from personnel and training-related equipment and soil compaction from military vehicles and equipment could occur as a result of the Proposed Action. Many of the HLZ and DZ sites have been previously disturbed; therefore, removal of vegetation would not be expected. Impacts on vegetation associated with light foot traffic would be minimal and no different than the regular use of the HLZ sites on USFS land from USFS employees and Search and Rescue Teams. No unique habitats or vegetation occurs near the northern Arizona USFS proposed training sites.

Great Basin Conifer Woodland, Petran Montane Conifer Forest, Interior Chaparral, and Arizona Upland Subdivision of Sonoran Desertscrub vegetation occur in the region of northern Arizona

USFS proposed training sites. All of the proposed training sites have been previously disturbed, have cement helicopter landing pads, or are adjacent to a developed area. Impacts on vegetation at these disturbed sites would be minimal. At the Roosevelt Lake site, water trainings include the use of rubber dinghies, which would be dropped into the water. Many of the northern Arizona USFS proposed training sites occur in grassy areas, previously disturbed, within ponderosa pine woodlands. There would be no significant impacts on vegetation.

Wildlife. Negligible to minor, temporary, adverse direct impacts on wildlife species would occur during the activities at the proposed training sites. During the course of the biannual three-week exercises, up to 300 rotary-wing sorties could be conducted for HLZ and DZ sites, with eight to 12 personnel per squad units. Training activities would likely disturb resident wildlife species and cause individuals to leave or temporarily avoid the area. These species would likely return after the disturbance has ended. Bird-helicopter strikes would be a potential impact; however, standard operating procedures would be used to minimize any potential effects of collisions with wildlife. The USAF is authorized for incidental takes of migratory birds provided that USAF adheres to the regulations set forth in the MBTA (Authorization of take incidental to military readiness activities, 50 CFR § 21.15 [authorization] and § 21.3 [definitions]). Many of the HLZ and DZ sites have been previously disturbed or have a permanent concrete pad for helicopter landings and are already used for helicopter operations. Therefore, impacts on wildlife would be minimal and no different than the effects from regular use of the HLZ sites on USFS properties from USFS employees and Search and Rescue Teams.

Although individuals may temporarily avoid the areas as a result of the Proposed Action, no impacts on wildlife populations would be expected to occur.

In a letter dated April 4, 2017, Arizona Fish and Game Department (AFGD) indicated that peregrine falcon nests occur approximately 0.8 mile from the point provided for the Mogollon Rim site and approximately one mile southwest of the Jacks Canyon site and that travel paths of flights would need to stay one-half mile from the nests during the breeding season (March 1–August 31).

Threatened and Endangered Species. This section discusses potential impacts resulting from the Proposed Action to the species listed in **Table 3-16**. In general, potential impacts resulting from the Proposed Action on threatened and endangered species would range from no effect to short-term negligible adverse impacts. **Table 4-12** summarizes the Proposed Action's effect determination on these species. Species that are determined to not be affected by the Proposed Action will not be discussed further.

Headwater chub. Short-term, negligible, direct adverse impacts on this species may occur as a result of the Proposed Action. The headwater chub has the potential to occur near the Roosevelt Lake site. The Proposed Action would consist of water training activities 0.3 to 2.7 acres around the proposed site, including the use of rubber dinghies. However, with the exception of light foot traffic, training activities would be restricted to already disturbed areas. Headwater chub could potentially avoid the area during the water training activities; however, effects would be negligible.

Table 4-12. Federal Threatened and Endangered Species in Northern Arizona USFS Land Effect Determination

Species	Federal Status	Species Effect Determination	Critical Habitat Effect Determination
Fish			
Headwater chub (*Gila nigra*)	PT	May affect, not likely to adversely affect	Not applicable
Roundtail chub (*Gila robusta*)	PT	May affect, not likely to adversely affect	Not applicable
Amphibians			
Chiricahua leopard frog (*Lithobates chiricahuensis*)	T	May affect, not likely to adversely affect	No effect
Reptiles			
Narrow-headed gartersnake (*Thamnophis rufipunctatus*)	T	May affect, not likely to adversely affect	No effect
Northern Mexican gartersnake (*Thamnophis eques megalops*)	T	May affect, not likely to adversely affect	No effect
Birds			
Mexican spotted owl (*Strix occidentalis lucida*)	T	May affect, not likely to adversely affect	No effect
Southwestern willow flycatcher (*Empidonax traillii extimus*)	E	May affect, not likely to adversely affect	No effect
Yellow-billed cuckoo (*Coccyzus americanus*)	T	May affect, not likely to adversely affect	Not applibable

Key: E = Endangered, PT = Proposed Threatened, T = Threatened

Roundtail chub. Short-term, negligible, direct adverse impacts on this species may occur as a result of the Proposed Action. The roundtail chub has the potential to occur near the Roosevelt Lake site. The Proposed Action would consist of water training activities 0.3 to 2.7 acres around the proposed site, including the use of rubber dinghies. However, with the exception of light foot traffic, training activities would be restricted to already disturbed areas. Roundtail chub could potentially avoid the area during water training activities; however, effects would be negligible.

Chiricahua leopard frog. Short-term, negligible, direct adverse impacts on the Chiricahua leopard frog may occur as a result of the Proposed Action. This species has the potential to occur near the Jacks Canyon, and Longview sites. The Proposed Action would consist of training activities 0.3 to 2.7 acres around the proposed sites. Impacts on this species from the training activities would include temporary avoidance of the area, and potential take of individuals from personnel movement. However, with the exception of light foot traffic, training activities would be restricted to already disturbed areas. To avoid impacts on the Chiricahua leopard frog, personnel would avoid riparian areas when possible, and conduct training activities at these sites outside of the breeding season, which is typically March through June for this species (USFWS Undated-a).

Chiricahua leopard frog Critical Habitat. No impacts on designated Chiricahua leopard frog critical habitat would be expected to occur as a result of the Proposed Action. None of the

northern Arizona USFS proposed training sites occur within five miles of Chiricahua leopard frog critical habitat (**Table 3-17**).

Narrow-headed gartersnake. Short-term, negligible, direct adverse impacts on the narrow-headed gartersnake may occur as a result of the Proposed Action. This species has the potential to occur near the Payson-Rimside site. The narrow-headed gartersnakes only occur up to 650 feet away from stream channels (USFWS 2014a). The Payson-Rimside site is less than 500 feet away from the East Verde River. Individuals would include temporarily avoid of the area due to personnel traffic and equipment movement. However, with the exception of light foot traffic, training activities would be restricted to already disturbed areas. To avoid adverse impacts on the narrow-headed gartersnake, personnel would avoid riparian areas during their training activities at the Payson-Rimside site.

Narrow-headed gartersnake Critical Habitat. Short-term, negligible, direct adverse impacts on narrow-headed gartersnake proposed critical habitat may occur as a result of the Proposed Action. This species has critical habitat in the East Verde River and the Payson-Rimside site. Due to location, distance from the stream channel, and that no training activity would occur in or near the river; no adverse impact on critical habitat would be expected to occur but, personnel movement could result in the trampling of riparian vegetation and increased stream sedimentation along the banks of the East Verde River. To avoid impacts on this proposed critical, personnel involved in the training activities would avoid entering the East Verde River in riparian areas with heavy vegetation and unstable stream banks.

Northern Mexican gartersnake. Short-term, negligible, direct adverse impacts on the northern Mexican gartersnake may occur as a result of the Proposed Action. This species has the potential to occur near the Jacks Canyon, Lake Roosevelt, Longview, and Payson-Rimside sites. The northern Mexican gartersnake has been found up to only 330 feet from permanent water (USFWS 2014a). The Proposed Action would consist of water training activities 0.3 to 2.7 acres around the proposed sites, including the use of rubber dinghies, and training activities on land adjacent to riparian areas. Individuals would temporarily avoid the area due to personnel traffic and equipment movement. However, with the exception of light foot traffic, training would be restricted to already disturbed areas.

Northern Mexican gartersnake Critical Habitat. No impacts on proposed northern Mexican gartersnake critical habitat would be expected to occur as a result of the Proposed Action. None of the northern Arizona USFS proposed training sites that occur within five miles of critical habitat contain the specific PCEs (**Table 3-17**).

Mexican spotted owl. Short-term, negligible, direct adverse impacts on the Mexican spotted owl may occur as a result of the Proposed Action. This species has the potential to occur near all 12 of the northern Arizona USFS proposed training sites. Noise and human activity would temporarily exceed typical disturbance levels within the proposed areas. However, with the exception of light foot traffic, training activities would be restricted to already disturbed areas; many of the northern Arizona sites have existing cement helipads or occur close to developed areas. If any owls were present during the Proposed Action, they might temporarily flush from their roost, avoid the training area, or otherwise temporarily modify their behavior. The

temporary and infrequent noise by people, vehicles, and helicopters would be expected to have short-term negligible impact (USFWS 2012c).

Delaney et al. (1999) found that ground-based disturbances elicited a greater flush response than aerial disturbance and reported a quarter-mile threshold for alert responses to helicopter flights. In addition, Delaney et al. (1999) found that Mexican spotted owl did not flee from helicopters when caring for young at the nest, but fled readily during the post-fledging period. To avoid impacts on this species training activities should be prohibited from February 1 through August 31 to avoid breeding and nesting season, when owls are most vulnerable.

In a letter dated April 4, 2017, AGFD specifically noted that the Mogollon Rim Site is immediately adjacent to two Mexican spotted owl Protective Activity Centers. Additionally, they noted another Protective Activity Center approximately one mile southwest of the coordinates provided for the Jacks Canyon site. No activities would be allowed within one-quarter mile of the Protective Activity Centers during the breeding season, from March 1 to August 31. This means that the travel paths of flights would need to stay one-quarter mile from the Mexican spotted owl Protective Activity Centers (AGFD 2017).

Mexican spotted owl Critical Habitat. No impacts on designated Mexican spotted owl critical habitat would be expected to occur as a result of the Proposed Action. **Table 3-17** shows which sites occur within five miles of designated Mexican spotted owl habitat. Because there would be no vegetation removal associated with the Proposed Action, there would be no expected impact on the critical habitat.

Southwestern willow flycatcher. Short-term, negligible, direct adverse impacts on the southwestern willow flycatcher may occur as a result of the Proposed Action. This species has the potential to occur near the Jacks Canyon and Roosevelt Lake sites. Water activities and other training actions at Roosevelt Lake near riparian areas could cause temporary avoidance of riparian vegetation as a result of the helicopter noise, and increased human activity in the riparian areas. However, with the exception of light foot traffic, training activities would be restricted to already disturbed areas. To avoid impacts on this species, training would be scheduled outside of the breeding season (April to September) for this species, and areas of heavy riparian vegetation at this site.

Southwestern willow flycatcher Critical Habitat. No impacts on designated southwestern willow flycatcher critical habitat would be expected to occur as a result of the Proposed Action. None of the northern Arizona USFS proposed training sites occur within five miles of critical habitat.

Yellow-billed cuckoo. Short-term, negligible, direct adverse impacts on the yellow-billed cuckoo may occur as a result of the Proposed Action. This species has the potential to occur near the Lake Roosevelt site. Water activities and other training actions over or along riparian areas could cause temporary avoidance of riparian vegetation as a result of the helicopter noise, and increased human activity in the riparian areas. However, with the exception of light foot traffic, training activities would be restricted to already disturbed areas. To avoid impacts on this species, training activities at these sites would be scheduled outside of the breeding season for this species, and avoid areas of heavy riparian vegetation. Yellow-billed cuckoos arrive on their breeding grounds in Arizona in late May to early June. Nesting typically occurs between late

June and late July. In the Lower Colorado River region nesting occurs primarily from late June to early August and peaking mid- to late-July (McNeil et al. 2013).

Miscellaneous

Vegetation. Under the Proposed Action, negligible, temporary, adverse direct impacts on vegetation would occur during the activities at the proposed training sites (see **Table 2-1** for site-specific training activities). During the course of the biannual three-week exercises, up to 300 rotary-wing sorties could be conducted for HLZ and DZ sites, with eight to 12 personnel per squad units. Trampling of vegetation and soil erosion from personnel and training-related equipment and soil compaction from military vehicles and equipment could occur as a result of the Proposed Action. Many of the HLZ and DZ sites have been previously disturbed; therefore, removal of vegetation would not be expected. Impacts on vegetation associated with light foot traffic would be minimal and no different than the regular use of the HLZ sites on USFS land from USFS employees and Search and Rescue Teams. No unique habitats or vegetation occurs near the northern Arizona miscellaneously-owned proposed training sites.

Most of the northern Arizona proposed training sites on miscellaneously-owned land are on private property within Plains and Great Basin Grassland, and Great Basin Conifer Woodlands. Mohave Desertscrub, Great Basin Desertscrub, and Petran Montane Conifer Forest, are also present in the vicinity of the proposed sites on naturalized habitat. Impacts on vegetation would be temporary and minimal at these sites due to the nature of the Proposed Action. There would be no significant impacts on vegetation.

