Environmental Assessment for the Translocation of Desert Tortoise in the Western Training Area, Fort Irwin, California

Prepared for

The National Training Center
Directorate of Public Works, Environmental Division

and

U.S. Army Corps of Engineers
Mobile District

June 2024

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Draft Finding of No Significant Impact for the Translocation of Desert Tortoise in the Western Training Area, Fort Irwin, California

Introduction

The Army has prepared an Environmental Assessment (EA) for the *Translocation of Desert Tortoise in the Western Training Area* (WTA), which is incorporated by reference into this Finding of No Significant Impact (FNSI). The EA and Draft FNSI have been prepared in accordance with the National Environmental Policy Act (NEPA) (42 United States Code Ch. 55), Council on Environmental Quality's (CEQ's) implementing regulations (40 Code of Federal Regulations [CFR] Parts 1500 to 1508), Department of the Army (Army) supplemental regulations (32 CFR Part 651), and other relevant laws and policies cited therein.

(see EA, Chapter 1)

Purpose and Need

The purpose of the Proposed Action is to support National Training Center (NTC) training requirements (as required by Public Law 107-107) and implement Mojave desert tortoise (*Gopherus agassizii)* mitigation agreed to in prior NEPA and Endangered Species Act documents. The Proposed Action is needed to relocate desert tortoises from the WTA prior to initiating training in 2025.

(see EA, Chapter 1)

Proposed Action and Alternatives

Based on the application of selection standards, developed based on best available data, the Proposed Action is the sole action alternative analyzed in the EA. The No Action is included as required by NEPA. The Proposed Action is to implement the Desert Tortoise Translocation Plan (DTTP), which includes translocation and monitoring of desert tortoises from the WTA to the WTA Translocation Site (WTATS) to avoid adverse impacts from training if they were to remain in the WTA. The WTATS includes lands managed by the Bureau of Land Management (BLM; 64 percent), Department of Defense (2 percent), State of California (3 percent), and nonfederal lands (31 percent). Desert tortoises would only be translocated in WTATS areas for which the Army has received authorization.

(see EA, Chapter 2)

Environmental Consequences

Overall, the Proposed Action could result in less than significant adverse impacts on the following resources *Air Quality, Biological Resources, Cultural Resources, Land Use, Soils, Water Resources,* and *Transportation*. Notable impacts are summarized below.

- Adverse impacts on individual tortoises could occur, but the Desert Tortoise Translocation Plan (DTTP) includes protective measures and limitations that would apply to the translocation effort and minimize mortality. Beneficial impacts are anticipated to the regional desert tortoise population, as recipient sites populations are augmented with translocated tortoises.

- Adverse impacts on air quality from vehicle and helicopter use and localized habitat and soil disturbance associated with personnel conducting the translocation would be limited to what is necessary. There would be no vehicular travel off of paved and unpaved "open" roads, which would ensure incidental impacts, such as invasive plant species proliferation and impacts on other desert wildlife, are also minimized. No impacts on special status plants are anticipated.
- Adverse impacts on historic properties would be avoided and/or mitigated per the terms of the Fort Irwin Programmatic Agreement on a case-by-case basis during implementation. The Proposed Action is consistent with Army and BLM land use plans.

(see EA, Chapter 3)

Mitigation and Monitoring

Measures integrated into the Draft DTTP would ensure adverse impacts on individual tortoises would be minimized during handling and translocation. Short- and long-term monitoring data would be used to confirm effectiveness and adaptively manage the translocation effort.

Best management practices incorporated into the Proposed Action would minimize adverse effects on select resources include limiting vehicles and helicopters to use existing designated "open" roads and previously disturbed areas (*Air Quality, Soils, and Water Resources*); and use of qualified biologists would minimize impacts on the desert tortoise and other wildlife encountered (*Biological Resources*).

(see EA, Chapter 3)

Authorizations

Prior to implementing the Proposed Action, the Army would secure the following authorizations:

- U.S. Fish and Wildlife Service approval of the DTTP
- BLM and State of California land access authorization

(see EA, Chapters 1 and 3)

Agency, Tribal, and Public Participation

The Army has conducted public scoping on the Proposed Action (18 January 2024 to 13 March 2024) and is seeking public comments on the EA and Draft FNSI from 22 June 2024 to 22 July 2024. Comments would be considered in the agency decision-making process and explained in the final documents that would be issued at the conclusion of the comment period.

(see EA, Chapter 1)

Conclusion

By implementing the Proposed Action, the Army seeks to sustain its training mission while conserving the Mojave desert tortoise and contributing to regional desert tortoise recovery efforts under the Recovery and Sustainment Partnership Initiative. Based on the findings of the EA, implementing the Proposed Action would not result in a significant impact on the human or natural environment. Therefore, an Environmental Impact Statement is not the anticipated outcome.

Decision

Subject to obtaining necessary authorizations, the Proposed Action may be implemented upon FNSI signature. National Historic Preservation Act Section 106 consultation, if required for ground-disturbing activities in the WTA associated with removal of tortoises from burrows, would be conducted concurrent with implementation. Implementers (i.e., qualified biologists conducting clearance surveys on the WTA) must coordinate with Fort Irwin's Cultural Resource Manager in advance to avoid adverse effects on historic properties.

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ENVIRONMENTAL ASSESSMENT
FOR THE TRANSLOCATION OF DESERT TORTOISE IN THE WESTERN TRAINING AREA, FORT IRWIN, CALIFORNIA
SIGNATURE SHEET

LEAD AGENCY/PROPONENT: Department of the Army

TITLE OF PROPOSED ACTION: Translocation of Desert Tortoise in the Western Training Area, Fort Irwin, California

APPROVED BY: Darrel F. Kemp, Acting Director, Public Works, U.S. Army Garrison Fort Irwin

REVIEW PERIOD: The Environmental Assessment and Draft Finding of No Significant Impact are available for review for a period of 30 days. Copies are available for review at the Fort Irwin Post Library, F Avenue, between 1st Street and 2nd Street, Building 333, Fort Irwin, California 92310; at the Barstow Library, 304 East Buena Vista, Barstow, California 92311; on the Internet at the project-specific website: https://IrwinWTADTTranslocationEA.com; and State Clearinghouse: https://ceqanet.opr.ca.gov/Search/Recent. The public notice was published in the *San Bernardino Sun* and *Victorville Daily Press* newspapers.

Written comments are to be submitted to the NEPA Planner within 30 days of the publishing date of the Notice of Availability at Fort Irwin Directorate of Public Works, Environmental Division, P.O. Box 105085, Fort Irwin, California 92310-5085, by email at comments@IrwinWTADTTranslocationEA.com; or on the website at https://IrwinWTADTTranslocationEA.com.

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1.0 Introduction

This Environmental Assessment (EA) was prepared in accordance with the National Environmental Policy Act of 1969 (NEPA), Section 102(2)(C); the Council on Environmental Quality's (CEQ's) regulations for implementing the procedural provisions of NEPA and the CEQ's September 2020 update for implementing the procedural provisions; Code of Federal Regulations (CFR) Title 40 Parts 1500 through 1508; and 32 CFR Part 651, *Environmental Analysis of Army Actions*. NEPA regulations collectively establish a process by which the Army considers the potential environmental impacts of its proposed actions and invites the involvement of agencies and interested members of the public prior to deciding on a final preferred course of action. As such, this EA facilitates the Army's decision-making process regarding proposed translocation of the Mojave desert tortoise (*Gopherus agassizii*) from the Western Training Area (WTA).

The National Training Center (NTC) on Fort Irwin, California, provides training for the Department of the Army (Army) and joint military branches. Because of its size, design, and terrain, the NTC is one of the few places in the world where brigade-size units (5,000+ soldiers and 600 to 1,200 armored vehicles) can test their combat readiness. The training needs and requirements of the Army change as new weapons and defense systems are developed, as new threats in different parts of the globe emerge, and as the tactics and technology used by enemies change. The Army prepared the 2023 *Final Legislative Environmental Impact Statement for Military Training and Public Land Withdrawal Extension* (2023 LEIS; Army 2023), which analyzed the potential environmental impacts associated with modernizing training, improving the training infrastructure, and extending the existing land withdrawal for an additional 25 years. The 2023 LEIS Preferred Alternative includes initiating training activities in the WTA of Fort Irwin. The 2023 LEIS Preferred Alternative included relocation of the Mojave desert tortoise from the WTA in advance of the initiation of training in 2025 per the agreements in the 2021 Biological Opinion (BO; U.S. Fish and Wildlife Service [USFWS] 2021a). Previous BOs were incorporated by reference into a single current BO for Fort Irwin. Further, Public Law 107-107 requires full compliance with the Endangered Species Act (ESA) for military use of withdrawn lands that include ground disturbance, and compliance with the ESA would also require relocation of desert tortoises. This EA analyzes the implementation of NEPA mitigation per the 2023 LEIS and Record of Decision, which is tied to ESA mitigation per the BO.

1.1 Project Area

The NTC on Fort Irwin was established in 1980 and includes 753,537 acres north of Barstow, California (Figure 1-1). The NTC provides unified land operations training for maneuver Brigade Combat Teams, including the Army's Stryker Brigade Combat Teams and Armored Brigade Combat Teams. Training is also provided for joint military branches, U.S. Army Reserve, National Guard units, and regular and transitional law enforcement units, as well as units permanently assigned to Fort Irwin (i.e., home-station units) (Army 2023).

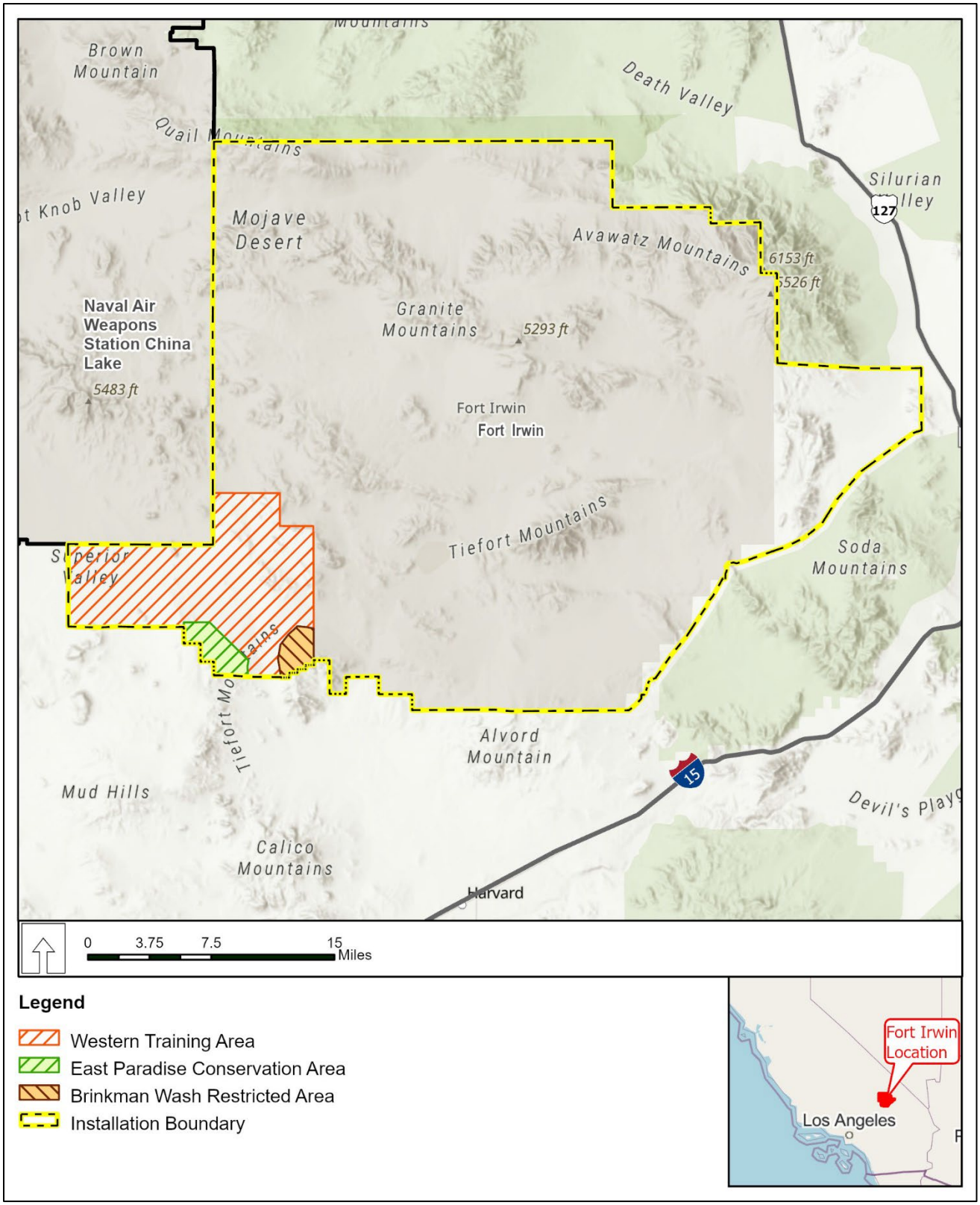

Figure 1-1. Location of Fort Irwin and the Western Training Area

The WTA comprises 71,249 acres, which include multiple off-limits areas for cultural resources conservation (647 acres), natural resources conservation (13,697 acres), dry lake beds (1,797 acres), and safety restrictions at inactive mines (380 acres). Therefore, the WTA without the off-limits areas is 54,818 acres (Army 2023). The natural resources conservation includes two restricted access areas (see Figure 1-1): the East Paradise Conservation Area (4,681 acres) and the Brinkman Wash Restricted Area (3,933 acres). These are also referred to as the No-Dig Area, which were established by the Army for conservation of the Lane Mountain milk-vetch (*Astragalus jaegerianus*).

1.2 Background

Previous translocation efforts for the WTA were halted due to a lawsuit concerning elevated coyote predation on translocated tortoises. This translocation occurred during drier conditions, which limited food resources, increasing coyote predation on tortoises. Subsequent analysis revealed the increased predation on tortoises by coyotes during drought conditions was occurring rangewide, not just on translocated tortoises (Esque et al. 2010). Lessons learned from previous translocations would be implemented in the current proposed action, including early detection of any increased predation, and translocation during favorable environmental conditions.

1.3 Purpose and Need

The purpose of the Proposed Action is to support NTC training requirements (as required by Public Law 107-107) and implement Mojave desert tortoise mitigation agreed to in the following regulatory documents:

- *2021 BO*;
- *2023 LEIS*; and
- Record of Decision for the 2023 LEIS (2024).

The Proposed Action is needed to relocate desert tortoises from the WTA prior to initiating training in 2025. The documents above are incorporated by reference, with specific citations provided throughout this EA.

1.4 Regulatory Requirements

In addition to NEPA, the regulatory requirements explained below apply to the Proposed Action and must be completed prior to, or concurrent with implementation.

- **Endangered Species Act (ESA)**. The ESA Section 7 consultation process is complete (2021 BO) and coordination with the USFWS on this EA is ongoing (Appendix B). The USFWS would approve the DTTP (see Appendix C) as well as translocation plans for individual tortoises prior to translocation from the WTA.
- **Clean Air Act (CAA)**. The Proposed Action complies with Mojave Air District Rule 2002 (General Conformity) as explained in Section 3.5 and Appendix D. No further analysis is needed.
- **National Historic Preservation Act (NHPA).** The Army intends to avoid adverse effects on historic properties during implementation of the Proposed Action; however, future

consultation could be required on a case-by-case basis (e.g., burrow excavations in the WTA) per the terms of the Fort Irwin Programmatic Agreement (Appendix E). All efforts would be made to expedite consultation to minimize project delay.

- **Other Authorizations.** The Army would obtain authorizations (e.g., Bureau of Land Management [BLM] and State of California) to monitor tortoises on state and federal land.

1.5 Cooperating Agency

In 1976, Congress passed the Federal Land Policy and Management Act (FLPMA), Public Law 94-57, 43 United States Code (USC) Sections 1701–1785, to direct the management of the public lands of the United States. In Section 601 of FLPMA, Congress required the preparation of the California Desert Conservation Area (CDCA) Plan. The CDCA Plan, as amended, established guidance for the management of the public lands of the California desert by the BLM in clear accordance with the intent of Congress and the people of the U.S., as expressed in the law. However, the underlying Land Use Plan for the area was amended and is now the interagency Desert Renewable Energy Conservation Plan (BLM 2016). Further, NEPA requires that BLM consider and document environmental impacts prior to making certain decisions, including those that involve endangered species management.

The BLM Barstow Field Office manages lands adjacent to Army-owned mitigation parcels proposed for desert tortoise translocation. As some desert tortoises translocated to Army-owned parcels would likely move substantial distances, they could become resident animals on BLM-managed lands. Therefore, the BLM Barstow Office would be the responsible federal agency for their management on BLM-managed lands, and the Army would conduct long-term monitoring of these translocated tortoises across BLM-managed lands. The Army would maintain responsibility for these translocated tortoises under Section 7 of the ESA and in accordance with the BO, including any unanticipated take of translocated tortoises.

For the BLM, the purpose for the Proposed Action is to respond to the requirement of the Army to translocate desert tortoises from the WTA to Army-managed lands adjacent to BLM-managed lands. BLM's need for the Proposed Action is to bolster desert tortoise populations off Fort Irwin, as regional tortoise densities are low. Augmenting populations off Fort Irwin including on BLM-managed lands is needed to maintain stable desert tortoise populations and lead to species recovery.

1.6 Decisions to Be Made

Based upon the information in this EA, the decision maker would determine (1) whether to implement the Proposed Action or make modifications if needed; and (2) whether the EA analysis supports a Finding of No Significant Impact (FNSI), Mitigated FNSI, or requires further analysis in an Environmental Impact Statement.

After the comment period has closed on this EA and Draft FNSI, the Army will consider public comments and issues in its decision using the notification process discussed in Section 1.8.

1.7 Tribal and Agency Coordination

The Army solicited input from interested and/or affected Native American tribes during public scoping (Appendix B). The Army will continue to work with the Fort Independence Tribal Historic Preservation Officer to determine opportunities for tribal participation during implementation.

The Army developed the EA and DTTP in coordination with the USFWS Palm Springs Fish and Wildlife Office, California Department of Fish and Wildlife (CDFW), and the BLM Barstow Field Office. The DTTP has been reviewed by USFWS prior to the development of this EA.

1.8 Public Participation

The Army initiated NEPA scoping during the development of the Proposed Action from 18 January 2024 to 13 March 2024. Comments received were considered in the development of this EA, which support the Draft FNSI. Commenters recommended additional environmental protection measures (see Appendix B), which may be considered as time and funds permit. The Proposed Action would be adaptively managed, but initially limited to the scope of the DTTP (which is mitigation for training impacts in the WTA) and the protective measures and limitations built into the plan (listed in Chapter 4). An alternative avenue for additional mitigation efforts could be the Recovery and Sustainment Partnership (RASP) Initiative. For more information, see Section 2.2.2.

The Army provided the public an opportunity to comment on this EA and Draft FNSI through a 30-day public comment period, which was initiated via a public notice, Notice of Availability (NOA), in the *San Bernardino Sun* and *Victorville Daily Press* newspapers. A copy of the EA, Draft FNSI, and NOA were made available as follows:

Hardcopies: Available at the Fort Irwin Post Library, F Avenue, between 1st Street and 2nd Street, Building 333, Fort Irwin, California 92310; at the Barstow Library, 304 East Buena Vista, Barstow, California 92311; and upon request from NTC (limited quantities available) via email.

Electronic copies: State Clearinghouse: https://ceqanet.opr.ca.gov/Search/Recent; and project-specific website: https://IrwinWTADTTranslocationEA.com

Public comments may be submitted via any of these methods:

Mail: Directorate of Public Works Environmental Division, NEPA Planner, PO Box 105085, Fort Irwin California 92310-5085

Website: https://IrwinWTADTTranslocationEA.com

Email: comments@IrwinWTADTTranslocationEA.com

Phone: (760) 380-5906

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2.0 Description of the Proposed Action and Alternatives

2.1 Overview

The Proposed Action is defined by the mitigation requirements from the 2023 LEIS and 2021 BO that require the translocation of desert tortoises from the WTA (see Section 2.2). To achieve the Purpose and Need, the Army used a screening process to determine the reasonable range of alternatives for implementing the Proposed Action (see Section 2.3.1) by translocating desert tortoises to the Western Training Area Translocation Site (WTATS; Figure 2-1). The WTATS includes lands managed by the BLM (64 percent), Department of Defense (DoD; 2 percent), the State of California (3 percent), and other nonfederal lands (31 percent). Desert tortoises would only be translocated in WTATS areas for which the Army has received authorization. The application of the screening process for potentially suitable desert tortoise translocation alternatives resulted in one action alternative carried forward for detailed analysis in this EA – the Proposed Action (see Section 2.3.3). The No Action Alternative is included as required by NEPA (see Section 2.3.4). Other alternatives considered are briefly discussed in Section 2.3.2.

2.2 Description of the Proposed Action

Under the Proposed Action, the NTC would safely, humanely, and successfully translocate all detected desert tortoises from the WTA with minimal impact on recipient site tortoises where translocated tortoises would be released.

2.2.1 Desert Tortoise Habitat Clearance Surveys

NTC would conduct habitat clearance surveys for the desert tortoise in the WTA. Habitat clearance surveys are 100 percent coverage surveys conducted by qualified biologists of all suitable desert tortoise habitat in order to locate and remove tortoises above and below ground (USFWS 2020). To complete the 100 percent coverage surveys, NTC would conduct two complete survey passes throughout the WTA in alternating north/south and east/west orientations. NTC would only conduct clearance surveys in the fall and/or spring, when ambient temperatures at the ground level are below 95 degrees Fahrenheit/35 degrees Celsius, and in accordance with desert tortoise handling permit requirements (USFWS 2020). Surveyors would maintain an adequate pace during clearance surveys to complete planned daily coverages (with maximum transect width of 5 meters in suitable desert tortoise habitat). NTC would utilize only experienced biologists (authorized by the USFWS) who can efficiently and safely handle tortoises, attach radio transmitters, and perform necessary measurements and health assessments when desert tortoises are detected during clearance surveys. The WTA includes desert tortoises that have been previously transmittered by NTC and are being tracked, as well as desert tortoises that have not previously been detected and are not being tracked. For all desert tortoises detected during clearance surveys and not previously transmittered, qualified biologists would attach a unique identifier (i.e., epoxy label) and radio transmitter (if tortoise is large enough) in order to monitor the tortoises either at the WTA until the desert tortoise would

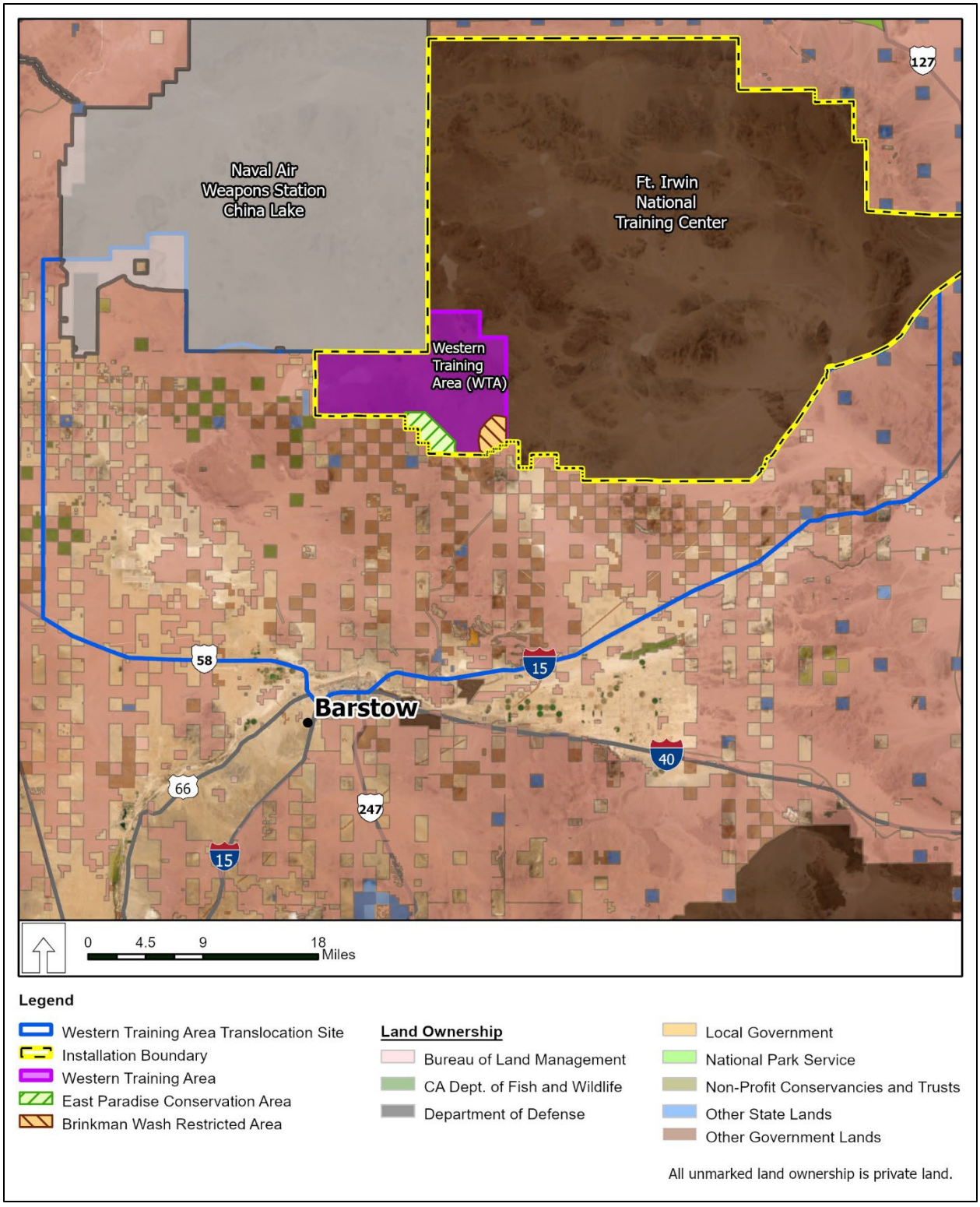

Figure 2-1. Location of the Western Training Area Translocation Site and Associated Land Ownership

be translocated and/or at the recipient sites following translocation (see Section 9 of the DTTP in Appendix C).

Tortoises of all size classes found during clearance surveys would be removed from the WTA. NTC could remove tortoises by attaching transmitters to adult tortoises detected during clearance surveys and leaving those transmittered tortoises in the WTA until tortoises are approved for translocation to recipient sites. NTC could also remove all detected desert tortoises from the WTA during clearance surveys by collecting them as they are encountered and moving them to existing outdoor USFWS-approved tortoise enclosures on Fort Irwin (Figure 2-2) to temporarily house tortoises. Some detected tortoises in the WTA would be too small for VHF radio transmitters, have conditions that warrant additional husbandry or veterinary care, or would otherwise be unsuitable (i.e., juvenile or unhealthy tortoises) for translocation and would be housed in the enclosure pens or transferred to a headstarting facility until those tortoises are determined by USFWS to be capable of being translocated.

Tortoises would only be moved to and held in the enclosures on Fort Irwin after approval by USFWS of a husbandry plan (i.e., a plan to ensure food and water are available to all captive tortoises; vegetation within the pens is properly irrigated; the pen is secured from predators and pests; and the annual captive tortoise census, survivorship, health and growth results are documented) (USFWS 2020). Tortoises would only be translocated to recipient sites after approval by USFWS of a disposition plan (USFWS 2020). This would include conducting health assessments on each desert tortoise to be translocated. A minimum of two health assessments must be completed on animals that would be translocated. For animals that have not been encountered before or have not had a health assessment, two assessments 14 and 30 days apart would be conducted, with the last assessment occurring immediately prior to the translocation date (USFWS 2020). Animals that were previously transmittered and had a health assessment done within one year of the translocation date would have a secondary health assessment conducted just prior to translocation. For both cohorts of animals (i.e., previously transmittered and not), biological samples would not be collected during the second health assessment. Tortoises free of health conditions that would not be a detriment to the translocation site population would be translocated; all other tortoises would remain in the enclosures until such a time they meet the health assessment screening criteria and are approved for translocation by USFWS.

2.2.2 Translocation

From 2020 through 2022, the U.S. Geological Survey (USGS) surveyed the WTA and WTATS to document habitat conditions and estimate tortoise abundance (Appendix C). Surveys were conducted in 1,408 plots following survey protocols documented in USFWS (2022b). All tortoise signs were recorded during surveys. The 2020 through 2022 surveys as well as monitoring efforts for telemetered tortoises throughout the WTA and WTATS included observations of 783 tortoises. Of the tortoises observed, 86 percent were adult tortoises with a consistent 2 male:1 female sex ratio across survey years. Health assessments were conducted on 393 tortoises during the 2020 through 2022 surveys. Most tortoises examined were classified as clinically normal and described as having adequately conditioned muscle and fat reserves; however, some were reported to have underconditioned muscle (i.e., loss of muscle mass) and fat reserves in 2022. Most tortoises presented with recessed eyes, likely due to temporary dehydration corresponding with the limited rainfall since 2020.

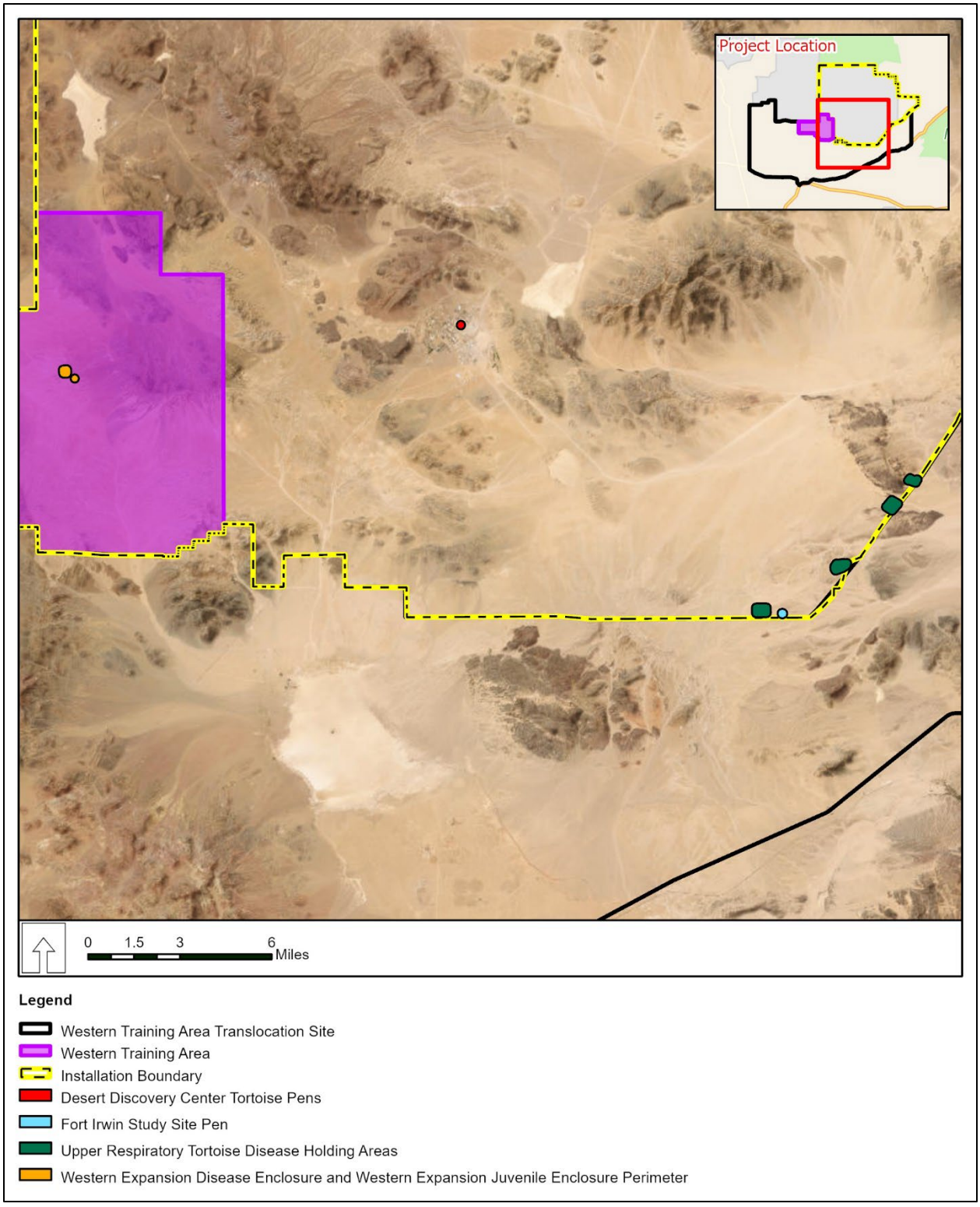

Figure 2-2. Location of Desert Tortoise Enclosures on Fort Irwin

A few tortoises exhibited notable health issues, including abnormal beaks, periocular swelling and redness, conjunctival swelling, mucoid ocular discharge, occluded and eroded nares, nasal discharge, active skin lesions, and active shell trauma, although these animals generally made up less than 6 percent of the assessed population.

Tissue samples taken from tortoises within the WTATS that were assessed from 2021 yielded positive laboratory results either for antibodies specific to *Mycoplasma agassizii* and *Mycoplasma testudineum*, albeit at low levels (Appendix C). Testing was performed via Enzyme-Linked Immunosorbent Assay (ELISA) testing (n=4, or 3.3 percent of the assessed population) or pathogen presence (via quantitative polymerase chain reaction [qPCR] testing; n=6, or 6.7 percent of the assessed population).

Using data collected from survey and monitoring efforts, USGS modeled the habitat suitability in the WTA and WTATS to estimate the number of tortoises in the WTA to be translocated and the estimated density of tortoises in the WTATS to evaluate the availability of habitat to support tortoises at the Translocation Sites (Appendix C). The mean estimated adult tortoise density at WTA was 1.08 adults per square kilometer, which corresponds to 273 live adult tortoises in the WTA (estimate range of adult tortoise density in the WTA is from 112 to 439 adult tortoises) to be translocated to the WTATS. Tortoise densities in the WTATS were estimated at 0.47, 0.43 and 0.41 adults per square kilometer in Sites 1, 2 and 3, respectively. Under the Proposed Action, NTC would translocate these adult tortoises to suitable translocation sites within the WTATS.

After conducting clearance surveys, NTC would compile a complete record of all tortoises found within the WTA, including information collected upon encounters (e.g., attached unique identifier, radio transmitter, and location) and complete health screenings for all tortoises in the WTA, as well as for select resident and control tortoises in the WTATS. Further, NTC would prepare disposition plans for all tortoises to be translocated from the WTA to the WTATS. Translocation would only occur once disposition plans for tortoises are approved by the USFWS. Until disposition plans are approved by USFWS, NTC would provide husbandry care to tortoises housed in enclosures on Fort Irwin or at a headstarting facility and would track any transmittered tortoises remaining in the WTA (USFWS 2020).

Upon approval of disposition plans by the USFWS, NTC would translocate desert tortoises to approved recipient sites within the WTATS. NTC would only translocate tortoises in the spring (April and May) or fall (September and October) when the weather conditions are suitable for tortoise activities. The NTC would not capture, move, transport, release, or purposefully cause a tortoise to leave its burrow for whatever reason when the ambient air temperature at ground level is above or anticipated to exceed 95 degrees Fahrenheit (35 degrees Celsius) before handling or processing can be completed (Desert Tortoise Council 1994; USFWS 2020). If necessary, NTC would conduct winter translocations (e.g., December through February) with prior approval from USFWS, but extreme heat or cold would be avoided (Cook et al. 1978). Tortoises would not be released in the summer (e.g., June through August) for any reason.

NTC would “tap out” desert tortoises found in burrows (tapping out is a technique for capturing tortoises in burrows) during clearance surveys to encourage them to exit (Medica et al. 1986); if the tapping out method does not work adequately, NTC would carefully excavate burrows to remove tortoises (Desert Tortoise Council 1994; USFWS 2020). NTC would employ biologists approved under NTC’s permit to transport radio-transmittered tortoises from the WTA or from

holding pens to recipient sites in the WTATS. They would use vehicles or rotary-wing aircraft to transport the tortoises to the designated release sites and would release them on the same day that the transport takes place. Translocating all tortoises is estimated to take up to 80 total transportation trips between the WTA and/or enclosure pens on Fort Irwin to recipient sites in the WTATS. All vehicles would remain on paved and unpaved roads, including Designated Open Routes as described in the BLM's *West Mojave Route Network Project* (BLM 2019); no off-road vehicular travel or travel off of designated “open” roads would occur during survey, translocation, or monitoring activities. Helicopters if used to transport tortoises would takeoff and land on existing roads or previously disturbed areas. NTC would transport tortoises in clean, protective, and ventilated containers to ensure their safety during translocation. NTC would sterilize the containers using a 10 percent bleach solution (USFWS 2019) between each use. The NTC would report the WTA cleared and total number of tortoises found to the USFWS and CDFW (USFWS 2020) following all clearance surveys and translocation events.

Prior to translocation, NTC would complete a minimum of two health assessments 14 to 30 days apart (for animals that have not received a health assessment within the last year), with the last assessment occurring immediately prior to the translocation date (USFWS 2020). Collection of biological samples would not be required for these two health assessments as long as samples are collected within one year of translocation (USFWS 2020). Any tortoise that NTC would find within the WTA with ELISA positive or qPCR positive tissue sample testing results for the acquired antibodies or pathogen presence of *Mycoplasma agassizii* or *Mycoplasma testudineum* would not be translocated and would remain isolated within holding pens on Fort Irwin. NTC would care for tortoises held in holding pens in compliance with the protocol outlined in an USFWS-approved tortoise husbandry plan (USFWS 2020).

When released, NTC would provide translocated tortoises with drinking water for 15 to 20 minutes and place tortoises into unoccupied-shelter sites, such as a tortoise soil burrow (if available), caliche cave, or in the shade of a shrub (USFWS 2020). If NTC releases tortoises in winter, they would be placed in burrows covered by Masonite boards, to be removed in early March, to encourage tortoises to remain in hibernation throughout the winter season (USFWS 2020).

The NTC would not construct any additional fencing in the WTATS. Most major roads intersecting and bounding the WTATS, including most of Interstate 15 and all of Fort Irwin Road, are already enclosed with tortoise exclusionary fencing. The NTC would coordinate through the (RASP, a joint initiative of the DoD and the Department of the Interior (DoI), to construct fence regionally to deter off-highway vehicle (OHV) travel and along Interstate 15, providing protection to desert tortoise habitat in the WTATS.

2.2.3 Monitoring

Monitoring would be required for 25 years (6 years of short-term monitoring and 19 years of long-term monitoring (see Appendix C) to determine if translocated tortoises support recovery of depleted populations in the Translocation Sites. Long-term monitoring would be funded from Fort Irwin, higher-level Army funding to the RASP, or a combination of both, unless the Anti-Deficiency Act applies (i.e., funding is not made available) in a given year. NTC would monitor the movement and health of all transmittered project tortoises that have been translocated from the WTA and those that serve as matching resident and control animals. This also includes monitoring any animals that remain in the WTA that were not translocated due to being too

small or receiving a diagnosis of disease until such a time as these animals are moved to holding pens or translocated to recipient sites. Monitoring would involve tracking transmittered tortoises, determining tortoise recruitment, estimating and comparing tortoise densities, conducting tortoise health assessments, and evaluating genetic integration. To be able to compare the translocated animals with resident and control populations, 100 to 150 resident/control tortoises have received transmitters and are being tracked simultaneously with the translocated tortoises.

To quantitatively monitor the movement of animals, NTC would track each transmitted tortoise in the recipient and Control Sites approximately biweekly on an annual basis. NTC would change transmitters for all tortoises within battery specifications of the transmitters to ensure transmitters remain functional on all transmittered tortoises. NTC would conduct tortoise tracking annually for six years, with long-term tortoise tracking responsibilities transitioning to the RASP. Movement of translocated tortoises will be compared to the resident and control populations to determine if there is a greater than 20 percent difference in overall distance travelled between translocated and resident/control tortoises as established in the DTTP.

Successful egg production, survival of hatching tortoises, and tortoise growth/survivorship are important measurements of tortoise recruitment. To assess egg clutch size and oviposition date and location, NTC would X-ray radiograph female tortoises, examining 20 translocated female tortoises and 20 resident female tortoises in each recipient site as well as 20 females in each Control Site annually. The radiograph assessments of females would take place every 10 days from mid-April through mid-June. NTC would track the nesting success of these radiographed females for six years, comparing clutch size with control and resident tortoises, to assess if they are within the 20 percent baseline difference established in the DTTP (Appendix C). Additionally, tortoise mid-line carapace length growth and overall survivorship would be compared between the translocated and resident/control animals to assess if they are within the 20 percent baseline difference established in the DTTP. After six years, egg production and tortoise growth assessments would transition to the RASP.

NTC would conduct annual tortoise density transects in the Translocation and Control Sites, with biologists walking 10- meter transects across all areas. These surveys would be used to estimate overall tortoise density, demography, and distribution of tortoises in the recipient sites. Further, NTC would conduct health and genetic sampling on 20 percent of tortoises encountered during annual density transect surveys in both Translocation and Control Sites. Health sampling would be needed for NTC to ascertain if there is a greater prevalence of disease in translocated tortoises than in recipient site resident tortoises. Genetic sampling would also be needed for NTC to evaluate if genetic integration occurs following tortoise translocation. NTC would conduct tortoise density transects, health sampling, and genetic sampling annually for six years with long-term tortoise density transect, health sampling, and genetic sampling efforts transition to the RASP.

NTC would prepare an annual report describing the results of the monitoring of translocated, resident, and control tortoises. The annual report would summarize the methods used during all monitoring activities and data analyses, describe monitoring results, and compare the annual monitoring results to previous years' monitoring results. The report would also discuss the translocation success based on the criteria outlined in the DTTP (Appendix C). NTC would submit the annual report to USFWS by 31 January of the subsequent calendar year.

2.3 Alternatives

A key principle of NEPA is that agencies consider a range of alternatives for a proposed action. Considering alternatives helps avoid unnecessary impacts and allows analysis of reasonable ways to achieve the stated purpose. To warrant detailed evaluation, an alternative must be reasonable. To be considered reasonable, an alternative must be affordable, capable of implementation, and satisfactory with respect to meeting the purpose of and need for the action.

Guidelines for translocating Mojave desert tortoises are available as USFWS recovery objectives and in updated translocation protocols (USFWS 1994, 2011, 2020, 2022b). These guidelines dictate the methods for clearance surveys, tortoise management and husbandry, and translocation. Therefore, there are no alternatives available for clearance surveys and translocation; these steps, if implemented, would need to follow prescribed guidelines. However, the implementation of translocation activities at alternative potential recipient sites is only limited by having suitable habitat requirements to support Mojave desert tortoises, contribute to their recovery in areas with depleted populations, and be within a reasonable distance to safely and securely transport desert tortoises during translocation activities.

2.3.1 Recipient and Control Sites

USGS initially evaluated approximately 1,380,084 acres (mostly west, south, and southeast) of the WTA in San Bernardino County, California, for suitable tortoise Translocation Sites. The initial evaluation reduced the area to include habitats most appropriate for translocated tortoises. USGS delineated the WTATS following this initial evaluation by reviewing suitable Translocation Sites for tortoises; holding discussions among NTC, BLM, USFWS, and USGS; and performing subsequent analyses. The WTATS includes approximately 814,459 acres of mostly public lands north of Barstow and Hinkley, California (see Figure 2-1). It is bounded on the north by Naval Air Weapons Station China Lake, to the south by the 3849332 North Universal Transvers Mercator (UTM) line, to the east by the 458197 Easting UTM lines, and to the west by the 571068 Easting UTM line within the Soda Mountains. The eastern side of the WTATS incorporates habitats where the NTC previously translocated tortoises from its Southern Expansion Area (Esque et al. 2005) in 2008. The WTATS includes the Grass Valley and Black Mountain wilderness areas along with two recreation areas and public campgrounds at Rainbow Basin and Owl Canyon. Land ownership in the WTATS includes public lands managed by the BLM (530,041 acres, 65 percent of the WTATS), NTC (79,074 acres, 9.7 percent of the WTATS and referred to as Irwin Mitigation Parcels), the State of California (22,981 acres, 2.8 percent), and nonfederal holdings/private property (approximately 183,352 acres, 22.5 percent). The WTATS is larger and more topographically diverse than the WTA. BLM provided recommended avoidance areas for desert tortoise translocations, which include habitats south of Interstate 15 and California State Route 58, areas east and south of a primary transmission utility corridor and access road, habitats south of Fossil Bed Road, BLM-designated Wilderness Areas (Grass Valley and Black Mountain Wilderness Areas), and targeted areas southwest of Fossil Bed Road with high-density recreation use and other landscape concerns.

Guidelines for desert tortoise translocation (USFWS 1994, 2011, 2020, 2022b) propose that:

- Translocated tortoises be placed into recipient sites of suitable tortoise habitat that support all tortoise life stages with no foreseeable habitat development or other impacts (e.g., increased OHV recreation activity).

- A depleted tortoise population be contained without evidence of a disease outbreak; avoid private land and access limitations.
- A minimum tortoise dispersal range be 6.5 kilometers and no closer than 6.5 kilometers to major unfenced roads or human development.
- Recipient sites do not overlap with designated sites where control tortoises live (Control Sites) so that translocation success can be measured by comparing response variables in animals among sites where environmental conditions vary measurably.

Based on the guidelines provided by USFWS and consultation with local and regional partners, USGS created a habitat model to support site selection for recipient and Control Sites related to WTA desert tortoise translocation activities (Appendix C).

As alternatives screening criteria, USGS designed a decision support tool to model suitable sites for tortoise translocation into the WTATS. The model was based on geospatial and environmental data. The model incorporated potential habitat suitability, predator threats, and several anthropogenic factors (e.g., roads, land use, ownership) considered to be important to the survival and health of tortoise populations. The model draws on knowledge from expert biologists to define model parameters. USGS selected seven criteria to evaluate suitable Translocation Sites: land ownership; habitat suitability; distance to roads; nest density of the common raven (*Corvus corax*), a known predator of young tortoises; connectivity; precipitation; and terrestrial development index. USGS ran five modeling scenarios; for each scenario, the set and bounds of each criterion were developed using information based on expert knowledge and then discussed as a group (i.e., USGS, USFWS, NTC, and BLM). USGS used set weights for each criterion to select suitable sites for desert tortoises. To identify the sites that met selection criteria in the most robust way, USGS analyzed the results from all five scenarios simultaneously to identify which areas received higher suitable ratings as Translocation Sites and were common among all five scenarios. USGS evaluated all Army-owned parcels in the WTATS that were specifically purchased to provide mitigation for the Army training activities in the WTA, as well as parcels in the WTA that would not be used for training activities, and Army-owned parcels outside of the WTATS (Figure 2-3).

This provided 263 separate parcels totaling 102,248.5 acres evaluated as alternative recipient sites for translocating desert tortoises from the WTA. See Section 4.0 of Appendix C for details of the Translocation Site modeling efforts completed by USGS.

From the combined analysis, USGS selected eight potential recipient sites (composed of 15 parcels) and two potential Control Sites that contained large, contiguous parcels that the model ranked as suitable habitat for tortoises. Those recipient sites and Control Sites were buffered by 6.5 kilometers to create three Translocation Sites and two Control Sites (Figure 2-4).