Wildlife. Negligible to minor, temporary, adverse direct impacts on wildlife species would occur during the activities at the proposed training sites. During the course of the biannual three-week exercises, up to 300 rotary-wing sorties could be conducted for HLZ and DZ sites, with eight to 12 personnel per squad units. Training activities would likely disturb resident wildlife species and cause individuals to leave or temporarily avoid the area. These species would likely return after the disturbance has ended. Bird-helicopter strikes would be a potential impact; however, standard operating procedures would be used to minimize any potential effects of collisions with wildlife. The USAF is authorized for incidental takes of migratory birds provided that USAF adheres to the regulations set forth in the MBTA (authorization of take incidental to military readiness activities, 50 CFR § 21.15 [authorization] and § 21.3 [definitions]). Many of the HLZ and DZ sites have been previously disturbed or have a permanent concrete pad for helicopter landings and are already used for helicopter operations. Therefore, impacts on wildlife would be minimal and no different from the effects from regular use of the HLZ sites on miscellaneously-owned lands from recreational use and Search and Rescue Teams.

Although individuals may temporarily avoid the areas as a result of the Proposed Action, no impacts on wildlife populations would be expected to occur.

Threatened and Endangered Species. This section discusses potential impacts resulting from the Proposed Action to the species listed in **Table 3-19**. In general, potential impacts resulting from the Proposed Action to threatened and endangered species would range from no effect to short-term negligible adverse effects. **Table 4-13** summarizes the Proposed Action's effect determination on these species. Species that would not be affected by the Proposed Action will not be discussed further.

Table 4-13. Federal Threatened and Endangered Species in Northern Arizona Miscellaneous Land Effect Determination

Species	Federal Status	Species Effect Determination	Critical Habitat Effect Determination
Plants			
Fickeisen plains cactus (*Pediocactus peeblesianus fickeiseniae*)	E	May affect, not likely to adversely affect	No effect
Amphibians			
Chiricahua leopard frog (*Lithobates chiricahuensis*)	T	May affect, not likely to adversely affect	No effect
Reptiles			
Northern Mexican gartersnake (*Thamnophis eques megalops*)	T	No effect	No effect
Birds			
Mexican spotted owl (*Strix occidentalis lucida*)	T	May affect, not likely to adversely affect	No effect
Southwestern willow flycatcher (*Empidonax traillii extimus*)	E	No effect	No effect
Yellow-billed cuckoo (*Coccyzus americanus*)	T	No effect	No effect
Mammals			
New Mexico meadow jumping mouse (*Zapus hudsonius luteus*)	E	May affect, not likely to adversely affect	No effect

Key: E = Endangered, T = Threatened

Fickeisen Plains Cactus. Short-term, negligible, direct adverse impacts on the Fickeisen plains cactus may occur as a result of the Proposed Action. This species has the potential to occur near the Sinkhole proposed site. Potential direct impacts would include trampling or crushing of cacti from personnel and training-related equipment. However, training activities would be restricted to already areas of 0.3 to 2.7 acres and only for short durations (few hours once a year). Because of the limited area and duration of the Proposed Action, the species may be affected, but highly unlikely.

Fickeisen Plains Cactus Critical Habitat. No impacts on designated Fickeisen plains cactus critical habitat would be expected to occur as a result of the Proposed Action. None of the northern Arizona miscellaneous proposed training sites occur within five miles of critical habitat.

Chiricahua leopard frog. Short term, negligible, direct adverse impacts on the Chiricahua leopard frog may occur as a result of the Proposed Action. This species has the potential to occur near the Caldwell Meadows and Sprucedale Guest Ranch sites. The Proposed Action would consist of training activities 0.3 to 2.7 acres around the proposed sites. Impacts on this species from the training activities would include temporary avoidance of the area, and potential take of individuals from personnel movement. However, with the exception of light foot traffic,

training activities would be restricted to already disturbed areas. To avoid impacts on the Chiricahua leopard frog, personnel would avoid riparian areas when possible, and conduct training activities at these sites outside of the breeding season, which is typically March through June for this species (USFWS Undated-a).

Chiricahua leopard frog Critical Habitat. No impacts on designated Chiricahua leopard frog critical habitat would be expected to occur as a result of the Proposed Action. The proposed Caldwell Meadows site is approximately five miles from designated Chiricahua leopard frog critical habitat (**Table 3-20**).

Mexican spotted owl. Short term, negligible, direct adverse impacts on the Mexican spotted owl may occur as a result of the Proposed Action. This species has the potential to occur near the proposed Sprucedale Guest Ranch site and the Caldwell Meadows site. Noise and human activity would temporarily exceed typical disturbance levels within the proposed areas. However, with the exception of light foot traffic, training activities would be restricted to already disturbed areas. If any owls were present during the Proposed Action, they might temporarily flush from their roost, avoid the training site, or otherwise temporarily modify their behavior. The temporary and infrequent noise by people, vehicles, and helicopters would be expected to have short-term negligible impact (USFWS 2012c).

Delaney et al. (1999) found that ground-based disturbances elicited a greater flush response than aerial disturbance and reported a one-quarter mile threshold for alert responses to helicopter flights. In addition, Delaney et al. (1999) found that Mexican spotted owl did not flee from helicopters when caring for young at the nest, but fled readily during the post-fledging period. To avoid impacts on this species training activities would be prohibited at this site from February 1 through August 31 to avoid breeding and nesting season, when owls are most vulnerable.

Mexican spotted owl Critical Habitat. No impacts on designated Mexican spotted owl critical habitat would be expected to occur as a result of the Proposed Action. Sprucedale Guest Ranch and Caldwell Meadows occur within designated critical habitat, but because no vegetation removal is expected for the Proposed Action, there would be no impact on the critical habitat.

New Mexico meadow jumping mouse. Short-term, negligible, direct adverse impacts on the New Mexico meadow jumping mouse may occur as a result of the Proposed Action. This species has the potential to occur near the Caldwell Meadows site. This site is within an alpine meadow with a stream less than 1,600 feet to the north of the proposed site. However, with the exception of light foot traffic, training activities would be restricted to already disturbed areas. If personnel do cross the stream during training activities this species could be trampled or its obligate riparian vegetation could be destroyed. To avoid impacts on the New Mexico meadow jumping mouse, personnel would avoid the stream and riparian vegetation by not going within 200 feet of the stream at this site.

New Mexico meadow jumping mouse Critical Habitat. No impacts on New Mexico meadow jumping mouse critical habitat would occur as a result of the Proposed Action. The New Mexico meadow jumping mouse has designated critical habitat in a small creek, 0.16 mile north of the Caldwell Meadows site. However, with the exception of light foot traffic, training activities would

be restricted to already disturbed areas. Minor foot-traffic would not occur in streams or riparian areas. Critical habitat also occurs within five miles of the Sprucedale Guest Ranch, as well as the Hannagan Meadows, Helibase Circular, KP Circular and KP Tank USFS sites; however, the Proposed Action would have no effect on New Mexico meadow jumping mouse critical habitat at these sites since the training activities would occur within 0.3 to 2.7 acres at the proposed sites.

4.4.1.3 NEW MEXICO

Military Installations

As mentioned in **Section 3.4.2.3**, the two proposed sites within Melrose Air Force Range and White Sands Missile Range in New Mexico would be permitted sites already governed by the installations' environmental policies and procedures, including existing ESA Section 7 conducted for the range and any associated requirements (see **Table 2-1** for site-specific training activities). The Proposed Action would result in a negligible increase in already existing operations at these training sites; therefore, impacts on biological resources (vegetation, wildlife, and threatened and endangered species) associated with the Proposed Action will not be evaluated further for these sites.

U.S. Forest Service

Vegetation. Under the Proposed Action, negligible, temporary, adverse direct impacts on vegetation would occur during the activities at the proposed training sites (see **Table 2-1** for site-specific training activities). During the course of the biannual three-week exercises, up to 300 rotary-wing sorties could be conducted for HLZ and DZ sites, with eight to 12 personnel per squad units. Trampling of vegetation and soil erosion from personnel and training-related equipment and soil compaction from military vehicles and equipment could occur as a result of the Proposed Action. Many of the HLZ and DZ sites have been previously disturbed; therefore, removal of vegetation would not be expected. Impacts on vegetation associated with light foot traffic would be minimal and no different than the regular use of the HLZ sites on USFS land from USFS employees and Search and Rescue Teams. No unique habitats or vegetation occurs near the New Mexico USFS proposed training sites.

Inter Mountain Basins Semi-desert Grassland, Madrean Evergreen Woodland, and Petran Montane Conifer Forest vegetation occur in the areas of the New Mexico USFS proposed training sites. Glenwood Ranger Station, Negrito Helibase, and Reserve Ranger Station have concrete landing pads for helicopters; therefore, impacts on vegetation would be minimal. The other sites have more naturalized habitat, but have been previously disturbed. Impacts on vegetation at these sites would include trampling of plants, soil compaction, and soil erosion. No unique habitat occurs within the area of these proposed training sites.

Wildlife. Negligible to minor, temporary, adverse direct impacts on wildlife species would occur during the activities at the proposed training sites. During the course of the biannual three-week exercises, up to 300 rotary-wing sorties could be conducted for HLZ and DZ sites, with eight to 12 personnel per squad units. Training activities would likely disturb resident wildlife species and cause individuals to leave or temporarily avoid the area. These species would likely return after the disturbance has ended. Bird-helicopter strikes would be a potential impact; however, standard operating procedures would be used to minimize any potential effects of collisions with

wildlife. USAF is authorized for incidental takes of migratory birds provided that the USAF adheres to the regulations set forth in the MBTA (Authorization of take incidental to military readiness activities, 50 CFR § 21.15 [authorization] and § 21.3 [definitions]). Many of the HLZ and DZ sites have been previously disturbed or have a permanent concrete pad for helicopter landings and are already used for helicopter operations. Therefore, impacts on wildlife would be minimal and no different than the effects from regular use of the HLZ sites on USFS lands from recreational use and Search and Rescue Teams.

Although individuals may temporarily avoid the areas as a result of the Proposed Action, no impacts on wildlife populations would generally be expected to occur.

USFS expressed concern that the regarding disturbance especially during denning season (USFS 2017). The proposed action would not involve construction and would not result in any long-term changes to or loss of habitat or loss of prey species. When preferred habitat is limited, wolves are known to select habitat where innocuous human activity occurs. The proposed action would have the potential to disturb wolves and might cause individuals to leave or temporarily avoid the area. While, wolves sometimes risk contact with humans if preferred habitat is not available; indirect human influence can affect the species reproduction (Paquet et al. 2001). Therefore, the Negrito sites would be avoided during denning season (April through May) (AGFD 2014).

Threatened and Endangered Species. This section discusses potential impacts resulting from the Proposed Action to the species listed in **Table 3-22**. In general, potential impacts resulting from the Proposed Action on threatened and endangered species would range from no effect to short-term negligible adverse effects. **Table 4-14** summarizes the Proposed Action's effect determination on these species. Species that are determined to not be affected by the Proposed Action will not be discussed further.

Table 4-14. Federal Threatened and Endangered Species in New Mexico USFS Land Effect Determination

Species	Federal Status	Species Effect Determination	Critical Habitat Effect Determination
Narrow-headed gartersnake (*Thamnophis rufipunctatus*)	T	No effect	No effect
Mexican spotted owl (*Strix occidentalis lucida*)	T	May affect, not likely to adversely affect	No effect

Key: T = Threatened

Mexican spotted owl. Short-term, negligible, direct adverse impacts on the Mexican spotted owl may occur as a result of the Proposed Action. This species has the potential to occur near the Negrito Airstrip, Negrito Center, Negrito North, Negrito South, and Rainy Mesa proposed training sites. Noise and human activity would temporarily exceed typical disturbance levels within the proposed areas. However, with the exception of light foot traffic, training activities would be restricted to already disturbed areas. If any owls were present during the Proposed Action, they might temporarily flush from their roost, avoid the training site, or otherwise

temporarily modify their behavior. The temporary and infrequent noise by people, vehicles, and helicopters would be expected to have short-term negligible impact (USFWS 2012c).

Delaney et al. (1999) found that ground-based disturbances elicited a greater flush response than aerial disturbance and reported a quarter-mile threshold for alert responses to helicopter flights. In addition, Delaney et al. (1999) found that Mexican spotted owl did not flee from helicopters when caring for young at the nest, but fled readily during the post-fledging period. To avoid impacts on this species training activities would be prohibited at these sites from February 1 through August 31 to avoid breeding and nesting season, when owls are most vulnerable.

Mexican spotted owl Critical Habitat. No impacts on designated Mexican spotted owl critical habitat would be expected to occur as a result of the Proposed Action. Four of the New Mexico USFS sites occur within designated critical habitat, and two are within one mile of critical habitat (**Table 3-23**), but because no vegetation removal would be associated with the Proposed Action, as well as the duration of the training activities, there would be no expected impact on the critical habitat.

Miscellaneous

The proposed miscellaneous training site Playas Training and Research Center in New Mexico is within city limits and considered a developed urban area (see **Table 2-1** for site-specific training activities). Because this area do not contain native or naturalized plants and animals, and naturalized habitats (e.g., grasslands, forests, and wetlands), they are not analyzed further for an impact on biological resources.

4.4.1.4 CALIFORNIA

Military Installations

As mentioned in **Section 3.4.2.4**, the 15 proposed sites within Camp Pendleton, March ARB, Naval Air Facility (El Centro), and NAS North Island in California would be permitted sites already governed by the installations' environmental policies and procedures, including existing ESA Section 7 conducted for the range and any associated requirements (see **Table 2-1** for site-specific training activities). The Proposed Action would result in a negligible increase in already existing operations at these training sites; therefore, impacts on biological resources (vegetation, wildlife, and threatened and endangered species) associated with the Proposed Action will not be evaluated further for these sites.

4.4.2 No Action Alternative

The No Action Alternative would not result in new biological resource changes. However, the sites currently being used for the AT exercise and analyzed in the 2002 CSAR EA would continue to be used based off of the actions described in **Section 2.1.1**. Under the No Action Alternative, the USAF would not conduct training for PR on USFS and miscellaneously-owned lands. No impacts on biological resources would be expected.

4.5 Cultural Resources

The impact analysis for cultural resources focuses on assessing how and to what extent the Proposed Action and No Action Alternative would impact cultural resources that are eligible for listing on the NRHP (i.e. historic properties) or have traditional significance for Native Americans or other groups. Direct, adverse impacts could occur by physically altering, damaging, or destroying all or part of a historic property; altering characteristics of the surrounding environment that contribute to the property's significance; introducing visual or audible elements that are out of character with the property or alter its setting; or neglecting a property to the extent that it deteriorates or is destroyed. Direct impacts can be assessed by identifying the types and locations of proposed activity and determining the exact location of cultural resources that could be affected. Indirect impacts generally result from increased use of an area and are harder to quantify. An example of an indirect impact is increasing the accessibility of a locale that could facilitate looting of a historic property.

4.5.1 Proposed Action

Activities under the Proposed Action would take place at previously disturbed locations or areas that are currently or previously used for the activities conducted under the Proposed Action (see **Table 2-1** for site-specific training activities). The nature of potential cultural resource impacts for each type of training activity are summarized below, followed by discussions of specific impacts on identified cultural resources by geographic region.

Potential Impacts by Activity Type

HLZs – Most HLZs involve the use of pre-existing, dedicated landing pads. These landing pads are previously disturbed and further use under the Proposed Action would not physically alter or disturb cultural deposits or historic properties. The use of dedicated landing pads is consistent with current use and would not introduce new visual or audible elements into the landscape. Some HLZs are in austere locations with unimproved surfaces. Use of these areas for helicopter landing would not involve ground-disturbing activities and would not impact buried cultural deposits. Rotor wash and foot traffic that occur during helicopter landing, take-off, and dismounted operations and maneuvers by personnel could result in some disturbance to archaeological deposits exposed on the surface. Rotor wash could also disturb above-ground architectural resources, depending on their structural condition. Use of HLZs in austere locations may introduce new audible or visual elements into the landscape that could impact the setting of nearby historic properties. However, such impacts would be temporary and limited in duration to the biannual training periods that the HLZ is in use. Some HLZs may not be used every year. In the case of traditional cultural properties (TCPs), temporary activities could still result in long-term impacts.

LZs – LZs would be established at existing military, USFS, and municipally-owned airfields. These locations are previously disturbed and the proposed activities are consistent with current use. Therefore, activities at LZs would not impact cultural resources.

DZs – DZs would be used by small squads of paratroopers with eight to 12 personnel, except at locations for water training scenarios, where equipment drops would take place over water.

Many DZs are also HLZs. Personnel drops and subsequent dismounted operations and maneuvers at dedicated helipads or similar facilities would have no impact on cultural resources. At austere locations, foot traffic during dismounted operations could disturb cultural deposits exposed on the surface. As with HLZs, the use of DZs could introduce new audible or visual elements into the landscape that could impact setting, but such effects would be temporary. Also as with HLZs, the effects of such activities at or near TCPs could have lasting impacts.

FARPs – FARPs would be established at existing airfields with the appropriate infrastructure to provide refueling capabilities. All helicopters and fixed-wing aircraft would be refueled at these locations and not at HLZs or LZs. Proposed FARP locations are previously disturbed and the proposed activities are consistent with current use. Therefore, activities at FARPs would not impact cultural resources.

Miscellaneous – Miscellaneous activities under the Proposed Action would not be expected to impact cultural resources. Classroom training, small arms qualifications, billeting, and logistics and operations centers would involve the temporary use of buildings, many of which were intended for the types of proposed activities (e.g., shooting ranges). These activities would not physically alter or destroy these buildings. Technical rope work and MOUT training may not be consistent with current uses of proposed locations but would not involve ground-disturbing activities and would not be expected to impact cultural resources. Water locations would involve equipment drops, operations, and maneuvers over water and would not be expected to impact cultural resources. All vehicular ground operations in relation to training activities would take place on improved and unimproved roads. No off-road use would take place except where proposed at the Camp Pendleton Off-Road Trail location. This location is an approved training location and off-road use is consistent with current use. Road maintenance is not expected and is not included as part of the Proposed Action.

4.5.1.1 SOUTHERN ARIZONA

Military Installations

The Proposed Action addresses AT training at 24 locations on military installations in southern Arizona. Proposed training locations on military installations in southern Arizona are permitted sites already approved for the types of activities covered under the Proposed Action. The range of activities proposed for these locations include HLZs, LZs, DZs, FARPs, MOUT, small arms qualification, and air support. Use of these locations would meet the environmental requirements and restrictions of each approved training locale, would not involve ground-disturbing activities, and would not introduce new audible or visual elements to the landscape (see **Table 2-1** for site-specific training activities). Training activities at the NATO Hill location at BMGR East would avoid sensitive cultural areas. Proposed activities on military installations in southern Arizona would have no effect on cultural resources.

U.S. Forest Service

The Proposed Action addresses AT training at eight locations on USFS property in southern Arizona. These locations are proposed for HLZs and technical rope work (see **Table 2-1** for site-specific training activities). Effects on cultural resources for each activity type would be

consistent with the descriptions above under **Potential Impacts by Activity Type**. These eight proposed training locations have not been previously surveyed and no cultural resources have been identified within the APE. A review of historic maps and aerial imagery concluded no historic architecture or above-ground features are present that would be susceptible to adverse impacts. Rotor wash and foot traffic during HLZ operations could impact unidentified archaeological sites exposed at these locations. Where the presence of cultural resources is unknown, and impacts are unknown, the USAF would conduct cultural resource surveys and evaluations prior to use for AT exercises.

Miscellaneous

The Proposed Action addresses AT training at 18 locations on miscellaneous properties in southern Arizona. The range of activities covered under the Proposed Action for these locations include: HLZs, LZs, DZs, FARPs, an operations center, classroom and MOUT training, small arms qualification, and water areas (see **Table 2-1** for site-specific training activities). Effects on cultural resources for each activity type would be consistent with the descriptions above under **Potential Impacts by Activity Type**. Twelve previously recorded sites were identified in proximity to the training locations proposed at Eloy North, Phoenix Sky Harbor IAP, Three Points Public Shooting Range, and Saguaro Lake. Eight sites are eligible for NRHP listing. Three sites are unevaluated for NRHP listing and are considered eligible for the purposes of this analysis. These 11 sites are discussed individually below in relation to the associated locations and proposed activities:

Eloy North

One historic property is near the proposed Eloy North location:

- **AZ AA:12:875 (ASM)** is the El Paso Natural Gas Pipeline No. 1007 and is eligible for NRHP listing.

The Eloy North location is proposed as a DZ and HLZ. Operations would take place in a disturbed field south of SkyVenture's indoor skydiving facility. DZ and HLZ operations would not directly or indirectly impact the site listed above.

Phoenix Sky Harbor IAP

Seven historic properties are near the proposed Phoenix Sky Harbor IAP location:

- **AZ T:12:131 (ASM)** is the Canal Patricio System, a prehistoric canal system eligible for NRHP listing.
- **P:3:6 (GP)** is an unidentified site with unknown eligibility for NRHP listing.
- **AZ T:12:62 (ASM)** is the Dutch Canal Ruin, a historic canal system eligible for NRHP listing.
- **AZ T:12:47 (ASM)** is Pueblo Salado, a Hohokam-era site eligible for NRHP listing.
- **AZ U:9:237 (ASM)** is a Hohokam-era site eligible for NRHP listing.
- **AZ U:0:297 (ASM)** is a prehistoric site unevaluated for NRHP listing.

- **AZ T:10:84 (ASM)** is the Welton-Phoenix-Eloy Spur of the Southern Pacific Railroad and is eligible for NRHP listing.

The Phoenix Sky Harbor IAP location is proposed as an LZ; use of the airport as an LZ would be contained within the existing airport footprint using existing infrastructure and would not have potential to alter or destroy physical characteristics of the sites listed above. Furthermore, use as an LZ is consistent with current use at the airport and would not introduce new audible or visual elements to the landscape.

Three Points Public Shooting Range

One NRHP-eligible site is near the proposed Three Points Public Shooting Range location:

- **AZ AA:16:377 (ASM)** is State Route 86 and is eligible for NRHP listing.

The Three Points Public Shooting Range location is proposed as a shooting range for small arms qualification. Activities would be contained within the existing facilities at the shooting range, would be consistent with current use, and would not impact these resources.

Saguaro Lake

Two sites are near the proposed Saguaro Lake location:

- **AZ U:6:194 (ASM)** is the Stewart Martin Dam Construction Camp and is eligible for NRHP listing.
- **AZ U:6:195 (ASM)** consists of a rock alignment and historic artifact scatters and is unevaluated for NRHP listing.

The Saguaro Lake location is proposed as a WTA. Activities would potentially involve personnel and equipment drops over the water and water-based operations and maneuvers. Water-based activities would not impact these historic properties. Proposed activities could introduce new audible and visual elements to the landscape, potentially affecting the historic character of the construction camp; however, these effects would be negligible and temporary. This impact would be limited to the duration of training activities and would not have a long-term, permanent effect on the camp. This would not affect the site's eligibility for NRHP listing.

In addition to previously recorded sites, the Phoenix, Bisbee Douglas, and Coolidge airports are historic airports that have not been recorded or evaluated for NRHP eligibility. These airports are proposed for HLZ, LZ, DZ, and FARP activities; these activities would be contained within the existing airport footprints using existing infrastructure and would not have potential to alter or destroy physical characteristics of these airports. Furthermore, these uses are consistent with historic and current uses at the airports and would not introduce new audible or visual elements to the landscape.

Unidentified cultural resources are possible at five proposed training locations that have not been completely surveyed: Eloy South, Highway 80 Paladins, Ruby Fuzzy Paladins, Tombstone Paladins, and Salt River Low. A review of historic maps and aerial imagery

concluded no historic architecture or above-ground features are present that would be susceptible to adverse impacts. Rotor wash and foot traffic during HLZ and DZ operations could impact unidentified archaeological sites exposed at these locations. The White Mountain Apache THPO concurred with the USAF's finding that training activities at Salt River Low would not effect cultural resources. Where the presence of cultural resources is unknown, and impacts are unknown, the USAF would conduct cultural resource surveys and evaluations prior to use for AT exercises.

4.5.1.2 NORTHERN ARIZONA

Military Installations

The Proposed Action addresses AT training at 11 locations on military installations in northern Arizona. These locations are permitted sites already approved for the types of activities covered under the Proposed Action (see **Table 2-1** for site-specific training activities). The range of activities proposed for these locations include HLZs, DZs, and MOUT training. Use of these locations would be consistent with environmental requirements and restrictions of each approved training locale, would not involve ground-disturbing activities, and would not introduce new audible or visual elements to the landscape. Proposed activities on military installations in northern Arizona would have no effect on cultural resources.

U.S. Forest Service

The Proposed Action addresses AT training at 20 locations on USFS property in northern Arizona. The range of activities covered under the Proposed Action for these locations include: HLZs, DZs, and technical rope work. One HLZ/DZ is water based (see **Table 2-1** for site-specific training activities). Effects on cultural resources for each activity type would be consistent with the descriptions above under **Potential Impacts by Activity Type**. Four previously recorded sites were identified in proximity to the proposed Comanche, Hannagan Meadow, Helibase Circular, KP Circular, KP Tank, Longview, and Mohawk training locations. The Hannagan Meadow, Helibase Circular, KP Circular, and KP Tank locations are adjacent to one another and are within 330 feet of the same site. All four sites are unevaluated for NRHP listing and are considered eligible for the purposes of this analysis. These four sites are discussed individually below in relation to the associated locations and proposed activities:

Comanche

One site is near the proposed Comanche location:

- **36066** is the Flim-Flam Railroad and is unevaluated for NRHP listing.

The Comanche location is proposed as a DZ. The location is an unimproved, undisturbed surface in a meadow adjacent to a two-track road. Personnel drops, and subsequent dismounted operations and maneuvers would not impact the railroad. Any vehicle traffic to the location would use the existing two-track road and would not disturb the site.