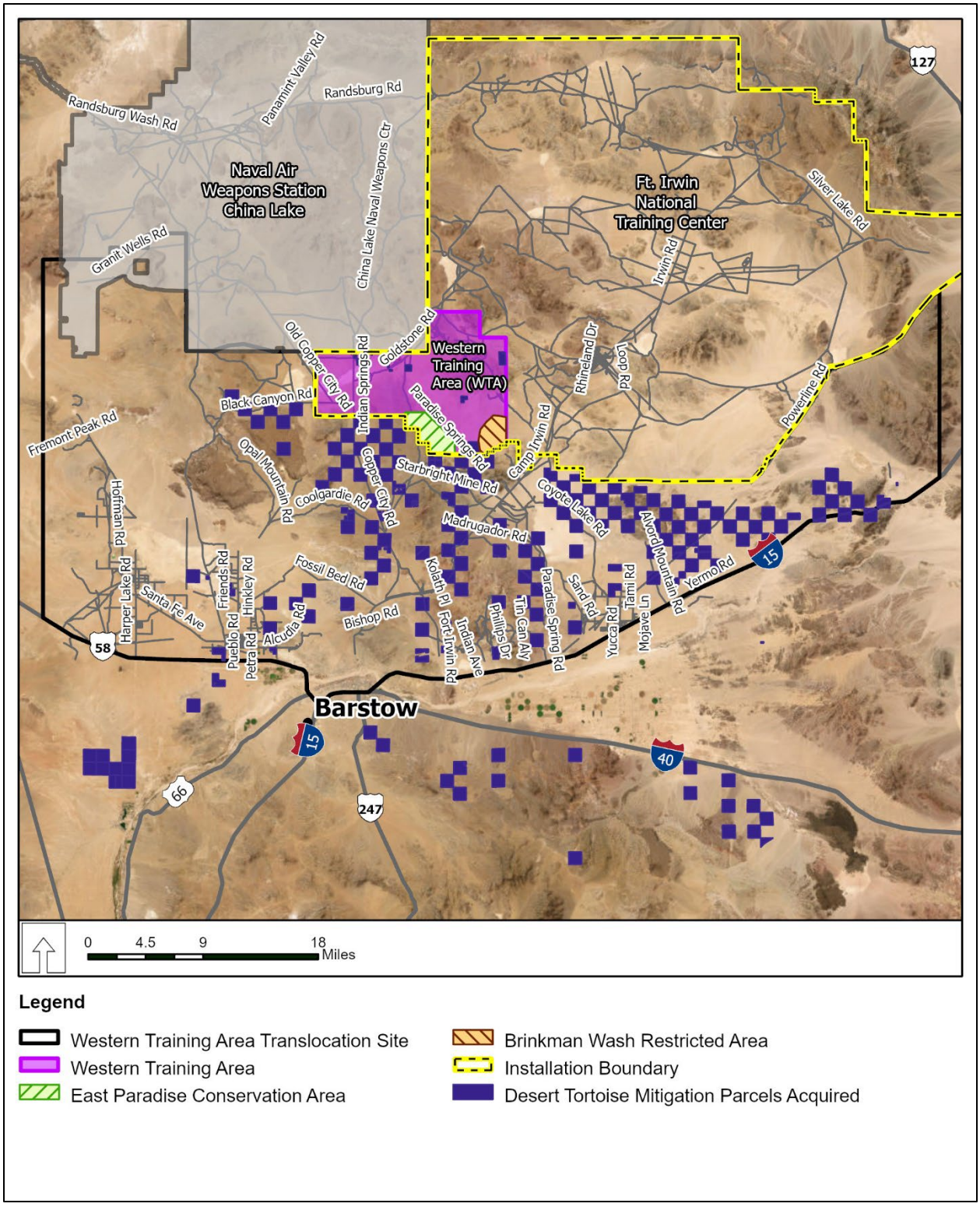

Figure 2-3. Location of All Parcels Evaluated for Desert Tortoise Translocation Recipient Sites

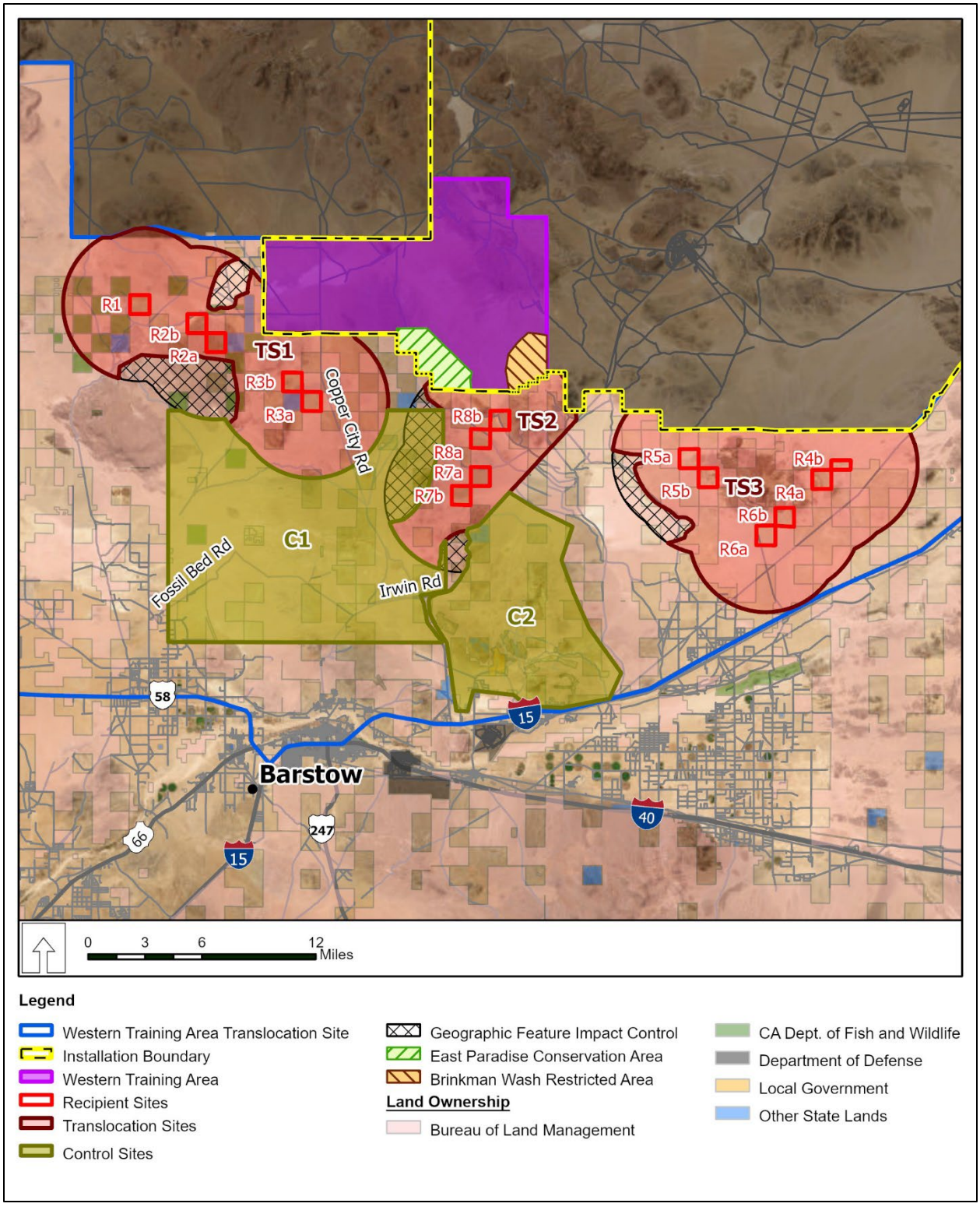

Figure 2-4. Location of Translocation Sites, Control Sites, and Recipient Sites

2.3.2 Alternative Recipient Sites Evaluated but Dismissed

The USGS decision support tool evaluated parcels as potential alternative recipient sites that were determined to not be suitable for desert tortoise translocation. A total of 263 Army-owned parcels were evaluated as alternative recipient sites in the WTA (outside of proposed training areas, in the WTATS, and outside of the WTATS; see Figure 2-3), and due to constraints identified through the habitat modeling process, 248 parcels were dismissed from further evaluation as alternative recipient sites (Table 2-1).

Table 2-1. Alternative Recipient Site Parcels Evaluated for Western Training Area Desert Tortoise Translocation

Parcel ID Number	Parcel Size (acres)	Location	Selected Alternative
0416-021-01-0000	622.5	Outside of the WTATS	No
0416-031-04-0000	644.7	Outside of the WTATS	No
0416-121-02-0000	640.4	Outside of the WTATS	No
0416-191-08-0000	641.2	Outside of the WTATS	No
0417-011-02-0000	632.0	Outside of the WTATS	No
0417-021-01-0000	641.1	Outside of the WTATS	No
0417-081-02-0000	643.9	Outside of the WTATS	No
0417-081-04-0000	647.4	Outside of the WTATS	No
0417-091-01-0000	634.9	Outside of the WTATS	No
0420-022-58-0000	686.0	Outside of the WTATS	No
0420-041-05-0000	646.7	Outside of the WTATS	No
0423-011-04-0000	646.7	WTATS	No
0423-021-02-0000	642.5	WTATS	No
0423-021-04-0000	634.3	WTATS	No
0423-031-10-0000	605.0	WTATS	No
0423-051-01-0000	642.2	WTATS	No
0423-051-07-0000	640.7	WTATS	No
0423-051-18-0000	81.8	WTATS	No
0423-051-24-0000	20.2	WTATS	No
0423-051-27-0000	39.7	WTATS	No
0423-082-03-0000	638.3	WTATS	No
0423-111-06-0000	204.6	WTATS	No
0423-111-07-0000	422.5	WTATS	No
0423-131-13-0000	611.1	WTATS	No
0423-171-03-0000	645.5	WTATS	No
0424-021-03-0000	172.0	WTATS	No
0424-021-05-0000	272.1	WTATS	No
0465-021-01-0000	647.3	Outside of the WTATS	No
0465-021-02-0000	646.0	Outside of the WTATS	No
0465-021-04-0000	642.3	Outside of the WTATS	No
0465-021-05-0000	650.9	Outside of the WTATS	No
0465-021-06-0000	642.2	Outside of the WTATS	No
0465-031-03-0000	325.9	Outside of the WTATS	No
0465-031-04-0000	323.4	Outside of the WTATS	No
0466-011-01-0000	681.5	Outside of the WTATS	No
0466-071-01-0000	667.1	Outside of the WTATS	No
0466-081-01-0000	652.4	Outside of the WTATS	No
0488-061-01-0000	469.6	Outside of the WTATS	No
0489-041-05-0000	651.8	WTATS	No
0489-051-04-0000	650.4	WTATS	No
0489-061-27-0000	605.3	WTATS	No
0489-192-02-0000	40.3	WTATS	No
0489-193-13-0000	162.8	WTATS	No
0489-193-36-0000	81.2	WTATS	No
0489-193-37-0000	81.5	WTATS	No

Parcel ID Number	Parcel Size (acres)	Location	Selected Alternative
0490-142-03-0000	643.0	WTATS	No
0494-011-10-0000	118.0	WTATS	No
0494-061-03-0000	402.0	WTATS	No
0494-331-05-0000	0.8	WTATS	No
0494-331-06-0000	0.7	WTATS	No
0495-011-18-0000	641.1	WTATS	No
0495-011-89-0000	609.3	WTATS	No
0495-113-18-0000	40.5	WTATS	No
0500-011-02-0000	480.8	WTATS	No
0500-021-04-0000	2.6	WTATS	No
0500-021-07-0000	0.5	WTATS	No
0500-021-12-0000	210.0	WTATS	No
0500-031-06-0000	2.5	WTATS	No
0500-031-07-0000	5.1	WTATS	No
0500-031-08-0000	16.6	WTATS	No
0500-031-09-0000	5.8	WTATS	No
0500-031-10-0000	5.0	WTATS	No
0500-031-11-0000	4.0	WTATS	No
0500-031-13-0000	13.8	WTATS	No
0500-031-14-0000	5.0	WTATS	No
0500-031-15-0000	5.1	WTATS	No
0500-031-16-0000	5.1	WTATS	No
0500-031-17-0000	4.9	WTATS	No
0500-031-18-0000	5.0	WTATS	No
0500-031-19-0000	5.0	WTATS	No
0500-031-21-0000	5.0	WTATS	No
0500-031-26-0000	5.1	WTATS	No
0500-031-27-0000	4.7	WTATS	No
0500-031-28-0000	2.6	WTATS	No
0500-031-31-0000	9.9	WTATS	No
0500-031-32-0000	5.2	WTATS	No
0500-031-36-0000	20.2	WTATS	No
0500-031-42-0000	4.9	WTATS	No
0500-031-43-0000	52.7	WTATS	No
0500-041-11-0000	4.8	WTATS	No
0500-041-12-0000	14.5	WTATS	No
0500-041-13-0000	4.8	WTATS	No
0500-041-14-0000	4.9	WTATS	No
0500-041-17-0000	10.4	WTATS	No
0500-041-22-0000	5.1	WTATS	No
0500-041-24-0000	4.9	WTATS	No
0500-041-28-0000	20.0	WTATS	No
0500-041-37-0000	5.0	WTATS	No
0500-041-38-0000	5.0	WTATS	No
0500-051-02-0000	159.5	WTATS	No
0500-051-10-0000	20.3	WTATS	No
0500-051-11-0000	19.8	WTATS	No
0500-051-12-0000	19.9	WTATS	No
0500-051-14-0000	21.0	WTATS	No
0500-051-15-0000	20.1	WTATS	No
0500-051-16-0000	20.3	WTATS	No
0500-051-18-0000	40.6	WTATS	No
0500-051-19-0000	39.7	WTATS	No
0500-051-21-0000	20.2	WTATS	No
0500-051-22-0000	19.8	WTATS	No
0500-051-25-0000	9.8	WTATS	No
0500-051-29-0000	19.9	WTATS	No
0500-051-30-0000	18.6	WTATS	No

Parcel ID Number	Parcel Size (acres)	Location	Selected Alternative
0500-051-31-0000	20.0	WTATS	No
0500-051-32-0000	19.7	WTATS	No
0500-051-34-0000	10.2	WTATS	No
0500-051-39-0000	5.2	WTATS	No
0500-051-40-0000	5.1	WTATS	No
0500-061-01-0000	646.5	WTATS	No
0500-061-02-0000	646.7	WTATS	No
0500-071-06-0000	199.7	WTATS	No
0500-081-02-0000	479.7	WTA	No
0500-091-02-0000	705.4	WTATS	No
0500-091-04-0000	640.8	WTATS	No
0500-091-06-0000	647.5	WTATS	No
0500-101-01-0000	684.3	WTATS	No
0500-101-03-0000	694.6	WTATS	No
0500-101-05-0000	647.3	WTATS	No
0500-111-02-0000	647.1	WTATS	**Yes - R3a**
0500-111-04-0000	647.5	WTATS	No
0500-111-06-0000	650.0	WTATS	No
0500-131-08-0000	72.3	WTATS	No
0500-131-11-0000	132.0	WTATS	No
0500-131-13-0000	191.5	WTATS	No
0500-131-16-0000	55.2	WTATS	No
0500-141-02-0000	645.2	WTATS	No
0500-161-04-0000	642.5	WTATS	**Yes - R3b**
0500-171-05-0000	638.7	WTATS	No
0507-011-05-0000	638.7	WTA	No
0507-021-06-0000	159.4	WTA	No
0507-031-43-0000	19.8	WTA	No
0507-031-46-0000	20.4	WTA	No
0507-041-05-0000	642.0	WTATS	No
0507-051-17-0000	645.9	WTATS	No
0507-073-04-0000	42.0	WTA	No
0507-073-08-0000	90.4	WTA	No
0507-073-09-0000	90.5	WTA	No
0507-073-10-0000	82.3	WTA	No
0507-074-25-0000	10.1	WTA	No
0507-091-24-0000	41.7	WTA	No
0507-121-01-0000	639.4	WTATS	**Yes - R2b**
0507-121-03-0000	639.4	WTATS	No
0507-121-05-0000	637.9	WTATS	**Yes - R2a**
0507-161-07-0000	661.4	WTATS	**Yes - R1**
0507-171-02-0000	639.0	WTATS	No
0507-171-04-0000	636.6	WTATS	No
0517-021-02-0000	389.7	WTATS	No
0517-141-01-0000	311.5	WTATS	No
0517-151-01-0000	161.2	WTATS	No
0518-011-01-0000	638.9	WTATS	No
0518-011-05-0000	622.2	WTATS	No
0518-031-07-0000	679.1	WTATS	No
0518-031-31-0000	603.0	WTATS	No
0518-041-03-0000	639.4	WTATS	**Yes - R7b**
0518-041-05-0000	636.6	WTATS	No
0518-051-11-0000	617.0	WTATS	No
0518-061-01-0000	644.9	WTATS	No
0518-101-03-0000	496.9	WTATS	No
0518-101-05-0000	643.7	WTATS	**Yes - R7a**
0518-111-02-0000	672.7	WTATS	No
0518-111-04-0000	644.0	WTATS	**Yes - R8a**

Parcel ID Number	Parcel Size (acres)	Location	Selected Alternative
0518-121-02-0000	708.0	WTA	No
0518-121-04-0000	651.4	WTATS	No
0518-121-07-0000	161.3	WTATS	No
0518-121-08-0000	160.9	WTATS	No
0518-121-10-0000	160.6	WTATS	No
0518-121-11-0000	164.2	WTATS	No
0518-131-01-0000	656.4	WTA	No
0518-131-05-0000	636.7	WTATS	No
0518-161-01-0000	643.3	WTATS	**Yes - R8b**
0518-161-06-0000	561.8	WTATS	No
0518-181-05-0000	553.2	WTATS	No
0518-191-05-0000	324.3	WTATS	No
0518-201-01-0000	643.8	WTATS	No
0518-201-03-0000	643.8	WTATS	No
0518-201-05-0000	640.7	WTATS	No
0518-211-03-0000	637.5	WTATS	No
0518-241-05-0000	633.8	WTATS	No
0518-251-06-0000	638.5	WTATS	No
0518-261-02-0000	643.4	WTATS	No
0518-261-04-0000	641.9	WTATS	No
0519-011-07-0000	663.3	WTA	No
0519-031-05-0000	123.9	WTA	No
0519-241-09-0000	20.2	WTA	No
0519-241-10-0000	302.2	WTA	No
0527-061-06-0000	659.5	Outside of the WTATS	No
0527-071-02-0000	637.2	Outside of the WTATS	No
0527-071-11-0000	222.9	Outside of the WTATS	No
0529-021-01-0000	634.6	Outside of the WTATS	No
0529-031-02-0000	637.7	Outside of the WTATS	No
0529-041-01-0000	637.8	Outside of the WTATS	No
0529-061-01-0000	628.9	Outside of the WTATS	No
0529-231-02-0000	638.5	Outside of the WTATS	No
0529-241-07-0000	646.3	Outside of the WTATS	No
0538-111-14-0000	465.8	WTATS	No
0538-131-01-0000	633.2	WTATS	No
0540-031-02-0000	603.4	WTATS	No
0540-041-02-0000	615.8	WTATS	No
0540-061-11-0000	602.2	WTATS	No
0540-071-01-0000	642.2	WTATS	No
0540-071-11-0000	614.2	WTATS	No
0540-081-04-0000	635.2	WTATS	No
0540-091-08-0000	634.9	WTATS	No
0540-091-15-0000	146.4	WTATS	No
0540-111-12-0000	485.8	WTATS	No
0540-121-14-0000	324.9	WTATS	No
0540-131-02-0000	648.9	WTATS	No
0540-141-01-0000	675.1	WTATS	No
0540-141-04-0000	584.1	WTATS	No
0540-151-03-0000	661.2	WTATS	**Yes - R6a**
0540-161-21-0000	327.2	WTATS	No
0540-161-38-0000	254.6	WTATS	No
0541-041-13-0000	53.2	WTATS	No
0541-121-03-0000	321.6	WTATS	No
0541-231-06-0000	643.9	WTATS	No
0541-231-22-0000	595.7	WTATS	No
0541-241-05-0000	639.7	WTATS	No
0541-241-66-0000	137.1	WTATS	No
0541-241-69-0000	446.2	WTATS	No

Parcel ID Number	Parcel Size (acres)	Location	Selected Alternative
0541-251-02-0000	633.8	WTATS	**Yes - R6b**
0541-251-06-0000	607.4	WTATS	No
0541-251-08-0000	72.9	WTATS	No
0541-251-09-0000	533.3	WTATS	No
0541-261-03-0000	666.7	WTATS	No
0541-261-11-0000	616.1	WTATS	No
0541-261-12-0000	16.3	WTATS	No
0542-061-50-0000	20.4	Outside of the WTATS	No
0542-121-02-0000	644.8	WTATS	No
0542-121-04-0000	643.4	WTATS	No
0542-121-07-0000	645.0	WTATS	No
0542-131-01-0000	657.4	WTATS	No
0543-011-01-0000	636.3	WTATS	No
0543-011-03-0000	644.5	WTATS	No
0543-011-05-0000	646.6	WTATS	**Yes - R5a**
0543-011-07-0000	640.5	WTATS	No
0543-011-09-0000	647.1	WTATS	**Yes - R5b**
0543-011-11-0000	637.8	WTATS	No
0543-081-11-0000	327.9	WTATS	**Yes - R4b**
0543-081-13-0000	638.4	WTATS	No
0543-081-15-0000	614.9	WTATS	No
0543-081-17-0000	643.4	WTATS	**Yes - R4a**
0543-081-26-0000	631.0	WTATS	No
0543-081-27-0000	9.7	WTATS	No
0543-091-13-0000	644.0	WTATS	No
0543-091-15-0000	658.9	WTATS	No
0543-091-17-0000	323.8	WTATS	No
0543-151-14-0000	664.6	WTATS	No
0543-161-01-0000	677.0	WTATS	No
0543-161-03-0000	657.0	WTATS	No
0543-161-11-0000	131.0	Outside of the WTATS	No
0543-161-13-0000	664.6	WTATS	No
0543-161-15-0000	671.5	WTATS	No
0543-161-17-0000	527.4	WTATS	No
0543-161-18-0000	85.1	Outside of the WTATS	No
0543-161-21-0000	261.0	WTATS	No
0543-161-26-0000	494.1	Outside of the WTATS	No
0543-161-38-0000	361.3	WTATS	No
0543-161-41-0000	92.9	WTATS	No
0543-161-43-0000	348.2	Outside of the WTATS	No
0543-171-37-0000	20.5	WTATS	No
0543-291-03-0000	315.0	WTATS	No
0543-291-05-0000	636.6	WTATS	No
0543-291-07-0000	581.8	WTATS	No

ID – identification number; **WTATS** – Western Training Area Translocation Site; **WTA** – Western Training Area

2.3.3 Preferred Proposed Action Implementation Alternative

Under the Preferred Alternative, the NTC would conduct clearance surveys in an attempt to detect all desert tortoises in the WTA and would translocate all detected desert tortoises from the WTA to approved Translocation Sites. Translocations would follow USFWS-approved disposition plans (i.e., plans specific for the translocation treatment of each desert tortoise, including specific release locations). All desert tortoises would be translocated to recipient sites within Translocation Sites 1, 2, and 3. NTC would monitor translocated desert tortoises and resident desert tortoises in the recipient sites, as well as tortoises in Control Sites 1 and 2, to

ensure successful outcomes for translocated desert tortoises and to document efforts towards desert tortoise species recovery.

Upon approval of disposition plans by the USFWS, NTC would translocate desert tortoises from the WTA to Translocation Sites as described in Section 2.2.2. It is estimated that 164 adult tortoises would be translocated to Translocation Site 1, 64 adult tortoises would be translocated to Translocation Site 2, and 123 adult tortoises would be translocated to Translocation Site 3 (Appendix C, Table 8).

Under the Preferred Alternative, the implementation of the Proposed Action would occur in Translocation Sites 1, 2, and 3. The following provides additional details on each of the recipient sites that would support desert tortoise translocations under the Proposed Action.

2.3.3.1 Translocation Site 1

Recipient Site R1. Recipient Site R1 (Figure 2-5) covers 661.4 acres and is easily accessible from a two-track road. The center of this release site is on a gentle hill that slopes into a wide, flat, and open expanse to the northeast. Medium-sized rolling hills of moderate slope are to the southwest. The soil is soft, sandy loam topped with gravel composite. Dense small-mammal burrows were present throughout the site. Vegetation consisted primarily of creosote bush (*Larrea tridentata*), white bursage (*Ambrosia dumosa*), California jointfir (*Ephedra californica*). and Nevada jointfir (*Ephedra nevadensis*), as well as several other less dominant species, such as rayless goldenhead (*Acamptopappus sphaerocephalus*), and turpentine broom (*Thamnosma montana*). There was no evidence of recent OHV use at the site center; however, several marked BLM roads and established campsites are in the general area, closer to the dry lake and east of the release site.

Recipient Sites R2a and R2b. Recipient Sites R2a and R2b (Figure 2-5) comprise 637.9 acres and 639.4 acres, respectively, and are in generally flat areas that are just south of a dry lake with semirocky, sandy soil. The dominant vegetation consists of saltbush species (*Atriplex* spp.), creosote bush, California jointfir, and Nevada jointfir.

Recipient Sites R3a and R3b. Recipient Sites R3a and R3b (Figure 2-5) comprise 647.1 acres and 642.5 acres, respectively, and are in low hills 2 to 4 miles south of the southern WTA border and west of the graded Copper City Road. Soil at these sites is sandy and contains some gravel with vegetation dominated by creosote bush and white bursage. Joshua trees (*Yucca brevifolia*) are present but are more numerous in the southern regions of R3a at higher elevations.

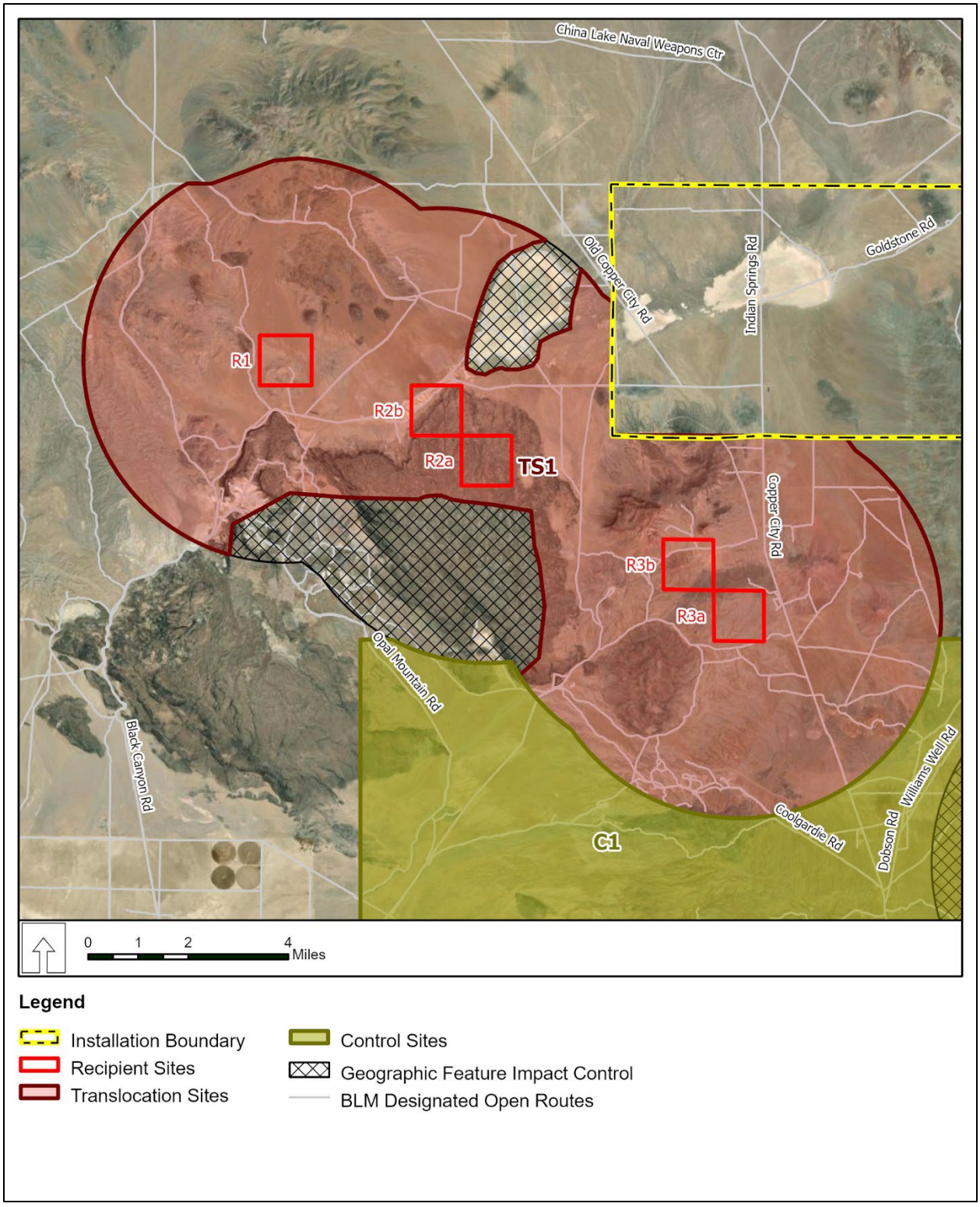

Figure 2-5. Translocation Site 1

2.3.3.2 Translocation Site 2

Recipient Sites R7a and R7b. Recipient Sites R7a and R7b (Figure 2-6) comprise 643.7 acres and 639.4 acres, respectively, and are easily accessible from a BLM dirt road from the north and west with only moderate OHV use noted in site surveys. Recipient Sites R7a and R7b are approximately 2 miles from a major paved road with tortoise exclusion fencing (Fort Irwin Road). Private properties are located east of Recipient Sites R7a and R7b, just off Fort Irwin Road. Soil is characterized as sandy-gravelly-loam. The shrub community is dominated by relatively small creosote bushes (mostly less than 3 feet tall) and white bursage. The site is surrounded by mountains with moderate eastward-facing slopes.

Recipient Sites R8a and R8b. Recipient Sites R8a and R8b (Figure 2-6) cover 644.0 acres and 643.3 acres, respectively, are approximately 1 mile to 2.5 miles south of the WTA, and contain the densest and tallest vegetation (composed of creosote bush and white bursage) of all the proposed release sites. The sites are moderately sloped from mountains to the west and east, consisting of semirocky and sandy soil with outcrops of silt and mudstone in the north.

2.3.3.3 Translocation Site 3

Recipient Sites R4a and R4b. Recipient Sites R4a and R4b (Figure 2-7) comprise 643.4 acres and 327.9 acres, respectively, and are surrounded by low, gravelly, and sandy hills with outcrops of silt and mudstone, several of which are moderately deep (6.5 feet to 15 feet deep) washes. The washes are east of the Alvord Mountain Range and west of a plateau with a radio tower. A major transmission utility corridor is to the south with marked BLM roads nearby, but the release sites are more accessible by following an unmarked two-track road by vehicle and hiking approximately 1,000 feet up a gentle slope. Minimal to no OHV disturbance is present at these release areas. R4a and R4b are dominated by mixed creosote bush and peach thorn (*Lycium cooperi*) as well as white bursage and desert senna (*Senna armata*).

Recipient Sites R5a and R5b. Recipient Sites R5a and R5b (Figure 2-7) cover 646.6 acres and 647.1 acres, respectively, located west of the Alvord Mountain and northeast of Coyote Dry Lake, and contain low hills. The soil is mostly sandy, littered with surface rocks near the bajada to the south and east, and dense volcanic gravel covers the hillsides.

Recipient Sites R6a and R6b. Recipient Sites R6a and R6b (Figure 2-7) comprise 661.2 acres and 633.8 acres, respectively, and are located just south of the Alvord Mountain and north of a major utility transmission corridor. The soil is very sandy with relatively sparse vegetation on the southern end of the site. Additionally, the Old Spanish Trail is on the west side of Recipient Sites R6a and R6b. Dominant vegetation includes creosote bush, white bursage, and desert senna.

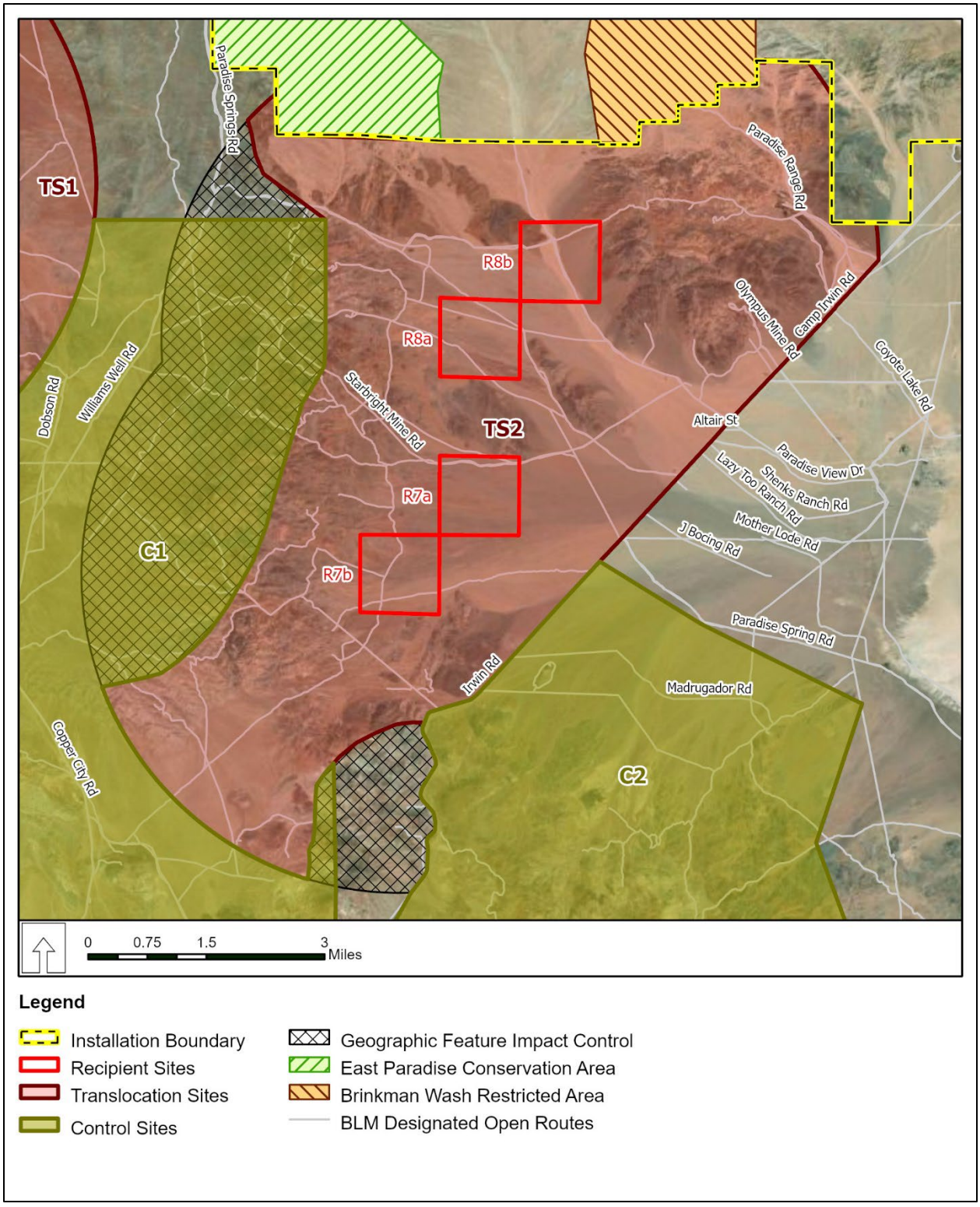

Figure 2-6. Translocation Site 2

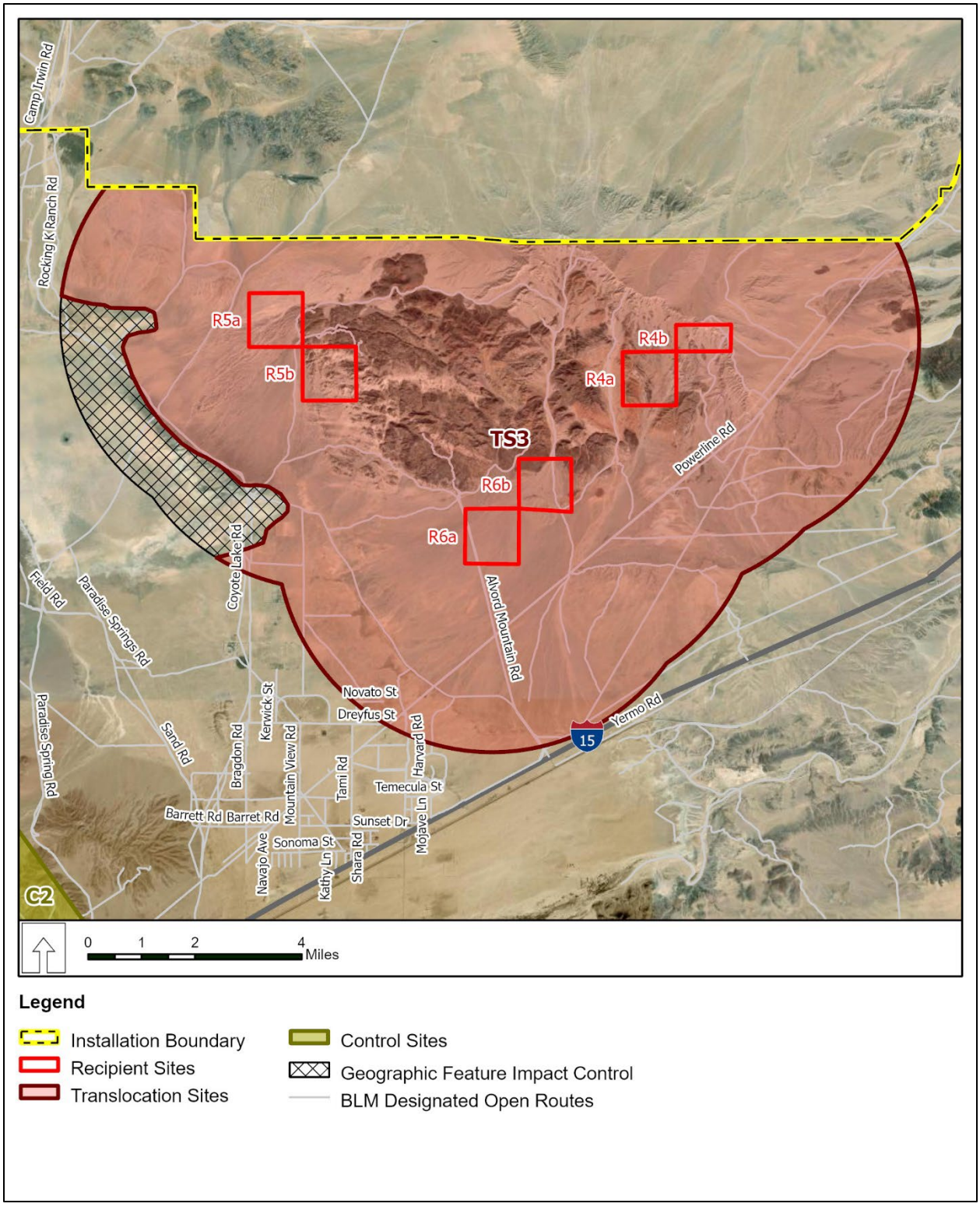

Figure 2-7. Translocation Site 3

2.3.3.4 Control Sites C1 and C2

Control Sites C1 and C2 (Figures 2-8 and 2-9, respectively) are intersected by Fort Irwin Road; are located to the south of R1, R2, R3, R7, and R8; and are closer to the city of Barstow than the recipient sites. Control Site C1 contains the Black Mountain Wilderness, BLM recreation areas (Rainbow Basin Natural Area and Owl Canyon Campground) to the southeast, and two graded dirt roads (Fossil Bed Road and Copper City Road). Control Site C1 has variable terrain, soil, and vegetation; areas with larger hills and canyons, rockier soil, and denser creosote bush, white bursage, and Joshua tree vegetation in the north; and smaller rolling hills, sandier soil, sparser vegetation, and more private land holdings are in the south.

Control Site C2 encompasses the Calico Mountains, is southwest of Coyote Dry Lake, and is bordered by Interstate 15 highway to the south. In the south and west, there are more private properties and more motorized recreation areas than in other areas in Control Site C2. In Control Site C2, soil is coarse, sandy loam with a mixed shrub creosote bush and white bursage community among large hills and canyons turning to medium-grade slopes to the north and south.

2.3.4 No Action Alternative

Under the No Action Alternative, NTC would not translocate desert tortoises from the WTA. Desert tortoises would remain on the WTA of Fort Irwin and the Army would not be able to conduct training operations as described in the 2023 LEIS. Desert tortoise populations within the WTATS and south of Fort Irwin that are currently considered depleted would not be increased via the Army's proposed tortoise translocation efforts. As a result, the No Action Alternative does not fulfill the Proposed Action's purpose and need. It is included in this analysis as a baseline against which the impacts of the other alternatives can be compared.

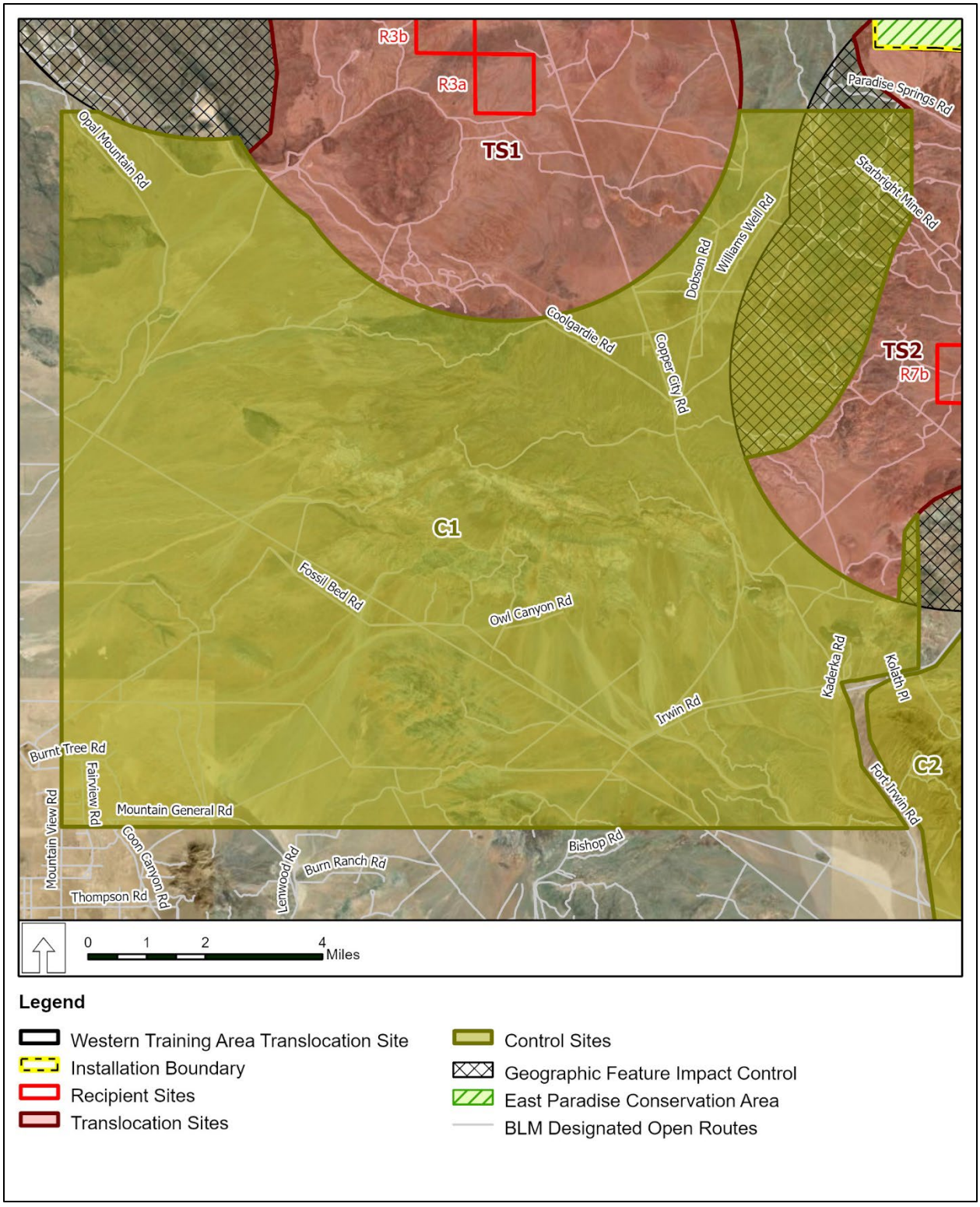

Figure 2-8. Control Site C1

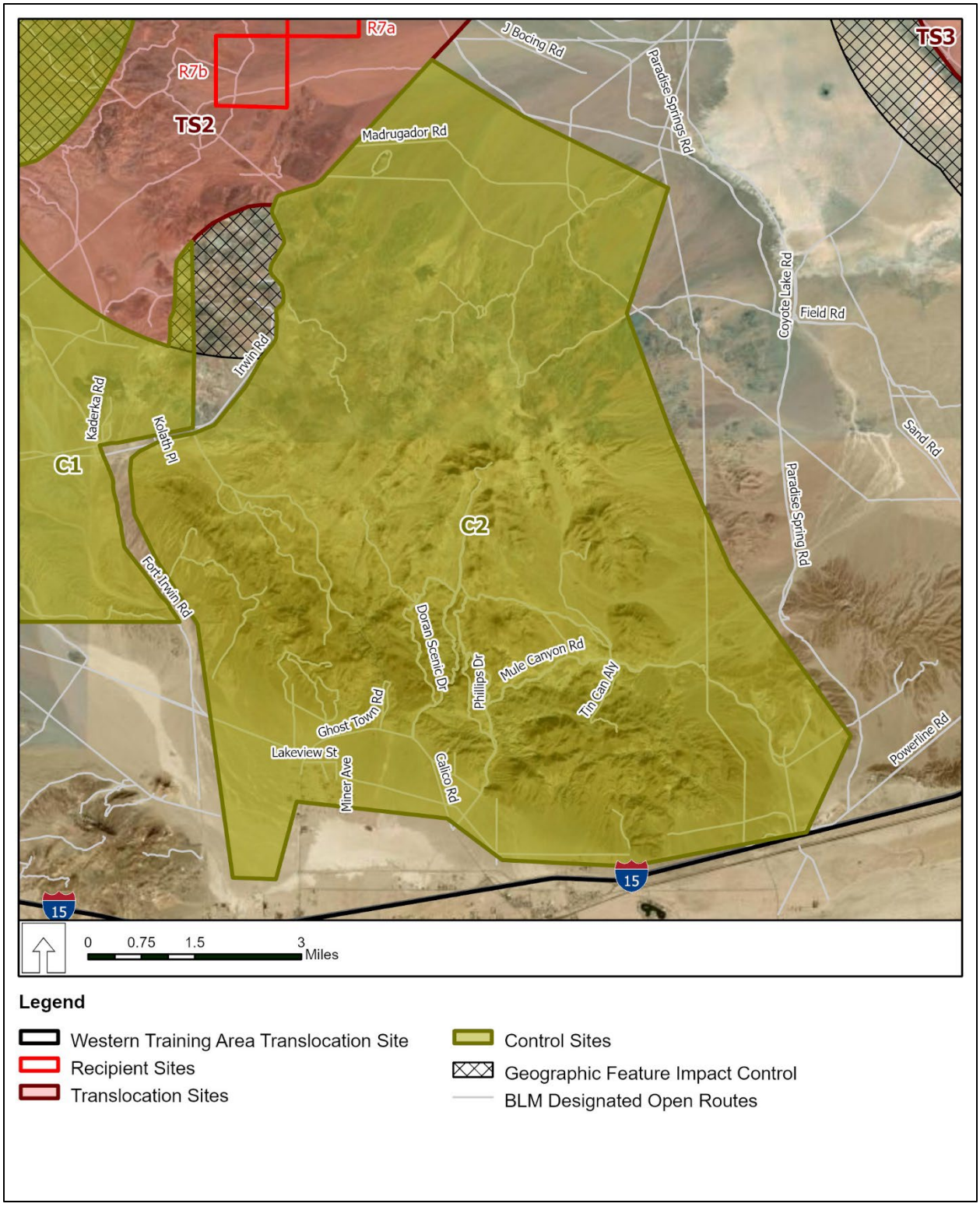

Figure 2-9. Control Site C2

3.0 Affected Environment and Consequences

Potential effects of the Proposed Action and No Action are presented in Sections 3-5 through 3-11 and are summarized in Table 4-1 in Chapter 4. Reasonably foreseeable future actions are discussed in Section 3.3. For other resources/issues considered but not carried forward see Section 3.2, and for cumulative impacts, see Section 3-12. Measures that would be implemented to avoid or minimize potential impacts to the environment, including those that would otherwise be significant, are presented in Sections 3.1 through 3.9 and summarized in Chapter 4.