Hannagan Meadow and Helibase Circular

One archaeological site is near the adjacent proposed Hannagan Meadow – USFS Helitack Base and Helibase Circular locations; however, the record on file with the Arizona State Historic

Preservation Office is incomplete and no information is known aside from its location. The proposed training locations are existing, dedicated helipads and associated facilities proposed as HLZs and DZs. Such activities are consistent with the locations' current use as a helitack base and would not impact the archaeological site.

Longview

One site is near the proposed Longview – USFS Helitack Base location:

- **NA20311** consists of multiple historic cabins that are unevaluated for the NRHP.

The Longview – USFS Helitack Base location is an existing, dedicated helipad proposed as an HLZ. The Apache-Sitgreaves NF indicated that the HLZ is not frequently used and helicopter operations associated with the AT exercise could adversely affect the nearby historic cabins. USAF has determined the Angel Thunder exercise would not affect the historic cabins at the Longview Helitack Base. Training operations would be very similar to USFS helitack operations at Longview and use of the location would be infrequent. The helipad is in a meadow away from the cabins, which are situated in a forested area at the edge of the APE. Further, USAF would avoid flying or hovering directly over the cabins and would adhere to all restrictions imposed by USFS in their special use permit.

Mohawk

One site is near the proposed Mohawk location:

- **AR-03-07-04-00461** is a prehistoric artifact scatter and is unevaluated for the NRHP.

The Mohawk location is proposed as a DZ. The location is an unimproved, natural surface adjacent to a two-track road with grass and shrub vegetation. Personnel drops and subsequent dismounted operations and maneuvers could have negligible impacts on surficial deposits. However, such disturbance would not be expected to affect significant features of the site or the site's eligibility for NRHP listing. Any vehicle traffic to the location would use the existing two-track road and would not disturb the site.

In addition to previously recorded sites, unrecorded historic buildings may be present at the Black Mesa, and Mormon Lake locations, which are proposed as HLZs. The Black Mesa and Mormon Lake locations have existing helipads; use of these locations as HLZs would be consistent with current use and would not impact historic buildings there.

Unidentified cultural resources are possible at seventeen proposed training locations that have not been completely surveyed: Black Mesa – USFS Helitack Base, Comanche, Elk, Flagstaff Hotshot – USFS Helitack Base, Helibase Circular, Jacks Canyon, KP Circular, KP Tank, Longview – USFS Helitack Base, Mogollon Rim, Mohawk, Mormon Lake – USFS Helitack Base, Overgaard – USFS Helitack Base, Payson-RimSide, Rough Rider, and Tribeland. A review of historic maps and aerial imagery concluded no historic architecture or above-ground features are present that would be adversely affected. Rotor wash and foot traffic during HLZ and DZ operations could impact unidentified archaeological sites exposed at these locations. Where the

presence of cultural resources is unknown, and impacts are unknown, the USAF would conduct cultural resource surveys and evaluations prior to use for AT exercises.

Miscellaneous

The Proposed Action addresses AT training at 30 locations on miscellaneous properties in northern Arizona. The range of activities covered under the Proposed Action for these locations include: HLZs, LZs, DZs, FARPs, operations centers, billeting, a logistics base, and a water area (see **Table 2-1** for site-specific training activities). Effects on cultural resources for each activity type would be consistent with the descriptions above under **Potential Impacts by Activity Type**. Three previously recorded sites were identified near the Flagstaff-Pulliam Airport, Kingman Airport, and Sinkhole locations. Two of the sites are eligible for NRHP listing; the remaining site is unevaluated for the NRHP but is considered eligible for the purposes of this analysis. These three sites are discussed individually below in relation to the associated locations and proposed activities:

Flagstaff-Pulliam Airport

- **NA14166** is a prehistoric lithic quarry and scatter and is unevaluated for NRHP listing.

The Flagstaff-Pulliam Airport is proposed as a HLZ and LZ. These activities would be contained within previously disturbed and improved surfaces at the airport and would have no impact on the archaeological site.

Kingman Airport

- **AZ G:9:8 (ASM)** is the Kingman Army Airfield (1942-1945) and is eligible for NRHP listing.

The Kingman Airport is proposed as an HLZ and LZ. Use of the airport as an HLZ and LZ would be consistent with historic and current use at the airport, would not introduce new audible or visual elements to the landscape, and would have no effect on the site.

Sinkhole

- **AZ I:7:5 (ASM)** is a prehistoric site known as the Gray Mountain Site and is eligible for NRHP listing.

Sinkhole is proposed as an HLZ at an unpaved landing strip outside of the community of Gray Mountain. HLZ operations at the landing strip would occur on previously disturbed soils and would not affect the site.

The Flagstaff-Pulliam Airport, Grand Canyon National Park Airport, Grand Canyon Valle Airport, H. A. Clark Memorial Field, Springerville Airport, and Winslow-Lindbergh Regional Airport are historic airports that have not been previously recorded and are unevaluated for the NRHP. These airports are proposed for HLZ and LZ activities, except at Winslow-Lindbergh Regional Airport, which is also proposed as a FARP and Logistics Base/Operation Center. These activities would be contained within the existing airport footprints using existing infrastructure or temporary facilities, such as CONEX containers, and would not have potential to alter or destroy

physical characteristics of these airports. These uses would be consistent with historic and current uses at the airports and would not introduce new audible or visual elements to the landscape.

Unidentified cultural resources are possible at 16 proposed training locations that have not been completely surveyed: Babbitt Ranch 1, Babbitt Ranch 2, Babbitt Ranch 3, Bone Crusher, Cattle, Cattle LTFW, Gerbil, HLZ 5, HLZ 7, HLZ 8, Lee's Ferry, Panda, Powerline, Sage, Sprucedale Guest Ranch, and Squirrel. A review of historic maps and aerial imagery concluded no historic architecture or above-ground features are present that would be susceptible to adverse impacts. Rotor wash and foot traffic during HLZ and DZ operations could impact unidentified archaeological sites exposed at these locations. Training activities at the Sprucedale Guest Ranch would consist of billeting and an operations center and would not impact cultural resources. Where the presence of cultural resources is unknown, and impacts are unknown, the USAF would conduct cultural resource surveys and evaluations prior to use for AT exercises.

4.5.1.3 NEW MEXICO

Military Installations

The Proposed Action addresses AT training at two locations on military installations in New Mexico. These locations are permitted sites already approved for the types of activities covered under the Proposed Action (see **Table 2-1** for site-specific training activities). The range of activities proposed for these locations include HLZs, DZs, shooting ranges, and MOUT training. Use of these locations would be consistent with environmental requirements and restrictions of each approved training locale, would not involve ground-disturbing activities, and would not introduce new audible or visual elements to the landscape. Proposed activities on military installations in New Mexico would have no effect on cultural resources.

U.S. Forest Service

The Proposed Action addresses AT training at 10 locations on USFS property in New Mexico. These locations are proposed as HLZs, DZs, and LZs (see **Table 2-1** for site-specific training activities). Effects on cultural resources for each activity type would be consistent with the descriptions above under **Potential Impacts by Activity Type**. Six previously recorded sites were identified near the Reserve Airport and Reserve Ranger Station training locations. Two sites are eligible for NRHP listing. Three sites are unevaluated or have unknown eligibility status and are considered eligible for the purposes of this analysis. These five sites are discussed below in relation to the associated Reserve Airport training location and proposed activities.

<u>Reserve Airport</u>

- **39974** is a multicomponent archaeological site eligible for NRHP listing.
- **39977** is a prehistoric archaeological site unevaluated for NRHP listing.
- **69064** is a prehistoric archaeological site unevaluated for NRHP listing.
- **70194** is a prehistoric archaeological site; the site's NRHP eligibility status is unknown.
- **149438** is a historic archaeological site eligible for NRHP listing.

The Reserve Airport location is proposed as an HLZ and LZ; these activities would be contained within the existing airport footprint, would use existing infrastructure, and would not have

potential to alter or destroy physical characteristics of the sites listed above. The Reserve Airport is historic and may contain unrecorded historic facilities. Use of the airport as an LZ for the AT exercise is consistent with current use and would not introduce new audible or visual elements to the landscape.

In addition to these previously recorded sites, three unrecorded historic resources were identified during the map and document review and in consultation with the Gila NF. Administrative buildings and sites are present at the Glenwood Ranger Station; a historic airstrip, the Negrito Airfield, is present at the proposed Negrito Center location is at the Negrito Airfield; and the Reserve Airport is present at the Reserve Airport location. These resources are assumed to be eligible for the NRHP; however, proposed training at these locations would be consistent with current helicopter and aircraft use and would have no adverse impact.

Unidentified cultural resources are possible at the Negrito North and Negrito South training locations. A review of historic maps and aerial imagery concluded no historic architecture or above-ground features are present that would be susceptible to adverse impacts. Rotor wash and foot traffic during HLZ and DZ operations could impact unidentified archaeological sites exposed at these locations. Where the presence of cultural resources is unknown, and impacts are unknown, the USAF would conduct cultural resource surveys and evaluations prior to use for AT exercises.

Miscellaneous

The Proposed Action addresses AT training at one location on miscellaneous property in New Mexico, the Playas Training and Research Center (see **Table 2-1** for site-specific training activities). The range of activities covered under the Proposed Action for these locations include: HLZs, LZs, DZs, MOUT training, driving, and billeting. The Playas Training and Research Center was previously analyzed for cultural resource impacts for the types of training activities included in the Proposed Action. The Proposed Action would be consistent with current use of the Playas Training and Research Center and would have no effect on cultural resources.

4.5.1.4 CALIFORNIA

Military Installations

The Proposed Action addresses AT training at 15 locations on military installations in California. These locations are permitted sites already approved for the types of activities covered under the Proposed Action (see **Table 2-1** for site-specific training activities). The range of activities proposed for these locations include HLZs, LZs, DZs, FARPs, MOUT training, and water areas. Use of these locations would be consistent with environmental requirements and restrictions of each approved training locale, would not involve ground-disturbing activities, and would not introduce new audible or visual elements to the landscape. Proposed activities on military installations in California would have no effect on cultural resources.

4.5.1.5 NEVADA

Military Installations

Activities at Nellis AFB associated with the AT training would consist of command and control-type activities. These activities would occur in existing facilities, would not involve modification to the facilities, and would have no impact on cultural resources.

4.5.1.6 SECTION 106 AND TRIBAL CONSULTATION

The USAF is undertaking Section 106 consultation regarding proposed activities and training locations in Arizona, New Mexico, and California. The USAF is not consulting on proposed command and control activities at Nellis AFB in Nevada, as these activities would not have potential to impact historic properties. On October 28, 2016 the USAF sent letters to the Arizona SHPO, New Mexico SHPO, the White Mountain Apache THPO, the Advisory Council on Historic Preservation, the Bureau of Indian Affairs, and 27 federally-recognized tribes with traditional associations with project areas in Arizona and New Mexico, inviting the parties to participate in Section 106 consultation. The letters introduced the proposal, described the APE, identified known cultural resources in the APE, and requested input, comments, and concerns on the proposal and cultural resource issues. At the time the USAF initiated consultation, the defined APE did not include military installations; therefore, the USAF did not initiate Section 106 consultation in California, where all training locations would be on military installations. No letter was sent to the California SHPO. Letters were sent to 32 federally-recognized tribes in California inviting the tribes to consult on the Proposed Action pursuant to NEPA; however, these letters did not initiate Section 106 consultation. A list of consulted parties is provided in **Appendix A**.

In a letter dated November 23, 2016, ACHP indicated they would not participate in Section 106 consultation, but could enter the process at a later date if their participation is needed, such as in the resolution of any adverse effects. The Arizona and New Mexico SHPOs responded in letters dated November 23 and December 2, 2016, respectively, providing information regarding cultural resources in the APE and requesting additional details concerning the Proposed Action. One tribe, the Agua Caliente Band of Cahuilla Indians responded that training would occur in the tribe's traditional use areas and requested continued consultation. USAF did not receive any response from the Bureau of Indian Affairs or any other federally-recognized tribes in response to the initial letter.

After sending the letters initiating Section 106 consultation, the USAF adjusted the definition of the APE to include proposed training locations on military installations. Revised descriptions of the APE and a findings of effects were provided to the Arizona SHPO, New Mexico SHPO, California SHPO, White Mountain Apache THPO, Bureau of Indian Affairs, and 59 federally-recognized tribes in letters sent March 2 and 3, 2017. The USAF determined the undertaking would not affect historic properties and requested concurrence on this determination from the Arizona SHPO, New Mexico SHPO, California SHPO, and White Mountain Apache THPO.