3.1 Methodology

In the following sections, the duration of each impact is described either as short term, such as desert tortoise translocation impacts, or long term, such as impacts related to vehicle travel during long-term monitoring activities. Impacts can be either beneficial or adverse and are defined as:

- **Beneficial** – The impact of implementing the action would benefit the resource/issue.
- **Adverse** – The impact of implementing the action would not benefit the resource/issue.

The degree of beneficial and adverse impacts and the intensity of each impact is defined as:

- **Negligible –** The impact is localized and not measurable or at the lowest level of detection.
- **Minor –** The impact is localized and slight but detectable.
- **Moderate –** The impact is readily apparent and appreciable.
- **Significant but Mitigable –** The impact is severely adverse or highly noticeable and considered to be significant, but the Army can implement measures to reduce the adverse impacts to less than significant.
- **Significant** – The impact violates or exceeds regulatory or policy standards, would substantially alter the function or character of the resource, or otherwise exceed the identified threshold.

3.2 Resource Areas Dismissed from Further Analysis

Only those resources that have the potential to be affected by the Proposed Action and alternatives were analyzed in detail, per CEQ guidance (40 CFR 1501.9 [f]). Therefore, the following resources were not carried forward for detailed analysis for the following reasons:

- **Airspace –** The Proposed Action does not involve aircraft training, so airspace would not be affected. Helicopter use during translocation events would not alter existing airspace boundaries or existing airspace times of use. Helicopter use would not conflict with other aircraft use of existing airspace. Helicopter flights would be at very low altitude for very short distances and would not conflict with any training activities in military special use airspace.

- **Geology –** The Proposed Action would consist of the translocation of desert tortoises from the WTA, which would not impact local or regional geology, or be impacted by geological resources or seismology.

- **Aesthetics and Visual Resources –** The Proposed Action is limited entirely to relocation of desert tortoises from the WTA to the designated Translocation Sites, and long-term monitoring of those translocated tortoises. Therefore, there would be no alterations of the landscape of the WTA or the Translocation and Control Sites under the Proposed Action. No construction or development is proposed under the Proposed Action that could alter visual resources or aesthetics. Therefore, no impacts on aesthetics or visual resources would occur with the implementation of the Proposed Action.

- **Noise –** The Proposed Action would include up to 10 helicopter trips and up to 200 vehicle trips between the WTA and the Translocation Sites during the active translocation of desert tortoises. These activities would generate noise higher than ambient noise levels but only for a short period of time (approximately eight months) as desert tortoises are translocated. These desert-tortoise-related transportation events would end once the desert tortoises are translocated. In the long term, noise would be generated from approximately four vehicles being used monthly to track and monitor transmittered translocated tortoises. All activities using helicopters and vehicles would remain on existing roads and developed areas and none of these transportation activities would occur proximate to sensitive noise receptors. As the noise generated from desert tortoise translocation activities would be short term and limited to undeveloped areas, and noise from monitoring desert tortoises would be long term but limited to vehicle trips on existing roads distant from any sensitive noise receptors, there would be no substantial impacts from increase noise associated with the Proposed Action.

- **Socioeconomics and Environmental Justice –** There would be no construction or development associated with the Proposed Action. The translocation of desert tortoises from the WTA to proposed Translocation Sites would require minor expenditures in the short term, but those expenditures would have no impact on the local or regional economy of Barstow or San Bernardino County, California. There would be no disproportionate impacts on minority, low-income, or youth populations from the proposed desert tortoise translocation, as these activities would be entirely confined to federally owned lands with monitoring potentially also occurring on adjacent public lands; there are no commercial or residential developments or properties in or proximate to these Translocation Sites. Therefore, there are no at-risk populations that could be disproportionately impacted by these activities.

- **Utilities –** The proposed translocation of desert tortoises from the WTA would not involve the use of any utilities, including communication systems. All tracking of transmittered desert tortoises would use VHS radio transmitters that would not interfere

with any existing communications system.

- **Recreation –** No public access is permitted on the WTA. Therefore, the translocation of desert tortoises from the WTA would have no impact on recreation in the WTA as no public recreational activities are allowed on the WTA. Translocation of desert tortoises to Army-owned parcels in the Translocation Sites and monitoring of transmittered tortoises in the Translocation and Control Sites would not impact recreational activities or recreational use on adjacent and nearby public lands, and public access and recreational activities are not permitted in the Army-owned parcels composing the recipient sites.

- **Hazardous Materials and Waste –** There would be no refueling of vehicles or helicopters in remote locations or in areas not specifically designated for refueling operations. All vehicles would be fueled at approved filling stations either on Fort Irwin or in the city of Barstow. Helicopter refueling for the limited trips to translocate tortoises would be completed at the Fort Irwin airfield following all NTC and Fort Irwin fueling and fuel loading management and safety procedures. Therefore, there would be no impacts from hazardous materials use or the generation of hazardous waste with the implementation of the Proposed Action. There are no Environmental Restoration Program sites that would impact the translocation of desert tortoises or be impacted by translocation activities. There would be no disturbance of any toxic substances, including lead-based paint, asbestos-containing materials, and polychlorinated biphenyls.

3.3 Reasonably Foreseeable Future Actions

Reasonably foreseeable direct and indirect effects associated with other proposed projects on the WTA and proximate to the proposed Translocation and Control Sites (Table 3-1) have also been analyzed for each resource.

Table 3-1. Reasonably Foreseeable Future Actions

Proposed Project	Project Summary	Estimated Implementation Date	Relevance to Proposed Action
National Training Center Western Training Area			
Landfill Expansion	Expansion of the existing landfill is currently under construction.	Ongoing	Potential impacts on air quality, soils, and water resources.
Common Raven Management	Conduct raven management at multiple DoD installations in the Mojave Desert to minimize impacts on the military mission and desert tortoise.	Ongoing	Potential impacts on biological and cultural resources.
Conversion of Range 1 into an MPRC	An air-to-ground integration village would be constructed at Range 1 to support unmanned aerial systems training	2025	Potential impacts on air quality, soils, water resources, and transportation.
Energy Security Measures projects	Increase Fort Irwin's energy security and resilience by facilitating an installationwide fuel switch from liquid propane gas, which is currently brought on to the installation via fuel tanker trucks along Fort Irwin Road, to natural gas, which is delivered via a new 6-inch-diameter steel pipeline.	2028	Potential impacts on soils, water resources, and biological resources.
Proposed Translocation and Control Sites			
SCE Eldorado Lugo Mohave Pesticide Use Permit	Permit allowing pesticide use for managing invasive plant species along rights-of-way on BLM-managed lands.	Ongoing	Potential impacts on water resources and biological resources.
SCE Abengoa Mojave Solar Power Plant	Construction of two solar facilities and fiber optic lines on private and BLM-managed lands.	Ongoing	Potential impacts on soils, water resources, and biological resources.
Caltrans 50-Year Lease for a High-Speed Rail Corridor (XpressWest)	Proposed construction of an approximately 200-mile high-speed rail corridor between southern California (Victorville) and Las Vegas, Nevada, as an alternative to automobile or air travel (Federal Railroad Administration 2011). The lease agreement allows XpressWest to operate largely within the median of I-15, which runs south of Fort Irwin through Barstow and covers the 135-mile section of the planned line within California.	2027	Potential impacts on soils, water resources, and transportation.
Daggett Solar Power Facility	Construction and operation of a 3,500-acre utility-scale, solar photovoltaic electricity generation and energy storage facility. The facility would produce up to 650 megawatts of power and include up to 450 megawatts of battery storage capacity near the Barstow-Daggett Airport south of I-15.	Under construction with full operation by 2025	Potential impacts on soils, water resources, and transportation.

DoD – Department of Defense; **MPRC** – Multipurpose Range Complex; **SCE** – Southern California Edison; **BLM** – Bureau of Land Management; **Caltrans** – California Department of Transportation; **I-15** – Interstate 15

3.4 Region of Influence

The project area, or region of influence (ROI), differs for the resources evaluated. Table 3-2 provides the ROI for each resource.

Table 3-2. Region of Influence for Each Resource

Resource	Region of Influence
Air Quality	San Bernardino County
Land Use	WTA and Translocation and Control Sites
Soils	WTA and Translocation and Control Sites
Water Resources	WTA and Translocation and Control Sites
Biological Resources	WTA and Translocation and Control Sites
Cultural Resources	WTA
Transportation	WTA and Translocation and Control Sites

WTA – Western Training Area

3.5 Air Quality

Under the authority of the Clean Air Act (CAA), the U.S. Environmental Protection Agency (USEPA) has established nationwide air quality standards to protect public health and welfare. These federal standards include National Ambient Air Quality Standards (NAAQS), which represent the maximum allowable atmospheric concentrations for six criteria pollutants: ozone, nitrogen dioxide, carbon monoxide, sulfur dioxide, lead, and particulate matter (which includes respirable particulate matter less than or equal to 10 micrometers in diameter [PM_{10}] and respirable particulate matter less than or equal to 2.5 micrometers in diameter [$PM_{2.5}$) (Table 3-3).

Table 3-3. National and California Ambient Air Quality Standards

Pollutant	Standard Value [1, 2]		Standard Type [3, 4]
Carbon Monoxide (CO)			
8-Hour Average	9 ppm [5]	(10 mg/m^3)	CAAQS and NAAQS Primary
1-Hour Average	35 ppm	(40 mg/m^3)	NAAQS Primary
1-Hour Average	20 ppm	(23 mg/m^3)	CAAQS
Nitrogen Dioxide (NO_2)			
Annual Arithmetic Mean	0.053 ppm	(100 µg/m^3)	NAAQS Primary and Secondary
Annual Arithmetic Mean	0.030 ppm	(56 µg/m^3)	CAAQS
1-Hour Average	0.100 ppm	(188 µg/m^3)	NAAQS Primary
1-Hour Average	0.180 ppm	(339 µg/m^3)	CAAQS
Ozone (O_3)			
8-Hour Average[2,3]	0.070 ppm	(137 µg/m^3)	CAAQS and NAAQS Primary and Secondary
1-Hour Average	0.090 ppm	(177 µg/m^3)	CAAQS
Lead (Pb) [6]			
3-Month Average[4]	-	0.15 µg/m^3	NAAQS Primary and Secondary
30-Day Average	-	1.5 µg/m^3	CAAQS

Pollutant	Standard Value [1, 2]		Standard Type [3, 4]
Particulate ≤10 Micrometers (PM_{10})			
24-Hour Average[5]	-	150 µg/m^3	NAAQS Primary and Secondary
24-Hour Average[5]	-	50 µg/m^3	CAAQS
Annual Arithmetic Mean	-	20 µg/m^3	CAAQS
Particulate ≤2.5 Micrometers ($PM_{2.5}$)			
Annual Arithmetic Mean[5]	-	12 µg/m^3	CAAQS and NAAQS Primary
Annual Arithmetic Mean[5]	-	15 µg/m^3	NAAQS Secondary
24-Hour Average[5]	-	35 µg/m^3	NAAQS Primary and Secondary
Sulfur Dioxide (SO_2)			
1-Hour Average[6]	0.075 ppm	(196 µg/m^3)	NAAQS Primary
3-Hour Average[6]	0.250 ppm	(655 µg/m^3)	CAAQS
3-Hour Average[6]	0.500 ppm	(1,300 µg/m^3)	NAAQS Secondary
24-Hour Average	0.040 ppm	(105 µg/m^3)	CAAQS
Visibility-Reducing Particles			
8-Hour Average	Extinction of 0.23 per kilometer	-	CAAQS
Sulfates			
24-Hour Average	-	25 µg/m^3	CAAQS
Hydrogen Sulfide			
1-Hour Average	0.030 ppm		CAAQS
Vinyl Chloride [6]			
24-Hour Average	0.1 ppm		CAAQS

Source: USEPA 2018, 2020; California Air Resources Board 2024

ppm – parts per million; **mg/m^3** – milligrams per cubic meter; **CAAQS** – California Ambient Air Quality Standards; **NAAQS** – National Ambient Air Quality Standards; **µg/m^3** – micrograms per cubic meter; **CO** – carbon monoxide; **NO_2** – nitrogen dioxide; **O_3** – *ozone; **Pb** – lead; **PM_{10}** – particulate matter less than 10 micrometers in diameter; **$PM_{2.5}$** – particulate matter less than 2.5 micrometers in diameter; **SO_2** – sulfur dioxide

Notes:

1 NAAQS (other than O_3, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The O_3 standard is attained when the fourth-highest 8-hour concentration in a year, averaged over three years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when 99 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard.

2 CAAQS for O_3, CO (except Lake Tahoe), SO_2 (1- and 24-hour), NO_2, PM_{10}, and visibility reducing particles, are values that are not to be exceeded. All others are not to be equaled or exceeded.

3 National Primary Standards are levels of air quality necessary, with an adequate margin of safety, to protect the public health.

4 National Secondary Standards are levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

5 Concentrations are first expressed in the units in which the rule was promulgated. Concentration in ppm in this table refers to ppm by volume or micromoles of pollutant per mole of gas.

6 The California Air Resources Board has identified lead and vinyl chloride as “toxic air contaminants” with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

Under the CAA, the country is classified into attainment, nonattainment, and maintenance areas for NAAQS. Any area not meeting the NAAQS is designated as “nonattainment” for the specific pollutant or pollutants, whereas areas meeting the NAAQS are designated as “attainment.” Maintenance areas are those areas previously designated as “nonattainment” and subsequently redesignated to “attainment,” subject to development of a maintenance plan.

Under the USEPA New Source Review (NSR) program, stationary sources of air pollution are required to have permits before construction of the source begins. NSR prevention of significant deterioration approval would be required if the proposed project was either a new source, had the potential to emit 250 tons per year or more of an attainment pollutant, or was an existing major source of emissions, making it a major modification in an attainment area, which would result in a net emissions increase above specified levels. Nonattainment NSR approval would be required if the proposed project was a new stationary source or a major source, making it a major modification in a nonattainment area with potential to emit nonattainment pollutants in excess of the NSR thresholds.

The CAA General Conformity Rule (40 CFR 6, 51, and 93) requires federal agencies to make written conformity determinations for federal actions in or affecting nonattainment or maintenance areas. If the emissions of a criteria pollutant (or its precursors) do not exceed the *de minimis* level, then the federal action has minimal air quality impacts. Therefore, the action is determined to conform for the pollutant under study; and no further analysis would be necessary.

The California Air Resources Board (CARB) oversees California air quality regulations. The California Ambient Air Quality Standards (CAAQS) are generally more stringent than the NAAQS. The CAAQS includes all NAAQS pollutants as well as sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particulates (Table 3-1).

The California CAA requires each local air district in which ambient concentrations violate the CAAQS to prepare an air quality management plan to achieve compliance with the CAAQS as a part of the State Implementation Plan. CARB is responsible for the State Implementation Plan for nonattainment pollutants but relies on each local air district to adopt mandatory statewide programs and provide additional strategies tailored for sources under their jurisdiction. Fort Irwin and the proposed Translocation and Control Sites are in San Bernardino County in the Mojave Desert Air Basin. The local air district with jurisdiction over the Mojave Desert Air Basin is the Mojave Desert Air Quality Management District (MDAQMD). The proposed vehicle use for the translocation of desert tortoises is subject to the requirements of MDAQMD rules, which include Rules 403 and 403.2 for fugitive dust control requirements.

Executive Order (EO) 13990, *Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis,* and EO 14008, *Tackling the Climate Crisis at Home and Abroad*, require federal agencies to evaluate climate change impacts from their proposals. *National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions and Climate Change* (88 Federal Register 1196) provides guidance on the inclusion of greenhouse gas (GHG) emissions and climate change analyses and their social costs as part of the environmental baseline for NEPA. GHGs are compounds that may contribute to accelerated climate change by altering the thermodynamic properties of the earth’s atmosphere. GHGs consist of carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, and perfluorocarbons (FedCenter 2024).

3.5.1 Affected Environment

San Bernardino County is in NAAQS nonattainment for PM_{10}. The Mojave Desert is subject to wind erosion from unvegetated and disturbed soils, typically leading to high particulate matter concentrations. The *Final Mojave Desert Planning Area Federal Particulate Matter (PM_{10}) Attainment Plan* (MDAQMD 1995) describes strategies focusing on unpaved road travel, construction, and local disturbed area in the populated areas to control particulate matter sources.

The Western Mojave Desert Area, which includes the WTA and the proposed Translocation and Control Sites, is in NAAQS nonattainment for ozone. The *MDAQMD Federal 70 ppb Ozone Attainment Plan (Western Mojave Desert Nonattainment Area)* (MDAQMD 2023) (1) provides a framework for attaining the 70 parts per billion (ppb) 8-hour ozone NAAQS by August 2033, (2) presents the progress the MDAQMD will make towards meeting all required ozone planning milestones, and (3) discusses the 2015 70 ppb 8-hour ozone NAAQS, preparatory to an expected nonattainment designation for the new NAAQS (MDAQMD 2023).

The WTA and proposed Translocation and Control Sites are in attainment for all other NAAQS criteria pollutants. Because the WTA and proposed Translocation and Control Sites are in a federal nonattainment area for PM_{10} and ozone, they are subject to the general conformity requirements.

3.5.2 Environmental Consequences

The threshold level of significance for air quality is defined as a violation of an ambient air quality standard or regulatory threshold. Potential air quality impacts associated with the Proposed Action were evaluated based on whether potential emissions would be localized or whether a reasonable potential exists for a violation of an ambient air quality standard or regulatory threshold.

3.5.2.1 Proposed Action

The Department of the Air Force's Air Conformity Applicability Model (ACAM) version 5.0.23a was utilized to estimate total direct and indirect mobile source emissions. ACAM was used to model emissions account for the aircraft operations associated with the proposed translocation of desert tortoises in conjunction with vehicle travel on paved and on unpaved roads. Table 3-4 summarizes the ACAM estimated total air emissions from the Proposed Action from sources associated with the Proposed Action. A copy of the calculations used to develop these estimates is in Appendix D. Implementation of the Proposed Action would result in minor, direct, short-term, adverse impacts on overall air quality from vehicle operations on paved and unpaved roads and up to 10 helicopter trips annually for the fall 2024 and spring 2025 tortoise clearances between Fort Irwin and the Translocation Sites. The operation of vehicles and helicopter flights would increase exhaust emissions and generate dust in the air during travel.

Table 3-4. Summary of Proposed Action Estimated Air Emissions

Project Activities	Estimated Annual Emissions (tons per year)							
	SO2	NOx	CO	PM_{10}	$PM_{2.5}$	VOCs	Pb	NH3
2024 Estimated Emissions								
Operational Sources	0.001	0.440	0.500	0.025	0.020	0.057	0.000	0.002
2025 Estimated Emissions								
Operational Sources	0.001	0.735	0.857	0.042	0.034	0.098	0.000	0.003
Insignificant Indicator Threshold	250	250	250	250	250	250	25	250
General Conformity *de minimis* Thresholds	N/A	N/A	N/A	100	N/A	N/A	N/A	N/A

SO_2 – sulfur dioxide; **NOx** – nitrogen oxide; **CO** – carbon monoxide; **PM_{10}** – particulate matter less than or equal to 10 micrometers in diameter; **$PM_{2.5}$** – particulate matter less than or equal to 2.5 micrometers in diameter; **VOC** – volatile organic compound; **Pb** – lead; **NH_3** – ammonia; **N/A** – not applicable

The estimated emissions from vehicular travel and aircraft operations during a single year from fall 2024 through spring 2025 would be substantially greater than the estimated emissions from vehicular travel in any one year of desert tortoise monitoring following translocation activities because monitoring activities would involve far fewer vehicle trips and no helicopter travel. Therefore, the estimated air emissions from any one year of monitoring during the 25 years of desert tortoise monitoring would be less than the estimated air emissions presented in Table 3-4.

ACAM (version 5.0.23a) was used to evaluate GHG emissions from the proposed desert tortoise translocation activities. For the analysis, the prevention of significant deterioration (PSD) threshold for GHG of 68,039 metric tons per year of carbon dioxide equivalents (CO_2e) was used as an indicator or "threshold of insignificance" for air quality impacts from translocation activities. The GHG PSD threshold identifies actions that are insignificant (i.e., *de minimis*). Actions with a net change in GHG (CO_2e) emissions below the insignificance threshold are *de minimus* on a global scale and no further analysis is warranted. The estimated C02e for proposed desert tortoise translocation activities is 81 metric tons per year in 2024 and 141 metric tons per year in 2025 (Appendix D). This is well below the PSD threshold of insignificance for GHG. Therefore, the GHG emissions from the proposed desert tortoise translocation activities would have no significant impact on local air quality. Globally, individual actions with GHG emissions each make a relatively small addition to global atmospheric GHG concentrations, and the implementation of the Proposed Action would contribute to the global atmospheric GHGs.

Implementation of the Proposed Action would result in no impacts on overall air quality from stationary source emissions as no new facilities would be constructed that would be stationary sources of air emissions.

Implementation of the Proposed Action would result in no impacts on overall long-term air quality from mobile source emissions associated with the translocation of desert tortoises from the WTA. When translocation operations are completed, emissions from helicopter trips would cease. Vehicle use would continue during all desert tortoise monitoring activities in the Translocation and Control Sites, but these annual air quality emissions would be substantially less than those shown in Table 3-4, as the number of vehicle operations would be greatly reduced following translocation. and no aircraft operations would be associated with long-term monitoring activities.

3.5.2.2 No Action Alternative

No desert tortoise translocation activities would occur in the WTA. Vehicle operations for clearance surveys, translocation operations, and monitoring of tortoises in the Translocation and Control Sites along with helicopter trips during translocation activities would not occur. Therefore, there would not be any additional emissions from vehicles and helicopters and no air quality impacts under the No Action Alternative.

3.6 Land Use

The term “land use” refers to real property classifications that indicate either natural conditions or the types of human activities occurring on a defined parcel of land. In many cases, land use descriptions are codified in local zoning laws.

Land use planning ensures orderly growth and compatibility between nearby property parcels or land areas. Land use planning for the Army is guided by Army Regulation 210-20, *Real Property Master Planning for Army Installations*. This document sets forth the responsibilities and requirements for the real property master planning process. The NTC and Fort Irwin’s Integrated Natural Resources Management Plan (INRMP; NTC and Fort Irwin 2022a) and Integrated Cultural Resources Management Plan (NTC and Fort Irwin 2022b) provide land use guidance relative to managing Fort Irwin’s natural resources and cultural resources, respectively.

For BLM-managed lands, the West Mojave Plan (BLM 2004) provides management strategies for the desert tortoise, Mohave ground squirrel (*Xerospermophilus mohavensis*) and over 100 other sensitive plants and animals to conserve those species throughout the western Mojave Desert, while at the same time establishing a streamlined program for compliance with the regulatory requirements of federal ESA and California Endangered Species Act (CESA). In addition, land use guidelines established by the U.S. Department of Housing and Urban Development and based on findings of the Federal Interagency Committee on Noise are used to recommend acceptable levels of noise exposure for land use.

Recreational resources are often considered as part of land use. Recreational resources include federal, state, and local parks, trails, scenic areas, beaches, indoor and outdoor community recreation centers, and playgrounds. Recreation areas are primarily limited to running and bicycle trails, ballfields, swimming pools, bowling alleys, theatres, playgrounds for children, and gymnasium facilities.

3.6.1 Affected Environment

3.6.1.1 Western Training Area

Fort Irwin is reserved for military usage with a cantonment (urban) area, airfields, and range and training areas. The cantonment area is the urbanized core of the installation, comprising military and family housing units, community facilities, administrative buildings, a hospital, schools, and outdoor recreational facilities, along with other land uses (Army 2023).

The WTA supports the military mission and contains inactive mineral mines that are continuing to be identified. Land use controls have been implemented for the abandoned mines to prevent access to these hazards. The Army is in the final stages of acquiring private holdings in the WTA. The conversion of the land to military training is addressed in the 2023 LEIS (Army 2023).

There are no recreational opportunities available on the WTA as it is closed to the public and used specifically for military mission activities.

3.6.1.2 Translocation and Control Sites

The recipient sites are on Army-owned lands south of the WTA. The recipient sites within the Translocation Sites are primarily surrounded by public lands and are comprised of BLM-managed lands and state-owned lands. The Control Sites are located on BLM-managed lands. BLM-managed lands are subject to the land management objectives of the Desert Renewable Energy Conservation Plan (BLM 2016). The BLM land use planning area designation from the Land Use Plan Amendment for the majority of the Translocation and Control Sites is in seven Areas of Critical Environmental Concern (ACECs) and one Special Recreation Management Area (SRMAs) (Table 3-5; Figures 3-1 through 3-5).

Table 3-5. Land Use Categories for the Translocation and Control Sites

Land Use Plan Amendment Category	TS1 (Acres)	TS2 (Acres)	TS3 (Acres)	CS1 (Acres)	CS2 (Acres)
Black Mountain ACEC	17,400	0	0	7,886	0
Calico Early Man Site ACEC	0	0	0	0	601
Coolgardie Mesa ACEC	2,471	354		10,418	0
Parish's Phacelia ACEC	0	0	898	0	0
Rainbow Basin/Owl Cyn ACEC	0	0	0	4,100	0
Superior-Cronese ACEC	48,900	28,215	66,596	69,540	19,241
West Paradise ACEC	0	685	0	0	0
Superior/Rainbow SRMA	42,233	0	0	45,301	0
General Public Lands	0.2	0	0.03	0	15,094

TS1 – Translocation Site 1; **TS2** – Translocation Site 2; **TS3** – Translocation Site 3; **CS1** – Control Site 1; **CS2** – Control Site 2; **ACEC** – Area of Critical Environmental Concern; **Cyn** – Canyon; **SRMA** – Special Recreation Management Area

3.6.2 Environmental Consequences

Potential impacts on land use are based on the level of land use sensitivity in areas potentially affected by the Proposed Action and alternatives as well as compatibility of those actions with existing conditions. In general, a land use impact would be adverse if it met one of the following criteria:

- Inconsistency or noncompliance with existing land use plans or policies
- Precludes the viability of existing land use
- Precludes continued use or occupation of an area
- Incompatibility with adjacent land use to the extent that public health or safety is threatened
- Conflict with planning criteria established to ensure the safety and protection of human life and property

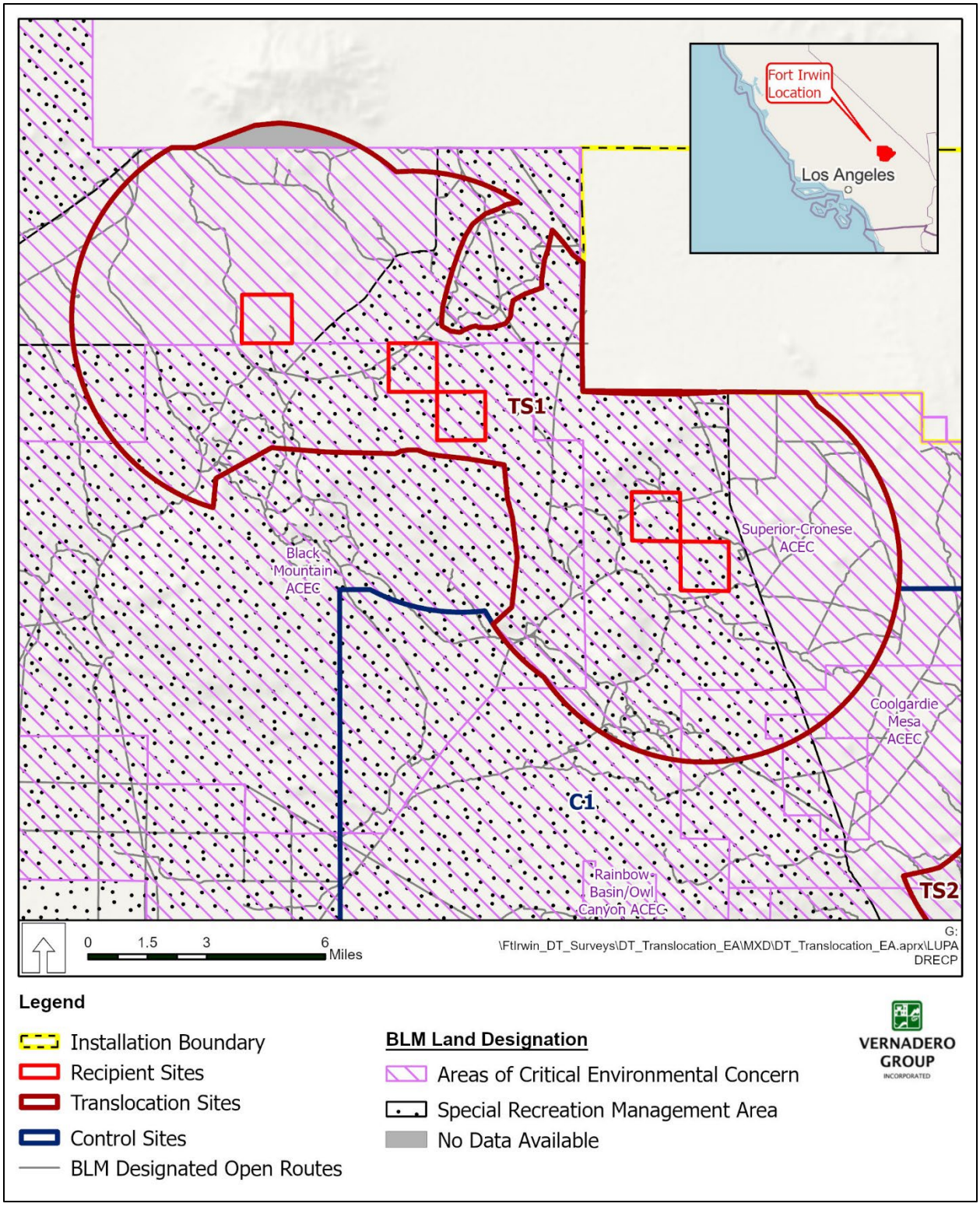

Figure 3-1. Land Use Designations for Translocation Site 1

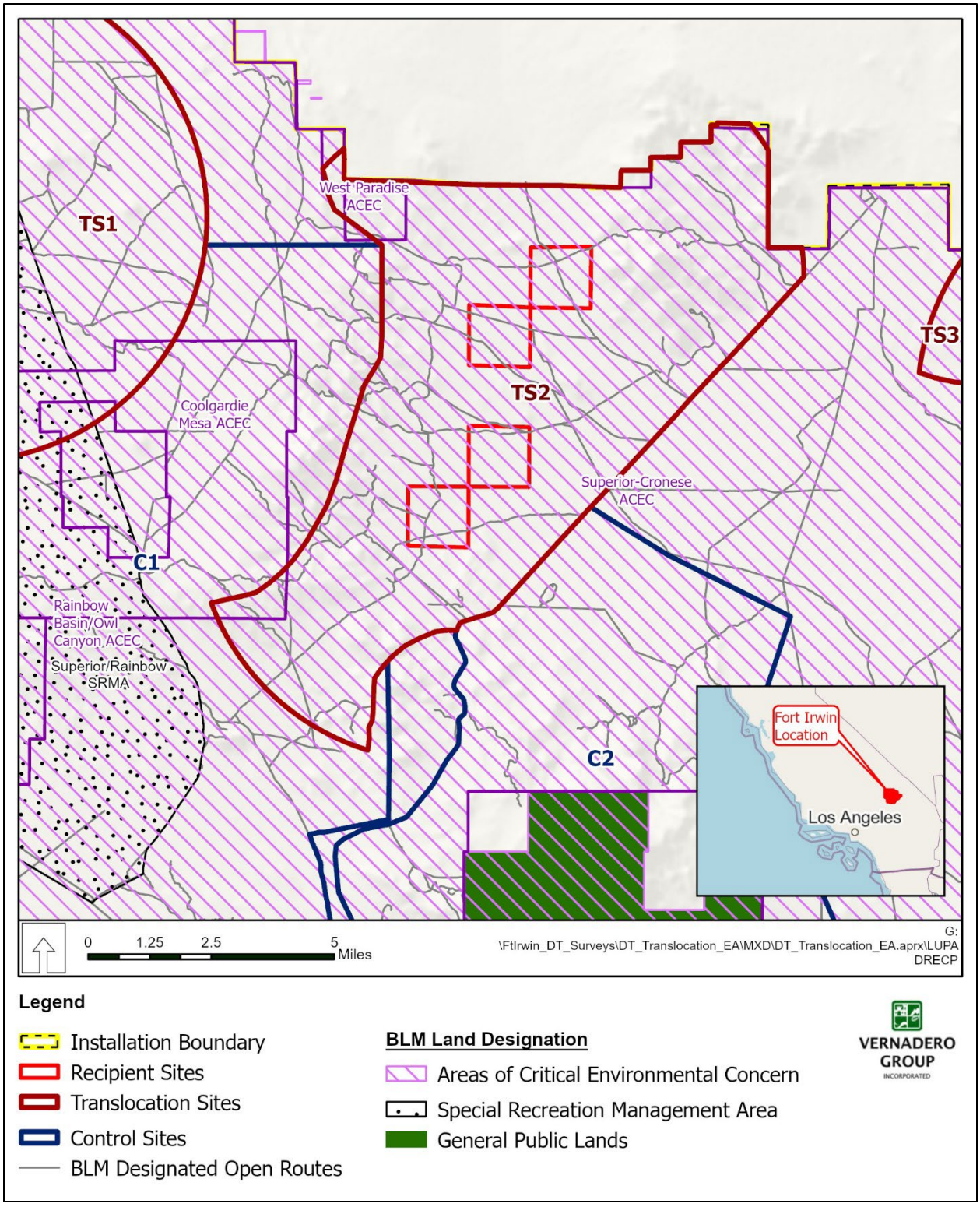

Figure 3-2. Land Use Designations for Translocation Site 2

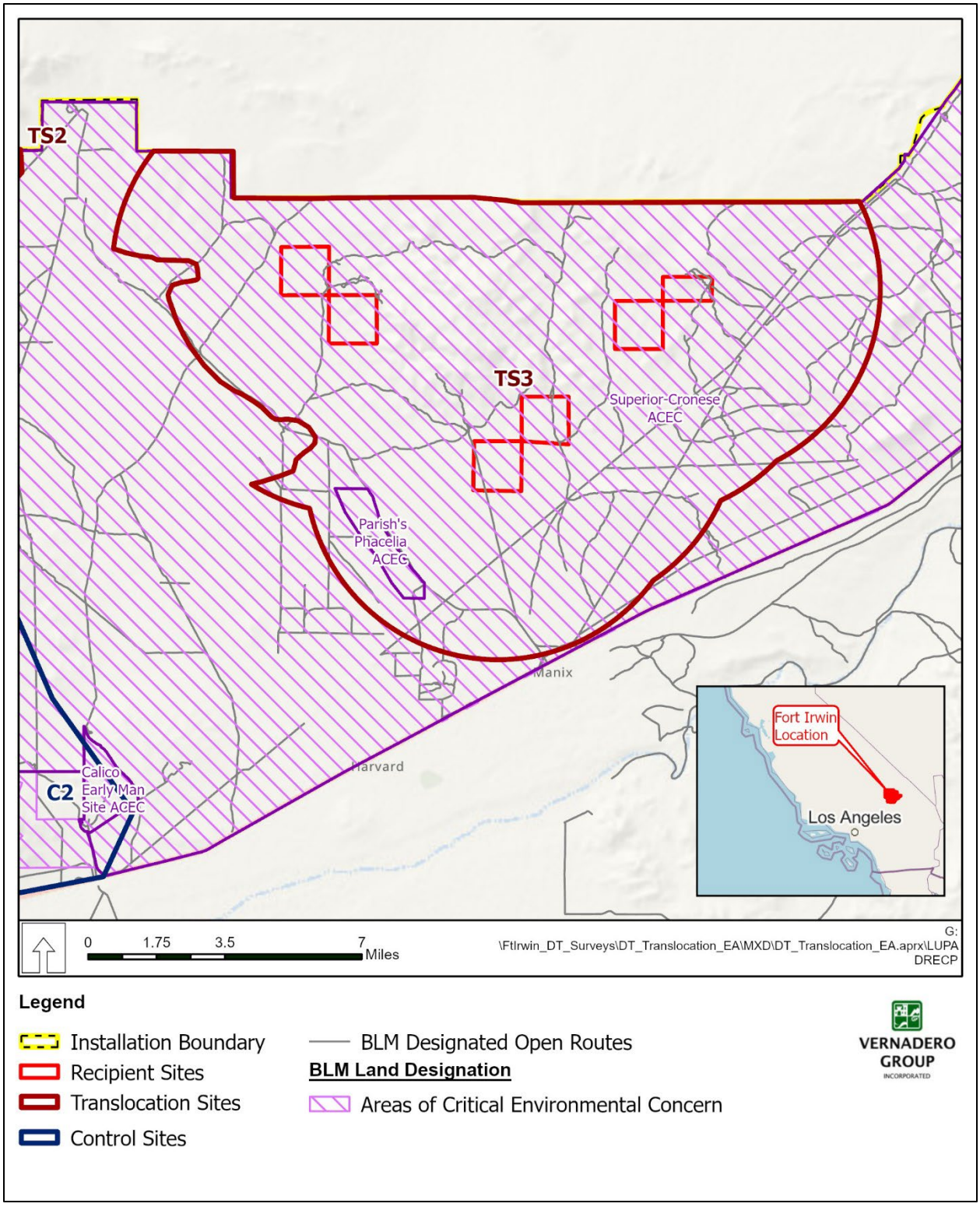

Figure 3-3. Land Use Designations for Translocation Site 3

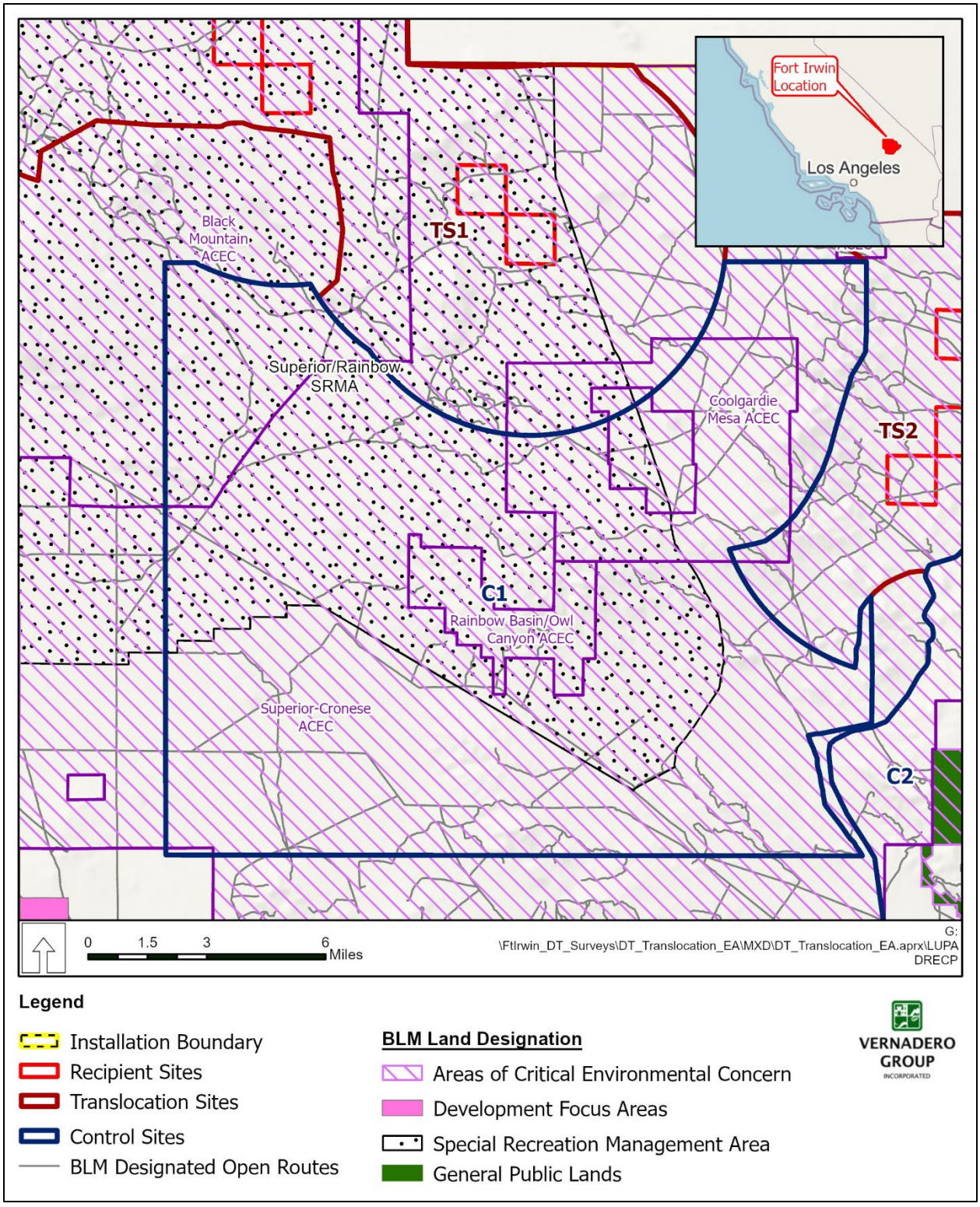

Figure 3-4. Land Use Designations for Control Site 1

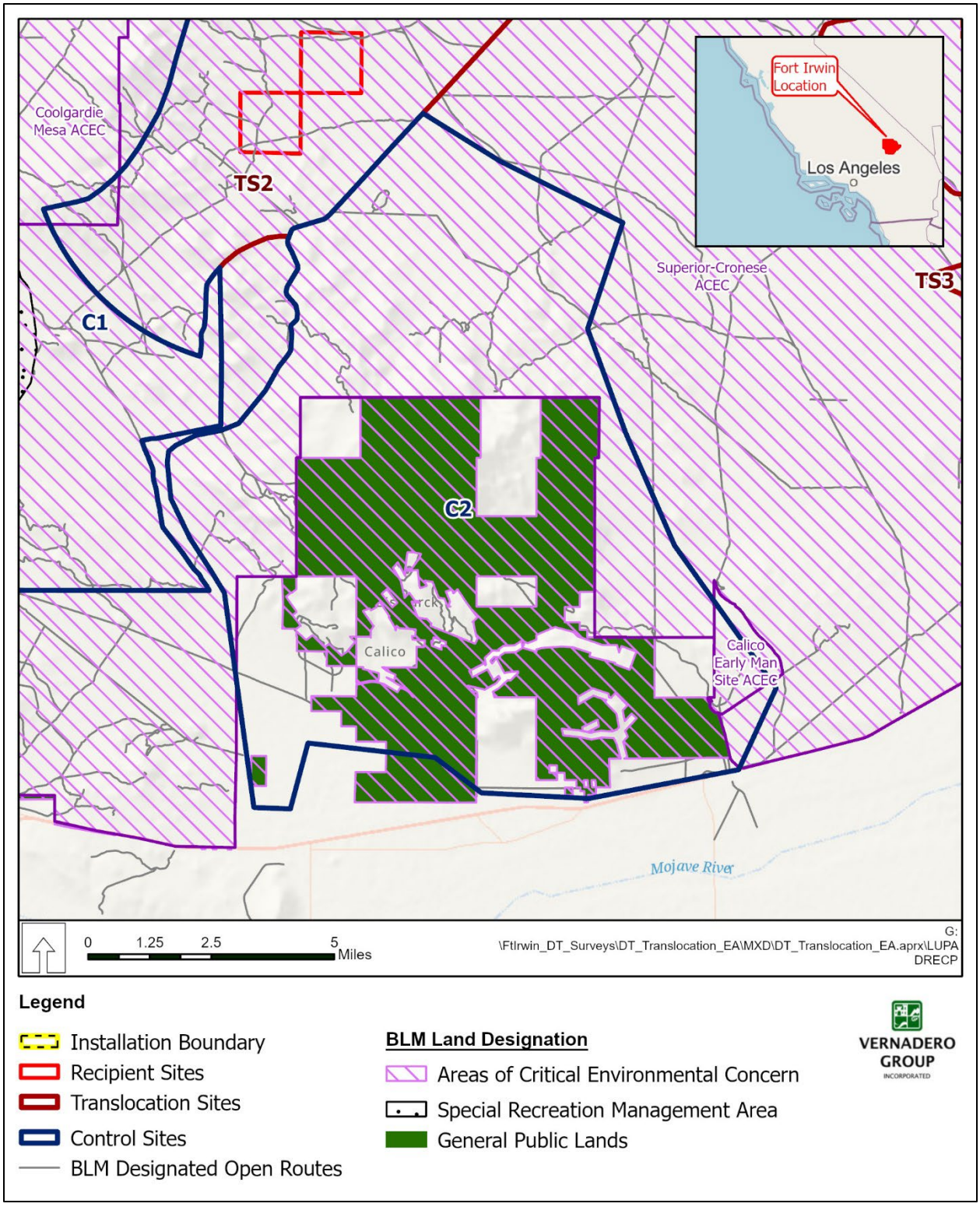

Figure 3-5. Land Use Designations for Control Site 2

3.6.2.1 Proposed Action

There would be negligible long-term impacts on land use from the Proposed Action. Under the Proposed Action, land use plans and policies in the Translocation and Control Sites would remain unchanged, and all activities would be in compliance with the designated land uses and compatible with the *Desert Renewable Energy Conservation Plan* (BLM 2016). All desert tortoise translocation and subsequent monitoring activities would limit vehicular travel to BLM Designated Open Routes as described in the *West Mojave Route Management Plan* (BLM 2019) There would be no cross-country vehicular travel allowed and no use of "existing" routes that have not been specifically designated by BLM as "open." The Army-owned recipient sites within Translocation Sites 1 through 3 are all designated by the Army to support desert tortoise translocation. The desert tortoise translocation activities to the recipient sites would be compatible with the ACECs, which have the objectives of maintaining or improving habitat for listed species, protecting sensitive resources, and to protect sensitive habitat from impacts associated with vehicle traffic.

Further, most of the Translocation and Control Sites are in the Superior-Cronese ACEC, which is specifically for maintain habitat for the desert tortoise, and Superior/Rainbow SRMA, which is identified for specific, structured recreation opportunities. The SRMA is a limited use area and vehicle use is limited to county roads and BLM open routes. Although no desert tortoise translocations are proposed specifically on BLM land, desert tortoises would likely move, and some would likely leave the recipient sites and move onto other lands. The Army would continue to track and monitor these tortoises in the long term, and the monitoring activities could occur in areas designated as General Public Lands. The long-term desert tortoise monitoring outside of the recipient sites and in the Translocation and Control Sites would potentially lead to these resource management activities occurring on lands designated for special recreation purposes or for general land use but would not likely occur on private lands with residential and commercial land use designations.

The monitoring activities would be compatible with the land policies associated with the BLM land use designations.

3.6.2.2 No Action Alternative

There would be no desert tortoise translocation under the No Action Alternative. Therefore, there would be no impacts on land use in the Translocation and Control Sites. There would be no vehicles using BLM-designated "open" roads during desert tortoise translocation and monitoring activities. However, the No Action Alternative would have a moderate long-term adverse impact on land use in the WTA, as the requirements of the military mission for use of the WTA for military training activities as described in the 2023 LEIS would not occur without desert tortoise translocation.

3.7 Soils

Soils are the unconsolidated materials overlying bedrock or other parent material. Soils typically are described in terms of their complex type, slope, and physical characteristics. Differences among soil types in terms of their structure, elasticity, strength, shrink-swell potential, and erosion potential affect their abilities to support certain applications or uses. In appropriate cases, soil properties must be examined for their compatibility with particular construction activities or types of land use.

3.7.1 Affected Environment

Soils in the WTA include Trigger-Rock outcrop-Calvista, Cajon-Arizo, Nickel-Bitter-Arizo, St. Thomas-Rock outcrop, Upspring-Sparkhule-Rock outcrop, and Playas (Table 3-6; Figure 3-6). Except for the Playas soil type, these soils all have moderate to low erodibility; Playas soils have high erodibility.

Soils in the Translocation Sites include Trigger-Rock outcrop-Calvista, Upspring-Sparkhule-Rock outcrop, Nickel-Bitter-Arizo, Cajon-Bitterwater-Bitter-Badland, Wasco-Rosamond-Cajon, Norob-Halloran-Cajon-Bryman, and Upspring-Sparkhule-Rock outcrop (Table 3-6; Figure 3-6). All these soil types have moderate to low erodibility.

Soils in the Control Sites include Wasco-Rosamond-Cajon, Cajon-Bitterwater-Bitter-Badland, Trigger-Rock outcrop-Calvista, Tecopa-Rock outcrop-Lithic Torriothents, Upspring-Sprkhule-Rock outcrop, Norob-Halloran-Cajon-Bryman, and St. Thomas Rock outcrop (Table 3-6; Figure 3-6). All these soils have moderate to low erodibility.

Table 3-6. Soil Types in the Western Training Area and the Translocation and Control Sites

Soil Type	WTA (Acres)	TS1 (Acres)	TS2 (Acres)	TS3 (Acres)	CS1 (Acres)	CS2 (Acres)
Cajon-Arizo (s1143)	22,688	27,390	15,059	16,870	2,079	5,335
Cajon-Bitterwater-Bitter-Badland (s1128)	0	3,574	0	19,518	8,503	6,706
Dune Land-Cajon (s1135)	0	0	0	457		
Nickel-Bitter-Arizo (s1142)	0	0	0	0	6,241	1,194
Norob-Halloran-Cajon-Bryman (s1039)	0	0	0	4,789	0	0
Playas (s1038)	1,869	0	0	0	0	34
Rosamond Variant-Rosamond-Playas-Gila-Cajon Variant-Cajon (s768)	12,416	1,882	0	0	0	0
St. Thomas-Rock Outcrop (s1125)	6,799	0	0	0	0	0
Tecopa-Rock Outcrop-Lithic Torriorthents (s1126)	0	0	0	0	0	5,291
Trigger-Rock Outcrop-Calvista (s1134)	25,485	22,682	13,390	8,937	24,430	3,797
Upspring-Sparkhule-Rock Outcrop (s1127)	1,297	11,225	950	0	2,428	13,813
Wasco-Rosamond-Cajon (s1024)	0	2,839	0	16,997	0	8,902

WTA – Western Training Area; **TS1** – Translocation Site 1; **TS2** – Translocation Site 2; **TS3** – Translocation Site 3; **CS1** – Control Site 1; **CS2** – Control Site 2

3.7.2 Environmental Consequences

Factors considered in determining whether implementing an alternative may have a significant adverse impact on soils include the extent or degree to which implementation of an alternative would do the following:

- Result in substantial soil erosion or the loss of topsoil, or
- Expose people or structures to potential substantial adverse effects, involving construction of facilities on inappropriate soil types.

The Proposed Action includes only limited potential ground-disturbing activities on the WTA and only associated with removal of desert tortoises from burrows if all other means of removing tortoises from burrows for translocation fail. Vehicles and helicopters would utilize unpaved roads for transport of desert tortoises and access during long-term monitoring; no OHV travel would occur under the Proposed Action.

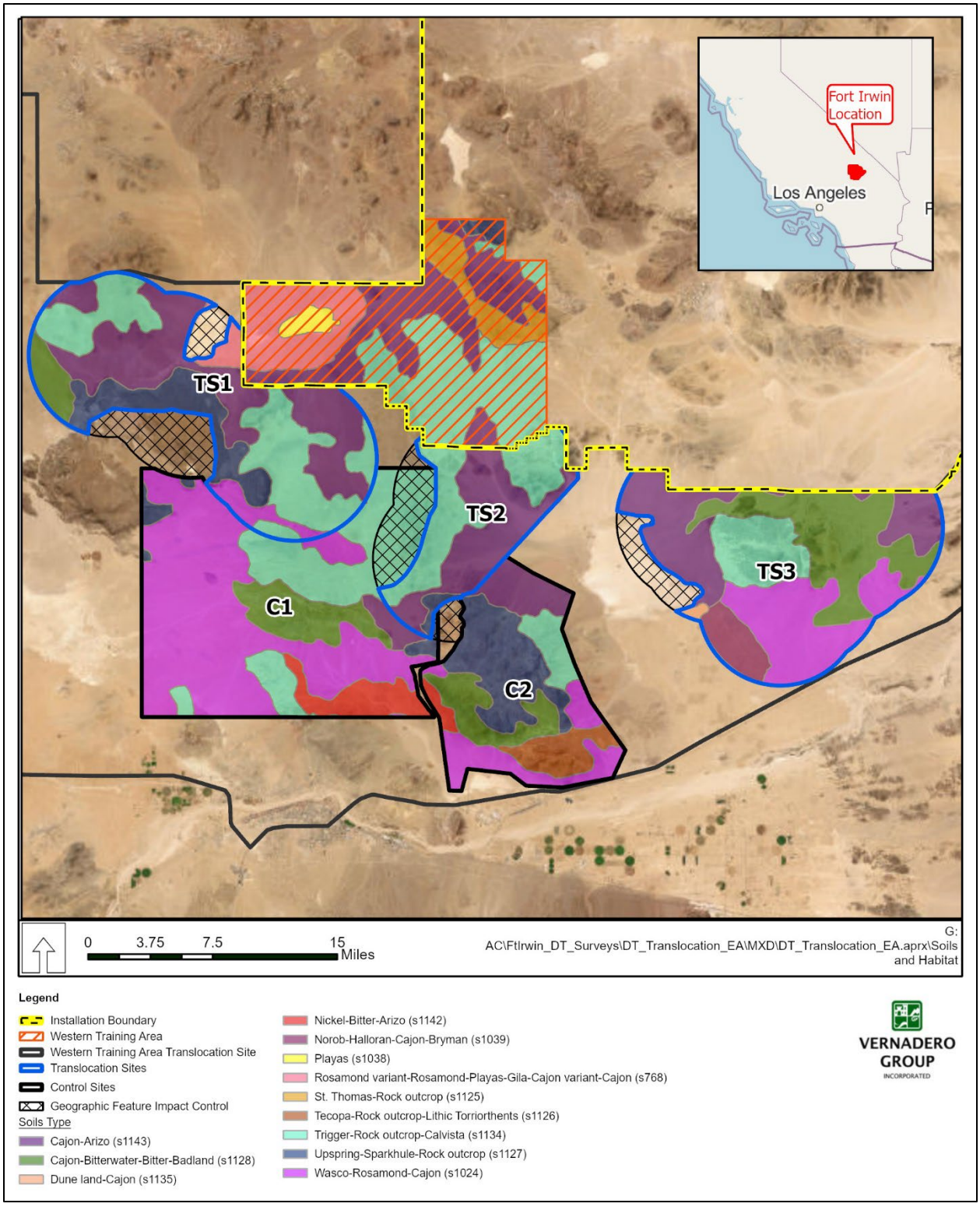

Figure 3-6. Soils at the Western Training Area, Translocation Sites, and Control Sites

3.7.2.1 Proposed Action

There would be minor long-term adverse impacts on soils from the Proposed Action. Soils could be disturbed at burrows where desert tortoises are detected during clearance surveys but cannot be removed from burrows using noninvasive techniques such as tapping out of tortoises. In these rare instances, burrows would be excavated to remove a desert tortoise for translocation. It is anticipated that approximately 10 desert tortoises in the WTA would have burrows that require excavation. Approximately 8 cubic feet of soil would be disturbed at each of these 10 burrows. All soils would be replaced and tamped down immediately following removal of desert tortoises. Therefore, the Proposed Action could directly impact approximately 80 cubic feet of soils in the WTA.

Vehicle travel and helicopter takeoffs and landings on unpaved roads would continue to disturb surface soils within the footprint of existing roadways. Although no new soil surfaces would be disturbed, the use of these unpaved roads during desert tortoise translocation and long-term monitoring would increase the potential for soil erosion and sediment transport into ephemeral streams. Increased use of unpaved roads could lead to greater road maintenance requirements, such as grading to maintain a passable road surface. This too would increase the potential for surface soil disturbance and sediment transport. Because these activities are limited to existing disturbed soils on unpaved road surfaces, and no undisturbed surface soils would be altered by vehicle or helicopter activity the impacts on soils would be minor.

3.7.2.2 No Action Alternative

There would be no desert tortoise translocation or long-term monitoring of translocated desert tortoises. There would be no soil-disturbing activities on the WTA associated with removing up to 10 desert tortoises from burrows by excavating the burrow. Therefore, there would be no impacts on soils.

3.8 Water Resources

Water resources include surface waters, groundwater, and floodplains. Surface waters include all lakes, ponds, rivers, streams, impoundments, and wetlands within a defined area or watershed. Wetlands are transitional areas between terrestrial and aquatic systems with land covered by shallow surface water. Groundwater resources include water contained in soils, permeable and porous rock, or unconsolidated substrate. Floodplains are areas that are flooded periodically by the lateral overflow of surface water bodies. There would be no activities during the desert tortoise translocation that would impact groundwater resources or impact or be impacted by floodplains. No disturbance of any surface features would occur that could impact ground water basins. No refueling of vehicles or equipment would occur in the WTA or in the Translocation and Control Sites. No surface modifications are proposed that could alter or impact floodplains. Translocation activities would not occur during times when flooding would be a concern. Therefore, groundwater resources and floodplains are not further discussed.

Ephemeral streams and dry lake beds are not regulated under Sections 401 and 404 of the Clean Water Act, and these surface-water features in the WTA and Translocation and Control Sites are not jurisdictional waters of the U.S. Waters of the State are not regulated on federal lands, such as Army-owned lands, including the WTA and recipient parcels in the Translocation Sites.

The Clean Water Act provides the authority to establish water quality standards, control discharges into surface and subsurface waters (including groundwater), develop waste treatment management plans and practices, and issue permits for discharges. A National Pollutant Discharge Elimination System (NPDES) permit under Section 402 of the Clean Water Act is required for discharges into surface waters. The USEPA oversees the issuance of NPDES permits at federal facilities as well as water quality regulations (Section 401 of the Clean Water Act) for both surface and groundwater within states.

3.8.1 Affected Environment

The WTA and Translocation and Control Sites are located in the Mojave Desert, where generally, surface water resources are rare and nearly all surface water flows in streams and channels are ephemeral or intermittent. There are no surface water lakes with standing water for substantial periods of time in the WTA or Translocation and Control Sites. Substantial water flow and accumulation occurs during large, high-intensity storm events, which typically occur in the summer months in the form of monsoon thunderstorms. Such events can cause 3 to 4 inches of rain within 24 hours and often within 6 hours (Army 2023).

Numerous watersheds are present within the WTA and Translocation and Control Sites (Figure 3-7). The WTA is primarily within the Superior Lake, Goldstone Lake, and Coyote Lake watersheds (Table 3-7). The Translocation Sites are within 10 separate watersheds, including the Baxter Wash-Mojave River, Black Canyon, Coyote Lake, Cronise Valley, Harper Lake, Inscription Canyon, Langford Well Lake, Manix Wash-Mojave River, Superior Lake, and Wall Street Canyon watersheds. The Control Sites are within eight separate watersheds, including the Black Canyon, Coyote Lake, Daggett Wash-Mojave River, Harper Lake, Manix Wash-Mojave River, Mount General, Superior Lake, and Wall Street Canyon watersheds.

The Superior Lake and Inferior Lake dry lakebeds are within the boundaries of the WTA. Other dry lakebeds are located in Translocation Sites 1 and 3 and in Control Site 1.

Ephemeral streams and dry lake beds are typically not regulated under Sections 401 and 404 of the Clean Water Act and these surface water features in the WTA and Translocation and Control Sites would not like be jurisdictional waters of the U.S. These surface water features could potentially be regulated by the State of California; however, waters of the state are not necessarily regulated on federal lands, such as Army-owned lands, including the WTA and recipient parcels in the Translocation Sites.

The nearest water listed as an impaired water body in accordance with Section 303(d) of the Clean Water Act is the Mojave River. The Baxter Wash, Daggett Wash, and Manix Wash watersheds have surface connectivity to the Mojave River.

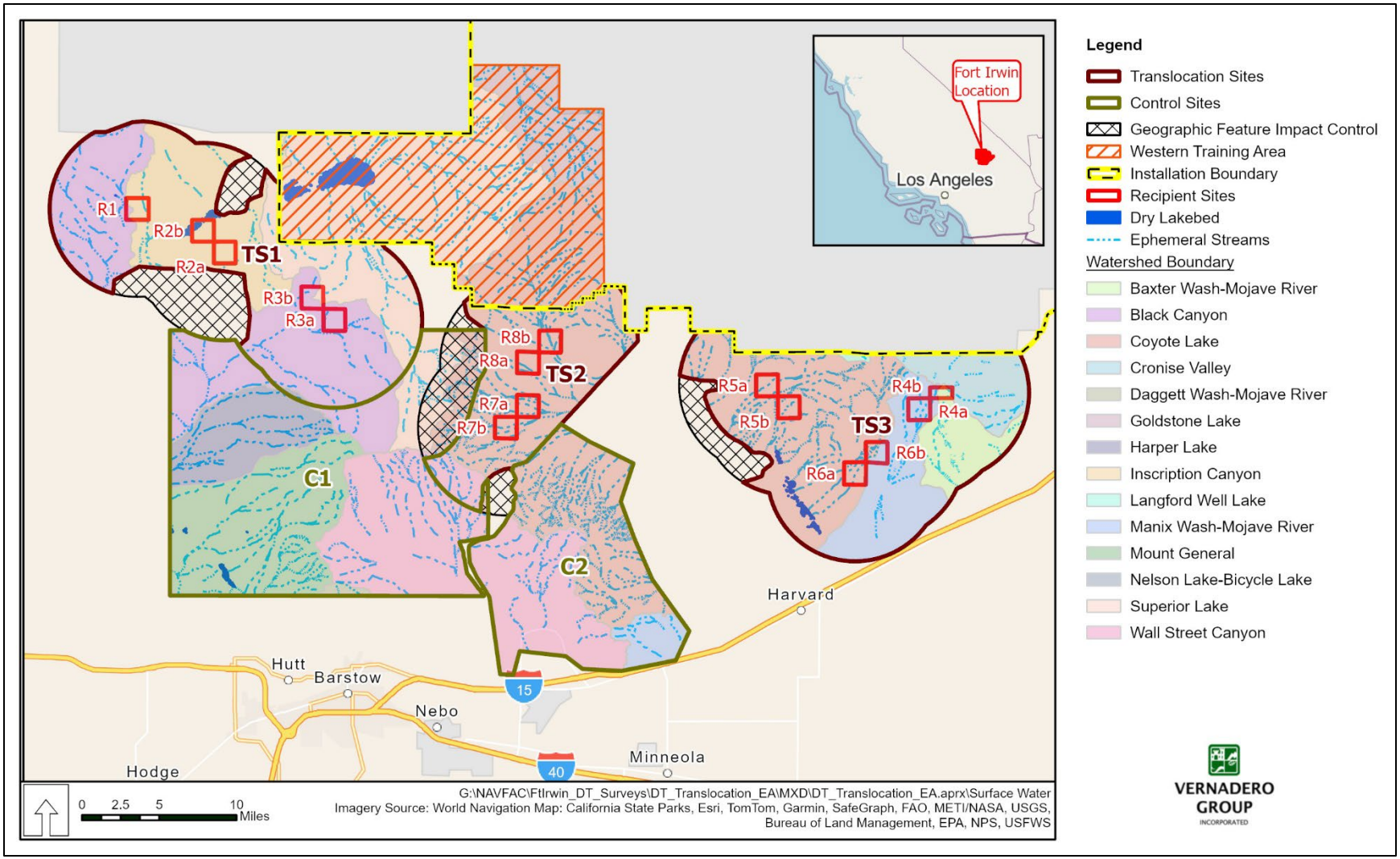

Figure 3-7. Surface Water Features and Watersheds in the Western Training Area, Translocation Sites, and Control Sites

Table 3-7. Watersheds of the Western Training Area and the Translocation and Control Sites

Watershed	WTA	TS1	TS2	TS3	CS1	CS2
Baxter Wash-Mojave River				X		
Black Canyon		X			X	
Coyote Lake	X		X	X	X	X
Cronise Valley				X		
Daggett Wash-Mojave River					X	
Goldstone Lake	X					
Harper Lake		X			X	
Inscription Canyon	X	X				
Langford Well Lake				X		
Manix Wash-Mojave River				X		X
Mount General					X	
Nelson Lake-Bicycle Lake	X					
Superior Lake	X	X			X	
Wall Street Canyon			X		X	X

WTA – Western Training Area; **TS1** – Translocation Site 1; **TS2** – Translocation Site 2; **TS3** – Translocation Site 3; **CS1** – Control Site 1; **CS2** – Control Site 2

3.8.2 Environmental Consequences

Adverse impacts on water resources would occur if the Proposed Action were to do any of the following:

- Reduce water availability or supply to existing users.
- Cause overdrafts of groundwater basins.
- Exceed safe annual yield of water supply sources.
- Affect water quality adversely.
- Endanger public health by creating or worsening health hazard conditions.
- Violate established laws or regulations adopted to protect water resources.

3.8.2.1 Proposed Action

There would be minor, long-term adverse impacts on water resources from the translocation and long-term monitoring of translocated desert tortoises. The potential excavation of a limited number of burrows (anticipated to be up to 10 burrows) on the WTA would disturb approximately 80 cubic feet of soils. Biologists conducting translocations of tortoises would carefully replace all excavated soils following burrow excavation and compact those soils to the extent practicable with hand tools. However, these disturbed soils could lead to increased sediment transport into surface waters during storm events, slightly contributing to the degradation of water quality in ephemeral streams.

Additionally, vehicle and helicopter use of unpaved roads during the translocation of desert tortoises from Fort Irwin to the Translocation Sites, and vehicle travel on unpaved roads during long-term monitoring of translocated tortoises would slightly increase the amount of soils disturbed as all vehicle movement and helicopter takeoffs and landings would occur on already disturbed surfaces. However, vehicles using unpaved roads would increase soil disturbance

along roadways, which could cause increased sediment transport in stormwater runoff, having minor impacts on water quality of ephemeral streams. Vehicle travel on unpaved roads would be limited to those designated as open by BLM (BLM 2019) and to those on the WTA where road travel would not damage especially sensitive locations, such as where existing roads cross sensitive cultural resources sites.

There would be no construction or development that could alter a floodplain. Further, there would be no substantive ground-disturbing activities associated with the Proposed Action that could change the characteristics of existing floodplains.

The WTA is primarily within the Superior Lake, Goldstone Lake, and Coyote Lake watersheds. The Superior Lake dry lake bed is within the boundaries of the WTA. Numerous ephemeral washes occur within the WTA. These washes and the dry lake beds may be regulated as waters of the State of California but are not jurisdictional waters of the United States and are not regulated under Sections 404 and 401 of the Clean Water Act. Waters of the State are not regulated on federally managed lands such as the WTA and the Army-owned recipient sites. Further, no ground-disturbing activities are proposed in the Translocation and Control Sites. Therefore, no impacts would occur to any surface water resource in the Translocation and Control Sites.

3.8.2.2 No Action Alternative

There would be no desert tortoise translocation activities and no long-term monitoring of translocated tortoises. Up to 10 desert tortoises would not be excavated from their burrows during translocation activities on the WTA, and there would be no associated soil disturbance that could increase sediment transport to nearby ephemeral streams or dry lake beds during storm vents. Therefore, there would be no impacts on water resources under the No Action Alternative.

3.9 Biological Resources

Biological resources include native or invasive plants and animals; sensitive and protected floral and faunal species; and the habitats, such as wetlands, forests, and grasslands, in which they exist. Habitat can be defined as the resources and conditions in an area that support a defined suite of organisms. The following is a description of the primary federal statutes that form the regulatory framework for the evaluation of biological resources.

Federal ESA. The ESA of 1973 (16 USC § 1531 et seq.) established protection over and conservation of threatened and endangered species and the ecosystems upon which they depend. Sensitive and protected biological resources include plant and animal species listed as threatened, endangered, or special status by the USFWS and the National Marine Fisheries Service. Under the ESA (16 USC § 1536), an “endangered species” is defined as any species in danger of extinction throughout all, or a large portion, of its range. A “threatened species” is defined as any species likely to become an endangered species in the foreseeable future. The USFWS maintains a list of species considered to be candidates for possible listing under the ESA. The ESA also allows the designation of geographic areas as critical habitat for threatened or endangered species. Although candidate species receive no statutory protection under the ESA, the USFWS has attempted to advise government agencies, industry, and the public that these species are at risk and may warrant protection under the ESA.

CESA. The CESA was originally enacted in 1970 but was repealed and replaced in 1984 and amended in 1997. The CESA provides for the designation of plants and animals as threatened or endangered after a formal listing process by the California Fish and Game Commission. A listed species, or any part or product of that listed species, may not be imported into the state, exported out of the state, "taken" (i.e., killed), possessed, purchased, or sold without proper authorization.

Migratory Bird Treaty Act. The Migratory Bird Treaty Act (MBTA) of 1918 makes it unlawful for anyone to take migratory birds or their parts, nests, or eggs unless permitted to do so by regulations. Per the MBTA, "take" is defined as "pursue, hunt, shoot, wound, kill, trap, capture, or collect" (50 CFR 10.12). Migratory birds include nearly all avian species in the U.S., with the exception of some upland game birds and nonnative species.

EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds,* requires all federal agencies undertaking activities that may negatively impact migratory birds to follow a prescribed set of actions to further implement the MBTA. EO 13186 directs federal agencies to develop a Memorandum of Understanding with the USFWS that promotes the conservation of migratory birds.

The National Defense Authorization Act for fiscal year 2003 (Public Law 107-314, 116 Stat. 2458) provided the Secretary of the Interior with the authority to prescribe regulations to exempt the armed forces from the incidental take of migratory birds during authorized military readiness activities. Congress defined military readiness activities as all training and operations of the U.S. 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.

In December 2017, the DoI issued M-Opinion 37050, which concluded that the take of migratory birds from an activity is not prohibited by the MBTA when the underlying purpose of that activity is not the take of a migratory bird. The USFWS interprets the M-Opinion to mean that the MBTA's prohibition on take does not apply when the take of birds, eggs, or nests occurs as a result of an activity, the purpose of which is not to take birds, eggs, or nests.

On 7 January 2021, the USFWS issued 86 Federal Register 1134, effective 8 February 2021, determining that the MBTA's prohibitions on pursuing, hunting, taking, capturing, killing, or attempting to do the same, apply only to actions directed at migratory birds, their nests, or their eggs; however, the MBTA rule was published on 8 March 2021 in conformity with the Congressional Rule Act (86 Federal Register 8715). On 7 May 2021, the USFWS published a proposal to revoke the 7 January 2021 final regulation that limited the scope of the MBTA. In addition, the USFWS opened a public comment period and solicited public comments on issues of fact, law, and policy raised by the MBTA rule published on 7 January 2021. The public comment period closed on 7 June 2021. On 20 July 2021, the USFWS published a public notice announcing the availability of two economic analysis documents for review and comment. These documents are associated with the proposed MBTA revocation rule, and the USFWS provided a 30-day public comment period on these documents. The public comment period closed on 19 August 2021. The USFWS finalized the revocation of the MBTA incidental take rule on 30 September 2021.

Bald and Golden Eagle Protection Act. The Bald and Golden Eagle Protection Act of 1940 (16 USC § 668-668c) prohibits the "take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle [or any golden

eagle], alive or dead, or any part, nest, or egg thereof." "Take" is defined as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb," and "disturb" is defined as "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, injury to an eagle, a decrease in productivity by substantially interfering with the eagle's normal breeding, feeding, or sheltering behavior, or nest abandonment by substantially interfering with the eagle's normal breeding, feeding or sheltering behavior." The Bald and Golden Eagle Protection Act also prohibits activities around an active or inactive nest site that could result in an adverse impact on the eagle.

BLM Sensitive Species. Sensitive species are those species requiring special management consideration to promote their conservation and reduce the likelihood and need for future listing under the federal ESA. Sensitive species are managed by BLM as special status species, along with federally listed and proposed species, which are automatically treated as special status species. The BLM Manual 6840, *Special Status Species Management*, requires State Directors to designate sensitive species within their respective jurisdictions and, at least once every five years, to review and update their sensitive species lists in coordination with state agencies responsible for managing fisheries, wildlife, and botanical resources.

3.9.1 Affected Environment

3.9.1.1 Vegetation

Typical dominant plant species in the WTA and Translocation and Control Sites include creosote bush (*Larrea tridentata*), burrobush (*Ambrosia dumosa*), ephedra (*Ephedra nevadensis*), rabbitbrush (*Chrysothyamnus depressus*), buckwheat (*Eriogonum fasciculatum*), bunchgrass (*Phleum* sp.), Texas filaree (*Erodium texanum*), common Mediterranean grass (*Schismus barbatus*), Russian thistle (*Salsola tragus*), saltbush (*Atriplex canescens*), and wild oats (*Avena fatua*).

Vegetation community mapping has been completed for portions of the Mojave Desert in California and is presented in the Central Mojave Vegetation Database (Thomas et al. 2004) The vegetation community map has complete coverage for the WTA, but only partial coverage for the Translocation and Control Sites (Figure 3-8), except for Translocation Site 3, which has been entirely mapped. Table 3-8 provides the area associated with each vegetation type in the WTA.

Table 3-8. Vegetation Types in the Western Training Area

Vegetation Type	Area (acres)
Blackbrush	3,618.3
Creosote	62,275.1
Dunes	928.7
Low Elevation Wash System	358.0
Mid-Elevation Wash System	729.4
Nevada Jointfir	54.0
Playa	1,990.1
Rural Development	53.6
Saltbush	535.4

Source: Thomas et al. 2004

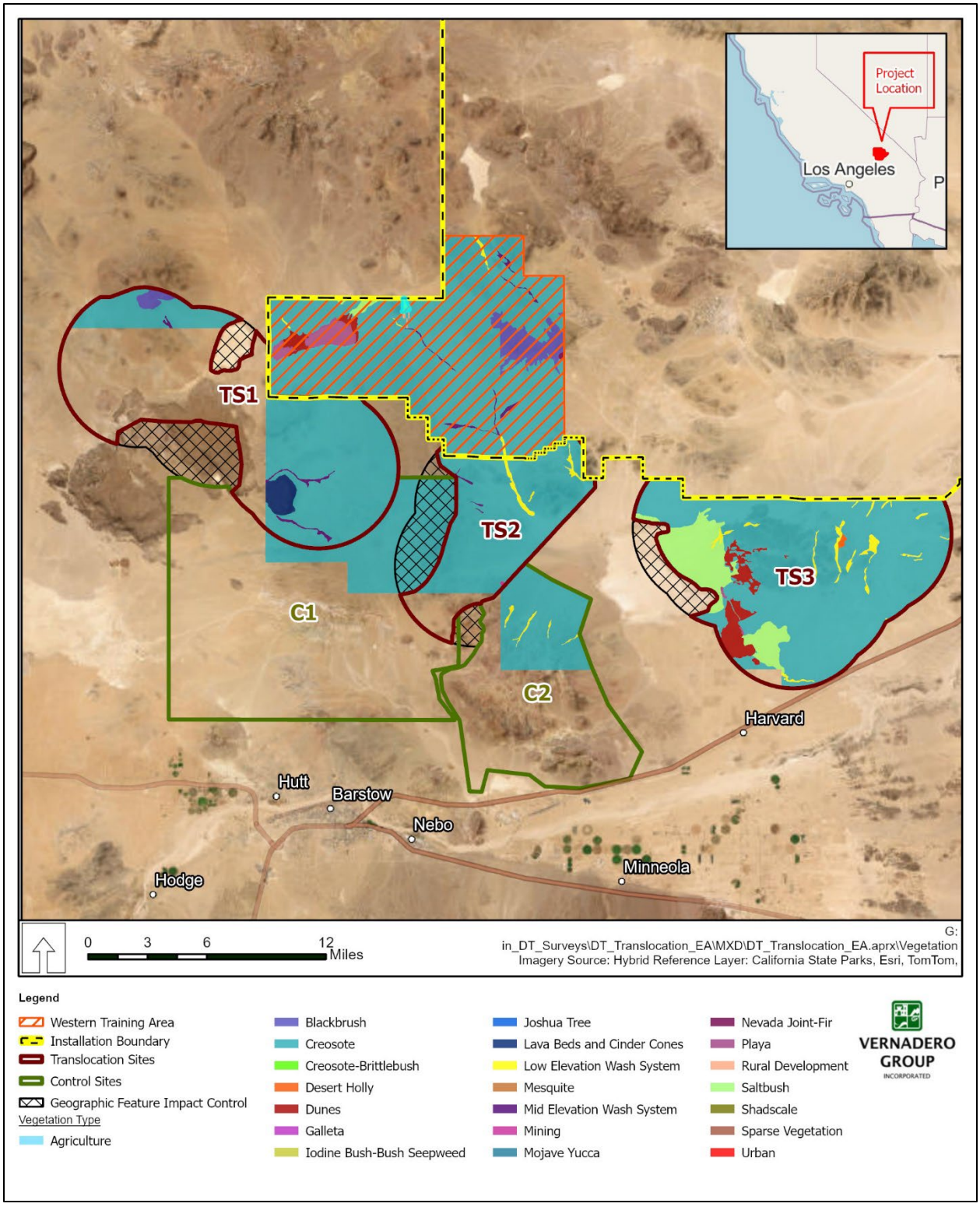

Figure 3-8. Vegetation Types in the Western Training Area and Translocation and Control Sites

Creosote is the dominant vegetation type in the WTA as well as in Translocation Site 3 and in those portions of the Translocation and Control Sites that have been mapped (Figure 3-8). In December 2023, vegetation cover was estimated along transects established in each of the Translocation and Control Sites. The five plant species with the highest plant cover in all the Translocation and Control Sites were creosote bush, burrobush, common Mediterranean grass, red-stemmed filaree (*Erodium cicutarium*), and bristly fiddleneck (*Amsinckia tessellata*). A total of 73 herbaceous plant species, 30 shrub species, and 1 tree species was identified during the surveys. Average shrub cover ranged from 6.7 to 15.5 percent and average herbaceous plant cover ranged from 2.6 to 5.1 percent (Vernadero Group Inc. 2024).

3.9.1.2 Wildlife

Wildlife known to occur on the NTC and Fort Irwin, including the WTA, is also likely present at the Translocation and Control Sites. Common wildlife likely to be present are those adapted to the Mojave Desert conditions with sparse vegetation cover and extreme annual temperatures. Perennial water sources are primarily limited to seeps and springs and generally lead to increased wildlife diversity in those areas. Rocky outcrops and terrain provide cover for reptile, rodent, bat, and bird species. No amphibians have been documented on the NTC and Fort Irwin and are also likely absent from the Translocation and Control Sites. The interior of dry lake beds provide very little wildlife habitat because there is a lack of vegetation in these areas. Dry lake beds have endemic microbial communities of algae supporting brine shrimp (*Artemia* sp.). Seasonally, dry lake beds can become flooded supporting migratory birds including waterbirds and waterfowl and shorebirds may nest along the perimeter of dry lakebeds during abnormally wet winters and springs when lakebeds flood for longer periods of time (Army 2023).

Common mammal species likely present on the WTA and in the Translocation and Control Sites include American badger (*Taxidea taxus*), kit fox (*Vulpes macrotis*), gray fox (*Urocyon cinereoargenteus*), bobcat (*Lynx rufus*), mountain lion (*Felis concolor*), black-tailed jackrabbit (*Lepus californicus*), desert cottontail (*Sylvilagus audubonii*), white-tailed antelope ground squirrel (*Ammospermophilus leucurus*), kangaroo rats (*Dipodomys* spp.), pocket mice (*Chaetodipus formosus*, *Chaetodipus penicillatus*, *Perognathus* spp.), field mice (*Peromyscus* spp.), desert woodrat (*Neotoma lepida*), and Botta's pocket gopher (*Thomomys bottae*) (Army 2023).

Bat habitat is present in abandoned mines, caves, and trees in the WTA and Translocation and Control Sites. Bats could use cliff faces and rock ledges for day roosts and Joshua trees for night roosts. A total of eight species of bats have been identified on Fort Irwin, and these species likely forage and/or roost in the Translocation and Control Sites. These include the canyon bat (*Parastrellus hesperus*), California myotis (*Myotis californicus*), Mexican free-tailed bat (*Tadarida brasiliensis*), pallid bat (*Antrozous pallidus*), Townsend's big-eared bat (*Corynorhinus townsendii)*, hoary bat (*Lasiurus cinereus*), red bat (*Lasiurus blossevillii*), and western mastiff bat (*Eumops perotis*) (Army 2023).

Common bird species associated with creosote scrub habitat include the black-throated sparrow (*Amphispiza bilineata*), rock wren (*Salpinctes obsoletus*), horned lark (*Eremophila alpestris*), common raven (*Corvus corax*), American robin (*Turdus migratorius*), mourning dove (*Zenaida macroura*), house sparrow (*Passer domesticus*), and greater roadrunner (*Geococcyx californianus*). Bird species commonly found around springs and seeps include common around water include the house finch (*Carpodacus mexicanus*), phainopepla (*Phainopepla nitens*),

northern mockingbird (*Mimus polyglottos*), and song sparrow (*Melospiza melodia*). Common bird species typically occurring in desert wash systems include the verdin (*Auriparus flaviceps*) and black-tailed gnatcatcher (*Polioptila melanura*). Common migratory species that only occur seasonally include yellow-rumped warbler (*Dendroica coronata*), Hutton's vireo (*Vireo huttoni*), cliff swallow (*Hirundo pyrrhonata*), ruby-crowned kinglet (*Regulus calendula*), and white-crowned sparrow (*Zonotrichia leucophrys*). Common raptors observed on NTC and Fort Irwin that also likely occur in the Translocation and Control Sites include red-tailed hawk (*Buteo jamaicensis*), northern harrier (*Circus cyaneus*), golden eagle (*Aguila chrysaetos*), prairie falcon (*Falco mexicanus*), barn owl (*Tyto alba*), burrowing owl (*Speotyto cunicularia*), and short-eared owl (*Asio flammeus*) (Army 2023).

The Mojave Desert supports a high diversity of reptiles. Common reptiles likely to be present on the WTA and the Translocation and Control Sites include the zebra-tailed lizard (*Callisaurus draconoides*), side-blotched lizard (*Uta stansburiana*), desert spiny lizard (*Sceloporus magister*), Great Basin whiptail (*Aspidoscelis tigris tigris*), coachwhip (*Masticophis flagellum*), gopher snake (*Pituophis melanoleucus*), western patch-nosed snake (*Salvadora hexalepis*), western shovel-nosed snake (*Chionactis occipitalis*), Mojave sidewinder (*Crotalus cerastes*), blind snake (*Leptotyphlops humulis*), ground snake (*Sonora semiannulata*), and Mohave rattlesnake (*Crotalus scutulatus*) (Army 2023).

3.9.1.3 Special Status Species

Special status species include those listed and proposed for listing under the federal ESA; species listed and proposed for listing as threatened, endangered, or rare under the CESA; fully protected animals in California; and BLM sensitive species. The Information for the Planning and Consultation database (USFWS 2024a) was searched for all federal ESA-listed species with the potential to occur within the action area. The NTC and Fort Irwin's INRMP (NTC and Fort Irwin 2022a), the 2023 LEIS (Army 2023), and BLM sensitive animal and plant species lists were reviewed to identify special status species that could also potentially occur in the project area. Those species are provided in Table 3-9. Designated critical habitat for two species, desert tortoise and Lane Mountain milk-vetch (*Astragalus jaegerianus*) is present in the WTA and the Translocation and Control Sites. Critical habitat for the desert tortoise fully overlaps the WTA and the Translocation Sites, as well as most of the Control Sites (Figure 3-9). Critical habitat for the Lane Mountain milk-vetch overlaps with portions of the WTA, Translocation Sites 1 and 2, and Control Site 1 (Figure 3-9).

Table 3-9. Special Status Species with the Potential to Occur at the Western Training Area and Translocation and Control Sites

Species	Status	Potential Occurrence in the WTA	Potential Occurrence in the TSs	Potential Occurrence in the CSs
Mammals				
American Badger (*Taxidea taxus*)	SSC	Rarely	Rarely	Rarely
Desert Kit Fox *(Vulpes macrotis)*	Proposed SSC	Yes	Yes	Yes
Mohave Ground Squirrel (*Xerospermophilus mohavensis*)	BLMS, ST	Yes	Yes	Yes
Pallid Bat (*Antrozous pallidus*)	BLMS, SSC	Yes	Yes	Yes

Species	Status	Potential Occurrence in the WTA	Potential Occurrence in the TSs	Potential Occurrence in the CSs
Townsend's Big-Eared Bat (*Corynorhinus townsendii)*	BLMS, SSC	Yes	Yes	Yes
Western Mastiff Bat (*Eumops perotis californicus*)	BLMS, SSC	Yes	Yes	Yes
Birds				
Bendire's Thrasher (*Toxostoma bendirei*)	BLMS, SSC	Yes	Yes	Yes
Burrowing Owl (*Athene cunicularia*)	BLMS, SSC	Yes	Yes	Yes
California Black Rail (*Laterallus jamaicensis coturniculus*)	ST, BLMS, SF	Unlikely	Unlikely	Unlikely
Golden Eagle (*Aquila chrysaetos*)	BGEPA, BLMS	Yes	Yes	Yes
Gray Vireo (*Vireo vicinior*)	BLMS, SSC	Yes	Yes	Yes
Least Bell's Vireo (*Vireo bellii pusillus*)	FE, SE	Seasonally	Seasonally	Seasonally
Loggerhead Shrike (*Lanius ludovicianus*)	SSC	Yes	Yes	Yes
Northern Harrier (*Circus hudsonius*)	SSC	Seasonally	Seasonally	Seasonally
Peregrine Falcon (*Falco peregrinus anatum*)	SE	Unlikely	Unlikely	Unlikely
Southwest Willow Flycatcher (*Empidonax traillii extimus*)	FE, SE	Unlikely	Unlikely	Unlikely
Swainson's Hawk (*Buteo swainson*i)	BLMS, ST	Seasonally	Seasonally	Seasonally
Yellow-Headed Blackbird (*Xanthocephalus xanthocephalus*)	SSC	Unlikely	Unlikely	Unlikely
Reptiles				
Desert Tortoise (*Gopherus agassizii*)	FT, SE	Yes and DCH	Yes and DCH	Yes and DCH
Mojave Fringe-Toed Lizard (*Uma scoparia*)	BLMS, SSC	Yes	Yes	Yes
Southwestern Pond Turtle (*Actinemys pallida*)	FPT, BLMS	No	No	No
Fishes				
Mohave Tui Chub (*Gila bicolor* ssp. *mohavensis*)	FE, SE. SF	No	No	No
Insects				
Monarch Butterfly (*Danaus plexippus*)	FC	Seasonally	Seasonally	Seasonally
Flowering Plants				
Barstow Wooly Sunflower (*Eriophyllum mohavense*)	BLMS	Yes	Yes	Yes
Clokey's Cryptantha (*Cryptantha clokeyi*)	BLMS	Yes	Yes	Yes
Desert Cymopterus (*Cymopterus deserticola*)	BLMS	Yes	Yes	Yes
Lane Mountain Milk-Vetch (*Astragalus jaegerianus*)	FE, BLMS	Yes and DCH	Yes and DCH	Yes and DCH
Mohave Monkeyflower (*Diplacus mohavensis*)	BLMS	Yes	Yes	Yes

Species	Status	Potential Occurrence in the WTA	Potential Occurrence in the TSs	Potential Occurrence in the CSs
Western Joshua Tree (*Yucca brevifolia*)	SC	Yes	Yes	Yes

WTA – Western Training Area; **TS** – Translocation Site; **CS** – Control Site

Status (alphabetical order)

BGEPA – Bald and Golden Eagle Protection Act; **BLMS** – Bureau of Land Management Sensitive; **DCH** – designated critical habitat; **FC** – federal candidate; **FE** – federally endangered; **FPT** – federally proposed threatened; **FT** – federally threatened; **SC** – state candidate; **SE** – state endangered**; SF** – fully protected; **SSC** – species of special concern; **ST** – state threatened

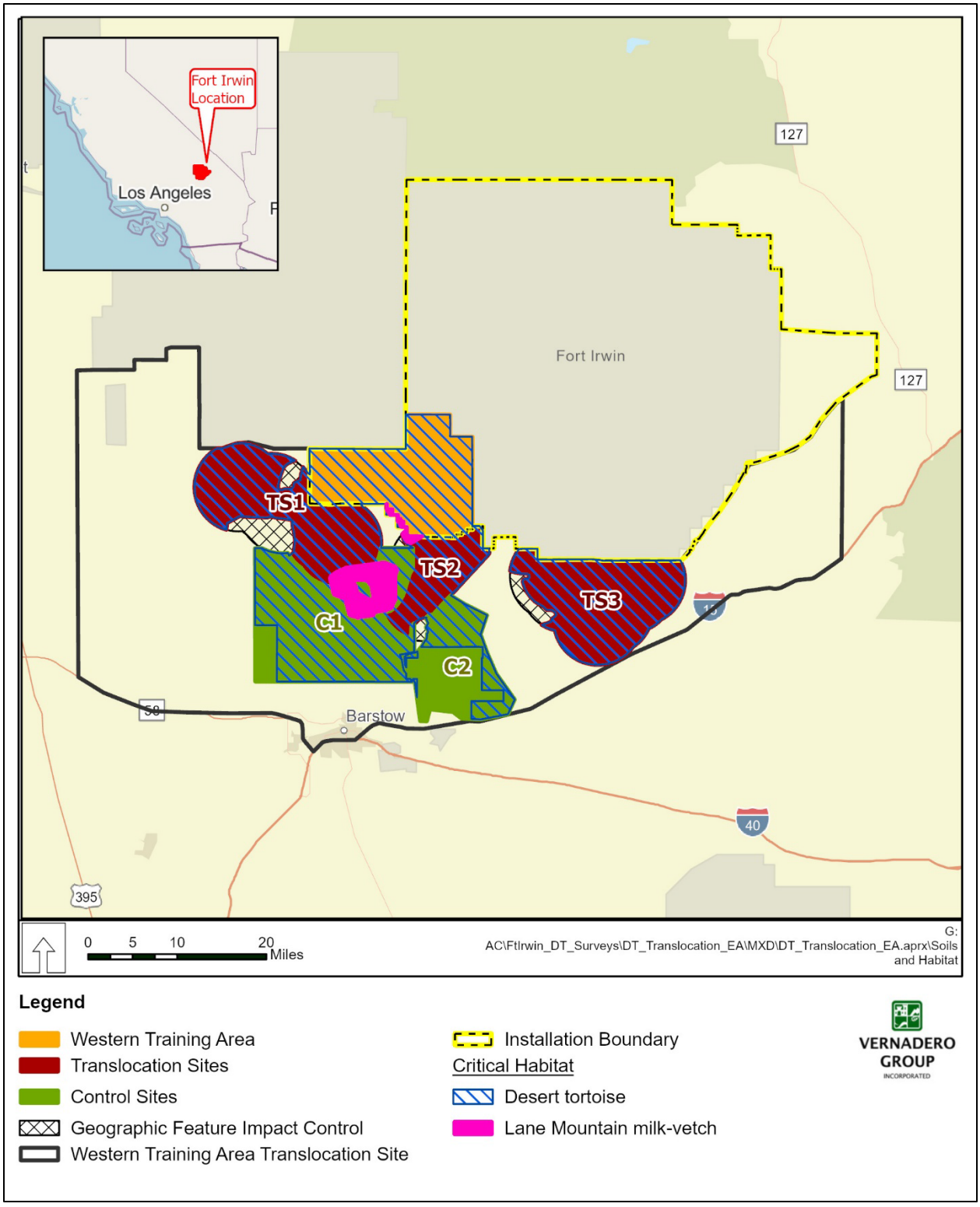

Figure 3-9. Designated Critical Habitat in the Western Training Area and Translocation and Control Sites

The following are brief descriptions of special status species with the potential to occur in the WTA and Translocation and Control Sites. Detailed descriptions of these species are provided in the 2023 LEIS, and those descriptions are incorporated into this EA by reference (Army 2023).

Mammals

American Badger (*Taxidea taxus*). The American badger is listed as a species of special concern by the CDFW. American badgers are primarily solitary mammals with short, stout legs, a flattened body, and a relatively small head in proportion to its body. Adult badgers are approximately 2.5 feet long and weigh about 15 to 20 pounds. They are excellent diggers and use their claws to excavate dens. Badgers are carnivores and prey on burrowing rodents (CDFW 2024). Badgers have been observed on Fort Irwin (NTC and Fort Irwin 2022a) and are expected to occur on the WTA and Translocation and Control Sites.

Desert Kit Fox (*Vulpes macrotis*). The desert kit fox is proposed as a species of special concern by CDFW. The desert kit fox is a small, nocturnal fox with long ears and fur on the soles of its feet. They live in the open desert, on creosote bush flats, and on sand dunes. Desert kit foxes remain in underground dens in the day and forage at night, and foraging occurs proximate to the den. They are carnivores and feed primarily on nocturnal rodents as well as birds, reptiles, and insects (National Park Service 2024). Desert kit foxes have been observed in the WTA (NTC and Fort Irwin 2022a) and are likely present in the Translocation and Control Sites.

Mohave Ground Squirrel (*Xerospermophilus mohavensis*). The Mohave ground squirrel is listed as threatened under the CESA. The Mohave ground squirrel's distribution is limited to the Mojave Desert of San Bernardino, Los Angeles, Kern, and Inyo counties. It feeds on a wide variety of green vegetation, seeds, and fruits, and forages on the ground, in shrubs, and in Joshua trees. The Mohave ground squirrel is diurnal and is active aboveground in the spring and early summer (CDFW 2024). The Mohave ground squirrel is known to be present on Fort Irwin with its greatest abundance in the WTA (NTC and Fort Irwin 2022a), and it likely occurs in the Translocation and Control Sites.

Pallid Bat (*Antrozous pallidus*). The pallid bat is a BLM sensitive species and is listed as a species of special concern by CDFW. Pallid bats have especially large ears and eyes larger than most North American bat species. They do not migrate long distances and are found in arid regions with rocky outcroppings in western North America. Water must be available close to roost sites. They utilize three different types of roosts: a day roost with warm horizontal openings, a night roost in the open with nearby foliage, and a hibernation roost typically in buildings, caves, or cracks in rocks. They primarily prey on insects but can eat lizards and rodents; this bat almost exclusively catches its food on the ground instead of in flight (Arizona Sonora Desert Museum 2024). Pallid bats have been detected on Fort Irwin through acoustic monitoring and mist-netting (NTC and Fort Irwin 2022). They are likely present on the WTA and the Translocation and Control Sites.

Townsend's Big-Eared bat (*Corynorhinus townsendii*). Townsend's big-eared bat is a BLM sensitive species and is listed as a species of special concern by CDFW. Townsend's big-eared bat is insectivorous and medium sized, with large ears and bilateral horseshoe-shaped lumps on its muzzle. It is distributed broadly in western North America and also occurs in two disjunct populations in the central and eastern U.S. During the summer, Townsend's big-eared bats are

active during the crepuscular periods of the day; they remain in a day roost during daylight hours and use night roosts to rest and digest food between evening and morning foraging. They move to winter hibernacula and hibernate from fall until spring and require spacious cavernlike structures for roosting during all life cycle stages. Townsend's big-eared bats forage primarily in and near vegetation, especially near riparian habitats, which are also used for commuting and drinking. They have the ability to hover and glean insects from vegetation (Gruver and Keinath 2006). Townsend's big-eared bat has been detected at Fort Irwin (NTC and Fort Irwin 2022) and is likely present in the WTA and Translocation and Control Sites.