USAF received concurrence on the determination of "no historic properties affected" from the California SHPO and the White Mountain Apache THPO. USAF did not receive a response from the New Mexico SHPO. Per the regulations at 36 CFR § 800.3(c)(4), USAF may proceed with a

determination of "no historic properties affected" without the New Mexico SHPO's concurrence. In a letter dated April 11, 2017, The Arizona SHPO did not concur with USAF's finding of no effect on historic properties for training sites in Arizona. Upon further consultation with the Arizona SHPO, USAF identified 92 training sites that are either: 1) on military installations and are currently approved for use for similar training activities; 2) have been surveyed within the last 10 years or, if surveyed more than 10 years ago, were surveyed at an intensive level; 3) are developed facilities (e.g. airports or dedicated boat launches) or highly disturbed (e.g. a quarry) such that cultural resource impacts would not reasonably be expected. USAF determined these 92 training sites would not require additional cultural resources work prior to their use for the Angel Thunder exercise (see **Table H-1**). The remaining 46 sites would require cultural resources survey and additional consultation with the SHPO prior to their use. The Arizona SHPO concurred with this determination in a letter dated April 26, 2017.

USAF also received letters from six tribes. The Agua Caliente Band of Cahuilla Indians, San Manuel Band of Mission Indians, and Yavapai-Apache Nation each indicated they had no concerns with the Proposed Action. The Campo Band of Mission Indians requested additional information about any cultural resources at training areas in California, which USAF provided. The Ak-Chin Indian Community deferred comment to the Tohono O'odham Nation. USAF received correspondence from the Tohono O'odham concurring with the finding of "no historic properties affected." The Gila River Indian Community requested clarification regarding the Section 106 findings of effect, which USAF provided. Copies of correspondence are provided in **Appendix A**.

4.5.1.7 SUMMARY

The Proposed Action would have negligible direct and indirect impacts on two identified cultural resources at two proposed training locations: the Stewart Martin Dam Construction Camp (AZ U:6:194 [ASM]) at Saguaro Lake and a prehistoric archaeological site (AR-03-07-04-00461) at Mohawk (**Table 4-15**). These impacts would not affect the sites' eligibility for NRHP listing.

Table 4-15. Cultural Resource Impacts

Training Location	Cultural Resource	Impact
Saguaro Lake	Stewart Martin Dam Construction Camp (AZ U:6:194 (ASM))	Indirect, negligible, temporary, adverse
Mohawk	Prehistoric archaeological site (AR-03-07-04-00461)	Direct, negligible, temporary, adverse

No impact would be expected on six cultural resources identified at the Comanche, Hannagan Meadow Helitack Base, Helibase Circular, Longview Helitack Base, Flagstaff-Pulliam Airport, Kingman Airport, or Sinkhole locations or at the various unevaluated historic airports and airfields where training activities would occur. No impact would be expected for training locations on military installations, as these locations are currently used and approved for similar training activities and installation personnel did not identify any cultural resource concerns. Use of these locations for the AT exercise would be consistent with environmental requirements and restrictions of each approved training locale, would not involve ground-disturbing activities, and would not introduce new audible or visual elements to the landscape. A total of 46 training

locations have not been surveyed and could contain unidentified cultural resources that could be affected by proposed training activities, identified in **Table H-2**. These locations would require a cultural resources survey and additional consultation on potential impacts to any identified sites prior to their use for AT training.

USAF would provide cultural sensitivity training to participants in the AT exercise and would provide daily briefings on cultural resource threats that may be encountered during each training task. In the event unanticipated cultural resources or human remains are identified during the AT exercise, the USAF would implement the appropriate Discovery Plan based on the location of the discovery. For training locations on military installations, event participants would implement the procedures outlined in the installation's ICRMP. For all training locations on Forest Service or miscellaneous properties, the procedures would follow the Discovery Plan outlined in Davis-Monthan AFB's INRMP. In all cases, participants would immediately cease operations at that location and take steps necessary to protect the resource from further disturbance. The USAF would notify the land managing agency or landowner, the SHPO, and federally-recognized tribes.

4.5.2 No Action Alternative

Under the No Action Alternative, USAF would not conduct the AT training at locations in Arizona, New Mexico, and California. USAF would not use the Saguaro Lake and Mohawk locations in Arizona and would not cause negligible direct and indirect impacts on sites at these locations. Cultural resources at all proposed training locations would still be subject to any disturbances from current and future uses not the subject of this proposal, including activities similar to the Proposed Action such as helicopter use.

4.6 Health and Safety

Any increase in safety risks would be considered an adverse impact on safety. The Proposed Action could have a significant impact with respect to health and safety if the following were to occur:

- Substantially increase risks associated with the safety of USAF personnel, or the local community
- Introduce a new health or safety risk for which USAF is not prepared or does not have adequate management and response plans in place.

4.6.1 Proposed Action

4.6.1.1 SOUTHERN ARIZONA

Military Installations

Short-term, minor, adverse and long-term, minor to moderate, beneficial impacts on military personnel safety would be expected. Due to the level of training that is required of the PR and CSAR programs, AT participants would be exposed to various activities that would increase chances of mechanical, health, and biological hazards. However, safety impacts would be minimized through implementation of AFI 91-301 and AFPD 91-3. Training would ultimately result in PR and CSAR personnel that are better prepared for deployment and PR activities,

which would result in a long-term, beneficial impact on safety (see **Table 2-1** for site-specific training activities). No significant impacts on health and safety would be expected.

U.S. Forest Service

Impacts on the health and safety of military personnel would be the same as those described in **Section 4.6.1.1** under military installations.

No impacts on public safety would be expected, as there would be no live-fire weapons or tracked vehicles associated with the activities proposed to be conducted in USFS-controlled lands. USAF guidelines and protocols, including AFI 13-217, would be observed for standoff distances during HLZ use to ensure safety to the general public. In addition, public announcements of upcoming AT exercise activities would be conducted and activities would be coordinated with USFS personnel and recreationalists who may be utilizing existing training areas to ensure AT exercise activities are conducted safely. Finally, AT exercise participants would comply with any and all permit safety requirements.

Miscellaneous

Impacts on the health and safety of military personnel and the general public would be the same as those described in **Section 4.6.1.1** under military installations and USFS-controlled lands.

4.6.1.2 NORTHERN ARIZONA

Impacts on the health and safety of military personnel and the general public would be the same as those described in **Section 4.6.1.1** under southern Arizona.

4.6.1.3 NEW MEXICO

Impacts on the health and safety of military personnel and the general public would be the same as those described in **Section 4.6.1.1** under southern Arizona.

4.6.1.4 CALIFORNIA

Impacts on the health and safety of military personnel and the general public would be the same as those described in **Section 4.6.1.1** under southern Arizona.

4.6.2 No Action Alternative

Under the No Action Alternative, the AT exercise would not be expanded and would result not achieving valuable training under realistic and varied environments for combat aircrews and PR forces expecting to deploy to real world combat zones, while reducing the reducing the opportunity to train with Joint Services; local, state, and DOD Interagencies; and Foreign Partner Nations. This would result in a long-term, minor to moderate, adverse impact on military personnel by limiting valuable training under realistic and varied environments and reducing the opportunity to train with Joint Services; local, state, and DOD Interagencies; and Foreign Partner Nations.

4.7 Hazardous Materials and Wastes

Impacts would be considered significant if the Proposed Action resulted in personnel exposure to hazardous materials, or if the action generated quantities of these materials beyond the capability of current management procedures. Impacts on hazardous materials management would be considered significant if the Proposed Action resulted in noncompliance with applicable federal and state regulations.

4.7.1 Proposed Action

4.7.1.1 SOUTHERN ARIZONA

Military Installations

Short-term, negligible, adverse impacts on hazardous materials and wastes management could be expected from implementation of the Proposed Action (see **Table 2-1** for site-specific training activities). No hazardous materials would be stored or used in the training areas; however, minor quantities of fuel or oils could be released to the environment during a vehicle or aircraft breakdown or refueling. Any spills or leaks would be handled in compliance with the SPCC Plan, Pollution Prevention Plan, and Hazardous Waste Management Plan as well as all local rules and regulations. Refueling of exercise aircraft and vehicles would occur at established refueling locations and it is assumed that all refueling locations (e.g., gasoline stations and airports) have adequate spill containment materials for accidental release during fueling.

U.S. Forest Service

Impacts on hazardous materials and waste management would be the same as those described in **Section 4.7.1.1** under military installations. AT exercise participants would comply with any and all permit safety requirements.

Miscellaneous

Impacts on hazardous materials and waste management would be the same as those described in **Section 4.7.1.1** under military installations.

4.7.1.2 NORTHERN ARIZONA

Impacts on hazardous materials and waste management would be the same as those described in **Section 4.7.1.1** under southern Arizona.

4.7.1.3 NEW MEXICO

Impacts on hazardous materials and waste management would be the same as those described in **Section 4.7.1.1**under southern Arizona.

4.7.1.4 CALIFORNIA

Impacts on hazardous materials and waste management would be the same as those described in **Section 4.7.1.1** under southern Arizona.

4.7.2 No Action Alternative

Under the No Action Alternative, the AT exercise would not be expanded. Biannual AT exercise requirements would not be expanded beyond the actions described in **Section 2.1.1.1** and analyzed in the 2002 CSAR EA. Therefore, no additional impacts to hazardous materials or wastes would occur.

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5. Cumulative and Other Impacts

5.1 Cumulative Impacts

CEQ regulations for implementing NEPA require that the cumulative impacts of a Proposed Action be assessed (40 CFR §§ 1500–1508). A cumulative impact is defined as the following (40 CFR § 1508.7):

> *The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.*

Cumulative impacts are most likely to arise when a relationship exists between a Proposed Action and other actions expected to occur in a similar location or during a similar time period. Actions overlapping with or in proximity to a Proposed Action would be expected to have more potential for a relationship than those more geographically separated.

5.1.1 Considerations for Potential Cumulative Impacts

The geographic region of influence (ROI) is an important consideration when discussing cumulative effects. For the purposes of this analysis, two ROI's could be initially considered. The ROI at the macro level would encompass an area from the Pacific coast to the border of New Mexico and Texas and from Las Vegas, Nevada, to the U.S./Mexico international border. Conversely, cumulative impacts could also be considered at the micro level where impacts are considered in a ROI that consists of the immediate vicinity of each training site location.

At the macro level, when impacts of the biannual training event are considered in the context of past, present, and future activities within the ROI, impacts to resources from the Proposed Action would be negligible when compared to all impacts associated with the rapid development that continues to occur throughout the Southwest.

A review of known Air Force activities within the macro-ROI was undertaken in order to provide context to the negligible impact determination. **Table 5-1** displays a series of military actions that represent past, present and future actions undertaken by USAF. The projects cover a variety of activities from military training events to long-term maintenance programs. Within the training events, air operations represent a major portion of the activities. When summarized, the total number of annual sorties that result from past and present operations and are projected to continue into the future is in excess of 200,000 sorties per year. The Proposed Action would represent less than one percent of this activity under all projected training scenarios

Additionally, USAF operational activities in themselves are a minor portion of the overall regional activity, further minimizing the impact of the Proposed Action. For this reason, cumulative impacts at the macro level will not be discussed further.

Table 5-1. Summary of past, present, and future Air Force activities in the Area of the Proposed Action

Project	Project Type	Brief Description	Status and Schedule
Davis-Monthan AFB			
West Coast CSAR Beddown	Training	Beddown of CSAR unit in the western U.S. to support the mission to provide worldwide, deployable long-range combat search and rescue of downed aircrew members and civilians.	Past, Present and Future
2012-14 Capital Improvements Program	Demolition and Construction	Specialized facilities for specific activities, such as a hush house for jet engine testing, and more general projects, such as administrative buildings and dormitories.	Present and Future
Implementation of the Total Force Training Mission for Visiting Units	Training	A year-round training mission designed to build and maintain the readiness of Active, Reserve, and Guard units, (collectively referred to as the Total Force of the Department of Defense), as well as foreign ally units.	Past, Present and Future
563rd Rescue Group Personnel Recovery	Training	The use of 20 HLZ and DZ sites for the 563rd Rescue 7 Group (563 RQG) Personnel Recovery Training Mission.	Future
BMGR			
Integrated pest management program (IPM) for the control of Sahara mustard on BMGR-East.	Pest Management	Physical removal of plants by hand and applications of herbicide by ground equipment and aircraft including the Air Force C-130 outfitted for pesticide dispersal.	Past, Present and Future
Range Enhancements	Military construction and training	Various range construction projects, paving of 7miles of road, lowering of flight altitudes over portions of Cabeza Prieta Wildlife Refuge, new taxiways and Control tower at Gila Bend Air Force Auxiliary Field and increased combat search and rescue and similar ground based and combined air-ground operations.	Past, Present and Future
Luke AFB			
Fireworks Display and Cleanup	Morale and Welfare	Fireworks display serves as a finale for the Fourth of July celebrations called Freedom Fest, which draws over 2,000 spectators comprised of Airmen and their families.	Past, Present and Future
F-35 Beddown	Aircraft Beddown	Basing of a Pilot Training Center (PTC) and beddown of up to 144 F-35A training aircraft at Luke AFB. Beddown includes construction of additional facilities to accommodate additional aircraft maintenance and up to 40% increase in total base population.	Present and Future

Project	Project Type	Brief Description	Status and Schedule
Holloman AFB, New Mexico			
Recapitalization of the 49th Wing Combat Capabilities and Capacities for Holloman AFB, New Mexico.	Aircraft Beddown	Relocation of two F-16 training squadrons (from Luke AFB) with 50 Primary Aircraft Inventory and six Backup Aircraft Inventory aircraft in two phases as well as associated infrastructure upgrades and multiple military construction projects.	Present and Future

Source: Davis-Monthan AFB 2002; Davis-Monthan AFB 2015a; Davis-Monthan AFB 2015b; Holloman AFB 2011; Luke AFB 2012; Luke AFB 2015; BMGR 2012b; BMGR 2014

The Proposed Action's contribution to cumulative impacts at the micro ROI could be considered to have the potential for greater effect to resources on a case-by-case basis and are therefore discussed further in the following resource sections.