Western Mastiff Bat (*Eumops perotis californicus*). Western mastiff bat is a BLM sensitive species and is listed as a species of special concern by CDFW. The western mastiff bat is the largest bat species in North America. It has a disjunct distribution with subspecies. The subspecies that occurs in North America has a range that extends across central Mexico and across the southwestern United States. The western mastiff bat is primarily a cliff-dwelling species with roosts high above the ground allowing a vertical drop of at least 9.8 feet below the roost entrance for flight. They primarily feed on moths, but they also feed on crickets and katydids. They are found in a variety of habitats but most often in broad open areas (Texas Parks and Wildlife Department 2024). Western mastiff bat was last detected on Fort Irwin in 1994 (NTC and Fort Irwin 2022) and has the potential to occur in the WTA and Translocation and Control Sites.

Birds

Bendire's Thrasher (*Toxostoma bendirei*). Bendire's thrasher is a BLM sensitive species and is listed as a species of special concern by CDFW. It is a medium-sized, brown songbird that primarily forages on the ground for insects. They also occasionally forage on spiders, berries, and other fruits. They typically nest in dense low shrubs, trees, and cacti (Nevada Department of Wildlife 2024). Bendire's thrashers have been detected during avian surveys on Fort Irwin (NTC and Fort Irwin 2022) and likely occur in the WTA and Translocation and Control Sites.

Burrowing Owl (*Athene cunicularia*). The burrowing owl is a BLM sensitive species and is listed as a species of special concern by CDFW. Burrowing owls are small owls that rely on burrows created by fossorial mammals. They also occur in human-made structures such as culverts and pipes. Burrowing owls occur across the Mojave Desert of Inyo, eastern Kern, northern Los Angeles, San Bernardino, eastern Riverside, eastern San Diego, and Imperial counties. Burrowing owls in California primarily feed on arthropods, small rodents, birds, amphibians, reptiles, and carrion (CDFW 2024). They would be expected to occur on the WTA and in the Translocation and Control Sites.

Golden Eagle (*Aquila chrysaetos*). The golden eagle is protected under the Bald and Golden Eagle Protection Act, is a BLM sensitive species, and is a fully protected species in California. Golden eagles are found throughout North America, but are more common in western North America, and are mostly resident in California. Golden eagles inhabit forests, canyons, shrublands, grasslands, and oak woodlands. They construct nests on platforms on steep cliffs or in large trees and mostly prey on rabbits, hares, and rodents (CDFW 2024).

Gray Vireo (*Vireo vicinior).* The gray vireo is a BLM sensitive species and is listed as a species of special concern by CDFW. It is a small, delicately built songbird with a slightly hooked bill. The gray vireo is gray, darkest on the wings and tail, with off-white underparts. It nests in desert habitats up to approximately 7,800 feet in elevation. The grey vireo nests in

pinyon pine-juniper, mesquite scrub, oak scrub, and chaparral habitats (Cornell Lab of Ornithology 2024). Gray vireos have been documented on Fort Irwin (NTC and Fort Irwin 2022). It is likely present on the WTA and Translocation and Control Sites.

Least Bell's Vireo (*Vireo bellii pusillus*). The least Bell's vireo is listed as endangered under both the federal ESA and CESA. Least Bell's vireo is a small gray, migratory songbird that has suffered reduced nesting productivity due to brood parasitism by the brown-headed cowbird (*Molothrus ater*). It has short, rounded wings and a short, straight bill. Least Bell's vireo breeds primarily in willow-dominated riparian woodlands but can forage and nest in adjacent mulefat scrub, oak woodlands, and chaparral. It is found in mesquite thickets in desert habitats. It primarily feeds on insects and spiders gleaned from leaves and branches (USFWS 2024b). There was a detection of Bell's vireo on Fort Irwin in 1997; however, there is no suitable breeding habitat on Fort Irwin for the least Bell's vireo (NTC and Fort Irwin 2022). This species could occur seasonally, foraging on the WTA and the Translocation and Control Sites, but would not likely breed in these areas due to a lack of suitable breeding habitat.

Loggerhead Shrike (*Lanius ludovicianus*). The loggerhead shrike is listed as a species of special concern by CDFW. The loggerhead shrike has a hooked all-dark bill, bluish-gray head and back, and grayish-white underparts. Loggerhead shrikes are migratory and return from wintering grounds to breed in mid-February to May. Loggerhead shrikes prefer open habitat with short grasses and forbs. Scattered shrubs and trees serve as nesting substrates and hunting perches. They feed on arthropods, amphibians, reptiles, small mammals, and birds (U.S. Department of Agriculture Forest Service 2003). Loggerhead shrikes have been observed on Fort Irwin (NTC and Fort Irwin 2022) and are assumed to occur in the WTA and Translocation and Control Sites.

Northern Harrier (*Circus hudsonius*). The northern harrier is listed as a species of special concern by CDFW. Northern harriers forage in a variety of treeless habitats that provide suitable vegetation structure and cover, an abundance of prey, and scattered perches. Harriers nest on the ground, typically in patches of dense vegetation. They feed on a variety of small- to medium-sized vertebrates, primarily rodents and small birds. Suitable habitat in the Mojave Desert is extremely limited and can potentially breed around dry lakebeds when flooded (CDFW 2024). This species could rarely occur on the WTA and the Translocation and Control Sites, most likely in the winter months (Army 2023).

Swainson's Hawk (*Buteo swainsoni*). The Swainson's hawk is a BLM sensitive species and listed as state threatened under the CESA. The Swainson's hawk is medium sized with long, pointed wings that curve up somewhat in a slight dihedral while in flight. The Swainson's hawk breeds in western North America and winters in South America. This species is adapted to open grasslands. Swainson's hawks primarily feed upon small rodents, especially voles, and other small mammals, birds, and insects. They nest adjacent to riparian areas and will also nest in lone trees in agricultural fields or pastures and in roadside trees (CDFW 2024). A Swainson's hawk has been confirmed on Fort Irwin at Bitter Spring (Army 2023) and could occasionally occur in the WTA and Translocation and Control Sites.

Reptiles

Mohave Desert Tortoise (*Gopherus agassizii*). The Mojave subpopulation of the desert tortoise is listed as threatened under the federal ESA and endangered under the CESA. The desert tortoise is a large, herbivorous reptile found throughout much of the Mojave and Sonoran

deserts; its range roughly approximates the distribution of creosote bush scrub. It has a high-domed shell and stocky, elephantlike limbs and a short tail. The carapace (upper shell) is brown and the plastron (lower shell) is yellow, both exhibiting prominent growth lines between the scutes. The desert tortoise spends most of its time in burrows, rock shelters, and pallets to regulate body temperature and reduce water loss. It is most active during spring, summer, and fall, with mating occurring in late summer to early fall and after seasonal rains. It is inactive most of the year (NTC and Fort Irwin 2022).

A final recovery plan was written for the Mojave population of the desert tortoise in 1994 and revised in 2011 (USFWS 2011). Critical habitat for the Mojave tortoise population was designated by the USFWS in 1994. The entire WTA is within the Superior-Cronese Critical Habitat Unit. Desert tortoises are known to occur in the WTA, and their presence in the WTA establishes the need for this EA. Their proposed translocation is described in the 2023 LEIS and 2021 BO.

Tortoise surveys in 2020 focused on the WTATS for desert tortoise translocation evaluation efforts found tortoise sign on 56.9 percent of 404 plots, and 66 percent of tortoises were found in burrows or within 3.3 feet of the burrow opening. Tortoises moved on average 2,031 +/- 528 feet from their first known location during the 2020 field season; the sex ratio patterns (2:1 male to female) were similar to results from previous work (NTC and Fort Irwin 2022). Tortoise densities averaged 0.47 adults/square kilometer, 0.43 adults/square kilometer, and 0.41 adults/square kilometer in Translocation Sites 1, 2, and 3, respectively (Appendix C). Therefore, desert tortoises are known to occur in the Translocation and Control Sites.

Mojave Fringe-Toed Lizard (*Uma scoparia*). The Mohave fringe-toed lizard s a BLM sensitive species and is listed as a species of special concern by CDFW. The Mojave fringe-toed lizard is medium-sized and in the family Phrynosomatidae, the family of the North American spiny lizards. Their distribution is restricted to sandy areas, and their coloration provides concealment. The Mojave fringe-toed lizard is omnivorous and primarily feeds on insects, but it will also eat seeds and flowers (USFWS 2024c). The Mojave fringe-toed lizard has been documented as occurring on Fort Irwin (NTC and Fort Irwin 2022) and is assumed to be present on the WTA and Translocation and Control Sites.

Insects

Monarch Butterfly (*Danaus plexippus*). The monarch butterfly is considered a candidate species by the federal ESA. There are two subpopulations of the migrating monarch butterfly in North America, the eastern population that overwinters in Mexico and breeds in the midwestern states of the United States and the western population that overwinters in California and breeds in much of the American West from Arizona to Idaho. Adult females primarily lay eggs on milkweed (*Asclepias* spp.) plants, and the caterpillars rely upon the milkweed plant for energy and protective toxins call cardenolides. The full cycle from egg to adulthood lasts approximately 20 to 35 days, and the caterpillars develop through five instars before becoming a chrysalis and pupating into an adult (CDFW 2024). Monarch butterflies likely occur in the WTA and the Translocation and Control Sites during migrations in the spring and fall.

Flowering Plants

Barstow Woolly Sunflower (*Eriophyllum mohavense*). The Barstow woolly sunflower is a BLM sensitive species. It is a small annual herb native to California and is in the Asteraceae

family. This species has not been observed on the WTA (NTC and Fort Irwin 2022), but suitable habitat is present on the WTA as well as in the Translocation and Control Sites.

Clokey's Cryptantha (*Cryptantha clokeyi*). Clokey's cryptantha is a BLM sensitive species. This is a small annual in the Boraginaceae family. It typically occurs in gravelly areas of course colluvium substrate and most frequently found on upper slopes. Clokey's cryptantha is known from the WTA (NTC and Fort Irwin 2022). It also could potentially occur in the Translocation and Control Sites.

Desert Cymopterus (*Cymopterus deserticola*). The desert cymopterus is a BLM sensitive species and is an herbaceous perennial plant in the Apiaceae (carrot) family. It occurs in deep, loose, well-drained sandy soil on alluvial fans and basins as well as on stabilized low sand dunes and occasionally on sandy slopes. The desert cymopterus on Fort Irwin are entirely located on the WTA (Fort Irwin 2022). This species has the potential to also occur in the Translocation and Control Sites.

Lane Mountain Milk-Vetch. The Lane Mountain milk-vetch is listed as endangered under the federal ESA and is a BLM sensitive species. The Lane Mountain milk-vetch is in the Fabaceae family and is part of Astragalus*,* the largest group of plants in the world, consisting of about 3,000 identified species. The Lane Mountain milk-vetch is known only from an area north of Barstow in San Bernardino County. It vines around neighboring vegetation for structural support and to provide protection from extremes in weather. It is a perennial plant species with a large taproot that allows the plant to remain dormant through several years of drought, resprouting when favorable conditions occur (USFWS 2024d).

The Lane Mountain milk-vetch is present in three populations on Fort Irwin, all in or near the WTA. The fourth and largest population is found south of the NTC and Fort Irwin on BLM-managed lands. The 2021 BO provides stipulations for avoiding, reducing, and offsetting impacts of military actions on the Lane Mountain milk-vetch (NTC and Fort Irwin 2022). There is designated critical habitat for this species in the Translocation and Control Sites, and a known fourth population overlaps portions of these areas. Therefore, the Lane Mountain milk-vetch is known to occur on the WTA and Translocation and Control Sites.

Mohave Monkeyflower (*Diplacus mohavensis*). The Mohave monkeyflower is a BLM sensitive species and is an annual herb native to California in the Phrymaceae (Scrophulariaceae) family. It has not been observed on the WTA (NTC and Fort Irwin 2022), but suitable habitat is present on the WTA as well as in the Translocation and Control Sites.

Western Joshua Tree (*Yucca brevifolia*). The western Joshua tree is a candidate species under the CESA and is protected under the Western Joshua Tree Conservation Act, a California Law enacted in July 2023 that prohibits the importation, export, take, possession, purchase, or sale of any western Joshua tree in California unless authorized by CDFW. This law is not necessarily applicable to federally owned lands such as Fort Irwin. The distribution of Joshua trees is primarily limited to the Mojave Desert, where they grow to a height of 16 to 40 feet. Joshua trees require hot temperatures and very little precipitation (CDFW 2024). Joshua trees are present on the WTA as well as in the Translocation and Control Sites.

3.9.1.4 Invasive Species

Nonnative plants are the invasive species of greatest concern in the Mojave Desert, including at NTC and Fort Irwin and Army-owned lands (such as the Translocation Sites) and BLM-

managed lands. Nonnative, invasive plants are threats to native habitats, endangered species, and native plant community composition and diversity. Nonnative, invasive plants are direct threats to seep and spring ecosystems in the desert environment. They are also a concern for the fire regime in the Mojave Desert. Historically, fires were infrequent, but increasing fuel associated with invasive plant species has increased the risk of fire spreading easily. Fire frequently causes the conversion of shrub-dominated plant communities to grass-dominated plant communities. High-priority invasive plant species include red brome *(Bromus rubens*), Sahara mustard (*Brassica tournefortii*), Russian thistle (*Salsola tragus*), smallflower tamarisk (*Tamarix parviflora*), and saltcedar (*Tamarix ramosissima*) (NTC and Fort Irwin 2022).

Invasive animal species are also a concern, and invasive animal species that are a management priority for the NTC and Fort Irwin include mosquitofish (*Gambusia affinis*), brown-headed cowbird, house mouse (*Mus musculus*), and black rat (*Rattus rattus*) (NTC and Fort Irwin 2022).

3.9.2 Environmental Consequences

To evaluate the potential impacts on biological resources, the level of impact is based on the following:

- Importance (i.e., legal, commercial, recreational, ecological, or scientific) of the resource
- Proportion of the resource that would be affected relative to its occurrence in the region
- Sensitivity of the resource to the proposed activities
- Duration of potential ecological ramifications

The impacts on biological resources are adverse if species or habitats of high concern are negatively affected over relatively large areas. Impacts are also considered adverse if disturbances cause reductions in population size or distribution of a species of high concern.

As a requirement under the ESA, federal agencies must provide documentation that ensures that agency actions do not adversely affect the existence of any threatened or endangered species. The ESA requires that all federal agencies avoid “taking” threatened or endangered species (which includes jeopardizing threatened or endangered species habitat). Section 7 of the ESA establishes a consultation process with USFWS that ends with USFWS concurrence or a determination of the risk of jeopardy from a federal agency project.

3.9.2.1 Proposed Action

Vegetation. There would be negligible adverse, long-term impacts on vegetation from the translocation of desert tortoises from the WTA to the Translocation Sites, including long-term monitoring in the Translocation and Control Sites. There would be no impacts on vegetation from vehicular travel during translocation and monitoring activities. All vehicular travel would remain on routes designated as “open” by BLM. There would be no off-road vehicular travel or travel on “existing routes” that have not been specifically designated by BLM as “open.” The only activities with the potential to impact vegetation would be the instances where desert tortoises would be excavated from burrows. Excavation of burrows is estimated to be required at 10 burrows during clearance surveys and translocation activities in the WTA. This would impact approximately 80 cubic feet of soils. Vegetation in these soils is typically sparse, with plant cover ranging from 2 to 15 percent. Excavation of soils to remove tortoises from burrows

would damage any vegetation present. Soils would be replaced, and properly compacted by biologists removing tortoises from burrows to avoid soil erosion. In time, these excavated areas could revegetate naturally. In the Mojave Desert, natural revegetation of disturbed soils happens very slowly and may require decades to reach the same plant cover as pre-excavation conditions.

Wildlife. There would be negligible adverse, long-term impacts on wildlife from the translocation of desert tortoises. Impacts on wildlife would occur from increased vehicular and aircraft noise during translocation activities, increased vehicular noise during long-term monitoring, and increased human activity involving conducting surveys, translocations, and monitoring. Noise from vehicles as well as helicopters used for tortoise transport and vehicles used during all aspects of the Proposed Action implementation would cause temporary stress on wildlife. However, wildlife in the area is likely habituated to vehicle activity, and all vehicles and helicopters would remain on existing paved and unpaved roads and previously disturbed areas. Vehicles would not travel off road or off of routes designated by BLM as “open” for any reason during surveys, translocation activities, or monitoring. Following the use of vehicles for these activities, wildlife would return to normal behavior. Incidental mortality of small mammals and reptiles could also result from the movement of vehicles. However, with vehicle movement limited to existing roads where suitable habitat for wildlife is extremely limited, there would be very little mortality of small vertebrate species from vehicle movement.

Special Status Species. The federally listed species that could occur in the WTA and Translocation and Control Sites, the desert tortoise and Lane Mountain milk-vetch would be managed in accordance with the 2021 BO under the Proposed Action. The 2021 BO describes the requirements for desert tortoise translocation activities, which would be implemented by the Proposed Action and in accordance with the DTTP (Appendix C). Therefore, no additional Section 7 consultation with the USFWS is required to implement the Proposed Action as the 2021 BO completes Section 7 ESA consultation for the proposed translocation of desert tortoises from the WTA. The 2021 BO also provides thresholds to reinitiate Section 7 consultation if specific desert tortoise take limits are reached. Therefore, the NTC and Fort Irwin would follow all conservation measures in the 2021 BO and reinitiate formal consultation with the USFWS if any thresholds for take as described in the 2021 BO are reached.

No impacts on other special status plant or animal species would occur as a result of the ground disturbance under the Proposed Action. A very limited area of ground disturbance would occur in the WTA to remove desert tortoises from burrows; that is anticipated to be up to 40 square feet of disturbance. This very limited soil disturbance would be highly unlikely to impact special status animal species as they would not necessarily be specifically associated with tortoise burrows. Further, only highly qualified desert tortoise biologists would conduct translocation activities and would recognize sensitive plant species or the presence of special status animal species and would take measures to avoid any direct impacts on these plants and animals if encountered near a burrow where excavation would be required.

There would be no impacts on special status plant species from vehicle travel or helicopter use during tortoise surveys, tortoise translocation events, and during long-term monitoring. All vehicle travel and helicopter takeoffs and landings would be limited to existing paved and unpaved roads designated by BLM as “open” and previously disturbed areas; therefore, impacts on vegetation would not occur. There would be negligible long-term, adverse impacts on some special status animal species, such as birds and reptiles, that could be temporarily startled or

displaced from vehicle and helicopter movement and noise. Incidental mortality of special status small mammals and reptiles would be highly unlikely, but possible if they were to be present on roadways during vehicle movement. Although there could be temporary displacement of special status animal species during vehicle movement on existing roads, and even potential incidental mortality events from vehicle strikes, there would be no population-level effects on these special status species from the Proposed Action.

Recreational OHV travel by the public could adversely impact desert tortoises that move off of Army-owned recipient sites onto public lands within the Translocation Sites. However, cross-country travel is not permitted on BLM lands in the Translocation Sites. OHV travel is restricted to designated "open" roads with further restrictions on vehicle stopping and parking in Desert Tortoise ACEC and California Desert National Conservation Lands (BLM 2019). These restrictions on OHV travel and associated enforcement by law enforcement officers in the majority of the lands in the Translocation Sites greatly reduces the risks of translocated desert tortoise injury or mortality from vehicular travel.

The translocation of desert tortoises to the Translocation Sites would augment existing desert tortoise populations. Population augmentation would have long-term beneficial impacts on the Mojave desert tortoise through improved reproductive capacity at a population level (2021 BO; USFWS 2021a).

Invasive Species. The disturbance of approximately 40 square feet of soil during the excavation of a limited number of desert tortoise burrows would increase the potential for invasive plant species cover on the WTA. However, this small area of disturbance to soils relative to the large size of the WTA and the Mojave Desert would be unlikely to have population-level effects on invasive species or increase fire risk from higher fuel loads, and biologists conducting the excavations would attempt to compact disturbed soils to limit the ability for invasive plant species seeds to germinate and spread. Therefore, there would be no substantial impact from invasive species under the Proposed Action.

3.9.2.2 No Action Alternative

There would be no translocation of desert tortoises under the No Action Alternative. There would be no impacts on wildlife from disturbance associated with helicopter trips during translocation activities and vehicular travel on paved and BLM designated "open" roads during translocation and monitoring activities. There would be no ground-disturbing activities that could increase the spread of invasive plant species on the WTA associated with excavation of up to 10 desert tortoise burrows. Resident desert tortoises in the WTA would remain on the WTA and training activities would not occur. Therefore, there would be no impacts on any biological resources.

3.10 Cultural Resources

Cultural resources may generally include resources important to a culture or community for scientific, traditional, religious, or other reasons. Cultural resources are protected and identified under several federal laws and EOs. Because cultural resources are not defined under NEPA, the Army relies on Army Regulation 200-1, which is consistent with the NHPA and includes environmental protection and enhancement; implements federal, state, and local environmental laws and DoD policies; and also requires the assessment of impacts of major actions on historic properties before the commencement of those actions. The term "historic property" refers to

national historic landmarks and to National Register of Historic Places- (NRHP-) listed and NRHP-eligible cultural resources. Worth noting is that some cultural resources important to Native American cultures may be outside the scope of these definitions, but inclusion of traditional cultural properties within the scope of the NHPA was aimed at closing this gap in perspective (e.g., King 2012).

Section 106 of the NHPA requires all federal agencies to consider the effects of their undertakings on historic properties (36 CFR 800.1[a]), and it provides the State Historic Preservation Office (SHPO), Native American groups, other interested parties, and the Advisory Council on Historic Preservation a reasonable opportunity to comment on such undertakings. For cultural resource analysis, the Area of Potential Effect (APE) is used as the ROI. APE is defined as the "geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist" (36 CFR 800.16[d]), and thereby diminish their historic integrity.

Adverse effects on historic properties under the NHPA are not automatically significant effects under the NEPA. Adverse effects on historic properties can be a consideration in determining whether significant effects exist under NEPA. The NHPA process for resolving adverse effects (e.g., avoidance or mitigation) can help avoid significant effects under the NEPA.

3.10.1 Affected Environment

For the Proposed Action, the APE for direct effects includes the entire WTA. Because there would be no ground-disturbing activities or OHV or helicopter travel in the Translocation and Control Sites, there would be no potential for impacts on cultural resources. Therefore, cultural resources of the Translocation and Control Sites are not described further.

The WTA is mostly level, but it features elevated terrain on the eastern side and includes two main dry lake beds, Superior Dry Lake and Inferior Dry Lake. Long, low, flat alluvial fans capped by thin aeolian sand sheets characterize the area. In this type of environment, archaeological materials may be present on the surface or buried in the latest Pleistocene and Holocene depositional environments. Springs near the WTA include Paradise Springs, Jack Rabbit Spring, and an unnamed spring approximately 2 to 4 miles southeast of the WTA. These springs likely served as important water sources (Army 2023).

All areas of the WTA that will be used for training have been surveyed for cultural resources (with NHPA consultation pending and protection measures in progress). Areas to be used for military training and support operations exclude off-limits areas and steep, inaccessible mountainous terrain (Army 2023).

Prehistoric resources are often flaked stone sites, including desert pavement quarries where raw materials were obtained. Pottery is present at a few sites, and several sites include groundstone (usually portable, but bedrock milling features are known). Rockshelters and petroglyphs also are present (Army 2023).

Historic resources include mining features, many of which are associated with the historic townsite of Goldstone. Segments of several historic roads and a few homesteads are present. Historic military sites, including those associated with World War II, are well-represented. Additionally, mining-related features, including stone cabins, fire rings, adits, shafts, quarries, prospect pits, and placer mining areas, have been identified (Army 2023).

Fort Irwin developed a Programmatic Agreement (PA; Appendix E) between the NTC and Fort Irwin, the California SHPO, the Advisory Council on Historic Preservation, and invited signatories—the Fort Mojave Indian Tribe, the Yuhaaviatam of San Manuel Nation, and the Timbisha Shoshone—in conjunction with the 2023 LEIS (Army 2023). The PA provides NHPA Section 106 compliance for activities discussed in the 2023 LEIS, including support operations such as the translocation of desert tortoises from the WTA in advance of proposed training activities, and defines potential undertakings in Stipulation III.A.1 (Appendix E). The PA identifies the steps for historic property identification and evaluation for undertakings (Stipulation III), such as determining the undertaking, defining the APE, identifying historic properties, completing NRHP eligibility evaluations, assessing effects (Stipulation IV); and preparing a resolution of adverse effects (Stipulation V).

3.10.2 Environmental Consequences

Section 106 of the NHPA requires all federal agencies to assess the effects of their undertakings on historic properties and seek to avoid, minimize, or mitigate adverse effects on those properties [36 CFR 800.1(a)]. For cultural resource analysis, the APE is used as the ROI. APE is defined as the “geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist” (36 CFR 800.16[d]), and thereby diminish their historic integrity.

Direct effects may include alteration or damage to a property during project activities. Indirect effects may include the introduction of visual, audible, or atmospheric elements that are out of character with a property or that alter its historic setting. Direct and indirect effects are considered adverse if a project would cause a change in any characteristic of a property that qualifies it for inclusion in the NRHP.

3.10.2.1 Proposed Action

Fort Irwin continues to complete large-scale cultural resources surveys and the development of resource protection measures, as appropriate, for the portions of the WTA that have not been surveyed (Army 2023). Under the Proposed Action, all vehicle travel during translocation and monitoring activities would remain on established roads and on those designated as “open” by BLM. No OHV travel or travel on BLM closed roads would occur. Activities that include the continued use of existing roads where operations are limited to existing facilities and no new ground disturbance would occur are activities determined to have no effect on historic properties and do not require review by the Cultural Resources Manager (CRM) according to the PA (Appendix E).

Clearance surveys for desert tortoises would identify, locate, and place transmitters on any detected tortoises; these activities would not be ground-disturbing and would have no impacts on cultural resources. The Proposed Action would translocate desert tortoises from the WTA to recipient sites, requiring qualified biologists to remove tracked and detected desert tortoises. In nearly all cases, tortoises would be removed from the surface or tapped out of burrows, avoiding any ground disturbance during the removal and translocation activities. However, it is anticipated that on rare occasions tortoises in burrows (estimated to be approximately 10 tortoises in burrows in the WTA) would need to be removed by further excavation of burrows using shovels and other hand tools for digging. This would be a ground-disturbing activity that could potentially impact known and unknown cultural resources.

It is not possible to know in advance where a tortoise may be detected within a burrow during clearance surveys, and then all non-ground-disturbing methods such as tapping out the tortoise would fail to remove the tortoise from that burrow. These locations would then require very limited surface soil removal (estimated to be 4 square feet and 8 cubic feet of soil disturbance per burrow) to uncover and remove the tortoise. In these instances (anticipated to apply to approximately 10 tortoises in burrows in the WTA), biologists would notify the Fort Irwin CRM of the exact location where the burrow would need to be excavated. The CRM would then identify and evaluate the burrow excavation requirements relative to identified historic properties (Stipulation III of the PA), if applicable, and subsequently assess the potential effects of the undertaking on historic properties as described Stipulation IV in the PA. By following the requirements of the PA for any ground-disturbing activities needed to remove tortoises from burrows, there would be no adverse effect on, and therefore no significant impacts on, historic properties in the WTA.

3.10.2.2 No Action Alternative

There would be no ground-disturbing activities under the No Action Alternative. No desert translocation activities would occur, and no excavation of desert tortoise burrows in the WTA would be required. Therefore, there would be no effects on historic properties under the No Action Alternative.

3.11 Transportation

Transportation is defined as the system of roadways, highways, and transit services that are in the vicinity of the Proposed Action area and could be reasonably expected to be potentially affected by the Proposed Action.

3.11.1 Affected Environment

Interstate 15 (I-15) and Interstate 40 (I-40) are the main transportation corridors in the region. I-15 connects the city of Barstow with the metropolitan Los Angeles area and Las Vegas, Nevada (Figure 3-10). U.S. Highway 395 is west of Fort Irwin, along the Naval Air Weapons Station China Lake boundary. I-40 originates in the city of Barstow, south of Fort Irwin and the Translocation and Control Sites, and continues east across the U.S. to its termination in Wilmington, North Carolina.

Fort Irwin Road is a two-lane defense access road maintained by San Bernardino County, with multiple passing lanes that provide public and military access to Fort Irwin from I-15. In 2014, the average daily traffic count on Fort Irwin Road was approximately 5,900 vehicles (Fort Irwin 2016).

The Victor Valley Transit Authority oversees the NTC Commuter bus service, which operates routes between Barstow and Fort Irwin and the Victorville area. Barstow to Fort Irwin has three routes to Fort Irwin in the morning and four return routes in the evening. The Victorville area to Fort Irwin includes two early-morning bus routes to Fort Irwin with four return routes offered in the afternoon (Victorville Valley Transit Authority 2024).

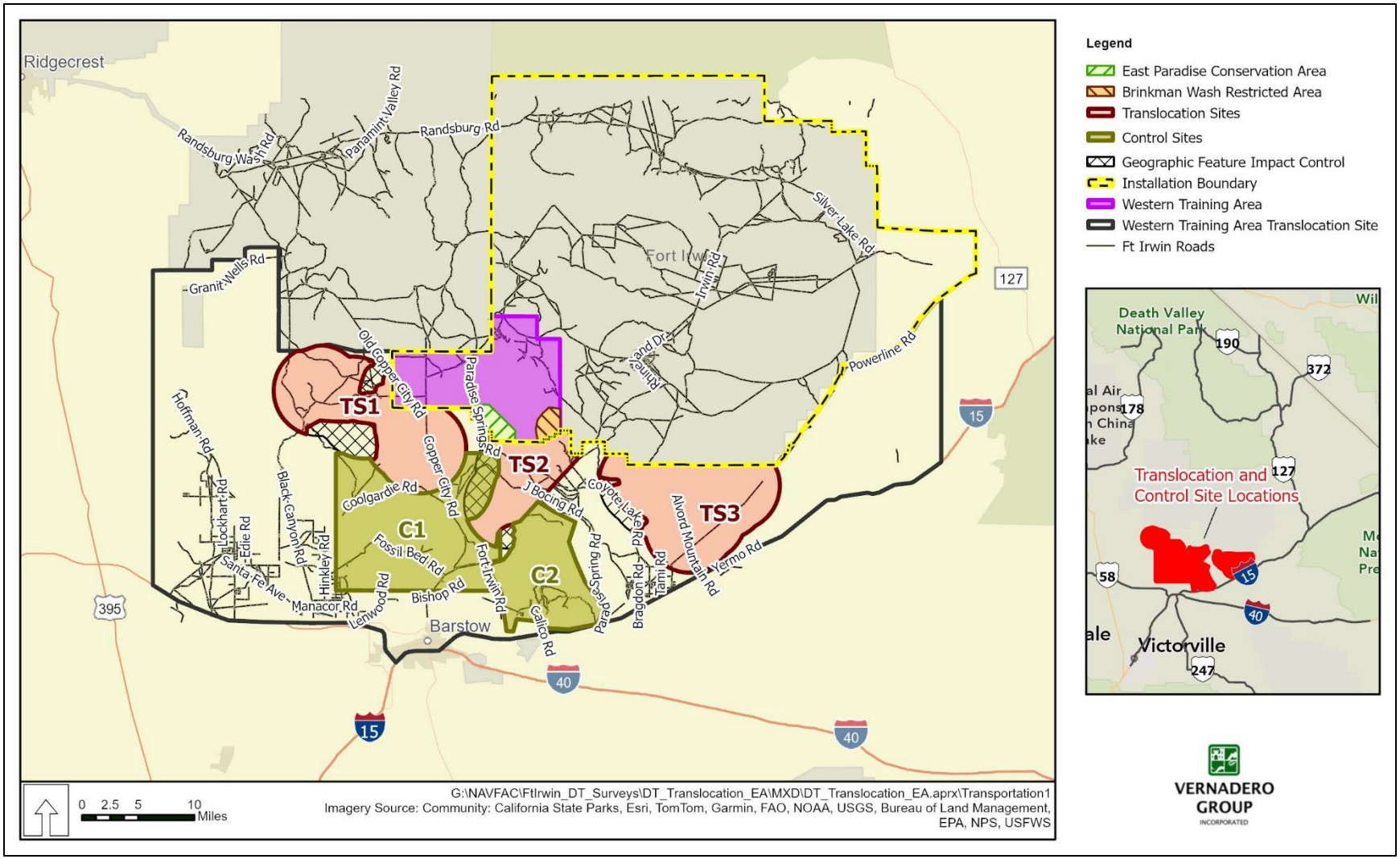

Figure 3-10. Local and Regional Transportation Proximate to the Western Training Area and Translocation and Control Sites

The Manix Trail is an unpaved trail that crosses under I-15 east of the city of Barstow and follows unpaved roads to Fort Irwin. Ground vehicles and equipment travel from the Yermo Rail Yard to Fort Irwin via surface roads from the Marine Corps Logistics Base Barstow Yermo Annex east to the Manix Trail. Equipment continues to Fort Irwin via the Manix Trail. Fort Irwin maintains the Manix Trail to allow most of the rotational training unit-associated wheeled military equipment to reach Fort Irwin without use of surface roads, except for the portion from the Yermo Rail Yard to the start of the Manix Trail.

Numerous paved and unpaved county and local roads extend north of the city of Barstow into the Translocation and Control Sites. BLM has specifically designated “open” roads for vehicular travel. Designated OHV routes are present on BLM-managed lands throughout the region between Fort Irwin and the city of Barstow.

3.11.2 Environmental Consequences

The threshold for significant impacts on traffic and transportation would be a permanent disruption in traffic flow on adjacent roadways or other surrounding roads. Factors considered in determining whether a significant traffic-related impact could occur include (1) an increase in vehicle trips that would disrupt or alter local circulation patterns, (2) permanent lane closures or other impediments to traffic, (3) activities that would create potential traffic safety hazards, (4) conflict with pedestrian and bicycle routes or fixed-route transit that would cause safety hazards, and (5) parking demand that exceeds the supply.

3.11.2.1 Proposed Action

There would be long-term, negligible, adverse impacts on local and regional transportation under the Proposed Action. There would be increased use of local and regional paved and unpaved roads during the active translocation of desert tortoises and to a less extent, during the long-term monitoring of translocated tortoises. It is anticipated that on the average, 10 vehicles would be used daily to support clearance surveys and desert tortoise transportation during translocation activities. This would cause an increase of vehicular traffic on paved and unpaved roads extending from Fort Irwin to the recipient sites located in the Translocation Sites.

It is unlikely that desert tortoise survey and translocation efforts would alter traffic at Fort Irwin gates or on local roads approaching the Fort Irwin gates. Not only would the number of vehicle trips daily be small, but many of those vehicle trips would go directly to the WTA and would not enter other gates on Fort Irwin.

Upon completion of translocation activities, it is anticipated that on the average two vehicles daily would be used to support the monitoring of translocated tortoises during 25 years of monitoring activities in the Translocation and Control Sites. Vehicles involved with monitoring activities would not enter Fort Irwin and would remain in the Translocation and Control Sites and would have no impacts on the Fort Irwin gate traffic.

3.11.2.2 No Action Alternative

There would be no increase in vehicle use or traffic under the No Action Alternative because there would be no desert tortoise translocation from the WTA. There would be no additional vehicle trips on BLM-designated “open’ roads. There would be no change in the number of vehicles utilizing Fort Irwin gates.

3.12 Cumulative Impacts

The scope of the main EA analysis was focused on relevant resources as explained in Section 3-2. This cumulative impact analysis is similarly focused and includes consideration of relevant reasonably foreseeable future actions listed in Table 3-1 (40 CFR 1508.1(g)).

3.12.1.1 Air Quality

Implementation of the Proposed Action under the Proposed Action, in addition to the reasonably foreseeable future actions listed in Table 3-1, may result in additional impacts on air quality. All the reasonably foreseeable future projects listed in Table 3-1 are construction projects. With the addition of these proposed construction projects at NTC and Fort Irwin and regionally, local air quality may be impacted as fugitive dust and other criteria pollutant emissions may increase; however, these increases would be temporary, localized, and short term. Thus, the potential cumulative impact on air quality would be negligible, and impacts on air quality would not be significant. Also, emissions from construction projects can be greatly reduced by following standard best practices for fugitive dust mitigation and emissions control. Such measures would substantially reduce particulate dust and other pollutants if several projects occur simultaneously.

3.12.1.2 Land Use

The Proposed Action would be implemented in accordance with all NTC and Fort Irwin land use policies and regulations as well as with the 2021 BO, 2023 LEIS, and the DTTP. All desert tortoise translocation activities would occur on Army-owned lands and long-term monitoring would be limited to Army-owned and public lands. Further, all other reasonably foreseeable proposed projects on NTC and Fort Irwin, as well as those proposed on BLM-managed lands proximate to the recipient sites, would also be compatible with existing and future land uses and land use plans. Therefore, the Proposed Action in combination with other reasonably foreseeable future projects have no cumulative impacts on land use.

3.12.1.3 Soils

Other proposed projects described in Table 3-1 involving grading, excavations, and construction or demolition could result in erosion-induced soil loss and sedimentation of adjacent ephemeral drainages and watersheds. Potential cumulative effects would include an increase in soil disturbance associated with construction, demolition, and road-building activities that could substantially increase erosion, soil creep, and unstable slopes. These impacts would be minimized by the use of best management practices during construction activities and site restoration to minimize soil erosion and reduce fugitive dust. With the implementation of best management practices during all construction activities for the projects listed in Table 3-1, in combination with vehicle and helicopter use on unpaved road surfaces under the Proposed Action, there would be short-term, negligible, cumulative adverse impacts on soils at NTC and Fort Irwin and regionally.

3.12.1.4 Water Resources

The Proposed Action implementation would disturb approximately 40 square feet of soil surface through tortoise burrow excavation activities. The proposed reasonably foreseeable projects listed in Table 3-1 would have the potential to adversely impact surface water from sedimentation and transport of petroleum, oil, and lubricants from construction equipment into

stormwater. However, the construction projects as described in Table 3-1 would be subject to the implementation of best management practices to protect surface water quality. However, following the completion of various proposed construction projects described in Table 3-1, there would be more impervious surfaces increasing the rate of stormwater discharge during rain events. Therefore, the implementation of the Proposed Action under the Proposed Action in combination with other proposed construction projects described in Table 3-1 would have long-term, minor, adverse cumulative impacts on water resources.

3.12.1.5 Biological Resources

The Proposed Action in combination with reasonably foreseeable future actions on and off NTC and Fort Irwin as described in Table 3-1 would potentially result in long-term, minor, cumulative adverse impacts on vegetation and wildlife due to a direct loss of vegetation from construction activities and loss of wildlife habitat from the removal of vegetation and creation of more developed area. However, no sensitive plant or wildlife resources would be impacted because of the Proposed Action or other proposed project. All noise impacts from proposed construction projects listed in Table 3-1 would be short term. There would be no cumulative effects on any federally listed species as all proposed projects on federal lands, including NTC and Fort Irwin, would fully comply with the requirements of the ESA.

3.12.1.6 Cultural Resources

The implementation of the Proposed Action under the Proposed Action, in addition to the reasonably foreseeable future actions listed in Table 3-1, is not anticipated to result in incremental or cumulative effects on historic properties, including archaeological sites, architectural resources, or traditional cultural properties as all activities on the WTA would be subject to the PA between NTC and Fort Irwin, the SHPO, the Advisory Council on Historic Preservation, and invited signatories (the Fort Mojave Indian Tribe, the Yuhaaviatam of San Manuel Nation, and the Timbisha Shoshone). Other projects off-post that include federal involvement, including those on federal lands or that receive federal funding, would also be subject to the requirements of the NHPA.

3.12.2 No Action Alternative

There would be no implementation of desert tortoise translocation activities, including clearance surveys, translocation of tortoises from the WTA to the recipient sites, and long-term monitoring of tortoises. Therefore, there would be no cumulative impacts on any resource area under the No Action Alternative.

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4.0 Summary of Environmental Effects

This EA contains a comprehensive evaluation of the existing conditions and environmental consequences of implementing the Proposed Action and the No Action Alternative, as required by NEPA. The potential direct, indirect, and cumulative impacts were evaluated.

Based on the findings of this EA, implementation of either the Proposed Action or No Action Alternative would not have significant adverse, direct, indirect, or cumulative effects on the quality of the environment (Table 4-1). Based upon the analysis of potential impacts, the Army has determined that implementing the Proposed Action does not constitute a major federal action that significantly affects the quality of the environment. This EA finds that no significant adverse impacts on human health or the environment are anticipated from the Proposed Action. Because there would be no significant impact resulting from the Proposed Action, a Draft FNSI has been prepared to accompany this EA, and an Environmental Impact Statement, the next higher level of environmental impact investigation under NEPA, is not anticipated or expected from the Proposed Action.

Table 4-1 Summary of Conclusion of Potential Impacts

Impact Category	Proposed Action	No Action Alternative	Discussion within the EA
Air Quality	Additional vehicle travel and helicopter flights would increase exhaust emissions and particulate matter. There would be minor, adverse impacts on air quality from vehicle and helicopter emissions during translocation and monitoring. There would be no air quality emissions from stationary sources. Greenhouse gas emissions would be insignificant.	There would be no additional emissions from vehicles and helicopters and no air quality impacts.	Section 3.5
Land Use	There would be no changes in designated land uses. Translocation and monitoring activities would be compatible with designated land uses on the WTA and Translocation and Control Sites. Vehicle travel would remain on existing roads in the WTA and on BLM-designated “open” roads on BLM lands.	There would be no impacts on land use in the Translocation and Control Sites. There would be moderate long-term adverse impacts on land use in the WTA, as the requirements of the military mission for use of the WTA for military training activities would not occur without desert tortoise translocation.	Section 3.6
Soils	Up to approximately 80 cubic feet of soils could be disturbed in the WTA by excavating burrows to remove desert tortoises during clearance surveys. Disturbed soils would be recompacted after the removal of tortoises from burrows to the extent practicable. No	There would be no soil-disturbing activities in the WTA or the Translocation or Control Sites. There would be no impacts on soils.	Section 3.7

Impact Category	Proposed Action	No Action Alternative	Discussion within the EA
	new soil disturbance would occur from vehicle and helicopter use during tortoise translocation and monitoring.		
Water Resources	There would be no impacts on floodplains or waters of the U.S. The disturbance of up to 80 cubic feet of soils on the WTA for the removal of tortoises from burrows during clearance surveys could adversely impact water quality of ephemeral streams through sediment transport during storm events. Disturbed soils would be recompacted to the extent practicable after the removal of tortoises from burrows to minimize these impacts.	There would be no soil disturbance that could increase sediment transport to nearby ephemeral streams. There would be no impact on water resources.	Section 3.8
Biological Resources	The removal of up to 10 tortoises from burrows via excavation would directly impact vegetation on the WTA, and disturbed soils would increase the potential for invasive plant species colonization. Soils would be replaced following tortoise removal. Excavated areas would naturally revegetate. Increased vehicular traffic and helicopter use would have negligible, adverse, long-term impacts on wildlife from increased noise and vehicle movement. However, all vehicular activities would remain on existing and designated “open” roads. Desert tortoise translocation would occur in accordance with the 2021 BO. Desert tortoise translocation would augment existing populations in the Translocation Sites providing a beneficial impact. There would be no impacts on any other special status species.	Resident tortoises would remain on the WTA and would not be translocated to the Translocation Sites. No impacts on biological resources would occur.	Section 3.9
Cultural Resources	The excavation of up to 10 burrows on the WTA could impact cultural resources. When soil disturbance would be required, biologists would notify the Fort Irwin CRM of the exact location where the burrow would be excavated. The CRM would identify and evaluate the burrow excavation requirements relative to identified historic properties (Stipulation III of the PA), if applicable, and subsequently assess the potential effects of the undertaking to historic properties as described Stipulation IV in the PA. By following the requirements of the PA for any ground-disturbing activities needed to remove tortoises from burrows, there would be no adverse effect on, and therefore no significant impacts on, historic properties in the WTA.	There would be no ground-disturbing activities in the WTA or in the Translocation and Control Sites. Therefore, there would be no effects on historic properties.	Section 3.10

Impact Category	Proposed Action	No Action Alternative	Discussion within the EA
Transportation	An average of 10 vehicles would be used daily in fall 2024 and spring 2025 to support translocation activities causing an increase of vehicular traffic on paved and unpaved roads extending from Fort Irwin to the Translocation Sites. Following translocation activities, an average to two vehicles would be used daily to support monitoring efforts for 25 years in the Translocation and Control Sites. There would be no impacts to the Fort Irwin gate traffic.	There would be no additional vehicle trips on the WTA or in the Translocation and Control Sites. There would be no impacts on transportation.	Section 3.11

EA – Environmental Assessment; **WTA** – Western Training Area; **BLM** – Bureau of Land Management; **U.S.** – Untied States; **BO** – Biological Opinion; **CRM** – Cultural Resources Manager; **PA** – Programmatic Agreement

Best Management Practices

Mitigation is used to reduce, avoid, or compensate for significant adverse impacts. However, this EA does not identify the need for mitigation measures because the Proposed Action would not result in any significant impacts on the natural or human environment. The Army would consider the use of best management practices (BMPs) during translocation activities. The following BMPs are to be considered for implementation as a part of the Proposed Action:

- Air Quality – All vehicle travel would remain on existing paved and unpaved roads designated as “open” by BLM. No off-road vehicular travel or vehicular travel on roads not designated as “open” by BLM would occur. All helicopter takeoffs and landings would occur on existing roadways or previously disturbed areas.
- **Soils** – No off-road vehicular travel would occur.
- **Water Resources** – No off-road vehicular travel would occur.
- **Biological Resources** – Only qualified biologists who meet the education and experience requirements of the 2021 BO would support translocation activities. Biologists would all be familiar with other special status species that could occur in the WTA and Translocation and Control Sites for avoidance where possible. Tortoise populations at Translocation Sites with previously low density would be augmented.

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Appendix A. Abbreviations and Acronyms

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ACAM	Air Conformity Applicability Model
ACEC	Area of Critical Environmental Concern
APE	Area of Potential Effects
Army	Department of the Army
BGEPA	Bald and Golden Eagle Protection Act
BLM	Bureau of Land Management
BLMS	Bureau of Land Management Sensitive
BMP	Best Management Practice
BO	Biological Opinion
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CDCA	California Desert Conservation Area
CDFW	California Department of Fish and Wildlife
CEQ	Council on Environmental Quality
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CO	carbon monoxide
CO_2e	carbon dioxide equivalents
CRM	Cultural Resources Manager
CS	Control Site
CS1	Control Site 1
CS2	Control Site 2
DCH	designated critical habitat
DoD	Department of Defense
DoI	Department of the Interior
DTTP	Desert Tortoise Translocation Plan
EA	Environmental Assessment
ELISA	Enzyme-Linked Immunosorbent Assay
EO	Executive Order
ESA	Endangered Species Act
FC	federal candidate

FE	federally endangered
FLPMA	Federal Land Policy and Management Act
FNSI	Finding of No Significant Impact
FPT	federally proposed threatened
FT	federally threatened
GHG	greenhouse gases
I-15	Interstate 15
I-40	Interstate 40
ID	identification number
INRMP	Integrated Natural Resources Management Plan
LEIS	Legislative Environmental Impact Statement
$\mu g/m^3$	micrograms per cubic meter
MBTA	Migratory Bird Treaty Act
MDAQMD	Mojave Desert Air Quality Management District
mg/m^3	milligrams per cubic meter;
MPRC	Multipurpose Range Complex
N/A	not applicable
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NH_3	ammonia
NHPA	National Historic Preservation Act
NO_2	nitrogen dioxide
NO_x	nitrogen oxide
NOA	Notice of Availability
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NSR	New Source Review
NTC	National Training Center
O_3	ozone
OHV	off-highway vehicle
PA	Programmatic Agreement
Pb	lead

$PM_{2.5}$	respirable particulate matter less than or equal to 2.5 micrometers in diameter
PM_{10}	respirable particulate matter less than or equal to 10 micrometers in diameter
ppb	parts per billion
ppm	parts per million
PSD	prevention of significant deterioration
qPCR	quantitative polymerase chain reaction
RASP	Recovery and Sustainment Partnership
ROI	Region of Influence
SC	state candidate
SCE	Southern California Edison
SE	state endangered
SF	fully protected
SHPO	State Historic Preservation Office
SO_2	sulfur dioxide
SSC	species of special concern
SRMA	Special Recreation Management Area
ST	state threatened
TS	Translocation Site
TS1	Translocation Site1
TS2	Translocation Site 2
TS3	Translocation Site 3
U.S.	United States
USC	United States Code
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UTM	Universal Transverse Mercator
VOC	volatile organic compound
WTA	Western Training Area
WTATS	Western Training Area Translocation Site

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Appendix B. Public and Agency Correspondence and Notices

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Example Scoping Letters

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DEPARTMENT OF THE ARMY
HEADQUARTERS, UNITED STATES ARMY GARRISON
BLDG 237, B AVE, P.O. Box 105021
FORT IRWIN, CA 92310-5000

January 18, 2024

Julie Hendrix
Natural Resources Specialist
U.S. Navy, Naval Air Weapons Station (NAWS) China Lake
429 E. Bowen Road, MS 4014
Building 00982
Floor 1
China Lake, CA 93555-6108

Subject: Environmental Assessment (EA) for Translocation of Desert Tortoise in the Western Training Area (WTA), Fort Irwin, California

Dear Julie Hendrix:

The Department of the Army (Army) is preparing an EA to evaluate potential environmental effects of translocating desert tortoises from the WTA, National Training Center (NTC), Fort Irwin, California. The EA is being prepared in accordance with the National Environmental Policy Act of 1969 (NEPA), Section 102(2)(C); the Council on Environmental Quality's (CEQ's) regulations for implementing the procedural provisions of NEPA and the CEQ's September 2020 update for implementing the procedural provisions; Code of Federal Regulations (CFR) Title 40 Parts 1500 through 1508 (CEQ 1978); and 32 CFR 651, Environmental Analysis of Army Actions. The purpose of this letter is to request your early comments on this proposed project and potential environmental impacts.

The NTC and Fort Irwin provide training for the Army and joint military branches. Because of its size, design, and terrain, the NTC is one of the few places in the world where brigade-size units (5,000+ soldiers and 600 to 1,200 armored vehicles) can test their combat readiness. The Army prepared the 2023 *Final Legislative Environmental Impact Statement for Military Training and Public Land Withdrawal Extension* (2023 LEIS), which analyzed the potential environmental impacts associated with modernizing training, improving the training infrastructure, and extending the existing land withdrawal for an additional 25 years. The 2023 LEIS Preferred Alternative includes initiating training activities in the WTA of Fort Irwin. The 2023 LEIS Preferred Alternative included relocation of the Mojave desert tortoise (*Gopherus agassizii*) from the WTA in advance of the initiation of training in 2025 per the agreements in the 2014 Biological Opinion and the 2021 Biological Opinion. Further, Public Law 107-107 requires full compliance with the Endangered Species Act (ESA) for military use of withdrawn lands that include ground disturbance, and compliance with the ESA would also require relocation of desert tortoises.

The purpose of the Proposed Action is to support the NTC requirements to assist deployable units in preparing their soldiers and to serve as a leadership crucible before soldiers are deployed into combat. The Proposed Action is needed to relocate desert tortoises from the WTA prior to initiating training in 2025 as required per the agreements in the 2014 and 2021 Biological Opinions. Training activities in the WTA as described in the 2023 LEIS cannot proceed until the requirements of the 2014 and 2021 Biological Opinions are met and desert tortoises are translocated from the WTA to other suitable habitats.

The Proposed Action would implement the Desert Tortoise Translocation Plan and would translocate Mojave desert tortoises that could be negatively affected by training activities in the WTA. The Proposed Action would conduct 100 percent clearance surveys in suitable desert tortoise habitats (which includes southwest exposures, loamy soils, adequate forage, and low predator densities) to detect desert tortoises in the WTA, translocate desert tortoises from the WTA to recipient sites, and monitor translocated tortoises. All healthy desert tortoises detected during 100 percent clearance surveys would be translocated to the WTA Translocation Site; sick and juvenile desert tortoises would be held temporarily in holding pens on Fort Irwin (or at a U.S. Fish and Wildlife Service approved headstart facility) prior to being translocated to the WTA Translocation Site.

The EA will identify the potential social, economic, and environmental impacts related to the Proposed Action and a No Action Alternative. The preparation of the EA will also be coordinated with Section 7 of the Endangered Species Act and Section 106 of the National Historic Preservation Act. As part of the early coordination and scoping process, we would like to provide you the opportunity to help identify key issues that will need to be addressed as part of the EA.

The Army respectfully requests your comments relative to specific environmental, social, and/or economic issues or geographic areas of concern; available technical information regarding the Proposed Action, and mitigation or permitting requirements that may be necessary for project implementation.

Comments on the Proposed Action and its alternatives will be accepted for 30 calendar days from the receipt of this letter. Comments received during this time will be used during the preparation of the EA. Written comments should be submitted to usarmy.jbsa.aec.nepa@mail.mil or can be mailed directly to: David Housman, Fort Irwin Directorate of Public Works, Environmental Division, P.O. Box 105085, Fort Irwin, California, 92310-5085.

Please contact me if you have any questions. I can be reached by email or mail to the physical address previously provided, or by phone at 760-380-7032.

Sincerely,

David Housman
Supervisory Natural Resources Specialist
DPW-Environmental Division

DEPARTMENT OF THE ARMY
HEADQUARTERS, UNITED STATES ARMY GARRISON
BLDG 237, B AVE, P.O. Box 105021
FORT IRWIN, CA 92310-5000

January 18, 2024

Chairman Robert Gomez
Kern Valley Indian Council
PO Box 833
Weldon, CA 93283

Subject: Environmental Assessment (EA) for Translocation of Desert Tortoise in the Western Training Area (WTA), Fort Irwin, California

Dear Chairman Gomez:

The purpose of this letter is two-fold: to give you an opportunity to review and comment on a proposed action in which you may have an interest and to invite your participation in government-to-government consultation with the Department of the Army (Army), pursuant to Section 106 of the National Historic Preservation Act (NHPA) regarding the proposed action, the translocation of desert tortoises.

The Army is preparing an EA to evaluate potential environmental effects of translocating desert tortoises from the WTA, National Training Center (NTC), Fort Irwin, California. The EA is being prepared in accordance with the National Environmental Policy Act of 1969 (NEPA), Section 102(2)(C); the Council on Environmental Quality's (CEQ's) regulations for implementing the procedural provisions of NEPA and the CEQ's September 2020 update for implementing the procedural provisions; Code of Federal Regulations (CFR) Title 40 Parts 1500 through 1508 (CEQ 1978); and 32 CFR 651, Environmental Analysis of Army Actions. The purpose of this letter is to request your early comments on this proposed project and potential environmental impacts.

The NTC and Fort Irwin provide training for the Army and joint military branches. Because of its size, design, and terrain, the NTC is one of the few places in the world where brigade-size units (5,000+ soldiers and 600 to 1,200 armored vehicles) can test their combat readiness. The Army prepared the 2023 *Final Legislative Environmental Impact Statement for Military Training and Public Land Withdrawal Extension* (2023 LEIS), which analyzed the potential environmental impacts associated with modernizing training, improving the training infrastructure, and extending the existing land withdrawal for an additional 25 years. The 2023 LEIS Preferred Alternative includes initiating training activities in the WTA of Fort Irwin. The 2023 LEIS Preferred Alternative included relocation of the Mojave desert tortoise (*Gopherus agassizii*) from the WTA in advance of the initiation of training in 2025 per the agreements in the 2014 Biological Opinion and the 2021 Biological Opinion. Further, Public Law 107-107 requires full compliance with the Endangered Species Act (ESA) for military use of withdrawn lands that include ground disturbance, and compliance with the ESA would also require relocation of desert tortoises.

The purpose of the Proposed Action is to support the NTC requirements to assist deployable units in preparing their soldiers and to serve as a leadership crucible before soldiers are deployed into combat. The Proposed Action is needed to relocate desert tortoises from the WTA prior to initiating training in 2025, as required per the agreements in the 2014 and 2021 Biological Opinions. Training activities in the WTA as described in the 2023 LEIS cannot proceed until the requirements of the 2014 and 2021 Biological Opinions are met and desert tortoises are translocated from the WTA to other suitable habitats.

The Proposed Action would implement the Desert Tortoise Translocation Plan and would translocate Mojave desert tortoises that could be negatively affected by training activities in the WTA. The Proposed Action would conduct 100 percent desert tortoise clearance surveys in suitable desert tortoise habitats (which includes southwest exposures, loamy soils, adequate forage, and low predator densities) to detect desert tortoises in the WTA, translocate desert tortoises from the WTA to recipient sites, and monitor translocated tortoises. All healthy desert tortoises detected during 100 percent clearance surveys would be translocated to the WTA Translocation Site; sick and juvenile desert tortoises would be held temporarily in holding pens on Fort Irwin (or at a U.S. Fish and Wildlife Service approved headstart facility) prior to being translocated to the WTA Translocation Site.

The EA will identify the potential social, economic, and environmental impacts related to the Proposed Action and a No Action Alternative. The preparation of the EA will also be coordinated with Section 7 of the Endangered Species Act and Section 106 of the National Historic Preservation Act. Pursuant to Section 106, activities that the EA is expected to cover include the potential excavation of desert tortoises, only where necessary to safely relocate them; no ground disturbance is anticipated at the recipient sites.

As part of the early coordination and scoping process, we would like to provide you the opportunity to help identify key issues that will need to be addressed as part of the EA. The Army respectfully requests your comments relative to specific environmental, social, and/or economic issues or geographic areas of concern; available technical information regarding the Proposed Action; and mitigation or permitting requirements that may be necessary for project implementation.

As part of the Environmental Analysis of Army Actions, and pursuant to Section 106 of the NHPA, implementing 36 Code of Federal Regulations Part 800, and Department of Defense Instruction 4710.02 Section 3, DoD Interactions with Federally Recognized Tribes, we request government-to-government consultation on this Proposed Action. Specifically pursuant to 36 Code of Federal Regulations § 800.4(a)(4), we invite you to provide information on any properties of historic, religious, or cultural significance that may be affected by the implementation of the proposed undertaking. As the proposed action is defined as a federal undertaking, we are seeking input and inviting participation from other consulting parties, such as the California State Historic Preservation Office.

Please forward your written comments or requests for additional information at your earliest convenience to usarmy.jbsa.aec.nepa@mail.mil or mail them directly to: Brenda Reed, Fort Irwin Directorate of Public Works, Environmental Division, P.O. Box 105085, Fort Irwin, California, 92310-5085. Comments on the proposed action and its alternative will be accepted for 30 calendar days from the receipt of this letter. If you have any questions, I can be reached by email (brenda.l.reed33.civ@army.mil) or by mail to the physical address previously provided, or by phone at 760-380-3740.

Sincerely,

Brenda Reed

Brenda Reed
Installation Archaeologist
DPW-Environmental Division

CF: Mr. Robert Robinson
Tribal Historic Preservation Officer

Scoping Period Correspondence Received

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California Program Office
P.O. Box 401 | Folsom, California 95763 | 916.313.5800
www.defenders.org

February 20, 2024

Dr. David Housman
Supervisory Natural Resources Specialist
Fort Irwin Directorate of Public Works, Environmental Division
Building 602, Fifth Street
Fort Irwin, CA 92310–5085
Sent via email to: david.c.housman.civ@mail.mil; usarmy.jbsa.aec.nepa@mail.mil

Re: Scoping notice for translocation of desert tortoises from the Western Training Area, Fort Irwin

Dr. Housman;

Thank you for the opportunity to submit scoping comments on the proposal to translocate desert tortoises from the Western Training Area (WTA) at Fort Irwin to habitats outside the installation boundary. This scoping comment letter is submitted by Defenders of Wildlife (Defenders) on behalf of its 2.1 million members and supporters in the U.S., including 316,000 in California.

Defenders is a national conservation organization founded in 1947 and dedicated to protecting all wild animals and plants in their natural communities. To this end, we employ science, public education and participation, media, legislative advocacy, litigation, and proactive on-the-ground solutions to impede the accelerating rate of extinction of species, associated loss of biological diversity, and habitat alteration and destruction.

Project Background Information

The Army proposes to translocate desert tortoises from the 61,776 acre WTA and consistent with the terms and conditions in recent biological opinions issued to the Army by the U.S. Fish and Wildlife Service (USFWS). The entire area is within the Superior-Cronese Critical Habitat Unit (CHU) for the threatened desert tortoise. According to the USFWS,[1] use of the WTA for increased training would require the translocation of approximately 1,100 adult and sub-adult desert tortoises off the site to adjacent lands owned by the Army and public lands managed by the BLM. Some desert tortoises (hatchlings and juveniles) would remain within the area because they would not be detected during capture and translocation activities. Translocation would include mandatory monthly monitoring of approximately 660 individual desert tortoises which will continue for a period of five years. The primary purpose of this monitoring is to determine the effects of translocation on both resident and translocated desert tortoises, including movements of individuals and mortality. The Army has not used the WTA for any training activities since it was added to Fort Irwin in 2002.

[1] Biological Opinion for the Proposed Addition of Maneuver Training Lands at Fort Irwin, California (8-8-09-F-43R)

Scoping Comments

Defenders scoping comments for the proposed translocation of desert tortoises from the WTA to lands owned by the U.S. Army and public lands managed by the BLM are as follows:

1. Recipient areas for translocation of desert tortoises

We recommend all areas where desert tortoises would be translocated to from the WTA be within the Superior-Cronese CHU, and that they exclude all human uses that pose a threat to the species, including all motorized off-highway use, mining, and livestock grazing.

For translocations to U.S. Army lands outside the installation, we recommend that durable fencing to exclude all motorized vehicle and off-highway vehicle use be installed and maintained in perpetuity. Any translocations to public land managed by the BLM should also be fenced to exclude such motorized vehicle use. We consider these habitat protection actions necessary for the translocation to succeed because of the widespread and intense use of motorized vehicles, including significant unauthorized vehicle use on closed routes and cross-country use that created new routes.

While closure of routes with signing and vertical mulching is a common form of route closure by the BLM, it has proven largely ineffective in preventing continued unauthorized motorized off-highway vehicle use. Thus, permanent fencing to exclude this use is necessary.

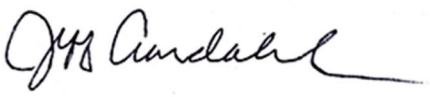
2. Mitigation measures to offset the impact of translocating desert tortoises

We recommend that the U.S. Army fund two BLM law enforcement rangers for five years that are dedicated to enforcing motorized off-road vehicle area and route closures in the Superior-Cronese CHU. Likewise, the U.S. Army should enforce these closures of its approximately 104,000 acres of land in the Superior-Cronese CHU that it acquired in 2004 to offset the impacts of expanding Fort Irwin.

Conclusion

Defenders hopes our comments and recommendations are useful to the U.S. Army in preparing an Environmental Assessment for the translocation of desert tortoises form the WTA. Please contact me via my email address, listed below, if you would like to discuss our letter further, or explore additional opportunities to mitigate the impacts of translocation of desert tortoises.

Sincerely,



Senior California Representative
Defenders of Wildlife
jaardahl@defenders.org

From: Housman, David C CIV USARMY USAG (USA)
Sent: Thursday, February 22, 2024 10:26 AM
To: 'Ed Larue'
Cc: Davis, David H CIV USARMY IMCOM HQ (USA)
Subject: RE: Draft EA for translocation of tortoises from the Western Training Area at Fort Irwin

Greetings Mr. LaRue,

Although the scoping comment period has closed, if you have comments beyond the two documents you provided, send them and the comments will be given consideration.

VR,
David C. Housman
Supervisory Natural Resources Specialist

Directorate of Public Works
USAG Fort Irwin, California 92310-5085
Office – 760-380-7032
Office: MWF 1000-1530; Tu 0900-1530
View our community calendar

New to NTC/Fort Irwin?

From: Ed Larue
Sent: Wednesday, February 21, 2024 3:42 PM
To: Housman, David C CIV USARMY USAG (USA)
Cc: Davis, David H CIV USARMY IMCOM HQ (USA) Judy Hohman; Jeff Aardahl; Ileene Anderson David Hedrick
Subject: Re: Draft EA for translocation of tortoises from the Western Training Area at Fort Irwin

Dear Mr. Houseman,

I interpret your response as a denial of our request for an extension to March 1 to provide scoping comments. We look forward to receiving the draft EA when available.

Regards,

Ed LaRue

On Wednesday, February 21, 2024 at 12:44:21 PM PST, Housman, David C CIV USARMY USAG (USA) wrote:

Greetings Mr. LaRue,

I am writing in response to the attached email chain I received today from our installation Wildlife Biologist, Mr. David Davis. Unfortunately, my email was misspelled in the attempt to contact me, so I never saw your message until today. It was an inadvertent oversight not sending the Desert Tortoise Council a scoping letter for the upcoming Environmental Assessment (EA). To be clear, the EA has not been completed nor gone out for public review; we have only sent scoping letters. When the EA is released for public comment that will afford the Desert Tortoise Council an opportunity to offer comment on the proposed action.

Thank you for your concern on this matter.

Respectively,

Dave

VR,

David C. Housman

Supervisory Natural Resources Specialist

Directorate of Public Works

USAG Fort Irwin, California 92310-5085

Office – 760-380-7032

Office: MWF 1000-1530; Tu 0900-1530

View our community calendar

New to NTC/Fort Irwin?

Please let me know if the Army extends this date for comments.

Thanks.

From: Ed Larue
Sent: Tuesday, February 20, 2024 4:18 PM
To:
Cc: Davis, David H CIV USARMY IMCOM HQ (USA); Judy Hohman ; Jeff Aardahl; Ileene Anderson; David Hedrick
Subject: Fw: Draft EA for translocation of tortoises from the Western Training Area at Fort Irwin

Dear Mr. Houseman,

Please see the email I sent to the indicated recipients on 2/16/2024. Whereas I may have sent the email to the wrong person - you being the right person - I am disappointed to report that none of the Army recipients responded to my query. Now, today is the deadline, and the Desert Tortoise Council has been excluded from this important, missed opportunity to participate, due to lack of contact from the Army.

Again, given the circumstances, we ask that the Desert Tortoise Council be given an extension to March 1 so that we may be able to provide our comments by then.

Thanks!

Ed LaRue

Desert Tortoise Council

Ecosystems Advisory Committee

----- Forwarded Message -----

From: Ed Larue

To: usarmy.jbsa.aec.nepa@mail.mil <usarmy.jbsa.aec.nepa@mail.mil>

Cc: Judy Hohman Jeff Aardahl; Ileene Anderson ; David Hedrick

Sent: Friday, February 16, 2024 at 02:34:32 PM PST

Subject: Draft EA for translocation of tortoises from the Western Training Area at Fort Irwin

Dear Army,

The Desert Tortoise Council wrote comment letters on the expansion of Fort Irwin, which are attached. In both of those letters, we asked to be identified and contacted as an Affected Interest for all activities associated with the Fort Irwin expansion into the Western Training Area, which certainly includes the Army's intent to translocate tortoises.

It has come to our attention only this afternoon, as per the following information, that an EA, unbeknownst to us, has been issued to the public with comments due in four days, on February 20:

We received the following email on the afternoon of February 16:

"*Environmental Assessment for Translocation of Desert Tortoises in the Western Training Area (WTA) of Fort Irwin, CA*

David Housman, Supervisory Natural Resources Specialist, DPW-Environmental Division

P.O. Box 105085, Fort Irwin, CA 92310-5085

760/380-7032

usarmy.jbsa.aec.nepa@mail.mil

GOOD LUCK!!

Debb Henggeler

Fundraising and Grants Chair

CTTC- High Desert Chapter

Victorville, CA 92393"

Our 49th annual Symposium is on February 20, and there is no way we can meet this deadline given the Army's failure to contact us with this draft EA as requested, twice! Our symposium is from February 20 through 23, 2024.

Given the above information, we request an extension to March 1, 2024 to allow us adequate time to respond due to the Army's lack of solicitation of public input.

Importantly, since we never received a copy of the Draft EA, we also ask that you respond to this email with a copy of the document or a link to it.

Ed LaRue

Desert Tortoise Council

Ecosystems Advisory Committee

July 6, 2021

NEPA Planner
Fort Irwin Directorate of Public Works
Environmental Division
Building 602, Fifth Street
Fort Irwin, CA 92310–5085
Via email to: usarmy.jbsa.aec.nepa@mail.mil

Re: Comments on Draft Environmental Impact Statement for Training and Public Land Withdrawal Extension, Fort Irwin, California

Dear Sir or Madam:

Thank you for the opportunity to submit comments on the Draft Environmental Impact Statement (DEIS) for the proposed Training and Public Land Withdrawal Extension at Fort Irwin, California (Proposed Action). Comments included in this letter are submitted by Defenders of Wildlife (Defenders) on behalf of its 2.2 million members and supporters in the U.S., including 323,000 in California and by the Desert Tortoise Council (Council), which functions to conserve and recover wild tortoises in sustainable habitats. Defenders submitted scoping comments on the Proposed Action along with the Council in a letter dated September 8, 2020.

Defenders is a national conservation organization founded in 1947 and dedicated to protecting all wild animals and plants in their natural communities. To this end, we employ science, public education and participation, media, legislative advocacy, litigation, and proactive on-the-ground solutions to impede the accelerating rate of extinction of species, associated loss of biological diversity, and habitat alteration and destruction.

The Council is a non-profit organization comprised of hundreds of professionals and laypersons who share a common concern for wild desert tortoises and a commitment to advancing the public's understanding of desert tortoise species. Established in 1975 to promote conservation of tortoises in the deserts of the southwestern United States and Mexico, the Council routinely provides information and other forms of assistance to individuals, organizations, and regulatory agencies on matters potentially affecting desert tortoises within their geographic ranges.

Brief Description of the Proposed Action (taken directly from the DEIS)

"Fort Irwin is comprised of 753,537 acres in the Mojave Desert southern California and within the California Desert Conservation Area (CDCA). The National Training Center (NTC) at Fort Irwin trains various types of Army Brigade Combat Teams (BCTs) and provides joint training for all branches of the U.S. military. Up to 12 BCT training rotations occur per year on numerous training areas and fixed ranges which accommodate mechanized equipment and live-fire exercises and training on the use of individual weapons systems. The Proposed Action includes modernized training, training infrastructure improvements and the extension of the existing land withdrawal. The Proposed Action is necessary to support new training doctrine with large combat operations against near-peer adversaries, accommodate testing and training with new weapons systems."

"Approximately 110,000 acres of Fort Irwin are public lands withdrawn from all types of appropriation and reserved for military purposes under Public Law 107–107 in 2001, which expires on December 28, 2026. The Army has a continuing military need for use of the withdrawn public land and intends to request that the U.S. Congress extend the withdrawal for at least 25 years, or in the alternative, for an indefinite period until there is no longer a military need for the land. Upon a separate application by the Army, the Bureau of Land Management will file a notice in the Federal Register of a U.S. Army withdrawal extension application. The Final EIS will be submitted to the U.S. Congress as a Legislative EIS to support the request for extension of the current land withdrawal and reservation for continued use by the U.S. Army."

"The Draft EIS analyzes a range of Proposed Mission Change Alternatives to the Proposed Action-No Mission Change, a Withdrawal Extension and a No Withdrawal Extension Alternative. The Mission Change Alternatives include different intensity and extent of training and training infrastructure. In the Western Training Area, a range of medium-to-heavy intensity training alternatives are analyzed. The No Mission Change Alternative would continue training at the current level with no modernization of training or improvement of training infrastructure."

"The Withdrawal Extension Alternative would extend the current withdrawal for 25 years or indefinitely until there is no longer a military need for the land. The No Withdrawal Extension Alternative would result in 110,000 acres in the Western and Eastern Training Areas returned to the public domain and managed by the Bureau of Land Management (BLM). The decision on the proposed land withdrawal will be made by the U.S. Congress. The U.S. Army Preferred Alternative has not been determined at this time and will be described in Final EIS."

"The Mission Change Alternatives would result in minor-to-moderate adverse effects that would be in addition to the effects of the No Mission Change Alternative; however, none of the effects would be significant. The environmental effects from the Withdrawal Extension Alternative would be comparable to those discussed for the Mission Change Alternatives. While the effects of the No Withdrawal Extension Alternative are uncertain, because of the unknown future uses of these areas if Army training is not conducted, it is expected that the No Withdrawal Extension Alternative would result in negligible effects on resources compared to the Withdrawal Extension Alternative."

DEIS Comments

We submit the following comments and recommendations on the DEIS:

1. **Western Training Area (WTA)**

The WTA was added to Fort Irwin through federal legislation signed into law on December 21, 2002. It is comprised of 61,776 of public land withdrawn from public land laws and entry under the mining law for exclusive use by the Army.

Comment/Agassiz's Desert Tortoise: Of all the mission changes proposed within the various ranges and training areas, we are most concerned over potential adverse impacts within the WTA, which has remained unused since being added to Fort Irwin through federal legislation on December 21, 2002. The entire area is within the Superior-Cronese Critical Habitat Unit (CHU) for the threatened Agassiz's desert tortoise (*Gopherus agassizii*)[1]. Subsequent to being added to Fort Irwin, the Army fenced the area to identify the former public lands as being located within a military installation where public access is prohibited. Excluding public access to the WTA for a period of approximately 15 years has likely benefited the desert tortoise and numerous other uncommon plant and animal species through exclusion of all public use, especially including motorized vehicles.

According to the U.S. Fish and Wildlife Service (USFWS),[2,3] use of the WTA for increased training would require the translocation of approximately 1,100 adult and sub-adult desert tortoises off the site and onto adjacent lands owned by the Army and public lands managed by the BLM. Some desert tortoises (hatchlings and juveniles) would remain within the area because they would not be detected during capture and translocation activities.

To offset the impacts of the expansion of Fort Irwin, the Army acquired approximately 102,000 acres of private land within the Superior-Cronese and Ord-Rodman CHUs for the desert tortoise in approximately 2004. It also acquired livestock grazing permits and ranch base property for the Harper Lake, Cronese Lake and Cady Mountain allotments and facilitated the permanent removal of livestock and the allotments by BLM. The 2004 biological opinion stated, "All land purchased [by the Army] will directly or indirectly promote the survival, recovery, and conservation of the desert tortoise or Lane Mountain milk-vetch." The Army also provided funding to BLM to restore or rehabilitate unauthorized off-highway vehicle (OHV) routes and increase enforcement of OHV use restrictions on public lands. We greatly appreciate the Army's previous contributions to recovery of the desert tortoise.

The Army is proposing alternative training uses of the WTA, stating, "Training activities may increase substantially in the Western Training Area as the Army completes the necessary mitigation

[1] FWS. 2012. Biological Opinion for the Proposed Addition of Maneuver Training Lands at Fort Irwin, California (8-8-09-F-43R). Ventura Fish and Wildlife Office, Ventura, California. July 30, 2009.
[2] USFWS. 2004. Biological Opinion for the Proposed Addition of Maneuver Training Lands at Fort Irwin, California (1-8-03-F-48). Ventura Fish and Wildlife Office, Ventura, California. March 15, 2004.
[3] USFWS. 2012. Biological Opinion for the Proposed Addition of Maneuver Training Lands at Fort Irwin, California (8-8-09-F-43R). Ventura Fish and Wildlife Office, Ventura, California. July 30, 2009.

measures agreed upon in the 2005 SFEIS and Record of Decision (Fort Irwin, 2005, 2006), as well as measures now being developed in consultation with the USFWS."

Since the 2004 biological opinion, the status of the desert tortoise in the Western Mojave Recovery Unit, including the Superior-Cronese CHU, has changed, with an ongoing downward population trend through 2019.[4] According to Allison and McLuckie (2018)[5], density of adult desert tortoises in the Western Mojave Recovery Unit declined by 51 percent between years 2004-2014, with an annual rate of decline of 7.1 percent. The authors also stated, "However, if the area available to tortoises is decreasing, then trends in tortoise density no longer capture the magnitude of decreases in abundance." Their research did not take into account the loss of occupied, suitable habitat for the desert tortoise from the expansion of Fort Irwin, the Marine Corps Air Ground Combat Center at Twentynine Palms and numerous large-scale solar energy projects. Lastly, Allision and McLuckie (2018) concluded, "The negative population trends in most of the TCAs [Tortoise Conservation Areas] for Mojave Desert Tortoises indicate that this species is on the path to extinction under current conditions. This may reflect inadequate recovery action implementation, slow response by tortoises and their habitat to implemented actions, or new and ongoing human activities in the desert that have not been mitigated appropriately."

The 2009 biological opinion addressed the WTA where the density of adult desert tortoises was 16.4/km^2 (6.3/mi^2) in the corresponding Superior-Cronese CHU based on surveys performed from 2001-2005.[6] The density of adult desert tortoises in the Superior-Cronese CHU is currently 1.9/km^2 based on the 2019 rangewide monitoring report published by the Desert Tortoise Recovery Office of the USFWS.[7] The current density of adult desert tortoises is significantly less than the minimum viable density estimate of 3.9/km^2 from the USFWS 1994 recovery plan for the species.[8]

All desert tortoises detected within the WTA would be captured and released onto federal lands within the adjacent Superior-Cronese CHU through relocation (short distance adjacent to the WTA boundary, or translocation involving greater distances that exceed the average home range of an adult desert tortoise. The DEIS indicates desert tortoise relocation and translocation would follow "...agreements in the 2014 Biological Opinion (USFWS, 2014) and 2021 Biological Opinion that is being developed (Appendix 4.1A)."

Recommendation: We recommend the Army's use of the WTA be designed to be compatible with maintaining at a minimum, and preferably enhancing, the desert tortoise population. We suggest

[4] United States Fish and Wildlife Service. 2021. Desert Tortoise Recovery webpage. Monitoring. Desert Tortoise Recovery Office. Reno, Nevada. https://www.fws.gov/nevada/desert_tortoise/dtro/dtro_monitor.html.

[5] Allison, L.J. and A.M. McLuckie. 2018. Population Trends in Mojave Desert Tortoises (*Gopherus agassizii*). Herpetological Conservation and Biology 13(2):433-452. http://www.herpconbio.org/Volume_13/Issue_2/Allison_McLuckie_2018.pdf.

[6] United States Fish and Wildlife Service. 2006. Range-wide monitoring of the Mojave population of the desert tortoise: 2001-2005 summary report. Desert Tortoise Recovery Office. Reno, Nevada. https://www.fws.gov/nevada/desert_tortoise/documents/reports/rangewide_monitoring_report_20061024.pdf.

[7] United States Fish and Wildlife Service. 2020. Range-wide Monitoring of the Mojave Desert Tortoise (Gopherus agassizii): 2019 Annual Reporting. Desert Tortoise Recovery Office. Reno, Nevada. https://www.fws.gov/nevada/desert_tortoise/documents/reports/2020/2019_DRAFT_RangewideMojaveDesertTortoiseMonitoring.pdf.

[8] United States Fish and Wildlife Service. 1994. Desert Tortoise (Mojave Population) Recovery Plan. Desert Tortoise Recovery Office. Reno, Nevada. http://ecos.fws.gov/docs/recovery_plans/1994/940628.pdf.

maximizing the use of the WTA with aircraft and minimal use of the area by mechanized land-based vehicles. Aircraft impacts could be lessened by reducing the number of aircraft Logistics Support Areas (LSAs) to the minimum number needed to meet training needs. Based on our review of the DEIS, it appears WTA Alternative 1, Medium-intensity Aviation Task Force, may be compatible with retaining and enhancing the desert tortoise population and its habitat. Regarding land-based vehicle use, adjusting it to correspond with the less-active seasons of the desert tortoise (typically June-August and November-February) may substantially reduce potential direct impacts to the tortoise. Further minimizing the impacts of Alternative 1 could lead to another alternative, which we term a Low-intensity Aviation Task Force.

We offer this recommendation given the ongoing decline in adult desert tortoise populations in the Western Mojave Recovery Unit and specifically within the Superior-Cronese CHU, which are now considerably less than minimum viable density. This recommendation would preclude the need to capture, relocate and translocate up to approximately 1,100 desert tortoises from the WTA, including the corresponding multiyear telemetry studies necessary to track individual animals to determine the short and long-term effects of moving them out of the WTA.

Recommendation: If tortoises require relocation and translocation from the WTA onto adjacent federal land outside Fort Irwin, we recommend that the receiving area be fully protected from all multiple land use activities. This can be achieved through implementing specific land use controls as detailed below, along with development of a robust monitoring plan. The latter is needed to test the efficacy of implementing these protective measures and to provide remedies to address specific failures (e.g., regular repair of breaches in the perimeter fence):

- Perimeter fence
- Dedicated law enforcement patrol
- Closed to all motorized vehicle use
- Closed to all firearm use, including hunting
- Closed to public access except by permit
- Withdrawn from public land laws and entry under mining laws

We make this recommendation based on the steep, ongoing decline in the desert tortoise population throughout the Western Mojave Recovery Unit and the Superior-Cronese CHU adjacent to Fort Irwin. This decline is due to a variety of human and human-related factors which have degraded habitat and placed tortoises at risk. Vehicle use is associated with desert tortoise mortality and destruction of its critical habitat. Vehicle use is also associated with the spread of invasive non-native plants, vandalism, shooting, trash dumping and the subsidization of common ravens which prey on tortoises.

We realize the details of a relocation and translocation plan involve not only the Army, but also the BLM and USFWS. We recommend that Scott Wilson (scott.wilson@wildlife.ca.gov), Program Manager for the Inland Deserts Region of the California Department of Fish and Wildlife (CDFW) be invited to participate in the development and implementation of a tortoise translocation plan since the species is currently listed as threatened under the California Endangered Species Act (CESA) and is a candidate under this Act for listing as endangered. This action would be consistent

with the intent of the Sikes Act Improvement Act to provide "mutual agreement of the parties [i.e., DOD, USFWS, state fish and wildlife agency] and state concerning the conservation, protection, and management of fish and wildlife resources."

Recommendation: The Final Environmental Impact Statement (FEIS) should clarify if any of the lands within the WTA were acquired by the Army in 2004 to offset the impacts of Fort Irwin expansion. The DEIS indicates the Army acquired some private lands within the area but did not clarify the purpose of the acquisition. If these lands were acquired with funding intended to offset or mitigate the impacts of the expansion, they should be excluded from all forms of training and other surface disturbing activities. A large majority of the 102,000 acres of private land the Army acquired to offset the impacts of the expansion were acquired from the Catellus Development Corporation. We recommend that such lands be identified on a map in the Final EIS.

Comment/Mohave Ground Squirrel (MGS): According to Leitner[9], the WTA supports a significant population of MGS (*Xerospermophilus mohavensis*), based on numerous field surveys dating back to 1977. The species was first state listed as threatened in 1971 by the California Fish and Game Commission. The WTA was surveyed from 2006-2007 in support of future planning by the Army for expanded training activities. Those surveys resulted in 36 individual MGS captured at 10 of 12 protocol trapping grids distributed throughout the WTA (Leitner 2009).

MGS have previously been recorded at Goldstone, Nelson, Bicycle and Drinkwater Lakes, Lucky Fuse and Lizard Gulch.[10] However, MGS have not been detected in these areas recently, including east of the Gary Owen impact area or on the Goldstone Complex (U.S. Army 2006). The National Training Center (NTC) encompasses about 360,500 acres of MGS habitat, or roughly 7.4% of the species' range.[11] Krzysik (1991) noted heavy shrub losses and MGS habitat disturbance at NTC associated with mapped vehicle use and bombing.[12] Tank maneuver areas and long-term bombing targets established and upgraded by the U.S. Air Force in the Leach Lake Tactical Range have likely rendered potential MGS habitat unsuitable.[13] Leitner additionally identified the Coolgardie Mesa-Superior Valley area to the south of Fort Irwin as a Mohave ground squirrel Core Area in his 2009 status report.

The DEIS states the MGS "...would experience displacement, habitat degradation and loss, and potential incidental mortality from training events; however, it is unlikely that brigade-level activities in the Western Training Area would affect the species at the local population level or jeopardize the

[9] Leitner, P. 2009. Current status of the Mohave ground squirrel. Transactions of the Western Section of The Wildlife Society 44:11-29.

[10] United States Army. 2006. National Training Center and Fort Irwin Integrated Natural Resources Management Plan and Environmental Assessment 2006-2011. Directorate of Public Works. Environmental Division. Fort Irwin, California.

[11] Wilkerson, C., and G. Stewart. 2005. Petition to list the Mohave ground squirrel (*Spermophilus mohavensis*) as a federally endangered species. Defenders of Wildlife. California Program Office. Sacramento, California. 49 pp.

[12] Krzysik, A.J. 1991. Ecological assessment of military training effects on threatened, endangered, and sensitive animals and plants at Fort Irwin, California. U.S. Army Corps of Engineers Resource Laboratory. Champaign, Illinois. 107 pp.

[13] ITS Corporation. 2006. Environmental assessment updating targets on Leach Lake Tactical Range at the National Training Center, Fort Irwin, California. Document prepared for U.S. Army Corps of Engineers, Fort Worth District and U.S. Air Force, Nellis Air Force Base (AFB). On file, Nellis AFB, Nevada.

continued existence of the species. These species will continue to be monitored and managed in accordance with the Fort Irwin INRMP [Integrated Natural Resources Management Plan]."

Further, the DEIS discloses that MGS abundance within Fort Irwin is greatest in the WTA, where the species occurrence was documented on 9 of 10 randomly placed sampling grids. Overall, based on existing records for the MGS, it appears the species occurs in higher densities in the western and northern portions of the WTA.

Recommendation: We recommend the Army's use of the WTA be designed to be compatible with maintaining the MGS population at a minimum, and preferably enhancing this imperiled species' occupied habitat. We suggest maximizing the use of the WTA by aircraft and minimal use of the area by mechanized land-based vehicles. Aircraft impacts could be lessened by reducing the number of aircraft LSAs to the minimum number required to meet training needs.

Based on our review of the DEIS, it appears WTA Alternative 1, Medium-intensity Aviation Task Force, may be compatible with retaining and enhancing the MGS population and minimizing loss of its habitat. Regarding land-based vehicle use, adjusting such use to correspond with the inactive seasons of the MGS (typically July-February) may substantially reduce the potential for vehicle crushing direct impacts to MGS. Further minimizing the impacts of Alternative 1 could lead to another alternative, which we term a Low-intensity Aviation Task Force.

Comment/Joshua Trees: According to the DEIS, Joshua tree (*Yucca brevifolia*) woodland occurs in the northern portion of the WTA, with extensive stands of large or mature individual trees. The DEIS (page 3-6) states, "Although the Joshua tree is under review by CDFW for protection under CESA, it is not considered a special status species at this time." Special Status Species are those afforded some level of federal, state, or local protection (DEIS, p. 3-1). Joshua tree woodlands are comprised of dense stands of individual Joshua trees, the latter of which occur over a substantial portion of the WTA.

The California Fish and Game Commission (CFGC) recently determined that listing the Western Joshua tree may be warranted under CESA, which automatically gave the species interim protection as a Candidate for listing under Section 2085 of the California Fish and Game Code during the remainder of the CESA listing evaluation process. At its meeting on September 22, 2020, the CFGC adopted a Special Order regarding incidental take of Western Joshua trees during the candidacy period for 15 proposed solar energy projects in Kern and San Bernardino counties. The proposed expansion of training and infrastructure at Fort Irwin was not granted incidental take for Western Joshua tree by the Fish and Game Commission in its Special Order.

Recommendation: The Western Joshua tree should be identified in the FEIS as a Special Status Species because it has been given protection as a Candidate for listing under CESA since September 22, 2020. We recommend the Army initiate consultation with the CDFW, Inland Deserts Regional Office in Ontario, California, to discuss the need and procedure for obtaining an Incidental Take Permit for the Western Joshua tree.

Within all areas proposed for ground-based training, we recommend Joshua tree woodland habitats be identified as Off Limits/Non-Maneuver areas. An appropriate buffer that will protect ecological

features associated with these special habitats should also be established for ground-based training actions.

Comment/Lane Mountain Milkvetch (*Astragalus jaegerianus*): Four populations of the endangered Lane Mountain milkvetch – Coolgardie, Paradise, Brinkman Wash, and Montana Mine – occur on and adjacent to Fort Irwin and critical habitat for this federally listed endangered plant has been designated. According to the DEIS, the WTA supports large populations of this species in the southern and eastern portions of the WTA. Mitigation for potential impacts to Lane Mountain milkvetch is not specified in the DEIS.

The Bureau of Land Management's 2006 West Mojave Plan established two areas of critical environmental concern (ACEC); one large ACEC encompasses the entirety of the Coolgardie population of milkvetch, and a much smaller one that directly abuts one of the preserves on the NTC. Prescriptions for such actions as route reduction, withdrawal of lands from future mining and fencing and signing as necessary for public education were adopted.

Recommendation: We recommend that specific impact avoidance and minimization measures for Lane Mountain milkvetch be developed and included in the FEIS. We make this recommendation because the DEIS simply states, " ...special status species [of plants] would be managed in accordance with agreements with USFWS (**Biology Mitigation-5**)."

Surveys used to document the occurrence of Lane Mountain milkvetch were not described in the DEIS. We are concerned that the sources of information used to address this species may be out of date and may not accurately account for the areas currently inhabited. Current and accurate location data for this species is needed for the Army to develop proposed impact avoidance and minimization measures.

We anticipate that the biological opinion for the proposed expanded training and infrastructure, currently in preparation by the USFWS, will provide greater detail on the occurrence and status of this species, including measures it deems necessary to avoid jeopardizing its existence and avoiding adverse modification or destruction of its critical habitat. However, we believe the Army has an obligation to disclose anticipated impacts to this species and mitigation measures to avoid and minimize those impacts in the DEIS and FEIS, and not simply rely on unspecified "agreements with USFWS."

2. **Eastern Training Area (ETA)**

The ETA was added to Fort Irwin through federal legislation signed into law on December 21, 2002. It is comprised of 46,438-acres of public land withdrawn from public land laws and entry under the mining law for exclusive use by the Army.

Comment/Agassiz's Desert Tortoise: An estimated 288 adult tortoises were determined to occupy the ETA based on field surveys performed in 2003.[14] Terrain in the ETA is much more rugged than

[14] United States Department of the Army. 2003. Transmittal letter and Biological Assessment for the Proposed Addition of Maneuver Training Lands at Fort Irwin, California, Document prepared by Charis Professional Services Corporation. 8 chapters plus appendices. Fort Irwin, California.

in the WTA, which limits access to many of the areas currently occupied by the desert tortoise. Based on the terrain features and limited amount of suitable habitat for the desert tortoise, we believe the DEIS adequately describes and mitigates potential impacts to the desert tortoise in the ETA.

Comment/Desert Bighorn Sheep: The DEIS is largely silent on the number, trend and habitat conditions within the ETA for desert bighorn sheep (*Ovis canadensis nelsoni*), other than, "...Nelson's desert bighorn sheep may occur in the five mountain ranges on Fort Irwin, but its activity appears to be concentrated in the Avawatz Mountains at the extreme eastern end of the Northern Corridor." (DEIS p. 3-20).

The estimated population of desert bighorn sheep in the entire Avawatz Mountains is 50-100 according to the CDFW.[15] The ETA borders the Avawatz Mountains Wilderness to the north and the Soda Mountains Wilderness to the south, both of which form large blocks of protected habitat for bighorn sheep throughout the area.

Currently, bighorn sheep occupy the Avawatz, both within the NTC and on adjacent lands managed by BLM and National Park Service due to the presence of several key water sources. The Soda Mountains Wilderness, lacking water sources and isolated from a sizeable bighorn population in the South Soda Mountains by Interstate 15, is located to the southeast. The Soda Mountains is a priority area for restoring a protected bighorn sheep population by constructing a wildlife crossing bridge and habitat linkage over Interstate 15 and installing rainwater catchments or guzzlers in strategic locations. Discussions are underway among officials within the California Department of Transportation and CDFW to have a wildlife crossing installed as part of the mitigation for impacts of the Desert Xpress high speed railroad that would be located within the I-15 median strip.

Mitigation measures submitted by Defenders and the Council in a scoping comment letter intended to avoid and minimize impacts to bighorn sheep are not reflected in the DEIS. Thus, we resubmit them as recommendations, below.

Recommendation: We recommend the Army manage its current and planned activities in the ETA to allow for desert bighorn sheep to move freely through the area, and that any security fences currently installed or planned in the future accommodate such movements.

The Army could additionally contribute to the conservation of this species by funding the installation of rainwater catchments to provide water for bighorn sheep at strategic locations identified by the CDFW, and in coordination with the BLM if the water sources would be located on public lands.

3. **Mitigation Measures**

The DEIS includes seven mitigation measures that are intended to minimize the effects of the proposed action and alternatives on biological resources. Overall, the proposed measures would minimize or avoid mortality to various species of special concern through standard or best

[15] Epps, C.W., V.C. Bleich, J.D. Wehausen, and S.G. Torres. 2003. Status of Bighorn Sheep in California. 2003 Bighorn Council Transactions: Volume 47. https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=43852&inline.

management practices. Some mitigation measures can't be identified until the consultation with the USFWS is completed, and a biological opinion is issued to the Army (i.e., Biology Mitigation-5: Implement mitigation measures related to federally listed species in accordance with agreements made with the USFWS and as documented in a biological opinion).

We submitted impact mitigation measure recommendations in a scoping comment letter for the proposed expansion of training activities and infrastructure at Fort Irwin on September 8, 2020. Frustratingly, not even one of those recommendations was incorporated into proposed mitigation measures listed in the DEIS.

Recommendation: We recommend that additional, specific mitigation measures be developed and included in the FEIS, in addition to those included in the forthcoming biological opinion from the USFWS. Additional recommended mitigation measures include the following, which follow the numbering sequence of those in the DEIS:

Mitigation Measure 8: Minimize impacts to the desert tortoise, Mohave ground squirrel and Western Joshua trees in the WTA by restricting ground vehicle use to a minimum number of existing dirt roads and placing Aircraft LSAs in previously disturbed areas or areas with no or minor occurrence of these species.

Mitigation Measure 9: Minimize direct impacts to the desert tortoise and Mohave ground squirrel by avoiding motorized vehicle use on designated dirt roads during the months of March-May and September-October.

Mitigation Measure 10: Fund all measures and activities designed to fully protect desert tortoise relocation and translocation area(s) on BLM managed public lands, if applicable.

Mitigation Measure 11: To mitigate overall long-term adverse impacts on the desert tortoise and desert bighorn sheep, acquire the grazing permit and base property for the Ord Mountain allotment and notify the BLM that all forage previously allocated to cattle should be allocated to wildlife. (Note: The Army attempted to acquire the permit and base property for this allotment approximately 20 years ago when Fort Irwin was expanded, but was unsuccessful).

Mitigation Measure 12: Establish a desert bighorn sheep conservation and management fund to support habitat restoration and enhancement projects undertaken by the Twentynine Palms Band of Mission Indians in cooperation with BLM and the CDFW. (Note: the Twentynine Palms Band of Mission Indians is a federally recognized tribe whose ancestral land included what is now Fort Irwin, much of the High Desert and the San Bernardino National Forest. Desert bighorn sheep has high cultural significance to the tribe).

Mitigation Measure 13: Contribute to the National Fish and Wildlife Foundation/Desert Managers Group raven control fund based on acres disturbed for non-renewable energy projects or activities and specify those funds support raven control in the Superior-Cronese and Fremont-Kramer CHUs in the Western Mojave Recovery Unit.

Mitigation Measure 14: Install and maintain protective fence that allows for safe passage of wildlife around large blocks of Army-acquired Catellus and BLM-managed public lands, and close and rehabilitate vehicle routes within habitat enclosed by the fenced boundary.

Mitigation Measure 15: Fund two BLM law enforcement rangers for five years that are dedicated to enforcing OHV area and route closures in the Superior-Cronese CHU.