5.1.2 Noise

5.1.2.1 SOUTHERN ARIZONA

Military Installations

Short- to long-term, negligible to minor, adverse cumulative impacts on military installations would be expected. The Proposed Action would not introduce any new sources of noise to southern Arizona military installations. Since 2006, the Angel Thunder exercise has been a featured event utilizing many of the installations identified in **Table 2-1** and is therefore already a portion of the past and present noise signature at Davis Monthan AFB and to a lesser extent other installations within the region. Although the exercise is to become a bi-annual event, the total level of noise activity from the two events would be unlikely to exceed current single exercise levels based on projected future exercise scenarios. Impacts to the existing noise environment on military installations would be intermittent in nature as training exercises would only take place on a limited basis (approximately 22 field days out of the year [11 per exercise]); however, noise levels would be heightened during portions of the training activities which in turn may represent a slightly greater future noise impact if installation daily operational tempo was reduced or curtailed. Cumulative impacts on noise levels could be lessened if training exercises under the Proposed Action were conducted on a rotating basis at southern Arizona military installations (**Table 2-1**).

U.S. Forest Service

Short- to long-term, negligible to minor, cumulative impacts on USFS training sites would be expected. USFS training sites, which primarily include HLZs, are rural in nature and would likely be used no more than once or twice per year if that particular site was chosen for training activities. Noise receptors in the area around training sites could be exposed to higher cumulative amounts of noise if noise impacts from helicopter fire suppression activities increase in future years; however, these instances would be sporadic in nature and training sites would return to status quo once training and fire suppression activities had finished. Additionally, the required issuance of special use permits by USFS would further reduce the potential of

cumulative impacts by avoiding authorization during critical time periods to sensitive species when necessary.

Miscellaneous

Short- to long-term, negligible to minor adverse cumulative impacts to miscellaneous training sites would be expected. Non-DOD users of the miscellaneous training sites (civilians, contractors, etc.) could experience intermittent higher levels of noise related to training activities. These instances would be brief, and would only occur during actual field training exercises during the field portion of the biannual 22-day training exercise.

5.1.2.2 NORTHERN ARIZONA

Military Installations

Impacts from noise on military installations in northern Arizona would be the same as described above under **Section 5.1.2.1**.

U.S. Forest Service

Impacts from noise at USFS training sites in northern Arizona would be the same as described above under **Section 5.1.2.1**.

Miscellaneous

Impacts from noise at miscellaneous training sites in northern Arizona would be the same as described above under **Section 5.1.2.1**.

5.1.2.3 NEW MEXICO

Military Installations

Impacts on military installations in New Mexico would be the same as those described under **Section 5.1.2.1**.

U.S. Forest Service

Impacts from noise at USFS training sites in New Mexico would be the same as those described above under **Section 5.1.2.1**.

Miscellaneous

Impacts from noise at miscellaneous training sites in New Mexico would be the same as those mentioned under **Section 5.1.2.1**.

5.1.2.4 CALIFORNIA

Military Installations

Impacts from noise on military installations in California would be the same as described above under **Section 5.1.2.1**.

5.1.3 Air Quality

5.1.3.1 SOUTHERN ARIZONA

Military Installations

Short-term, negligible, adverse cumulative impacts on air quality are expected. The AT sites fall into three broad categories: airfields which originate sorties, training sites that regularly see military or other vehicle use and training sites that see little vehicular use.

Eleven sorties in the southern Arizona region are assumed to originate at military installations, and the majority of training locations in this zone are also located at military sites. These locations regularly see aircraft and ground vehicle activity that generates air emissions and the addition of the AT exercise would increase these emissions by negligible to small amounts. Therefore, cumulative impacts on air quality as a result of the Proposed Action would be both short-term and negligible to minor, as training would only take place at most over a 14-day period (three mobilization days and 11 field days) twice per year, and total emissions would result in only a small fraction of the current emissions budget for each facility.

U.S. Forest Service

Impacts on air quality from USFS training sites in southern Arizona would be similar to those described for training sites at military installations in this section. Emissions generated from training activities would be minimal in nature as they would only be associated with field training exercises. Impacts would be further mitigated since the same training sites would most likely not be chosen for consecutive exercises. Some of the sites are very remote and do not currently see consistent rotary or fixed-wing activity, so any emissions from AT exercises would increase emissions over the baseline level. However, due to the minimal amount of emissions generated (less than 0.1 tpy for any given pollutant) and the short duration of the exercise, the adverse impacts would be short-term and negligible.

Miscellaneous

Impacts on air quality from miscellaneous training sites in southern Arizona would be similar to those described for military installations in this section. Emissions generated from training activities would be minimal in nature as they would either be aircraft operations occurring at already existing airfields or they would be short-duration field training exercises. Impacts would further be mitigated since the same training sites would most likely not be chosen for consecutive exercises. Some of the sites are remote and do not currently see consistent rotary or fixed-wing activity, so any emissions from AT exercises would increase emissions over the baseline level. However, due to the minimal amount of emissions generated (less than 0.1 ton per year for any given pollutant for non-airfield sites), and the short duration of the exercise, the adverse impacts would be short-term and negligible.

5.1.3.2 NORTHERN ARIZONA

Military Installations

Impacts on air quality at northern Arizona military installation training sites would be similar to those described under **Section 5.1.3.1**.

U.S. Forest Service

Impacts on air quality at northern Arizona USFS training sites would be similar to those described under **Section 5.1.3.1**.

Miscellaneous

Impacts on air quality at northern Arizona miscellaneous training sites would be similar to those described under **Section 5.1.3.1**.

5.1.3.3 NEW MEXICO

Military Installations

Impacts on military installations in New Mexico would be the same as those described under **Section 5.1.3.1**.

U.S. Forest Service

Impacts on air quality at New Mexico USFS training sites would be similar to those described under **Section 5.1.3.1**.

Miscellaneous

Impacts on air quality at New Mexico miscellaneous training sites would be similar to those described under **Section 5.1.3.1**.

5.1.3.4 CALIFORNIA

Military Installations

Impacts on air quality at California military installation training sites would be similar to those described under **Section 5.1.3.1**.

5.1.4 Airspace Management

5.1.4.1 SOUTHERN ARIZONA

Military Installations

Short-term, negligible, adverse cumulative impacts on airspace management would be expected. Training would be coordinated with the appropriate military installations to ensure training is conducted safely and does not interfere with other aircraft operations on or in the vicinity of the installation. Approved AT training activities would be unlikely to disrupt present military installation aircraft operations or create cumulative impacts to future operations unless unforeseen changes to operational tempo were to occur.

U.S. Forest Service

Short-term, negligible to minor, adverse cumulative impacts on airspace management would be expected. Cumulative impacts on regional airspace could occur in future years where airspace is used and controlled by FAA and DOD, and where there are increases in civilian aircraft activity. This would require more coordination between airspace managers and users to satisfy their respective missions. All training would be coordinated ahead of time to ensure that the airspace is safely allocated and that no conflicts with AT training would occur.

Miscellaneous

Impacts on air space from miscellaneous training sites in southern Arizona would be similar to those described for USFS lands.

5.1.4.2 NORTHERN ARIZONA

Military Installations

Impacts on airspace management at northern Arizona military installation training sites would be similar to those described under **Section 5.1.4.1**.

U.S. Forest Service

Impacts on airspace management at northern Arizona USFS training sites would be similar to those described under **Section 5.1.4.1**.

Miscellaneous

Impacts on airspace management at northern Arizona miscellaneous training sites would be similar to those described under **Section 5.1.4.1**.

5.1.4.3 NEW MEXICO

Military Installations

Impacts on military installations in New Mexico would be the same as those described under **Section 5.1.4.1**.

U.S. Forest Service

Impacts on airspace management at New Mexico USFS training sites would be similar to those described under **Section 5.1.4.1**.

Miscellaneous

Impacts on airspace management at New Mexico miscellaneous training sites would be similar to those described under **Section 5.1.4.1**.

5.1.4.4 CALIFORNIA

Military Installations

Impacts on airspace management at California military installation training sites would be similar to those described under **Section 5.1.4.1**.

5.1.5 Biological Resources

5.1.5.1 SOUTHERN ARIZONA

Military Installations

Short-term, negligible adverse cumulative impacts on biological resources at military installations would be expected. As mentioned under **Section 3.5.2**, it is assumed that the military installations being used for training have INRMPs that would detail potential impacts to biological resources on the respective installations. AT training activities at military installations would be short-term in nature (22 days per year), and would represent a small component of the

annual installation training regime. Furthermore activity levels at the various military ranges are constantly monitored for excessive use to ensure their sustainability. A premise of range sustainability is to minimize the cumulative impacts to geology, flora and fauna.

U.S. Forest Service

Short-term, negligible to minor, adverse cumulative impacts on biological resources at USFS training sites would be expected. Trampling of vegetation from personnel could occur as a result of the Proposed Action however many of the USFS training sites have been previously disturbed and; therefore, significant impacts would not be expected. Because training would only occur over a maximum of 22 days a year and training at the same location would occur for no more than 2 days in a biannual event, USFS sites would be able to return to the status quo once training at the site has concluded. If future training exercises at a site were to occur and were immediately followed by a need for fire suppression activities, a short-term increase in cumulative impacts could occur to nesting birds. At locations where documented sensitive species could occur, it may be advisable to avoid use of these sites during the spring training events.

Miscellaneous

Similar impacts, however slightly less, as described USFS sites above would be expected to miscellaneous sites in southern Arizona. Impacts on southern Arizona miscellaneous sites would be less because many of the miscellaneous sites are not as rural as USFS sites. For more rural miscellaneous sites, impacts similar to those mentioned under USFS sites would be expected. No significant cumulative impacts on biological resources would be expected due to the sporadic and short nature of the training and no significant ground disturbance would occur.

5.1.5.2 NORTHERN ARIZONA

Military Installations

Impacts on biological resources at northern Arizona military installation training sites would be similar to those described under **Section 5.1.5.1**.

U.S. Forest Service

Impacts on biological resources at northern Arizona USFS training sites would be similar to those described under **Section 5.1.5.1**.

Miscellaneous

Impacts on biological resources at northern Arizona miscellaneous training sites would be similar to those described under **Section 5.1.5.1**.

5.1.5.3 NEW MEXICO

Military Installations

Impacts on military installations in New Mexico would be the same as those described under **Section 5.1.5.1**.

U.S. Forest Service

Impacts on biological resources at New Mexico USFS training sites would be similar to those described under **Section 5.1.5.1**.

Miscellaneous

Impacts on biological resources at northern Arizona miscellaneous training sites would be similar to those described under **Section 5.1.5.1**.

5.1.5.4 CALIFORNIA

Military Installations

Impacts on biological resources at California military installation training sites would be similar to those described under **Section 5.1.5.1**.

5.1.6 Cultural Resources

5.1.6.1 SOUTHERN ARIZONA

Military Installations

Negligible, adverse cumulative impacts on cultural resources at military installations would be expected. The Proposed Action will not involve any intentional ground disturbance activities and would utilize previously disturbed locations or areas that are currently used for similar types of training .Since training events would take place for a maximum of 22 days per year, and the level of training at any given installation or site at an installation would be of minimal intensity and duration, minimal cumulative Impact would be expected. Additionally training locations are developed subsequent to surface surveys for artifacts thus avoiding potential for total training to have an effect. The impact of helicopter rotor wash from AT and other training could have the potential to cumulatively affect subsurface artifacts but scheduled maintenance of sites would avoid such cumulative impacts in most instances.

U.S. Forest Service

Impacts on USFS training sites in southern Arizona would be the same as those described for military installation sites above.

Miscellaneous

Impacts on miscellaneous sites in southern Arizona would be the same as those described for military installation sites above.

5.1.6.2 NORTHERN ARIZONA

Military Installations

Impacts on military installations in southern Arizona would be the same as those described under **Section 5.1.6.1**.

U.S. Forest Service

Impacts on USFS training sites in northern Arizona would be the same as those described under **Section 5.1.6.1**.

Miscellaneous

Impacts on miscellaneous training sites in northern Arizona would be the same as those described under **Section 5.1.6.1**.

5.1.6.3 NEW MEXICO

Military Installations

Impacts on military installations in New Mexico would be the same as those described under **Section 5.1.6.1**.