4. **Fort Irwin INRMP**

The DEIS indicates that various Special Status Species occurring within Fort Irwin will "...continue to be monitored and managed in accordance with the Fort Irwin INRMP [Integrated Natural Resources Management Plan]."

Recommendation: We recommend that all monitoring and management commitments for individual Special Status Species in the INRMP be included in the FEIS. This will allow for a comprehensive description of how these species will be managed at Fort Irwin and facilitate how this information is documented and conveyed to the public.

The INRMP for Fort Irwin was prepared in compliance with the Sikes Act (as amended), which states, in part:

"Cooperative Preparation: The Secretary of a military department shall prepare each integrated natural resources management plan for which the Secretary is responsible in cooperation with the Secretary of the Interior, acting through the Director of the United States Fish and Wildlife Service, and the head of each appropriate State fish and wildlife agency for the State in which the military installation or State-owned National Guard installation concerned is located. Consistent with paragraph (4), the resulting plan for the military installation or State-owned National Guard installation shall reflect the mutual agreement of the parties concerning conservation, protection, and management of fish and wildlife resources."

The DEIS indicates that the current INRMP covers all the lands within Fort Irwin, including those additional withdrawn lands added to the installation in 2002. However, the DEIS does not describe any of the mutual agreements reached between the Army, USFWS and CDFW regarding conservation, protection and management of fish and wildlife resources within the installation. Rather the DEIS simply states, "The INRMP includes fire management prescriptions, including rapid response and effective control of fires. Further, adherence to fire safety measures during training reduces the potential for fires."

The Army's INRMP for Fort Irwin needs to be updated to include agreed-upon monitoring and management commitments for the Western Joshua tree, a Candidate for listing under CESA, which is protected under Section 2085 of the California Fish and Game Code.

5. **Fort Irwin Blue Ribbon Panel Report**

LaRue (2000)[16] published the findings of a scientific panel that was assembled by the Department of Army and Department of Interior regarding the proposed expansion of Fort Irwin, which we provide herein because it is missing from or not used in preparing the DEIS. The Blue Ribbon Panel Report (Report) is particularly apropos because it specifically addresses impacts associated with Fort Irwin expansion southwards into the Alvord Mountains, which has already occurred, and expansion into the WTA, which has occurred but without the potentially intensive military training envisioned in the DEIS, depending on the selected alternative.

Whereas this Report is provided in a link in the footnote and incorporated by reference as existing information that was not included in the DEIS, a few pertinent quotes follow with regard to the importance of this area to tortoise recovery, the status of the tortoise in 2021 compared to 2000, impacts associated with use of the WTA, and proposed mitigation measures, many of which have not been implemented:

Page 1. "The current status of the tortoise [in 2000] is further from recovery than when first listed in 1990. These [1998-1999] surveys indicate that current tortoise numbers are very much lower than was estimated in 1984 on Dr. Berry's maps." As noted above, the declines have continued since this statement in 2000, with a 51% decline in tortoise numbers from 2004 to 2014."

Page 3. "Delays in implementing the Recovery Plan have contributed toward the direction of a jeopardy biological opinion for the southern expansion of Fort Irwin. This is one reason this panel concludes that the protection of those remaining tortoises and their habitat is even a higher priority now [in 2000] than in 1994."

Similarly, on Page 4, "…it is the conclusion of this panel that the answer is 'Yes, the [southern] expansion [of Fort Irwin] would constitute jeopardy in the West Mojave Recovery Unit.'"

Page 4. "All available data support this team's conclusion that the current southern expansion [of Fort Irwin] proposal is likely to jeopardize the tortoise. Given the above information, this panel concludes that the desert tortoise in the West Mojave Recovery Unit is more appropriately characterized as 'endangered' than 'threatened,' even if Fort Irwin does not expand."

The panel identified the subject area, including the WTA, as important to tortoise recovery for the following reasons:

Page 5. "Most of the proposed expansion area has been identified as essential to tortoise recovery by the U.S. Fish and Wildlife Service. The southern and western portions of the proposed expansion

[16] Results of the Fort Irwin Tortoise panel meeting of 18-19 January and 18 February 2000. Dated 15 March 2000, findings of the 13-member panel considering mitigation measures to offset the expansion of Fort Irwin. https://www.dropbox.com/s/fwky2t9ax1pyo8x/Blue%20Ribbon%20Panel%20Report.LaRue.2000.pdf?dl=0.

area, calculated to be approximately 182 mi^2, were designated in 1994 as tortoise critical habitat by the U.S. Fish and Wildlife Service."

Page 5. "Most of the proposed expansion area has been identified as essential to maintaining viable desert tortoise populations by the Bureau of Land Management. Thus, of the 1,288 mi^2 currently designated as Category I and II habitat in the West Mojave [by the BLM, a designation that is no longer used], approximately 182 mi^2 (14%) would be lost to the expansion.

Page 6. "The tortoise distribution in the proposed expansion area may limit the spread of those infectious diseases important to the tortoise. The spatial distribution of tortoises within the proposed expansion area, particularly in the Paradise Valley and eastern portions of Superior Valley, is one characterized by high density pockets surrounded by lower densities."

Page 6. "Given the limited, available data, the prevalence of upper respiratory tract disease appears not to be as pronounced in the vicinity of Fort Irwin as it is in other areas of the West Mojave, such as the Desert Tortoise Research Natural Area. If tortoises are indeed relatively disease-free in this area, it may be due to the isolation from diseased populations or resistance to the disease. In either case, these tortoises contribute significantly to the recovery potential for tortoises in the West Mojave."

Page 7. "The proposed expansion area is comprised of relatively pristine, undisturbed habitat. As per the disturbance analysis completed by the Chambers Group in 1990, 223 of the 273 square miles (82%) in the proposed expansion area (which includes the 182 mi^2 of critical tortoise habitat) were characterized as "Least Disturbed" (20.7 mi^2 and the highest rating of habitat quality) and "Lightly to Moderately Disturbed" (202 mi^2 and the second highest rating). Only 0.6 mi^2 of the proposed expansion area was characterized as "Irretrievably Lost" (the lowest rating)."

Page 7. In the WTA, "…there are no off-highway vehicle areas open to free play in the vicinity, thus relatively little cross-country travel was noted away from existing roads; there are no utility corridors fragmenting the area (the Boulder Corridor is located just east of the proposed expansion area); no cattle allotments occur (the Cronese Lakes allotment is located just east), nor is there illegal sheep grazing as has been noted elsewhere in the West Mojave; although historic mining occurred at the abandoned Goldstone town site, no active mines are found in the area. And mainly, there is no urban interface, which presently threatens tortoises in all other DWMAs [Desert Wildlife Management Areas]."

On pages 9 through 13, the Report includes mitigation measures in Section III: Measures Necessary to Reduce the Likelihood of Jeopardy if Expansion Occurs. Except for retiring cattle and ephemeral sheep allotments in the Superior-Cronese CHU, none of the measures identified by this panel have been implemented. We recommend that the Army reconsider these measures as still being pertinent to the current proposal to open the WTA to mechanized impacts.

Conclusion

Our comments and recommendations on the DEIS for proposed expansion of training and infrastructure at Fort Irwin identify our concerns over impacts to Special Status Species and provide recommendations for resolving those impacts. **We do not concur with the DEIS statement:**

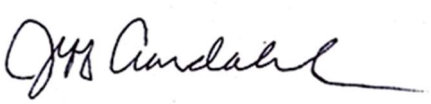
"Because the identified cumulative activities as well as the Mission Change Alternative would be managed in accordance with the ESA and other applicable regulation and all projects on Fort Irwin would be managed in accordance with the Fort Irwin INRMP, the combined effect from these activities **is expected to be less than significant**" (emphasis added).

The relatively undisturbed conditions within the WTA (documented in LaRue 2000) and the extensive presence of Special Status Species (e.g., desert tortoise, Mohave ground squirrel and Western Joshua tree) have the potential to be significantly impacted depending on the alternative adopted.

We have offered an alternative to the Medium-Intensity Aviation Task Force designed to minimize the adverse impacts to Special Status Species within the WTA, and which may provide sufficient protection for the desert tortoise to preclude the need for the Army to capture, relocate and translocate up to 1,100 individuals off the installation and into the Superior-Cronese CHU.

Please contact us if you would like to discuss our comments and recommendations prior to preparation of the FEIS.

Sincerely,



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Ed LaRue
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September 8, 2020

Dr. David Housman
NEPA Planner
Fort Irwin Directorate of Public Works, Environmental Division
Building 602, Fifth Street
Fort Irwin, CA 92310–5085
Sent via email to: XXXXXXXXXXXXXXXXXX; usarmy.jbsa.aec.nepa@mail.mil

Re: Notice of Intent to prepare an Environmental Impact Statement for Training and Public Land Withdrawal Extension, Fort Irwin, California

Dr. Housman;

Thank you for the opportunity to submit scoping comments on the proposal to modernize training and improvement of training infrastructure at Fort Irwin. Scoping comments included in this letter are submitted by Defenders of Wildlife (Defenders) on behalf of its 1.8 million members and supporters in the U.S., including 279,000 in California; and the Desert Tortoise Council (Council).

Defenders is a national conservation organization founded in 1947 and dedicated to protecting all wild animals and plants in their natural communities. To this end, we employ science, public education and participation, media, legislative advocacy, litigation, and proactive on-the-ground solutions to impede the accelerating rate of extinction of species, associated loss of biological diversity, and habitat alteration and destruction.

The Council is a non-profit organization comprised of hundreds of professionals and laypersons who share a common concern for wild desert tortoises and a commitment to advancing the public's understanding of desert tortoise species. Established in 1975 to promote conservation of tortoises in the deserts of the southwestern United States and Mexico, the Council routinely provides information and other forms of assistance to individuals, organizations, and management and regulatory agencies on matters potentially affecting desert tortoises within their geographic ranges.

Project Background Information

The Fort Irwin National Training Center (NTC) consists of approximately 753,537 acres of federal land in the Mojave Desert of San Bernardino County, California. The United States Army intends to prepare an environmental impact statement (EIS) to analyze potential impacts from modernization of training and improvement of training infrastructure at Fort Irwin. Training changes are required

to support new training doctrine that focuses on large Army formations operating against near-peer adversaries.

Approximately 110,000 acres of Fort Irwin training land areas are public lands withdrawn from all types of appropriation and reserved for military purposes under Public Law 107–107 (2001). This public land withdrawal terminates on December 28, 2026. The Army has identified a continuing military need for the land beyond the termination date and intends to request Congress to extend the withdrawal and reservation for military purposes for at least 25 years; or in the alternative, for an indefinite period until there is no longer a military need for the supporting land. Upon a separate application by the Army, the Bureau of Land Management (BLM) will file in the Federal Register a separate notice of withdrawal extension application. This EIS will be submitted to Congress to support the legislative request for extension of this withdrawal and reservation. The document will also serve as the EIS that will analyze training changes proposed for the withdrawn federal land.

The EIS will analyze alternatives, which consist of different magnitudes of implementation, and the No Action Alternative, under which there would be no modernization or improvement to training activities conducted at Fort Irwin. The No Action Alternative would also include the possibility that public land withdrawal extension would not occur and that portions of the installation would return to the public domain (i.e., public land). The Proposed Action includes an increase in training activities that reflects new mission requirements and improvement of training infrastructure on these lands.

For Fort Irwin's Western Training Area (WTA), the EIS will consider a range of medium to heavy intensity training alternatives. In terms of withdrawal, the alternatives include extension of the current withdrawal and reservation for 25 years or indefinitely until there is no longer a military need for the land. All military activities under consideration would be conducted within the boundaries of the installation. Resource areas that may be impacted include air quality, airspace, traffic, noise, water resources, biological resources, cultural resources, socioeconomics, utilities, land use, and solid and hazardous materials and waste. Impacts to these resources may occur from changing the scope or magnitude of military training activities within the current Fort Irwin boundaries.

Actions proposed include establishment of and improvements to training infrastructure such as trail networks, communications systems, radar systems, training areas, urban training sites, air operations infrastructure, and live-fire ranges. The analysis will also consider the potential for cumulative environmental effects. Significant impacts could occur to biological and cultural resources.

Under the Proposed Action, Fort Irwin will continue to operate as a multipurpose installation that serves a broad customer base. Activities anticipated at Fort Irwin include:

1. Changes in Training Activities
    - Maneuver Training
    - Sustainment Training
    - Increased use of the WTA
2. Training Infrastructure Modifications
    - Increase Live Weapons Training Capabilities
    - Improve Urban Operations Sites
    - Improve Communication Capabilities
    - Create new simulated Chemical, Biological, Radiological, Nuclear Training Facilities

- Forward Arming and Refueling Points & Ready Ammunition Storage Areas
- Driver Training
- Land Navigation
- Radar System Upgrades
- Land Management (Integrated Training Area Management)

3. Training Range Improvements
4. Manix Trail Maintenance

Defenders and the Council submit the following scoping comments on the proposed activities:

1. **Increased use within the Western Training Area (WTA)**: The 61,776 acre WTA was added to Fort Irwin through federal legislation on December 21, 2002. The entire area is within the Superior-Cronese Critical Habitat Unit (CHU) for the threatened Agassiz's desert tortoise (*Gopherus agassizii*). According to the U.S. Fish and Wildlife Service (USFWS)[1], use of the WTA for increased training would require the translocation of approximately 1,100 adult and sub-adult desert tortoises off the site and onto adjacent lands owned by the Army and public lands managed by the BLM. Some desert tortoises (hatchlings and juveniles) would remain within the area because they would not be detected during capture and translocation activities. Translocation would include mandatory monthly monitoring of approximately 660 individual desert tortoises which will continue for a period of five years. The primary purpose of this monitoring is to determine the effects of translocation on both resident and translocated desert tortoises, including movements of individuals and mortality. It is important to note that the Army has not used the WTA for any training activities since it was added to Fort Irwin in 2002.

The USFWS reported that the average density of adult desert tortoises in the Superior-Cronese CHU documented during line-distance sampling surveys in 2019 was 1.9/km^2 (4.9/mi^2), which is significantly less than the minimum viable density of 3.9/km^2 (10/mi^2) reported in the initial 1994 recovery plan for the desert tortoise[2]. The trend in density and the overall population have been in significant decline since line distance sampling began in 2004[3]. The population of adult desert tortoises in the Western Mojave Recovery Unit is now less than 50% of what existed in 2004.

According to Leitner[4], the WTA supports a significant population of Mohave ground squirrel (*Xerospermophilus mohavensis*) based on numerous field surveys dating back to 1977. The species was first state-listed as threatened in 1971 by the California Fish and Game Commission. The WTA was surveyed from 2006-2007 in support of future planning by the Army for expanded training activities. Those surveys resulted in 36 individual Mohave ground squirrel (MGS) captured at 10 of 12 protocol trapping grids distributed throughout the WTA (Leitner 2009). Leitner identified the Coolgardie Mesa-Superior Valley area as a Mohave ground squirrel Core Area in his 2009 status report.

[1] Biological Opinion for the Proposed Addition of Maneuver Training Lands at Fort Irwin, California (8-8-09-F-43R)
[2] U.S. Fish and Wildlife Service. 1994. Desert Tortoise (Mojave Population) Recovery Plan. U.S. Fish and Wildlife Service, Portland, OR. Pp. 73, plus appendices.
[3] Allison, L.J. and A.M. McLuckie. 2018. Population trends in Mojave desert tortoises (Gopherus agassizii). Herpetological Conservation and Biology 13(2):433–452.
[4] Leitner, P. 2009. Current status of the Mohave ground squirrel. Transactions of the Western Section of The Wildlife Society 44:11-29.

The Draft EIS (DEIS) should analyze and disclose the direct, indirect and cumulative impacts of past, current and future activities likely to occur in the action area, with an emphasis on the desert tortoise and its critical habitat; and the MGS. Field surveys for these two species should conform to the most recent survey instructions and protocols. For the desert tortoise they are in the USFWS 2009 Field Manual[5] and the 2019 Pre-project Survey Protocol.[6] For MGS they are in the 2003 Mohave Ground Squirrel Survey Guidelines published by the California Department of Fish and Wildlife (CDFW).[7]

Due to significant and ongoing declines in the desert tortoise population within the Western Mojave Recovery Unit, including the Superior-Cronese CHU where the proposed activities would occur, we recommend that the Army include specific actions to promote the recovery of the desert tortoise in the action area in addition to proposed activities described in the scoping notice (i.e., modernization of training and improvement of training infrastructure, including moderate to heavy intensity training activities in the WTA).

We offer the following actions for the Army to consider as part of its proposed action to promote the recovery of the desert tortoise in the Western Mojave Recovery Unit and mitigate the adverse impacts of the proposed activities in the WTA:

- Contribute to the National Fish and Wildlife Foundation/Desert Managers Group raven control fund based on acres disturbed for non-renewable energy projects or activities, and specify those funds support raven in the Superior-Cronese and Fremont-Kramer Critical Habitat Units in the Western Mojave Recovery Unit.
- Install and maintain protective fence around large blocks of Army-acquired Catellus and BLM-managed public lands, and close and rehabilitate vehicle routes within habitat enclosed by the fenced boundary.
- Acquire the Ord Mountain allotment livestock grazing permit, remove cattle from the allotment and request the BLM allocate all forage to wildlife and permanently retire the allotment.
- Fund two BLM law enforcement rangers for five years that are dedicated to enforcing off-road vehicle area and route closures in the Superior-Cronese and Fremont-Kramer CHUs.
- Fund and implement both desert tortoise and MGS regional monitoring surveys within the WTA at regular intervals (3-5 years) to determine how new military maneuvers are affecting distributions and densities of these covered species.
- Fund other studies, such as USFWS' distance sampling program, to monitor regional trends of tortoises (and MGS if studies are identified by CDFW) to determine population trends in the Western Mojave Recovery Unit.

We also recommend that the DEIS include impact mitigation measures for the MGS due to the importance of WTA acreage for the species, as well as conservation measures as part of the Army's proposed actions. Impact mitigation and conservation measures could include the following:

[5] https://www.fws.gov/nevada/desert_tortoise/dt/dt_manuals_forms.html
https://www.fws.gov/nevada/desert_tortoise/documents/manuals/MojaveDesertTortoisePre-projectSurveyProtocol_2019_v2.pdf

[7] https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=83975&inline

- Install and maintain fence around large blocks of Army-acquired Catellus and BLM public lands, and close and rehabilitate vehicle routes within the fenced boundary.
- Acquire the Cantil Common or Monolith-Cantil allotment (domestic sheep) grazing permits and request the BLM allocate all forage to wildlife and permanently retire the allotment.

2. **Increased use within the Eastern Training Area (ETA)**: The 46,438-acre ETA was added to Fort Irwin through federal legislation on December 21, 2002. The scoping notice in the Federal Register did not specify what training activities and infrastructure enhancements would occur in the area, so we are providing general comments about wildlife species that should be addressed in the DEIS. The ETA is not designated as critical habitat for the desert tortoise. The Army has used the ETA for a minor amount of training since approximately 2006.

The ETA was generally described by the USFWS in the 2012 biological opinion issued to Fort Irwin[8] as:

"*The ETA includes the South Avawatz Mountains in its southernmost portion. The eastern portion of the parcel is a large alluvial fan that slopes to the east and is crossed by numerous small braided washes. The Army has used the eastern expansion area to set up logistics operations and Forward Arming and Refueling Points for Army aviation units. Additionally, several access routes have been and are being improved for ease of access to the eastern expansion area.*"

"*Desert tortoises within the* [ETA] *are generally confined to the area where the alluvial fan joins the mountainous areas to the west of the alluvial fan (Everly 2012b). The alluvial fan downslope from this area is extremely rocky. The alluvial fan is also somewhat below elevations at which desert tortoises most frequently occur and thus may be hotter and receive less rainfall than areas to the east. These factors may be responsible for desert tortoises being largely restricted to the upper alluvial fan where, presumably, temperatures are cooler and rainfall more abundant*."

An estimated 288 adult desert tortoises were determined to occupy the ETA based on field surveys performed in 2003 by Charis Professional Services Corporation under contract with the Army. It should be noted that terrain in the ETA is much more rugged than in the WTA, which limits access to many of the areas currently occupied by the desert tortoise.

The ETA also includes habitat in the Avawatz Mountains occupied by desert bighorn sheep (*Ovis canadensis nelsoni*). The estimated population in the entire Avawatz Mountains is 50-100 according to the CDFW.[9] The ETA borders the Avawatz Mountains Wilderness to the north and the Soda Mountains Wilderness to the south, forming a large block of protected habitat that sustains bighorn sheep throughout the area. A priority of the CDFW is to restore habitat linkages for desert bighorn between the South Soda Mountains and Soda Mountains Wilderness, which would be achieved by constructing a wildlife crossing bridge over Interstate 15. Discussions are underway with the California Department of Transportation to have a wildlife crossing bridge installed as part of the mitigation for impacts of the Desert Xpress high speed railroad that would be located within the I-15 median strip.

[8] Biological Opinion for the Proposed Addition of Maneuver Training Lands at Fort Irwin, California (8-8-11-F-38R), dated April 27, 2012.
[9] https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=43852&inline

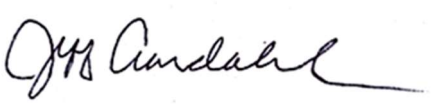
The DEIS should analyze the impact of ongoing and any proposed increases in training and infrastructure improvements in the ETA on desert tortoises and desert bighorn sheep. We also recommend that the Army manage its current and planned activities in the ETA to allow for desert bighorn sheep to move freely through the area, and that any security fences currently installed or planned in the future accommodate such movements.

The Army could additionally contribute to the conservation of this species by funding the installation of rainwater catchments to provide water for bighorn sheep at strategic locations identified by the CDFW and in coordination with the BLM if the water sources would be located on public lands.

Conclusion

Defenders and the Council hope our comments and recommendations are useful to the Army when it prepares the DEIS for proposed activities. We believe the Army has opportunities to not only mitigate for adverse impacts to the desert tortoise, Mohave ground squirrel and desert bighorn sheep, but to also include species conservation actions in its proposed activities. Please contact us at the contact information listed below if you would like to discuss our letter further, or explore additional opportunities relative to special status species wildlife management in the affected area.

Sincerely,



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From:	Reed, Brenda L CIV USARMY (USA)
To:	Eric Webb
Subject:	[External] - FW: [Non-DoD Source] Re: Desert Tortoise Environmental Analysis and Section 106 Consultation
Date:	Wednesday, January 24, 2024 8:22:40 AM

From: Sean Scruggs
Sent: Tuesday, January 23, 2024 8:41 PM
To: Reed, Brenda L CIV USARMY (USA) ; Carl Dahlberg
; Alisa Lee
Subject: [Non-DoD Source] Re: Desert Tortoise Environmental Analysis and Section 106 Consultation

Brenda,

Thank you for providing this information for comment.

In the past, I have participated in Cultural Monitoring / Tribal Monitoring of BigHorn Sheep at Creech Air Force Base during capture and release operations.

I would like to discuss this further and determine what the other viewpoints are of the other tribes. At a minimum there should be a tribal discussion to determine when there is a "best" time to move the tortoises.

I do know that certain tribes have protocols for handling tortoises, in addition to the protocols that biologists use - possibly including prayers and songs - depending on cultural customs. Cultural participation has the potential to increase the success of relocation.

If no other tribes participate in this process, I would like to be further involved up to and including an opportunity to participate and offer cultural insight into this process.

Thank you

Sean Scruggs
Fort Independence Indian Reservation
THPO
725-500-7284

On Thu, Jan 18, 2024 at 5:16 PM Reed, Brenda L CIV USARMY (USA) wrote:

> Good afternoon—

The attached Fort Irwin document is a letter regarding development of an Environmental Analysis for the anticipated translocation of desert tortoises from Fort Irwin's Western Training Area (WTA). The desert tortoises would be moved to other suitable habitat prior to initiation of full military training in the WTA. At this early stage in the process, Fort Irwin personnel are seeking input regarding environmental considerations and are initiating consultation pursuant to Section 106 of the National Historic Preservation Act. As discussed in the letter, please let us know of any questions that you have or input that you would like to provide (contact information is supplied in the letter).

Brenda Reed
Cultural Resources Manager/Installation Archaeologist

Mohahve Historical Society
P.O. Box 21
Victorville, CA 92393

2-9-24

Dept. of the Army
Headquarters, U.S Army Garrison
Bldg 237, 13 Ave., P.O. Box 105021
Ft. Irwin, Ca. 92310-5000

This is Mary Taylor, Pres. of Mohahve Historical Society. Apple Vly, Ca.

We have had several fieldtrips to Ft. Irwin & I am familiar w/ the area, the "Box" so I am familiar w/ the area, the needs of the tortoise, & your need for expansion. It is always difficult to relocate the protected species of tortoise. The Ca. Turtle & Tortoise Club, High Desert Cpt, was familiar w/ a prior relocation that listed the same descriptions of the new habitat location listed at the top of pg. 2 of the letter & received (SW exposures, loamy soils, adequate forage & low predator density) a/c to the current president the relocated tortoise did not survive. I also contacted the Mojave Desert Land Trust organization for their input, but did not receive much information about the Ft. Irwin relocation, other than that they heard about it.

(over)

I am probably not much help. I brought the letter from you up at our MHS Bd. mtg. Tues. 2/7. The general feeling was that the tortoise will again be on the losing end against the U.S. Army. I'm sure you'll do what you need to do, but we are not happy. The illegal marijuana grows & their chemicals left behind are wiping out large numbers of desert tortoise, so this is just one more thing.

Thank you for alerting us.

Sincerely,
Marcella J Taylor
MHS Current Pres.

See contact on back.

My phone # on card.

NATIONAL INDIAN JUSTICE CENTER

5250 Aero Drive
Santa Rosa, California 95403
A non-profit corporation

Phone: (707) 579-5507
Fax: (707) 579-9019
E-mail: nijc@aol.com
Web: www.nijc.org

Raquelle L. Myers, Executive Director

January 23, 2024

Dear Brenda,

We want to inform you that we have unfortunately lost a very important person in our company. Raquel past away last January. We have enclosed a copy of her death certificate for your records. Her passing was unexpected and left numerous friends and family in complete heart break. We have dissolved the National Indian Justice Center due to this unfortunate loss. Please update anyone who may be a known contact to Raquel.

Sincerely

Michelle Perkins

Michelle Perkins

From: Hendrix, Julie M CIV USN NAVFAC SW SAN CA (USA)

Sent: Monday, February 12, 2024 5:08 PM
To: usarmy.jbsa.aec.nepa@mail.mil
Subject: Attn: David Houseman, Army Ft Irwin re: EA for translocation of Desert Tortoise in the Western Training Area (WTA), Fort Irwin, CA
Importance: High

David,

I have been out of the office and have just now received letter dated Jan 18, 2024 via FedEx, Subject: EA for translocation of Desert Tortoise in the Western Training Area (WTA), Fort Irwin, CA

I would like to review and possibly submit comments on the Proposed Action within the deadline (30 calendar days from receipt of letter). Can you provide an electronic link or DoD SAFE the *2023 Final Legislative Environmental Impact Statement for Military Training and Public Land Withdrawal Extension*? This will enable me to help identify key issues which will need to be addressed as part of the EA, as part of the early coordination and scoping process as mentioned in this Jan 18, 2024 letter I received.

v/r,

Julie Hendrix
Natural Resources Specialist/Biologist
Naval Air Weapons Station China Lake (NAWSCL)
Naval Facilities Engineering Systems Command (NAVFAC)

From: Housman, David C CIV USARMY USAG (USA)
Sent: Monday, February 26, 2024 2:56 PM
To: Hendrix, Julie M CIV USN NAVFAC SW SAN CA (USA)
Subject: Response to scoping letter for Fort Irwin tortoise translocation EA

Hi Julie,

I just received your scoping letter response today and request for a copy of the Fort Irwin Legislative EIS (LEIS). Although the scoping period has closed please feel free to provide comments for our consideration. I have attached the requested LEIS.
Thank you.

VR,
David C. Housman
Supervisory Natural Resources Specialist
Directorate of Public Works
USAG Fort Irwin, California 92310-5085
Office – 760-380-7032
Office: MWF 1000-1530; Tu 0900-1530
View our community calendar

Silent Spirits Preserve
David/Deborah Henggeler
HIGH DESERT CHAPTER – CTTC
SOSS Rescue & Sanctuary
P.O. Box 888
Lucerne Valley, CA 92356-0888

15 February 2024

DAVID HOUSMAN
Supv. Nat'l Resources Specialist
DPW-Environmental Division
DEPT. OF ARMY HEADQUARTERS
Bldg, 237, B Ave, P.O. BOX 105021
Fort Irwin, CA 92310-5000

RE: WTA Translocation of Desert Tortoises

Dear Mr. Housman:

We appreciate your letter of January 18th giving us this opportunity to address some of the questions it raises and the many issues that need clarifying. Foremost, we understand the importance of Ft. Irwin's unique location for critical training exercises. We are also aware of an important Military mind-set regarding collateral sacrifices, and combat-ready military to protect our National Security. In this light, we could not find information or documents supporting any alternative areas you may have pursued that would have less impact on the environment and species therein. Also, there is no doubt that **ALL** Tortoises will be negatively impacted by Army Training maneuvers, unless the answers to the below make that point moot. Which brings us to the questions ~

- Where is the new Location?
- Is it on Army Property as well?
- It's the WTA that will be cleared of Tortoises but are they being moved to an adjacent parcel near the WTA? In which case, the terrain should be like home to them but is there a buffer zone so that fencing isn't required?
- Will you be using Biologists, Veterinarians, Environmental or USGS and other specialists in the detecting phase as well as the relocating phase of this operation?

We fear that much of our letter of concern here would be unnecessary if there hadn't been so many ambiguities in the information passed on to us, and of course, there may be very valid reasons for that. Anyway, one example, you site a vague date of 2025 for initiation of Training which sounds like less than a year away. Are we to assume then, that the 2023 LEIS was initiated well before 2023?

Again, your letter states 2025 for initiation of Training per compliance with the 2014 and 2021 Biological Opinion analyses. These Opinions can serve as guidelines but, in fact, list the many failures inherent in disrupting and translocating the Desert Tortoise (DT). We feel confident that if the needed time and human resources are allocated, this Translocation Project can be

accomplished with much more success than previously experienced. **We therefore strongly suggest and request per EIS & REC protocols, an extension of the 2025 deadline.**

The Records of Environmental Consideration (REC), which aims to promote better decisions, (*and per NEPA and the EA*), will identify all actions that may impact the social, economic, and environmental resources of proposed areas. Here's our take:

Key Environmental Concerns for healthy DT's ~ You state some of this in your letter:

- **New Location must have** plenty of natural browse/forage, creosote and other scrub for shelter, majority of East-facing burrows (*started indentations by work force*), **Soil** of sand/loam/caliche combo enough so burrows don't collapse
- Isolated enough so the threat of people, trash and Ravens is mitigated
- Genotyped, marked & screened for diseases (mainly herpesvirus & mycoplasma)
- Loss of habitat is especially key when battling to help conserve and protect struggling Threatened Species

Key Economic Concerns ~ The EA needs to include **dedicated funding for** tortoises, wherever they wind up, to directly provide long-term care and maintenance for all tortoises that are displaced from the WTA. For instance, think about the Foster Children Programs and the Homeless population crisis we're facing. An impossibly frustrating situation where the ball gets passed or dropped. And gee, all we're dealing with here is a critically endangered species that, by some standards has equal right to its existence without being harassed and compromised.

We're not aware of a line-item in government budget to fund unhealthy, temporarily housed tortoises, and per Federal and State Regulations sick DT's are never to be released into the natural desert, so there would be no "prior to being released" as your letter indicates for the sick population. Unless possibly there will be an exception made because the Recipient site is on Ft. Irwin land?

Essentially, these sick and temp-housed DT's become "homeless". And yes, DF&W Service does have approved organizations, rescues & sanctuaries for these "homeless" DT's, but these **approved** facilities have been temporarily housing DT's for years and years with zero funding. Ditto this scenario with hatchlings and juveniles, although there are surely a couple of Headstart facilities that may be open for more if they pose no contamination threat. Therefore,

- Based on your proposal, what funding do you have in place, or plan to implement, for the necessary requirements of habitat structures, husbandry and maintenance for the "temporarily" (*most likely permanently displaced*) detained DT's? Because, historically, despite promises to do so, big Corporations, State and Federal wildlife and Land management agencies have often failed to devote enough money and staff to ensure the **long-term** welfare for these displaced Tortoises.

- If these funding requirements have yet to be established then, do you consider this an important enough concern to factor **before** you proceed?

Social Concerns:

There is an incredible amount of concern and involvement by a myriad of organizations civilians, classrooms, (*a lengthy list*,) to improve and re-establish the DT in a thriving natural habitat with the lowest level of anthropogenic impact. These efforts require truckloads of time: time to plan fundraising events, build, plant and maintain captive habitats, and even more funds to feed, and to pay for fuel costs and Veterinarian expenses.

As you know, these are keystone animals. They and the plants that help them survive are indicators of the health of our future and of this Planet. It seems prudent to do whatever we can to boost their numbers and their survival, rather than allow them to slide into extinction.

So, in your proposal, have you determined what an acceptable mortality rate is for the DT's that are being translocated? If so, what is your level of acceptance?

.

Some of us have personally visited established Recipient areas where we found many empty shells and partial carapaces due to predation, too few burrows or other protection from the elements, lack of browse/forage *(starvation*), or a lack of precipitation to enable enough plant growth for the DT to obtain moisture when there are no puddles, drip or catch basins. Due to these issues mortality rate is way too high for a fragile, 10,000-year-old species.

We sincerely hope that wherever possible, you are taking seriously the EPA & EIS directive to objectively assess the proposed actions, rather than justify decisions already made.

On behalf of the previous captioned organizations, we respectfully offer our comments and truly appreciate your considering them.

Sincerely,

David Henggeler

Deborah Henggeler
dndheng@reagan.com

Cc: Christine Wormuth, U.S. Sec. of Army
Lt. Gen. Scott A. Spellmon, U.S. Army Corps of Engineers

United States Department of the Interior
U.S. FISH AND WILDLIFE SERVICE
Ecological Services
Palm Springs Fish and Wildlife Office
777 East Tahquitz Canyon Way, Suite 208
Palm Springs, California 92262

In Reply Refer to:
2022-0080092-NEPA-001-SB

March 13, 2024
Sent Electronically

David Housman
Fort Irwin Directorate of Public Works
Environmental Division
P.O. Box 105085
Fort Irwin, California 92310-5085

Subject: Comments on Fort Irwin's Proposed Environmental Assessment for Desert Tortoise Translocation Plan

Dear David Housman:

Thank you for your letter and invitation to provide comments for your upcoming environmental assessment to evaluate the potential effects of translocating desert tortoise [Mojave population Distinct Population Segment (*Gopherus agassizii*); desert tortoise] from the Western Training Area, National Training Center. We reviewed your letter and are currently reviewing the draft translocation plan you provided to the U.S. Fish and Wildlife Service (Service) on February 1, 2024. We are coordinating with the Desert Tortoise Recovery Office and will be providing our comments on the translocation plan by the end of the month. Below are the Service's comments on the environmental assessment for your consideration.

The Service recommends the following information be addressed for the proposed action or alternatives:

1. Maintain as much flexibility by including as many potential release sites in your analysis as possible.

2. Select release sites that contain high habitat suitability and least threats first, then consider treatment potential [within Recovery and Sustainment Partnership (RASP) initiative focal areas].

3. Translocation site selection needs to be coordinated in advance with land manager partners including the Bureau of Land Management, the California Department of Fish and Wildlife, and the Service early to ensure best sites are selected.

4. Verify current mammalian predator populations within proposed recipient sites within 1 month prior to release and avoid high density predator areas (including nearby coyote

dens or badger activity). Confer with coyote experts and the Animal and Plant Health Inspection Service to address any management needs.

5. Coordinate desert tortoise releases with the Service to ensure recipient site tortoise populations are able to rise above the minimum viable density (4 tortoises/km^2).

6. Include adaptive management actions that may be needed to protect translocated desert tortoises after translocation, such as predator deterrence or route restoration management.

7. Develop specific short-/long-term triggers (i.e., increased unauthorized OHV incursions, increased mammalian predators, decreased translocated tortoise survivorship) that result in management actions (close unauthorized routes, increase law enforcement patrols, manage predators).

8. Ensure short-term monitoring funding for the initial 6 years and how to ensure proposed long-term monitoring needs (such as recruitment studies and studies on the reproductive contribution of translocated individuals), especially if assured RASP initiative funding cannot be directed to this project area.

9. Schedule annual reviews during off-seasons with the Service and provide the Service with the raw data collected for the previous year.

Thank you for the opportunity to provide comments on the environmental assessment that is being prepared. We will work to complete our more detailed comments on the Fort Irwin's Western Training Area translocation plan by the end of the month. If you have any questions, please contact Jeremy Bisson[1] of this office at 760-322-2070, extension 403.

Sincerely,

MARY WOULFE

Digitally signed by MARY WOULFE
Date: 2024.03.13 14:29:29 -07'00'

for Rollie White
Assistant Field Supervisor

[1] jeremy_bisson@fws.gov.

Appendix C. Desert Tortoise Translocation Plan

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Desert Tortoise Translocation Plan for the U.S. Department of Army's National Training Center & Fort Irwin - Western Training Area (WTA)

Submitted by

David C. Housman, Supervisory Natural Resources Specialist
Directorate of Public Works, Building 602
USAG Fort Irwin, California 92310

May 2024

Data collection, research, and content for this plan were developed by:

Todd Esque, Ally Xiong, Sarah Doyle, Sean Murphy, and Chad Wilhite
US Geological Survey, Western Ecological Research Center, Boulder City, Nevada

and

Kenneth Nussear
University of Nevada – Reno

For more information on the USGS visit https://www.usgs.gov or call 1-888-ASK-USGS.

The plan was edited and coordinated with the US Fish and Wildlife Service by:

David C. Housman, Supervisory Natural Resources Specialist
US Army National Training Center, Fort Irwin, California

All requirements set forth in this plan requiring the expenditure of Army NTC / Fort Irwin funds are expressly subject to the availability of appropriations and requirements of the Anti-Deficiency Act (31 USC section 1341). No obligation undertaken by Army NTC / Fort Irwin under the terms of this plan will require or be interpreted to require a commitment to expend funds not obligated for a particular purpose.

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ABBREVIATIONS

AKDE	Autocorrelated kernel density estimates
Army	U.S. Army
BLM	U.S. Bureau of Land Management
Caltrans	California Department of Transportation
CDFW	California Department of Fish and Wildlife
CMWG	Conservation Management Working Group
DoD	Department of Defense
DOI	Department of Interior
DTRO	Desert Tortoise Recovery Office (U.S. Fish and Wildlife Service)
ELISA	Enzyme-linked Immunosorbent Assay
USFWS	U.S. Fish and Wildlife Service
GPS	Global Positioning System
ID	Identification
MCL	Midline carapace length
MOU	Memorandum of Understanding
NAD	North American Datum
NAWS	Naval Air Weapons Station (China Lake)
NTC	National Training Center (Ft. Irwin)
OHV	Off-highway vehicle
qPCR	Quantitative Polymerase Chain Reaction
PL	Plastron length
PRISM	Parameter elevation Regression on Independent Slopes Model
RASP	Recovery and Sustainment Partnership
SCR	Spatial capture-recapture (model)
SEA	Southern Expansion Area
SETA	Southern Expansion Translocation Site
UTM	Universal Transverse Mercator
USGS	U.S. Geological Survey
Vernadero	Vernadero Group Inc.
WEA	Western Expansion Area (now WTA – Western Training Area)
WETA	Western Expansion Translocation Area (now WTATS – Western Training Area Translocation Site)
WTA	Western Training Area (previously WEA – Western Expansion Area)
WTATS	Western Training Area Translocation Site (previously WETA – Western Expansion Area Translocation Site)

GLOSSARY

Term	Definition
Biological Opinion	The procedures to plan, implement, monitor, and study translocation of tortoises were written using terms and conditions outlined in the U.S. Fish and Wildlife Service Biological Opinion (USFWS 2021a: USFWS Biological Opinion for the Recovery and Sustainment Partnership Initiative, Use of Additional Maneuver Training Lands, and Operations and Activities at the National Training Center and Fort Irwin, San Bernardino County, California. BO# FWS-SB-20F0163-21F1366, December 13, 2021).
Biological samples	Samples collected from monitored animals that includes blood and oral swabs used for health assessment purposes.
Clearance procedures	Activities outlined in clearance procedure, which include: clearance surveys, the removal of tortoises found during clearance surveys, deconstruction of burrows found in area of high activity (WTA), additional translocation any other tortoises found after translocation, extracting tortoises from burrows, excavating burrows, nest and egg handling, and temporary confinement of tortoises.
Clearance surveys	Clearance surveys are conducted at least two seasons (Fall/Spring) prior to proposed actions that may pose a threat to tortoises. Surveys will locate as many animals as possible prior to proposed actions and attach unique IDs and transmitters.
Disposition plan	A specific proposal for each desert tortoise from the project site (e.g., translocate to specific release area at recipient site, transport to veterinarian for evaluation and treatment, remove from population, etc.). The disposition plan template (Appendix H in USFWS 2019; contact USFWS for most recent version) includes summary health information for all assessments of each tortoise. It must be completed within the season in which translocation is proposed to occur and is one part of the *Translocation Review Package* (definition from USFWS 2020).
Fitness	Metrics used to identify translocation success, which may include but are not limited to: growth rate, survival, reproduction, individual contributions to population growth and mortality rates.
Ft. Irwin mitigation parcels/Mitigation parcels	Holdings by the NTC (referred to as Irwin Mitigation Parcels; ~320 km^2; 79,074 ac; 9.7 %), the State of California (~93 km^2; 22,981 ac; 2.8 %), and non-federal holdings or private property (~ 742 km^2; 183,352 ac; 22.5 %), represent the remaining ownership and are largely concentrated in the southern WTATS (Figure 1).

Incidental tortoises	Animals that are not in pens or have a radio transmitter attached. These animals are not part of the study tortoise groups. All incidental tortoises will have an attached unique ID.
Penned tortoises	Any animal that is housed in temporary holding pens and cared for regularly by trained biologists in accordance with a USFWS approved husbandry plan.
Recipient site/population	The location/population to which desert tortoises removed from a project site will be translocated (USFWS 2020). This area includes any area and tortoises within the 6.5km radius buffer from release sites. This term has the same definition and purpose as the translocation site.
Reference animals/tortoises/population	Animals living outside of the translocation sites, proximal to the study area, but whose movements are predicted to not overlap with translocated or resident animals.
Reference site/population	The area that is separated from the project and recipient population. This area contains reference animals that are selected for monitoring purposes relative to translocated and resident animals (USFWS 2020).
Release area	The area into which most tortoises are expected to move and settle after release (USFWS 2020). This area includes any area within the 6.5km radius buffer from the release points.
Resident animals/tortoises/population	Animals living within the recipient sites prior to translocation.
Season	Spring: First week of April to first week of June Summer: Second week of June to first week of September Fall: Second week of September to first week of November Winter: Second week of November to last week of March.
Study tortoises	Any animal that was regularly monitored and has a transmitter attached. Data from these tortoises are used in analyses of short and long-term metrics. This includes the translocated tortoise population, resident population, and reference population.
Telemetered tortoises	Desert tortoises that have a radio transmitter attached and are being monitored regularly by permitted biologists.
Translocated animals/tortoises/population	Animals moved to a recipient site.
Translocation site	The location/population to which desert tortoises removed from a project site will be translocated (USFWS 2020). This area includes any area and tortoises within the 6.5km radius buffer from release sites. This term has the same definition and purpose as the recipient site.
Translocation	The human-mediated movement of living organisms from one area with free release in another (IUCN 2013).

Executive Summary

The U.S. Department of the Army proposes to commence military activity at the Fort Irwin National Training Center within the Western Training Area (WTA) and to translocate Mojave desert tortoises (*Gopherus agassizii*; hereafter tortoise) to the Western Training Area Translocation Site (WTATS). This desert tortoise translocation plan provides a timeline of activities, and guidelines for assessing the short-term and long-term success of this desert tortoise translocation in accordance with the biological opinion (USFWS 2021). Importantly, the monitoring projects are designed to document the ultimate effects of the Army's translocation action (e.g., not just inform future translocations elsewhere). Results from the translocation and corresponding monitoring and research projects will inform future translocations throughout the Mojave Desert for augmenting and expanding depleted desert tortoise populations. The plan has two main objectives: 1) to provide guidelines allowing the steps necessary to achieve a safe, humane, and successful translocation of tortoises from the WTA, with minimal impact to resident desert tortoises at sites where translocated animals are released (recipient sites) and 2) to collect data that will inform future strategies and improve best management focus for desert tortoise recovery (USFWS 1994; Tracy et al. 2004; USFWS 2011; Esque et al. 2005; USFWS 2020).

The procedures to plan, implement, monitor, and study translocation of tortoises were written using terms and conditions outlined in the U.S. Fish and Wildlife Service Biological Opinion that described effects of the expansion of the military base boundary (USFWS 2021a: USFWS Biological Opinion for the Recovery and Sustainment Partnership Initiative, Use of Additional Maneuver Training Lands, and Operations and Activities at the National Training Center and Fort Irwin, San Bernardino County, California. BO# FWS-SB-20F0163-21F1366, December 13, 2021) as well as recommendations provided in the Desert Tortoise Recovery Plan and 5-year review (USFWS 2011, 2020, 2021a, 2022b). This plan was developed with the input from subject matter experts on appropriate translocation timing and procedures, as well as on how tortoise ecology and habitat can best be studied to further knowledge on tortoise translocation. Short- and long-term metrics are addressed and measured by specific monitoring and research projects that can be used to assess the success of translocation activities.

To identify and prioritize possible translocation sites of desert tortoises from the WTA to the WTATS, scientists from the U.S. Geological Survey and the University of Nevada, Reno (UNR) collaborated to estimate the current and predicted densities of tortoises throughout the study area with respect to habitat suitability using a Geographic Information System (GIS) decision support model and spatial-capture recapture (SCR) analysis. Site selection was modeled using a form of Ordered Weighting Average that was informed with geospatial data specific to tortoise habitat, threats to tortoises, anthropogenic factors, and additional spatiotemporal factors that are thought to affect tortoise population survival. Additionally, the model can be used to generate specific management scenarios to evaluate how different land use and management decisions may affect areas considered for tortoise translocation. Expert knowledge and published studies on tortoise ecology were used to simulate five variations of weighted data that were combined to identify eight potential recipient sites and two potential reference sites. Additional reference sites can be identified once final recipient site selection is made.

Protocols described herein include surveys for the presence, distribution, health status, and habitat use of the resident tortoises in the selected release areas (WTATS) for desert tortoises moved from the WTA. Spatial capture-recapture (SCR) models were used to estimate tortoise densities in the WTATS and WTA during different years and seasons (Spring and Fall). Density estimations will be used to determine how many translocated tortoises can be released into each translocation site so that density exceeds the threshold of 3.9 adult tortoises/km^2 (USFWS 2020).

This project is designed to monitor metrics that are correlates of desert tortoise fitness and can be used to inform decision-making. For example, growth, survival, reproduction, individual contributions to population growth and mortality rates are all correlates of fitness and have been identified as metrics for translocation success. To best assess the effects of translocation, tortoises from each study group (translocated, resident, and reference) are monitored after translocation at different time scales to determine short- and long-term translocation success.

1.0 Introduction

The U.S. Department of Army (Army) plans to commence military activity and training exercises within the Army's National Training Center (NTC) and Fort Irwin's -Western Training Area (WTA) in San Bernardino County, California. The NTC will establish training areas to test the combat readiness of brigade-sized units (e.g., 1,000 – 5,000 soldiers and 1,000 – 1,500 vehicles) in a realistic battlefield environment. Starting in 2025 (Appendix A), up to 10 brigade-level training events may occur with force-on-force and live-fire scenarios to prepare units for combat and security missions. Joint military branches (Marine Corps, Navy, and Air Force), Army Reserve, National Guard, Special Operations, multinational partnerships, and regular and transitional law enforcement units also train at the NTC, along with units stationed at Fort Irwin. Planned actions in the WTA would likely change land use patterns in areas that were previously undisturbed and impact habitats such that translocation of the federally and California state listed Mojave desert tortoises (*Gopherus agassizii*; hereafter tortoise) is required by the USFWS before training ensues to minimize tortoise mortality (USFWS 1994; USFWS 2011; USFWS 2020; USFWS 2022b).