U.S. Forest Service

Impacts on USFS sites in New Mexico would be the same as those described under **Section 5.1.6.1**.

Miscellaneous

Impacts on miscellaneous sites in New Mexico would be the same as those described under **Section 5.1.6.1**.

5.1.6.4 CALIFORNIA

Military Installations

Impacts on military installations in California would be the same as those described under **Section 5.1.6.1**.

5.1.7 Health and Safety

5.1.7.1 SOUTHERN ARIZONA

Military Installations

Short-term, adverse, negligible, and long-term beneficial, minor cumulative impacts on health and safety would be expected. Short-term, adverse impacts would result from day-to-day training activities at southern Arizona military installations. During all phases of training, safety standards required by the respective installation, DOD, USAF and applicable federal, state and local health and safety rules and guidelines would be adhered to. Training events would occur for a maximum of 22 days out of the year, and only certain portions of training would take place on the military installations. Long-term, beneficial cumulative impacts would be expected from better trained-USAF personnel.

U.S. Forest Service

Adverse impacts on health and safety at USFS sites would be similar to those described for military installation sites. USFS sites are more rural in nature; therefore, USAF personnel could be exposed to different health and safety hazards such as biological (animal bites, strings, etc.), mechanical (slips, trips, falls, etc.). The general public could be exposed to short-term impacts; however, USAF guidelines and protocols, including AFI 13-217, would be observed for standoff distances during HLZ use to ensure DOD and public safety. Long-term, beneficial cumulative impacts would be the same as those mentioned for military installation sites.

Miscellaneous

Impacts from miscellaneous sites would be the same as those mentioned for USFS sites.

5.1.7.2 NORTHERN ARIZONA

Military Installations

Impacts on northern Arizona military installations would be the same as those mentioned under **Section 5.1.7.1**.

U.S. Forest Service

Impacts on USFS sites in northern Arizona would be the same as those mentioned under **Section 5.1.7.1**.

Miscellaneous

Impacts on miscellaneous sites in northern Arizona would be the same as those mentioned under **Section 5.1.7.1**.

5.1.7.3 NEW MEXICO

Military Installations

Impacts on military installations in New Mexico would be the same as those described under **Section 5.1.7.1**.

U.S. Forest Service

Impacts on USFS sites in New Mexico would be the same as those mentioned under **Section 5.1.7.1**.

Miscellaneous

Impacts on miscellaneous sites in New Mexico would be the same as those mentioned under **Section 5.1.7.1**.

5.1.7.4 CALIFORNIA

Military Installations

Impacts on California military installations would be the same as those mentioned under **Section 5.1.7.1**.

5.1.8 Hazardous Materials and Wastes

5.1.8.1 SOUTHERN ARIZONA

Military Installations

Short-term, negligible, adverse cumulative impacts on hazardous materials and wastes would be expected. As mentioned under **Section 4.7.1**, no hazardous materials would be stored or used in the training areas; however, minor quantities of fuel or oils could be released to the environment during a vehicle or aircraft breakdown or refueling. Any spills or leaks would be handled in compliance with the SPCC Plan, Pollution Prevention Plan, and Hazardous Waste Management Plan as well as all local rules and regulations. Refueling of exercise aircraft and

vehicles would occur at established refueling locations and it is assumed that all refueling locations (e.g., gasoline stations and airports) have adequate spill containment materials for accidental release during fueling.

U.S. Forest Service

Impacts on USFS sites would be the same as mentioned for military installation sites.

Miscellaneous

Impacts on miscellaneous sites would be the same as mentioned for military installation sites.

5.1.8.2 NORTHERN ARIZONA

Military Installations

Impacts on military installations in northern Arizona would be the same as those mentioned under **Section 5.1.8.1**.

U.S. Forest Service

Impacts on USFS sites in northern Arizona would be the same as those mentioned under **Section 5.1.8.1**.

Miscellaneous

Impacts on miscellaneous sites in northern Arizona would be the same as those mentioned under **Section 5.1.8.1**.

5.1.8.3 NEW MEXICO

Military Installations

Impacts on military installations in New Mexico would be the same as those described under **Section 5.1.8.1**.

U.S. Forest Service

Impacts on USFS sites in New Mexico would be the same as those mentioned under **Section 5.1.8.1**.

Miscellaneous

Impacts on miscellaneous sites in New Mexico would be the same as those mentioned under **Section 5.1.8.1**.

5.1.8.4 CALIFORNIA

Military Installations

Impacts on military installations in California would be the same as those mentioned under **Section 5.1.8.1**.

5.2 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 §1502.16). Primary irreversible effects result from permanent use of 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 would be expected as a result of the implementation of the Proposed Action. Military training necessarily involves consumption of nonrenewable resources, such as fuel for vehicles or 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 would be extremely low. For all activities designated as fire hazards, the U.S. Air Force is required to coordinate training at approved locations with available response vehicles to comply with appropriate Crash Recovery Program instructions.

5.3 Reasonable and Prudent Measures and Best Management Practices

The Proposed Action would not result in significant adverse effects to any resources at any training sites or the surrounding areas. All activities would be conducted under the oversight of controlling agencies through the adherence to installation environmental policies and procedures or through adherence to the requirements of special use permits or MOUs where required.

To further reduce potential impacts to biological and cultural resources, appropriate measures could be considered by the controlling agency or private land owners for inclusion in special use permits and MOUs. **Table 5-2** identifies biological and cultural resources conditions that may warrant review and consideration on a case-by-case basis for the adoption of prudent measures and acceptable best management practices during the preparation of special use permits and MOUs.

Table 5-2. Potential Site Specific Concerns for Biological and Cultural Resources

Name	Type	Controlling Agency	Potential Biological Restrictions	Cultural Concerns	Training Activity *Key below
Southern Arizona – Military Installations					
Aux 6	DZ/HLZ/LZ/FARP	Luke AFB	Covered by controlling agency	Covered by controlling agency	1, 2, 3, 4, 5, 6, 7, 8
Aux 6 Circular	DZ/HLZ/LZ	Luke AFB	Covered by controlling agency	Covered by controlling agency	1, 2, 3, 4, 5, 6, 7
Aux 6 Rectangular	DZ/HLZ/LZ	Luke AFB	Covered by controlling agency	Covered by controlling agency	1, 2, 3, 4, 5, 6, 7
DM AFB	DZ/HLZ/LZ/FARP	DM AFB	Covered by controlling agency	Covered by controlling agency	1, 2, 3, 4, 5, 6, 7, 8
DM AFB CATM	Firing Range	DM AFB	Covered by controlling agency	Covered by controlling agency	4, 5
Florence	DZ/HLZ/MOUT	Florence Military Reservation	Covered by controlling agency	Covered by controlling agency	2, 3, 4, 5, 6, 7, 8
Gila Bend Air Force Auxiliary Base	DZ/HLZ/LZ/FARP	Luke AFB	Covered by controlling agency	Covered by controlling agency	1, 2, 3, 4, 5, 6, 7, 8
Hubbard	FARP	Fort Huachuca	Covered by controlling agency	Covered by controlling agency	1, 2, 3, 4, 5, 6, 7, 8
Hubbard (Tombstone)	LZ/HLZ/Austere DZ/LZ/HLZ	Fort Huachuca	Covered by controlling agency	Covered by controlling agency	1, 2, 3, 4, 56, 7, 8
Humor	DZ/HLZ	Fort Huachuca	Covered by controlling agency	Covered by controlling agency	2, 3, 4, 5
Libby Army Airfield	DZ/HLZ/LZ/FARP	Fort Huachuca	Covered by controlling agency	Covered by controlling agency	1, 2, 3, 4, 5, 6, 7, 8
NATO Hill (WPT 74)	HLZ	Luke AFB	Covered by controlling agency	Covered by controlling agency	2, 4, 5
OP Charlie	HLZ/Close Air Support	Luke AFB	Covered by controlling agency	Covered by controlling agency	2, 4, 5
Range 3 – HLZ 1	HLZ	Luke AFB	Covered by controlling agency	Covered by controlling agency	2, 4, 5
Range 3 – HLZ 2	HLZ	Luke AFB	Covered by controlling agency	Covered by controlling agency	2, 4, 5

Name	Type	Controlling Agency	Potential Biological Restrictions	Cultural Concerns	Training Activity *Key below
Southern Arizona – Military Installations (continued)					
Range 3 – HLZ 3	HLZ	Luke AFB	Covered by controlling agency	Covered by controlling agency	2, 4, 5
Range 3 – HLZ 4	HLZ	Luke AFB	Covered by controlling agency	Covered by controlling agency	2, 4, 5
Range 3 – HLZ 5	HLZ	Luke AFB	Covered by controlling agency	Covered by controlling agency	2, 4, 5
Range 3 – HLZ 6	HLZ	Luke AFB	Covered by controlling agency	Covered by controlling agency	2, 4, 5
Range 3 – Tower Helipad	HLZ	Luke AFB	Covered by controlling agency	Covered by controlling agency	2, 4, 5
South TAC	HLZ	Luke AFB	Covered by controlling agency	Covered by controlling agency	2, 4, 5
Target 333	DZ/HLZ	Luke AFB	Covered by controlling agency	Covered by controlling agency	2, 3, 4, 5
Tombstone Circular	DZ	Fort Huachuca	Covered by controlling agency	Covered by controlling agency	2, 3, 4, 5
Tombstone Rectangular	DZ	Fort Huachuca	Covered by controlling agency	Covered by controlling agency	2, 3, 4, 5
Southern Arizona – U.S. Forest Service (USFS)[1]					
Canelo	DZ/HLZ	Coronado NF	Breeding seasons: February through August	None	2, 3, 4, 5
Devon	HLZ	Coronado NF	Breeding seasons: February through August	None	2, 4, 5
Mesa	HLZ	Coronado NF	Breeding seasons: February through August	None	2, 4, 5
Mount Lemon	Technical Rope Work	Coronado NF	Breeding seasons: February through August	None	2, 4, 5, 6, 7
Ranger	DZ/HLZ	Coronado NF	Breeding seasons: February through August	None	2, 3, 4, 5, 6, 7
Saddle Mountain East	DZ/HLZ	Coronado NF	Breeding seasons: March through July	None	2, 3, 4, 5

Name	Type	Controlling Agency	Potential Biological Restrictions	Cultural Concerns	Training Activity *Key below
Southern Arizona – U.S. Forest Service (USFS)[1] (continued)					
Saddle Mountain South	DZ/HLZ	Coronado NF	Breeding seasons: March through July	None	2, 3, 4, 5
Saddle Mountain West	DZ/HLZ	Coronado NF	Breeding seasons: February through August	None	2, 3, 4, 5
Southern Arizona – Miscellaneous					
Bisbee Douglas IAP	DZ/HLZ/LZ/FARP	Cochise County	None	None	1, 2, 3, 4, 5, 6, 7, 8
Coolidge Airport	DZ/HLZ/LZ/FARP	City of Coolidge	None	None	1, 2, 3, 4, 5, 6, 7, 8
Eloy North	DZ/HLZ	Skydive Arizona	None	None	3, 4, 5, 7
Eloy South	DZ/HLZ	Skydive Arizona	None	None	3, 4, 5, 7
Highway 80 Paladins (TW 2 Paladins)	DZ/HLZ	ADOT	None	None	2, 3, 4, 5
Little Outfit	DZ/HLZ	Pete Robbins	Breeding seasons: January through July	None	1, 2, 3, 4, 5, 6, 7
Phoenix Sky Harbor IAP	LZ	City of Phoenix	None	None	1, 6, 7
Pima County Emergency Operations Center	Operations Center	Pima County Sheriff	None	None	6
Pima County Regional Training Center	Classrooms/MOUT	Pima County Sheriff	None	None	4
Ruby Fuzzy Paladins	DZ/HLZ/Observation Point	State of Arizona	None	None	2, 3, 4, 5
Scottsdale Osborne	HLZ	Scottsdale Healthcare	None	None	2
Three Points Public Shooting Range	Shooting Range	Tucson Rifle Club, Inc.	None	None	4
Tombstone Paladins	DZ/HLZ	State of Arizona	None	None	2, 3, 4, 5
University of Arizona Medical Center	HLZ	University of Arizona Medical Center	None	None	2
Salt River High	HLZ	White Mountain Apache	Breeding seasons: March through July	None	2, 4, 5

Name	Type	Controlling Agency	Potential Biological Restrictions	Cultural Concerns	Training Activity *Key below
Southern Arizona – Miscellaneous (continued)					
Salt River Low	HLZ/Water Area	White Mountain Apache	Breeding seasons: February through August	None	2, 4, 5
Saguaro Lake Ranch	Water Area	Arizona DPS	Breeding seasons: February through August	Indirect impacts on Stewart Martin Dam Construction Camp	2, 4, 5
Verde River	Water Area	Arizona DPS	Breeding seasons: February through August	None	2, 4, 5
Northern Arizona – Military Installations					
Camp Navajo Army Base	MOUT	Camp Navajo	Covered by controlling agency	Covered by controlling agency	2, 3, 4, 5, 6, 7
Fort Tuthill	Operation Center/Billeting	Fort Tuthill	Covered by controlling agency	Covered by controlling agency	7
L Tank	DZ/HLZ/MOUT	Camp Navajo	Covered by controlling agency	Covered by controlling agency	2, 3, 4, 5, 6, 7
Metz Tank	DZ/HLZ	Camp Navajo	Covered by controlling agency	Covered by controlling agency	2, 3, 4, 5, 6, 7
Navajo East	DZ/HLZ	Camp Navajo	Covered by controlling agency	Covered by controlling agency	2, 3, 4, 5, 6, 7
Navajo Railroad	DZ/HLZ	Camp Navajo	Covered by controlling agency	Covered by controlling agency	2, 3, 4, 5, 6, 7
Navajo West	DZ/HLZ	Camp Navajo	Covered by controlling agency	Covered by controlling agency	2, 3, 4, 5, 6, 7
Neill Flat	DZ/HLZ	Camp Navajo	Covered by controlling agency	Covered by controlling agency	2, 3, 4, 5, 6, 7
Rogers Lake (Logger Camp)	DZ/HLZ/MOUT	Camp Navajo	Covered by controlling agency	Covered by controlling agency	2, 3, 4, 5, 6, 7
Rodgers Napier	HLZ	Camp Navajo	Covered by controlling agency	Covered by controlling agency	2, 4, 5, 6, 7
Rodgers Wren	HLZ	Camp Navajo	Covered by controlling agency	Covered by controlling agency	2, 4, 5, 6, 7

Name	Type	Controlling Agency	Potential Biological Restrictions	Cultural Concerns	Training Activity *Key below
Northern Arizona – USFS[1]					
Black Mesa - USFS Helitack Base	DZ/HLZ	Apache-Sitgreaves NF	Breeding seasons: March through June	None	2, 3, 4, 5, 6, 7
Comanche	DZ	Coconino NF	Breeding seasons: March through June Livestock possibly present June through October	None	
Elk	DZ	Coconino NF	Breeding seasons: March through June Livestock possibly present June through October	None	
Flagstaff Hotshot – USFS Helitack Base	DZ/HLZ	Coconino NF	Breeding seasons: March through June	None	2, 3, 4, 5, 6, 7
Hannagan Meadow – USFS Helitack Base	HLZ	Apache-Sitgreaves NF	Breeding seasons: March through June	None	2, 3, 4, 5, 6, 7
Helibase Circular	DZ	Apache-Sitgreaves NF	Breeding seasons: March through June	None	2, 3, 4, 5, 6, 7
Jacks Canyon	HLZ	Coconino NF	Breeding seasons: March through August	None	2, 4, 5
KP Circular	DZ	Apache-Sitgreaves NF	Breeding seasons: March through June	None	2, 3, 4, 5
KP Tank	HLZ	Apache-Sitgreaves NF	Breeding seasons: March through June	None	2, 3, 4, 5
Longview - USFS Helitack Base	DZ/HLZ	Coconino NF	Breeding seasons: March through June	None	2, 3, 4, 5, 6, 7
Mogollon Rim (General Crook)	HLZ/Technical Rope Work	Apache-Sitgreaves NF	Breeding seasons: March through August	None	2, 4, 5
Mohawk	DZ	Kaibab NF	None	Indirect impacts on archaeological site	
Mormon Lake – USFS Helitack Base	DZ/HLZ	Coconino NF	Breeding seasons: March through June	None	2, 3, 4, 5, 6, 7
Overgaard – USFS Helitack Base	DZ/HLZ	Apache-Sitgreaves NF	None	None	2, 3, 4, 5, 6, 7

Name	Type	Controlling Agency	Potential Biological Restrictions	Cultural Concerns	Training Activity *Key below
Northern Arizona – USFS (continued) [1]					
Payson-RimSide	DZ	Tonto NF	Breeding seasons: March through July	None	
Pittman Valley	DZ/HLZ	Kaibab NF	None	None	2, 3, 4, 5, 6, 7
Roosevelt Lake	Water DZ/Water HLZ	Tonto NF	Breeding seasons: March through August	None	2, 3, 4, 5
Rough Rider	HLZ	Coconino NF	None	None	2, 4, 5
Tribeland	DZ	Kaibab NF	None	None	2, 3, 4, 5
Northern Arizona – Miscellaneous					
Babbitt Ranch 1	HLZ	Private	None	None	2, 4, 5, 6, 7
Babbitt Ranch 2	HLZ	Private	None	None	2, 4, 5, 6, 7
Babbitt Ranch 3	HLZ	Private	None	None	2, 4, 5, 6, 7
Bone Crusher	HLZ	Private	None	None	2, 4, 5, 6, 7
Caldwell Meadows	DZ/HLZ	AGFD	Breeding seasons: March through July	None	2, 3, 4, 5, 6
Cattle	HLZ/DZ	Private	None	None	2, 3, 4, 5, 6, 7
Cattle LTFW	HLZ/LZ	Private	None	None	1, 2, 4, 5, 6, 7
Colorado River	Water Area	Arizona DPS	None	None	4, 5
Flagstaff Pulliam Airport	HLZ/LZ	City of Flagstaff	None	None	1, 2, 4, 5, 6, 7
FR 320/311	DZ/HLZ/LZ	Private	None	None	1, 2, 3, 4, 5, 6, 7
Gerbil	HLZ/DZ	Private	None	None	2, 3, 4, 5, 6, 7
Gila County Sheriff Roosevelt Substation	HLZ	Gila County Sheriff	None	None	2, 3, 4, 5, 6, 7
Grand Canyon National Park Airport	LZ	State of Arizona	None	None	1, 2, 4, 5, 6, 7
Grand Canyon Valle Airport	DZ/HLZ/LZ	Grand Canyon Valley Corp	None	None	1, 2, 3, 4, 5, 6, 7
H. A. Clark Memorial Field	DZ/HLZ/LZ	City of Williams	None	None	1, 2, 3, 4, 5, 6, 7
HLZ 5	HLZ	Private	None	None	2, 4, 5, 6, 7
HLZ 6	HLZ	Private	None	None	2, 4, 5, 6, 7
HLZ 7	HLZ	Private	None	None	2, 4, 5, 6, 7

Name	Type	Controlling Agency	Potential Biological Restrictions	Cultural Concerns	Training Activity *Key below
Northern Arizona – Miscellaneous (continued)					
HLZ 8	HLZ	Private	None	None	2, 4, 5, 6, 7
Kingman Airport	DZ/HLZ/LZ	City of Kingman	None	None	1, 2, 3, 4, 5, 6, 7
Lee's Ferry	DZ/HLZ/LZ	National Park Service	Breeding seasons: April through August	None	1, 2, 3, 4, 5, 6, 7
Panda	HLZ	Private	None	None	2, 4, 5, 6, 7
Powerline	HLZ	Private	None	None	2, 4, 5, 6, 7
Sage	HLZ/DZ	Private	None	None	2, 3, 4, 5, 6, 7
Sinkhole	HLZ	Private	None	None	2, 4, 5, 6, 7
Springerville Airport	DZ/HLZ/LZ	City of Springerville	None	None	1, 2, 3, 4, 5, 6, 7
Sprucedale Guest Ranch	Billeting/Operation Center	Whitney Wiltbank	Breeding seasons: March through June	None	2, 3, 4, 5, 6, 7
Squirrel	HLZ/DZ	Private	None	None	2, 3, 4, 5, 6, 7
St. Johns Industrial Air Park	DZ/HLZ/LZ/FARP	City of St. Johns	None	None	1,2,3,4,5,6,7,8
Winslow-Lindbergh Regional Airport	DZ/HLZ/LZ/FARP/ Austere Logistics Base/Operation Center	City of Winslow	None	None	1, 2, 3, 4, 5, 6, 7, 8
New Mexico – Military Installations					
Melrose Air Force Range	DZ/HLZ.MOUT/ Shooting Range	USAF	Covered by controlling agency	Covered by controlling agency	1, 2, 3, 4, 5. 6, 7
White Sands Missile Range	DZ/HLZ.MOUT/ Shooting Range	Army	Covered by controlling agency	Covered by controlling agency	1, 2, 3, 4, 5, 6, 7
New Mexico – USFS[1]					
Glenwood Ranger Station	DZ/HLZ	Gila NF	Breeding seasons: March through Aug	None	2, 3, 4, 5, 6, 7
Negrito Airstrip	DZ/HLZ/LZ	Gila NF	Denning season April through May	None	1, 2, 3, 4, 5, 6, 7
Negrito Center	DZ/HLZ	Gila NF	Breeding seasons: March through August	None	2, 3, 4, 5, 6, 7

Name	Type	Controlling Agency	Potential Biological Restrictions	Cultural Concerns	Training Activity *Key below
New Mexico – USFS[1] (continued)					
Negrito Helibase	HLZ	Gila NF	Denning season April through May	None	2, 4, 5, 6, 7
Negrito North	DZ/HLZ	Gila NF	Breeding seasons: March through June	None	2, 3, 4, 5, 6, 7
Negrito South	DZ/HLZ	Gila NF	Breeding seasons: March through June	None	2, 3, 4, 5, 6, 7
Rainy Mesa	HLZ	Gila NF	Breeding seasons: March through June	None	2, 3, 4, 5
Reserve Ranger Station	DZ/HLZ	Gila NF	None	None	2, 4, 5, 6, 7
New Mexico – Miscellaneous					
Catron County Fairgrounds	HLZ	Catron County	None	None	2, 4, 5, 6, 7
Playas Training and Research Center	DZ/HLZ/LZ/MOUT/ Driving/Billeting	New Mexico Institute of Mining and Technology	None	None	1, 2, 3, 4, 5, 6, 7
Reserve Airport	DZ/HLZ/LZ	Catron County	None	None	1, 2, 3, 4, 5, 6, 7
California Military Installations					
Camp Pendleton Cartwright Water	DZ/HLZ/Water Area	Camp Pendleton	Covered by controlling agency	Covered by controlling agency	2, 3, 4, 5
Camp Pendleton HOLF	DZ/HLZ/MOUT	Camp Pendleton	Covered by controlling agency	Covered by controlling agency	2, 3, 4, 5, 6, 7
Camp Pendleton NFG	DZ/HLZ/LZ	Camp Pendleton	Covered by controlling agency	Covered by controlling agency	2, 3, 4, 5, 6, 7
Camp Pendleton Off-Road Trail	Off-Road	Camp Pendleton	Covered by controlling agency	Covered by controlling agency	2, 4, 5
Camp Pendleton PDL	DZ/HLZ/MOUT	Camp Pendleton	Covered by controlling agency	Covered by controlling agency	2, 3, 4, 5, 6, 7
Camp Pendleton Red Beach	DZ/HLZ/Austere HLZ/Water	Camp Pendleton	Covered by controlling agency	Covered by controlling agency	2, 3, 4, 5, 6, 7
El Centro	DZ/HLZ/LZ/FARP	Naval Air Facility El Centro	Covered by controlling agency	Covered by controlling agency	1, 2, 3, 4, 5, 6, 7, 8

Name	Type	Controlling Agency	Potential Biological Restrictions	Cultural Concerns	Training Activity *Key below
California Military Installations (continued)					
Knots Circular Water	DZ/HLZ Water	Naval Air Station (NAS) North Island	Covered by controlling agency	Covered by controlling agency	2, 3, 4, 5
Leon	DZ/HLZ	NAS North Island	Covered by controlling agency	Covered by controlling agency	2, 3, 4, 5
March ARB	HLZ/LZ/FARP	March ARB	Covered by controlling agency	Covered by controlling agency	1, 2, 4, 5, 6, 7, 8
NAS North Island NZY	HLZ/LZ/FARP	NAS North Island	Covered by controlling agency	Covered by controlling agency	1, 2, 4, 5, 6, 7
Nautica Circular Water	DZ/HLZ Water	NAS North Island	Covered by controlling agency	Covered by controlling agency	2, 3, 4, 5
San Clemente Island Naval Auxiliary Landing Field	HLZ/LZ/FARP	NAS North Island	Covered by controlling agency	Covered by controlling agency	1, 2, 4, 5, 6, 7
San Clemente Island West	DZ/HLZ	NAS North Island	Covered by controlling agency	Covered by controlling agency	1, 2, 4, 5, 6, 7
San Nicolas Island	HLZ/LZ	NAS North Island	Covered by controlling agency	Covered by controlling agency	1, 2, 4, 5, 6, 7
Nevada – Military Installation					
Nellis AFB	n/a	Nellis AFB	n/a	n/a	6

Notes:
[1] Use of these sites would require issuance of special use permit.
Training Activity Key:

1. Fixed-Wing Terminal Area Operations
2. Rotary-Wing Terminal Area Operations
9. Parachute Operations
4. Dismounted Ground/Water Operations
5. Dismounted Ground/Water Movement
6. Command, Control, Communications, Computers, and Intelligence Operations Location
7. Logistical/Beddown location
8. Forward Aircraft Refueling Point

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