The Army's Plan for military activities in the WTA follows previously completed actions from the Fort Irwin Military Land Withdrawal Act of 2001 (Congress Public Law 107-107, div. B, title XXIX, December 28, 2001, 115 United States Statues at Large 1336), authorizing NTC to expand its training activities into 142,629 ac (~577 km^2) of military lands previously designated as Critical Habitat for tortoises. These lands included NTC expansion areas that had enough tortoises to warrant translocation: the Southern Expansion Area (SEA; 18,197 ac) and the Superior Valley (referred to as Western Expansion Area, or WEA, during the 2005 translocation; now referenced as the Western Training Area; 70,555 ac). To prepare for the NTC's first large-scale tortoise translocation in 2005, available data were used to formulate the plan and support translocation as an adequate solution for successful relocation of displaced tortoises. Much of the available information focused on several short-term translocation success metrics (e.g., movement patterns and survivorship), with further investigation required to evaluate the effects of translocation at several temporal scales to evaluate long-term (15–30 years) success given the long lifespan of desert tortoises (Tasse 1989; Dickinson and Fa 2000; Fischer and Lindenmayer 2000; USFWS 2020). Desert tortoises are generally sexually mature when they reach >180 mm carapace length (Turner et al. 1986, 1987). The time it takes for tortoises to reach this size ranges between 15 and 21 years, depending on environmental conditions and other habitat characteristics that affect resource availability during their development (Turner et al. 1987; Tracy and Tracy 1995; Medica et al. 2012). Monitoring (25 years) is implemented to fully understand the success of translocation.

Previous plans for the translocation of tortoises from NTC expansion areas (Esque et al. 2005; Esque et al. 2009) sought to expand knowledge to: 1) provide safe, humane, and successful translocation of tortoises with minimal impact to resident (animals living within the recipient sites prior to translocation) and reference (telemetered animals living outside of the translocation sites, but whose movements are predicted not to overlap with translocated or resident animals) tortoises at sites where translocated animals are released; 2) study tortoises impacted by translocation to increase understanding of the ecology, conservation, and management of desert tortoises (USFWS 1994; Tracy et al. 2004; USFWS 2011; USFWS 2022b); and 3) define

measures of success for translocation and provide metrics to evaluate success over multiple time scales.

Translocation of approximately 650 adult tortoises from the NTC's SEA to public lands just to the south (the Southern Expansion Translocation Area; SETA) occurred in 2008. NTC's 2008 Translocation Plan described short- and long-term conservation science activities. In 2011, all conservation science activities supported by NTC for tortoises associated with the SEA and WEA (now WTA) as described in the 2008 Translocation Plan were discontinued; although, extramural funding from the National Science Foundation supported limited activities for ~ 4 years and provided some post-translocation short-term information (Table 1). The NTC translocations were followed by additional translocations for planned military training activities in the region (such as Marine Corps Air Ground Combat Center, Twentynine Palms, CA, 2016; USFWS 2017).

Research and monitoring of tortoises, habitats, and translocation activities associated with the NTC translocation have substantially contributed to knowledge of tortoise ecology, regional landscape conditions, and related effects of translocation, with numerous studies supported financially and logistically by the NTC (Table 1). Various surveying and analytical methods employed to detect tortoise presence have informed regional tortoise density estimates, population trends, and habitat models used to predict potential areas of tortoise habitat (Aycrigg et al. 2002; Berry et al. 2006; Karl 2002; Heaton et al. 2008a, 2008b; Nussear et al. 2008, 2009; Harless et al. 2010; Allison and McLuckie 2018; Carter et al. 2020; Parandhaman et al. 2022; Averill-Murray and Allison 2023; Kissel et al. 2023; Zylstra et al. 2023).

Identification, assessment, and protection of suitable tortoise habitat has become critical to tortoise conservation, because enduring tortoise population declines have been documented in four of the five federally designated Mojave Desert recovery units (Allison and McLuckie 2018; Zylstra et al. 2023). Human development and habitat fragmentation have contributed to tortoise population declines and impacted the demographic viability of tortoise populations vital to the survival of the species (Averill-Murray and Hagerty 2014; Allison and McLuckie 2018; Carter et al. 2020; Hromada et al. 2020; Averill-Murray et al. 2021; Averill-Murray and Allison 2023). One aspect of supporting demographically viable tortoise populations is identifying tortoise genetic units on the landscape to allow evaluations of the costs and benefits to genetic diversity when moving tortoises among sites, which can be a driver of healthy tortoise populations (Averill-Murray and Hagerty 2014; Scott et al. 2020). Initial genetic integration of translocated tortoises into release areas was low when paternity of young tortoises was analyzed based on genetics (Mulder et al. 2017). However, further longer-term reproductive investigation is needed.

During and following the 2008 NTC SEA translocation, research was conducted to better understand movement and spatial use (e.g., through habitat and among burrows), disease transmission risks, stress levels, and gene flow following translocation (Latch et al. 2011; Drake et al. 2012; Aiello et al. 2014; Averill-Murray and Hagerty 2014; Bowen et al. 2015; Farnsworth et al. 2015; Sah et al. 2016; Mulder et al. 2017; Aiello et al. 2018; Mack and Berry 2023). The stress response of translocated tortoises was assessed by quantifying and comparing values of the reptilian hormone corticosterone (CORT) for translocated, resident, and reference tortoises; results indicated that translocation did not elicit a detectable physiological stress response from

tortoises, but rather patterns varied by sex, activity season, and year (Drake et al. 2012). Additional post-translocation studies corroborated findings on spatial-use and site fidelity from previous years, in which translocated tortoises dispersed greater distances (1.5× more than reference tortoises) and had lower site fidelity in the first year after translocation when compared to resident and reference populations (Hinderle et al. 2015). Translocated tortoises are likely to disperse shorter distances and have a higher likelihood of survival when the recipient sites have an abundance of tortoise burrows, a variety of soil substrate textures that provide opportunities for burrow construction, and plentiful washes on the landscape for travel corridors and foraging, though translocated tortoises generally visit fewer burrows than resident tortoises (Mack et al. 2015; Sah et al. 2016; Nafus et al. 2017a). Threats to desert tortoises, including proximity to urban areas and predation by mammalian carnivores, were documented after the 2008 SEA translocation. However, these threats were not unique to the NTC or translocation activities and instead were documented throughout the Mojave Desert in relation to prolonged drought conditions and subsidized predators in proximity to urbanized areas (Esque et al. 2010; Cypher 2010; Emblidge et al. 2015). Other documented threats included vehicular traffic, litter, extreme weather, and ravens (*Corvus corax*; Walde et al. 2007; McIntyre et al. 2010; Mack and Berry 2023). Tortoise disease, particularly Upper Respiratory Tract Disease (URTD) and testudinid herpesvirus, has been further chronicled, with the pathogenicity of suspected causative agents *Mycoplasma agassizii* and *Mycoplasma testudineum* confirmed, refined antibody and pathogen presence laboratory tests developed, and transmission patterns in captive and wild populations studied (Jacobson et al. 2012; Aiello et al. 2014; Berry et al. 2015; Aiello et al. 2018).

Table 1. List of some citations that describe monitoring and research of Mojave desert tortoises, tortoise habitat, and tortoise translocation activities supported by NTC Fort Irwin.

Citation	General Topic(s)	Research Activities
Aiello et al. 2014	Disease	Disease dynamics between translocated tortoises and resident tortoises and infection outbreak likelihood based on tortoise population dispersal, susceptibility, size, and connectivity.
Aiello et al. 2018	Disease	Identification of transmission patterns associated with mating strategies, burrow use, and seasonal behaviors of wild and captive desert tortoises.
Allison and McLuckie 2018	Adult Density Trends	Line-distance sampling for estimating annual adult densities in Mojave Desert federally designated Tortoise Conservation Areas (TCAs).
Andersen et al. 2000	Habitat Modelling	Creation of a statistical GIS-based desert tortoise habitat model using survey field data and data from available spatial databases.
Averill-Murray and Allison 2023	Road Density	Decline of tortoise populations within conservation areas where road densities were >0.75 km/km^2 and consequential recommendations for managing conservation areas.

Aycrigg et al. 1998	Habitat Modelling	Assessing the impacts of military training at the NTC Fort Irwin on desert tortoises and their habitat; a model was developed to provide land managers with a tool that would predict tortoise population trends based on land use.
Aycrigg et al. 2002	Habitat Modelling	Spatially dynamic tortoise habitat modelling to assess impacts of military training.
Baxter et al. 2008	Reproduction	Monitoring nest placement of wild and captive female tortoises to study effects on hatchling sex ratio and survival at the Fort Irwin Study Site (FISS).
Berry 2002	Physical Growth	Measuring growth rings of costal scutes on tortoises while comparing growth to years of precipitation and forage biomass availability.
Berry et al. 2006	Anthropogenic Threats	Tortoise density variability in proximity to anthropogenic sources (e.g., surface disturbance, paved roads, trash, military ordnances).
Berry et al. 2015	Disease	Using health evaluation and testing for the prevalence and spatial distribution of *Mycoplasma* to understand habitat variables that affect tortoise health.
Bowen et al. 2015	Genetics, Disease, Stress	Development of a leukocyte gene transcription biomarker panel to assess physiological health and stress of tortoises within specific environmental conditions.
Carter et al. 2020	Habitat Modelling, Anthropogenic Threats	Using habitat modelling to evaluate efficacy of desert tortoise habitat protections at national, state, and local levels when quantifying human development.
Cypher et al. 2018	Predation	Observation of coyote (*Canis latrans*) diet patterns and preference.
Doak et al. 1994	Demographics	Demographic analyses/Population Viability Analysis (PVA) conducted on Western Mojave tortoises to model survival and population growth for desert tortoises.
Drake et al. 2012	Stress	Physiological stress associated with tortoise translocation.
Emblidge et al. 2015	Predation	Observation of localized tortoise predation and patterns linked to American badgers (*Taxidea taxus*).

Esque et al. 2005	Translocation Plan	NTC Ft. Irwin's land expansion program tortoise translocation plan for translocation of tortoises from the Southern Expansion Area (SEA).
Esque et al. 2009	Translocation Plan	Amendment to NTC Fort Irwin's land expansion program tortoise translocation plan (2005) for translocation of tortoises from the Western Expansion Area (WEA).
Esque et al. 2010	Predation	Predation of translocated tortoises in comparison to resident and control tortoises and overall range-wide patterns, with respect to drought considerations.
Franks et al. 2011	Home Ranges	Home range size comparisons between adult male and female tortoises among areas with varying precipitation.
Harless et al. 2010	Home Ranges	Tortoise home range size estimation using two compared statistical estimators and field sampling.
Hazard and Morafka 2002	Movement Patterns	Observation of movement patterns of previously captive neonate and juvenile tortoises released to the Fort Irwin Study Site.
Heaton et al. 2008a	Surveys	Using wildlife-detector dog and human surveying teams to compare if either team increased risks or types of predation on desert tortoises.
Heaton et al. 2008b	Habitat Modelling	Development of a spatially explicit decision support system model to identify potential suitable translocation areas for tortoises incorporating biological, anthropogenic, and logistic criteria.
Hinderle et al. 2015	Site Fidelity and Dispersal	Dispersal, homing, and overall movement of translocated tortoises subject to three distance treatments.
Jacobson and Berry 2009	Disease	Presence of oxalate crystals within renal system of tortoises.
Jacobson et al. 2012	Disease	Research review and updates on Upper Respiratory Tract Infection (URTD) and its causative agents (*Mycoplasma agassizii* and *Mycoplasma testudineum*) in tortoises.
Johnson et al. 2005	Disease	Genetic sequencing of tortoise herpesvirus-2 (THV-2) for the first-time using information from an adult female captive tortoise exhibiting

		anorexia, lethargy, and mouth lesions consistent with previous reports of tortoise herpesvirus.
Johnson et al. 2006	Disease	ELISA testing used to detect antibodies for and identify clinical signs of disease associated with *Mycoplasma agassizii* and tortoise herpesvirus, with exposure to *Mycoplasma* found to be higher in captive tortoises than in wild tortoises.
Karl 2002	Demographics	Tortoise density estimates at NTC Fort Irwin expansion areas using survey data.
Kissel et al. 2023	Occupancy	Predicting range-wide occupancy, colonization, and local extinction rates of tortoises using data from the long-term USFWS line distance sampling program.
Krzysik 1994	Management	Assessment and monitoring report of surrounding habitat, biological and environmental parameters that affect tortoise distribution and density, and management and research implications at NTC Fort Irwin.
Latch et al. 2011	Genetics	Identification of factors with greatest influence on genetic variation within tortoise populations at local scales.
Mack et al. 2015	Site Fidelity, Cover Sites	Cover site use with varying structural characteristics.
Mack and Berry 2023	Site Fidelity, Dispersal, Survival	Review of NTC Fort Irwin Southern Expansion Area (SEA) tortoise translocation.
McIntyre et al. 2007	Predation	Identifying common raven (*Corvus corax*) threats to tortoises in the SETA translocation area based on raven density surveys.
Mulder et al. 2017	Genetics, Recruitment	Male genetic integration into translocation area populations by testing genetic paternity of hatchlings from translocated and resident female tortoises.
Nagy et al. 2015a	Head-starting, Side Fidelity, Dispersal, Survival	Releasing head-started juvenile tortoises under different conditions to assess the effects of release distance, release season, and age and body size on homing behavior and survivorship.
Nussear et al. 2008	Surveys	Comparative surveys to determine whether human or detector dog teams were more effective at detecting desert tortoises in the wild.
Oftedal et al. 2002	Diet	Annual vegetation biomass, nutritional quality, and forage selection by captive tortoises held at NTC Fort Irwin.

Sah et al. 2016	Cover Sites	Refuge (burrow) use variability by translocated and resident tortoises relative to season, burrow age, and topographic location of burrow.
Spangenberg 1996	Field enclosures	Use of tortoise enclosures to obtain data on the life history of neonate and juvenile tortoises and evaluate enclosure use as a conservation tool.
Spotila and Avery 2002	Land use	Lessons from the expansion of the National Training Center at Fort Irwin.
Walde et al. 2007	Anthropogenic Threats	Threats of human garbage and litter particularly resistant to degradation (e.g., balloons) to tortoises.
Westervelt et al. 1997	Land use	Development of a dynamic simulation model to manage and protect the desert tortoises at NTC Fort Irwin; model creates multiple land use scenarios and predicts their consequences and severity on natural and human environments.
Woodman et al. 1990	Density, Distribution	Report of the estimated density and distribution of desert tortoises at NTC Fort Irwin and Goldstone Space Communications Complex.
Zylstra et al. 2023	Density	Development of a hierarchical distance sampling model that accounts for ecological and observational processes and predicts potential spatial variation in tortoise densities.

1.1 Desert Tortoise Translocation Objectives

This translocation plan is designed to monitor metrics that are correlates of desert tortoise fitness and can be used as thresholds for decision-making. Methods to evaluate the short- and long-term success of this translocation and to enhance knowledge of desert tortoise translocations (described below), include future surveys in areas where translocation occurred to evaluate the status of translocated, resident, and reference tortoise populations at several time scales (Berry 1986; Dodd and Seigel 1991; Nussear 2012). This plan includes recent results of baseline biological investigations (April 2020- November 2022) pertaining to tortoises in the WTA and surrounding habitats, including the WTATS and the release areas (recipient sites) for translocated tortoises. Resident and reference tortoises in the WTATS have been monitored since Spring 2020. Monitoring efforts are designed to achieve the goals of (1) measuring translocation success and fitness of tortoises in all study groups, (2) the short- and long-term assimilation of translocated tortoises into the recipient population, and (3) enhance the understanding of resource requirements to assist in future translocations and tortoise conservation management.

The plan builds on previous translocation endeavors while addressing clearance, translocation, monitoring methods, and expected results of translocation implementation for associated tortoises; this information is intended to help maximize individual survival and promote regional

recovery efforts for tortoises when possible. The methods described are consistent with the recommendations and guidance from the U.S. Fish and Wildlife Service (USFWS; original and revised Mojave desert tortoise recovery plans; USFWS 1994; USFWS 2011) and Translocation Plan Development Guidance document (USFWS 2020), Bureau of Land Management (BLM), and California Department of Fish and Wildlife (CDFW). Details of the proposed WTA military activities, potential impacts, and terms and conditions can be found in the Biological Opinion for the *Recovery and Sustainment Partnership Initiative, Use of Additional Maneuver Training Lands, and Operations and Activities at the National Training Center and Fort Irwin, San Bernardino County, California* (USFWS-SB-20F0163-21F1366, December 13, 2021) and the roject Timeline (Appendix A).

2.0 Project Area – Site Descriptions

Western Training Area (WTA)
The WTA (286 km^2; 70,555 ac) is in the southwest corner of the NTC (Figure 1). The WTA is bounded by the geographical designations of 3908200 and 3890200 North and 492500 and 516500 East Universal Transverse Mercator (UTM) lines. The WTA borders the Naval Air Weapons Station-China Lake (NAWS-CL; 3908200 North UTM; 492500 East UTM) to the north, the Paradise Range and Lane Mountain to the south, and Superior Dry Lake to the west. The WTA is comprised of broad flat valleys with many sandy washes interspersed by low gentle hills and rocky outcrops (northwest corner of WTA). Most of the area is internally drained by the Superior and Goldstone Basins. The elevation within WTA ranges from 814 to 1,382 m.

The WTA includes two contiguous areas of restricted access that are not considered further in this translocation plan. Excluding the conservation or restricted access areas, the WTA encompasses 254 km^2 (62,764 ac) (Figure 1). The first restricted access area is known as the East Paradise Conservation Area that is 18 km^2 (4,349 ac) and was designated as a BLM Area of Critical Environmental Concern (ACEC; BLM 2005) for the conservation of the Mojave desert tortoise, endemic Lane Mountain milkvetch (*Astragalus jaegerianus*), and the Mohave ground squirrel (*Xerospermophilus mohavensis*). The East Paradise Conservation Area is fenced with tortoise exclusionary fencing to the northeast, allowing tortoises from the southwest to access this area but not the rest of the WTA. The second restricted access area, Brinkman Wash Restricted Area, was designated by the Army for foot traffic only and is 14 km^2 (3,385 ac).

Western Training Area Translocation Site (WTATS)
The WTATS was delineated through discussions among BLM, NTC, U.S. Geological Survey (USGS), and USFWS by reviewing suitable translocation sites for tortoises and subsequent analyses by USGS (see Section 4.0: Modeling Habitat Site Selection for Recipient and Reference Sites). Approximately 5,585 km^2 (1,380,084 ac) of lands mostly west, south, and southeast of the WTA in San Bernardino County, California were evaluated (Figure 1). During our evaluation, we reduced the footprint of this larger landscape (used and referenced as the study area) to include habitats most appropriate for translocated tortoises, and this is the area now referred to as the Western Training Area Translocation Site (WTATS; Figure 1). The WTATS covers ~3,296 km^2 (814,459 ac) of mostly public lands north of Barstow and Hinkley, California. It is bounded on the north by the Naval Air Weapons Station China Lake (3917952 and 3849256 North UTM lines), to the south by the 3849332 North UTM line, to the east by the 458197 Easting UTM lines, and to the west by 571068 Easting UTM line within the Soda Mountains. The eastern side

of the WTATS incorporates habitats where NTC previously translocated tortoises from its Southern Expansion Area (SEA; Esque et al. 2005) in 2008. The WTATS includes two BLM-designated Wilderness Areas, Grass Valley and Black Mountain, and two recreation areas and public campgrounds at Rainbow Basin and Owl Canyon, collectively comprising 210 km^2 (51,892 ac) (Figure 1). The WTATS is a mosaic of property ownership and management, with public lands managed by the BLM, which administers the greatest amount of land (~ 2,145 km^2; 530,041ac; 65%) (Figure 1) and oversees a large network of roads and trails (including OHV) in the region. Holdings by the NTC (referred to as Fort Irwin Mitigation Parcels/Irwin Mitigation Parcels that are 1 mi^2; ~320 km^2; 79,074 ac; 9.7 %), the State of California lands (~93 km^2; 22,981 ac; 2.8 %), and non-federal or private property (~ 742 km^2; 183,352 ac; 22.5 %), represent the remaining ownership and are largely concentrated in the southern WTATS (Figure 1). The WTATS is more topographically diverse than the WTA, and comprised of large broad valleys, rugged volcanic and granitic mountains, and gentle hills comprised of diverse sedimentary parent materials. The region encompasses a large network of washes that drain into the Superior and Harper Valley Basins and associated dry lakes. The elevation in this area ranges from 516 to 1250 m.

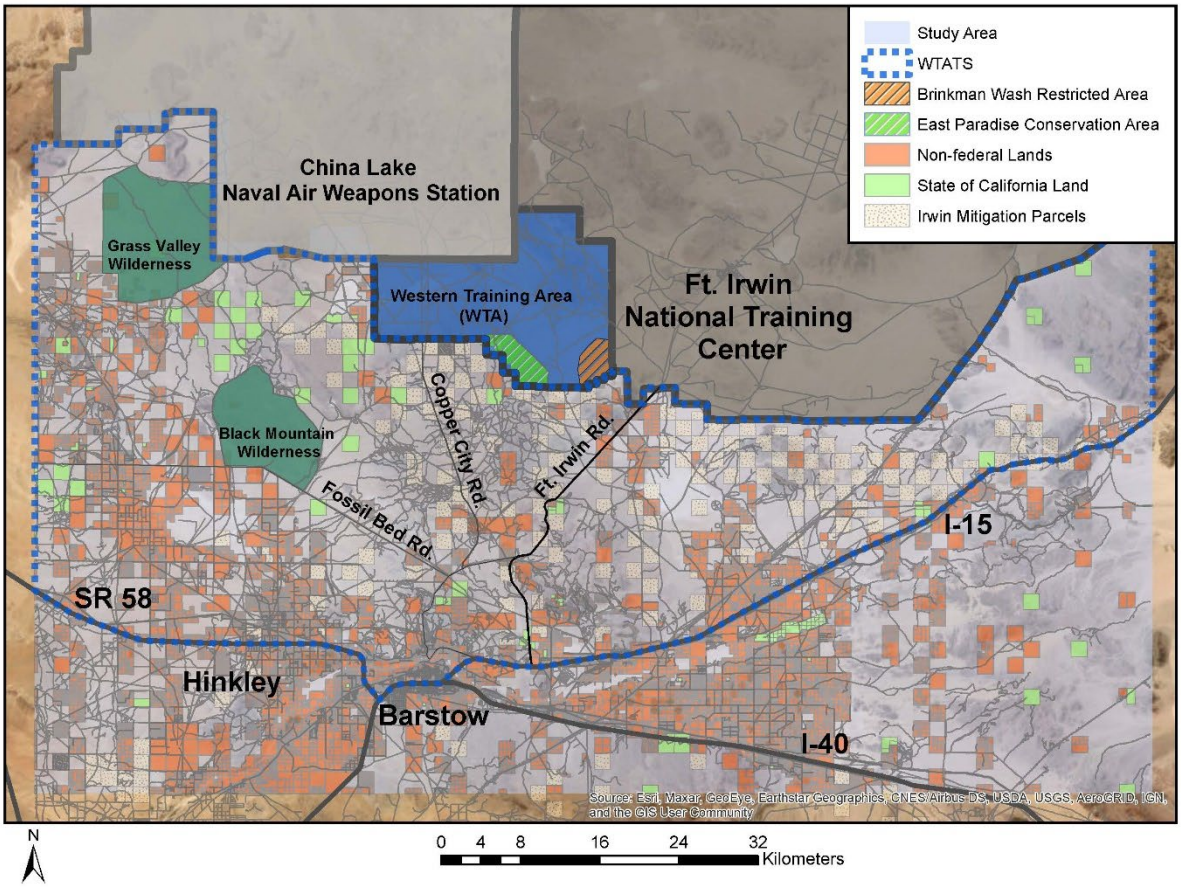

Figure 1. The U.S. Army's National Training Center plans to expand military activities into Fort Irwin's Western Training Area (WTA). The study area includes the Western Training Area Translocation Site (WTATS), which is mostly comprised of federally managed lands, areas south of the Naval Air Weapons Station China Lake and NTC, and areas north of Interstate 15 (I-15) and California State Route 58 (SR 58). The WTATS also includes some non-federal lands, State of California lands, private and public lands with designated recreation and wilderness areas (including a large network of OHV trails), and lands

owned by the NTC (Irwin Mitigation Parcels and restricted access areas Brinkman Wash Restricted Area and East Paradise Conservation Areas).

2.1 Site Selection Guidance from BLM

Due to a complex network of property ownership, management, and landscape use throughout the West Mojave management area, staff at BLM – Barstow and Ridgecrest Field Offices provided recommendations for habitats and areas that should be excluded from consideration as potential recipient sites within the WTATS study area. These recommended avoidance areas included: 1) areas south of I-15 and SR 58; 2) areas east and south of a primary transmission utility corridor and access road; 3) BLM-designated wilderness (Grass Valley and Black Mountain wildernesses); and 4) targeted areas south and southwest of Fossil Bed Road that have highly intense recreation activities and other landscape concerns (Figure 2). In later discussions, the BLM indicated that any translocated tortoises that moved into designated Wilderness Area habitats from their recipient sites would not be removed by the BLM. However, such a scenario is unlikely because proposed recipient sites, and their calculated dispersal range buffers (6.5 km; USFWS 2020), are not expected to extend into Wilderness Areas and/or are separated from Wilderness Areas by natural geographic barriers. The BLM Barstow Field Office also provided information regarding where BLM and their partners are focusing route restoration efforts (e.g., areas between and east of the Wilderness Areas), with the suggestion that these areas receive higher priority as recipient sites due to in-progress and anticipated improvements in habitat conditions.

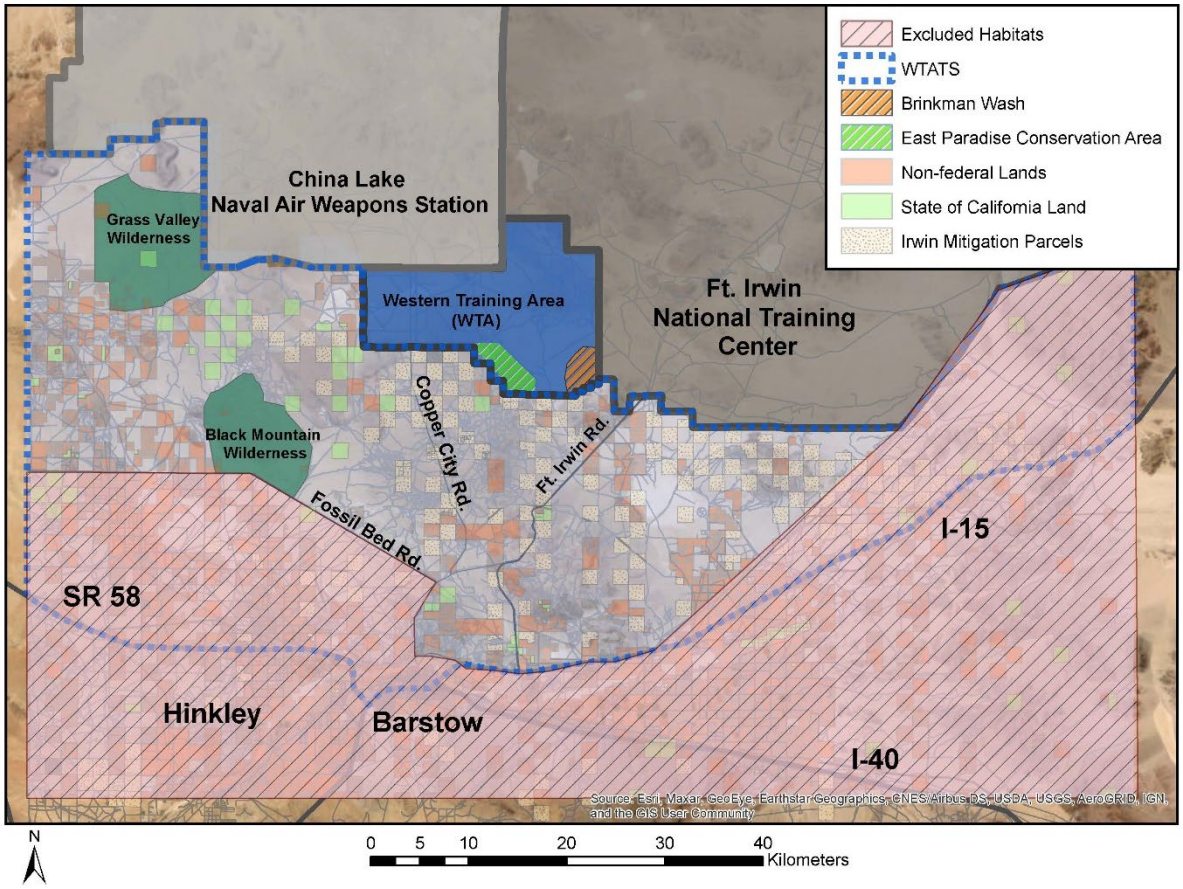

Figure 2. Revised project area map that shows areas excluded from translocation consideration (Excluded Habitats) based on recommendations from the BLM that are consistent with property ownership and landscape use in the region.

3.0 Baseline Tortoise Investigations (2020–2022)

Baseline tortoise and habitat investigations were performed in the WTA and the WTATS after the boundaries and habitat considerations were identified. All baseline activities pertaining to tortoises and their habitats were authorized under a USFWS federal permit (#TE-63428D-0, -1), a CDFW Memorandum of Understanding (MOU; signed March 30, 2020), and a BLM MOU (signed March 31, 2020). A subset of tortoises located during the tortoise surveys (described in the next section) were fitted with radio transmitters to allow for future locating and investigations (telemetered tortoises). Activities were conducted using tortoise surveying, capturing, handling, and monitoring methods, and applications described in Section 6 of this plan.

Tortoise Survey Plots

Proposed training areas (i.e., the WTA) and recipient sites (in the WTATS) were surveyed to estimate tortoise density, abundance, and to document habitat characteristics. Survey plots (300×300 m) were randomly distributed on public lands for tortoise surveys during Spring and Fall seasons of 2020, 2021, and 2022 following protocols similar to USFWS 2022a (Figure 3). All tortoise sign was recorded, including live tortoises (including tortoises >180-mm carapace length [hereafter adults] and tortoises ≤180mm carapace length [hereafter juveniles]), carcasses,

and burrows. Plots were located at least 50 m from BLM-designated roads and excluded from non-federally owned parcels, campgrounds, dry lake beds (when possible), and designated Wilderness Areas. Survey transects were spaced at 10m intervals beginning in the southwestern corner of each plot. A total of 1,408 plots were surveyed in the project area from Spring 2020 to Spring 2022.

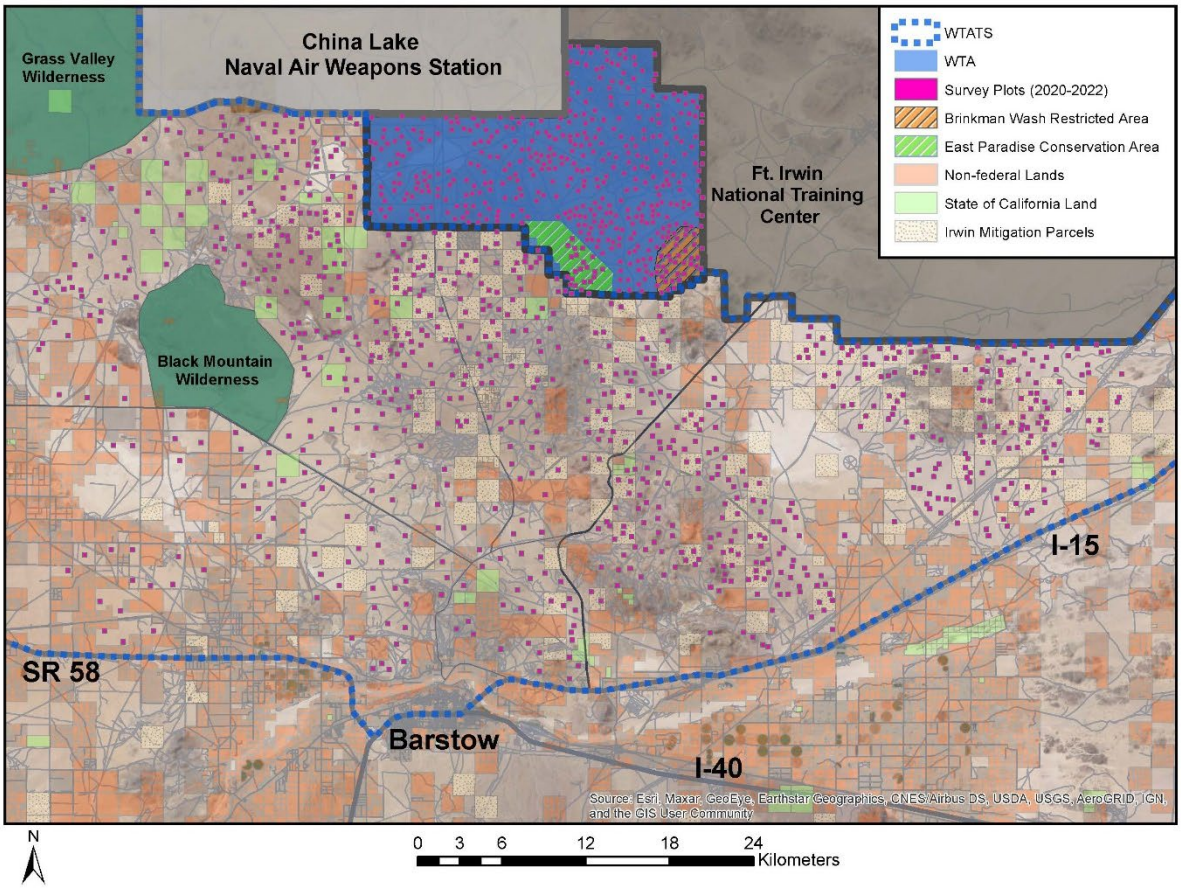

Figure 3. Map of plots (pink squares) within the NTC Western Training Area (WTA) and adjacent public lands (WTATS) surveyed from Spring 2020 to Spring 2022. A cumulative total of 1,408 plots (300x300 m) were surveyed.

Baseline Tortoise Health Assessments

The 2020–2022 plot surveys (Figure 3) and monitoring efforts for telemetered tortoises throughout the project area included observations of 783 tortoises, 41 of which were from the 2008 NTC translocation efforts (Figure 4). Of the tortoises observed, 86% were adult tortoises with a consistent 2 male:1 female sex ratio among years. Most tortoise encounters occurred when tortoises were in burrows or under vegetation. The most frequently used vegetative cover species throughout the study area were *Larrea tridentata*, *Ambrosia dumosa*, and *Atriplex polycarpa.*

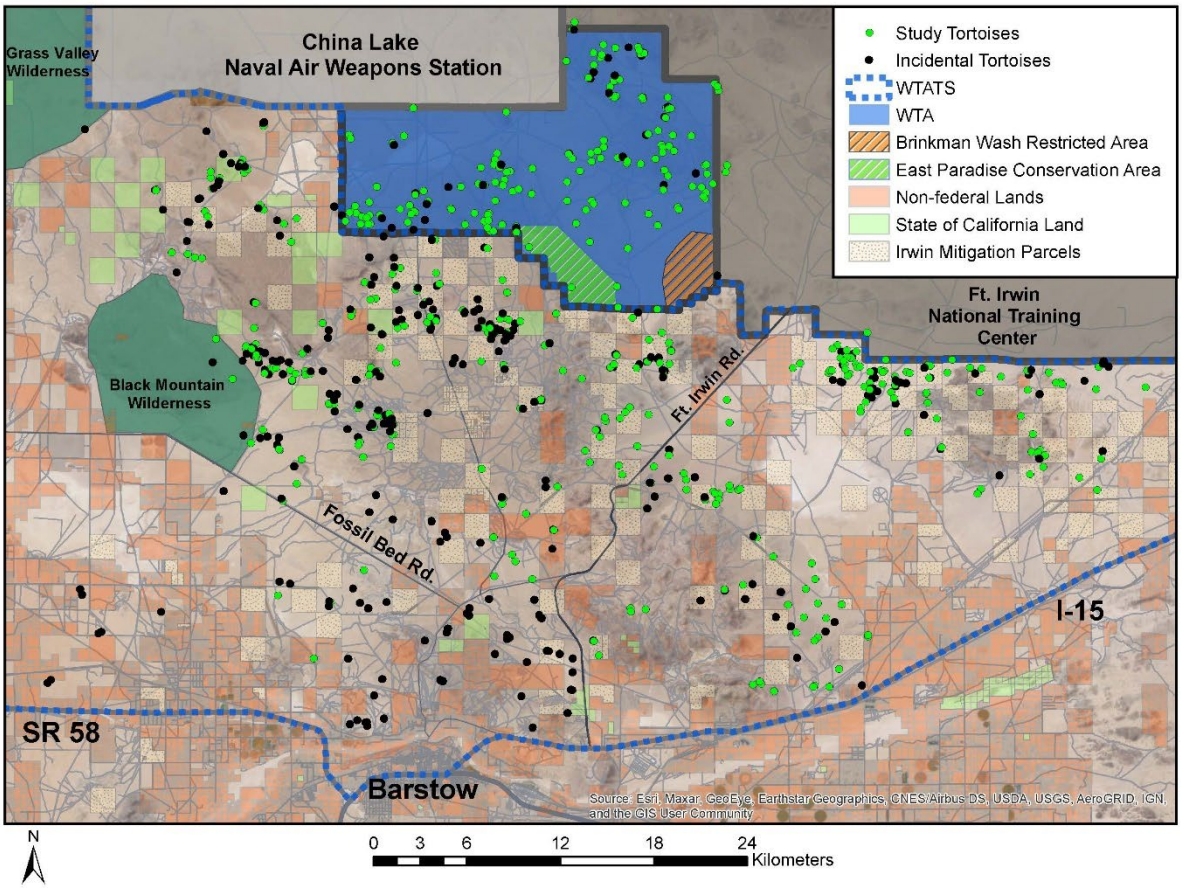

Figure 4. A Mojave desert tortoise habitat evaluation was conducted during 2020–2022 to provide updated information on the presence, distribution, and condition of tortoises and their habitats within the Western Training Area Translocation Site (WTATS) and Western Training Area (WTA). Live tortoises, including all telemetered tortoises that were tracked at least once per month (study tortoises; lime green circles). Additional marked, but not telemetered tortoises (incidental tortoises; black circles), were found during survey and monitoring field efforts from 2020–2022.

From 2020–2021 in the WTATS and WTA, telemetered tortoises were evaluated for clinical health conditions with physical assessments, including Body Condition Scoring (BCS) and tissue collection (blood samples and oral swabs) whenever possible, following USFWS guidance (2019). Clinical health conditions of tortoises were characterized by examining each animal's posture, respiration, face (with specific attention to the eyes, periocular tissue, nares, mouth, tongue, and oral mucosa), skin, and shell for signs of disease, abnormalities, damage, or discoloration. Health assessors also searched for any discharge from the cloaca, eyes, nares, and mouth, or evidence of ulceration, erythema, swelling, or discharge on the skin (USFWS 2019). The overall condition and fat stores with respect to skeletal features of the head and limbs of animals were characterized through assignment of numerical body condition scores, first through categorization as “under”, “adequate”, or “over” condition, and then by numerical values (e.g., Under: 1–3, Adequate: 4–6, Over: 7–9) to provide a precise and repeatable measurement (USFWS 2019). Ectoparasites observed on tortoises (including *Ornithodoros* spp., ticks) were

counted, placed in cryogenic vials, and stored on wet ice while in the field and later flash frozen with dry ice or placed directly into ultracold storage (-70°C).

Immediately following the physical assessment, tissues were collected from each animal when possible (including blood and oral swabs). Whole blood was extracted (0.3–2.0 mL, separated into aliquot samples, when appropriate) via subcarapacial venipuncture (Hernandez-Divers et al. 2002) using a 3.81-cm, 23-gauge needle and 3-mL syringe coated in sodium heparin to prevent coagulation. Whole blood was either placed directly onto a Whatman™ FTA™ card (GE Healthcare Life Science, Marlborough, MA; <0.01 mL blood), into a cryogenic vial with Invitrogen RNAlater™ (ThermoFisher Scientific, Vilnius, Lithuania) mixed at 2 parts solution: 1 part blood for future RNA extraction and gene expression analysis, or into a BD Microtainer® tube with lithium heparin (Becton Dickinson and Company, Franklin Lakes, NJ) for subsequent centrifugation to separate plasma. Sloughed epithelial cells from mouths of tortoises were collected using oral swabs that were rotated slowly across surfaces of the tongue and oral mucosa. All samples were stored on wet ice for no more than four hours and then transferred to an ultracold freezer (-70°C). Blood plasma and oral swab samples were sent to labs for Enzyme-linked Immunosorbent Assay (ELISA) testing for acquired antibodies and quantitative polymerase chain reaction (qPCR) testing for pathogen presence of *Mycoplasma agassizii* (Myag) or *Mycoplasma testudineum* (Myte)—both causative agents of Upper Respiratory Tract Disease (URTD) in desert tortoises—and Testudinid Herpesvirus (TeHV2; Origgi et al. 2002; Johnson et al. 2005; Wendland et al. 2007; Jacobson et al. 2012; Burgess et al. 2021). ELISA lab results were reported as negative (antibody titer <32), suspect (antibody titer ≥32 and <64), or positive (antibody titer ≥64), whereas qPCR lab results were reported as negative, positive, or equivocal (inconclusive) based on cycle threshold values.

Health assessments were conducted on 393 telemetered tortoises throughout the NTC project area during 2020–2022. Most tortoises examined were classified as clinically normal and described as having adequately conditioned (BCS 4 or BCS 5). However, some were documented as under-conditioned (BCS 3) for muscle and fat reserves in 2022. Most tortoises presented with recessed eyes, likely related to temporary dehydration states that corresponding with the limited rainfall since 2020. A few tortoises exhibited notable health characteristics, including abnormal beaks, periocular swelling and redness, conjunctival swelling, mucoid ocular discharge, occluded and eroded nares, nasal discharge, active skin lesions, and active shell trauma. These animals represented <6% of the assessed population. Tissue samples assessed during 2020–2021 yielded positive laboratory results from within the WTATS either for antibodies specific to Myag and Myte (via ELISA testing; n=4, or 3.3% of assessed population), or pathogen presence (via qPCR testing; n=6, or 6.7% of assessed population) of Myag and Myte.

Baseline Tortoise Mortalities

Mortalities of study and incidental tortoises, after initial encounters, occurred in both the WTATS and WTA study areas (n=37, or 5% of encountered tortoises) during 2020–2022. A higher tortoise mortality rate was observed in 2022 (8.7% of encountered tortoises) than previous years, likely related to prolonged drought conditions in the southwestern United States (Williams et al. 2022). More male than female tortoise mortalities were recorded (4M:2F:1U). However, the proportion was consistent with observed regional 2:1 sex ratio for the population.

Predator controls on ravens (egg-oiling, removal, etc.) were implemented in the Superior-Cronese Critical Habitat Unit and surrounding areas, which have been effective for reducing raven reproduction rates and predation rates on sensitive species like the desert tortoise and sage-grouse (Shields et al. 2019; Xiong 2020; Holcomb et al. 2021; Sanchez et al. 2021). Decision support tools and models have been developed to assist managers in identifying areas of predator concern (Shields et al. 2019; Xiong 2020; Currylow et al. 2021). Preliminary results and observations do not suggest recent high die-off areas in the project area from predation, disease, or climate variability.

4.0 Modeling Habitat Site Selection for Recipient and Reference Sites

Guidelines for translocating Mojave desert tortoises are available as USFWS recovery objectives and in updated translocation protocols (USFWS 1994; USFWS 2011; USFWS 2020). These guidelines propose that: 1) translocated tortoises be placed into recipient sites of suitable tortoise habitat that support all tortoise life stages with no foreseeable habitat development or other impacts (e.g., increased OHV recreation activity, solar energy development), 2) contain a depleted tortoise population without evidence of a disease outbreak, 3) avoid private land not secured for conservation/mitigation and access limitations, 4) provide recipient sites having a minimum tortoise dispersal range of 6.5 km (lacking barriers) and no closer than 6.5 km to major unfenced roads or human development, and 5) do not overlap with designated sites where reference tortoises live (reference sites) so that translocation success can be measured by comparing response variables in animals among sites where environmental conditions vary. Based on the guidelines provided by USFWS and consultation with local and regional partners (see Section 2.1: Site Selection Guidance from BLM), a model was created as a decision support tool to inform site selection for recipient and reference sites related to the NTC translocation activities using these guidelines to the greatest extent possible.

The model uses review of previous studies on desert tortoise ecology (e.g., resource selection, habitat suitability, predators (raven nests), environmental influences, etc.) and knowledge from expert biologists (BLM, NTC, USFWS, and USGS) to define model parameters. Parameters included geospatial and environmental data considered important to the survival and health of tortoise populations, such as habitat suitability, precipitation, raven threats, and several anthropogenic factors (e.g., roads, land use, land ownership). The model can be used to run hypothetical scenarios, based on user selected values, that permit investigation of the relative costs and benefits of a variety of potential management actions and scenarios that are not limited to the NTC translocation.

4.1 Technological Framework

Variables used for prioritizing potential recipient and reference sites included biological and anthropogenic factors likely to affect desert tortoise populations. The R package “shiny” v1.7.1 (Chang et al. 2023) was used to develop a dynamic visual application in which the user interface provides options to manipulate the influence of spatial and temporal (e.g., precipitation) data interactively. The variables, relationships between variables, and variable weights used to evaluate the potential of a site were analyzed using the application to develop a variety of models for evaluation in this translocation plan. Each model consisted of a series of raster layers thought to have a positive influence on tortoise population success, and a second set that were considered to decrease the effectiveness of translocation. The areas proposed for desert tortoise translocation

have a weighted value equal to or greater than the mean model value (Appendix B). The following seven criteria were selected for analyses to evaluate suitable translocation sites.

Recipient Site Selection

Land Ownership – Parcels purchased by the NTC were approved by the military and considered as potential recipient sites. Privately held lands, non-federal lands, state lands, and wilderness/conservation areas were not considered as potential recipient sites. Once the mean model value is determined, the application highlights suitable sites for release (1) or unsuitable for release (0) by assigning binary values to each parcel.

Model Criteria

Habitat Suitability – Since the previous translocation effort involving the expansion of the NTC (Esque et al. 2005; Heaton et al. 2008b), a desert tortoise habitat model was developed (Nussear et al. 2009; Parandhaman et al. 2022) using desert tortoise presence data (1970–2008) and environmental data (e.g., surface roughness, slope, aspect, bulk density, rockiness, soil depth, precipitation, annual plant potential, and perennial plant cover) to analyze and develop a probability of habitat potential to identify areas of suitable desert tortoise habitat throughout the Mojave Desert and parts of the Sonoran Desert. Nussear et al. (2009) is the primary model in use to delineate Mojave desert tortoise habitat throughout its range since its publication. The 2009 model was modified for use in ranking potential habitat suitability by converting the original 1 km^2 raster cell size habitat model to the 2.59-km^2 (one square mile, or section) cell size for this analysis using an area weighted average.

Distance to roads – OHV activity and large networks of roads reduce numbers of tortoises and decrease habitat quality (Custer et al. 2017; Averill-Murray and Allison 2023). A roads layer was developed using the BLM (e.g., designated OHV roads, dirt roads on public land, access roads), TIGER/Line 2018 (e.g., access roads and paved roads), and archived USGS GPS tracks (e.g., designated OHV roads and dirt roads that may not have been present on BLM road file) from previous work in the area. Monthly monitoring conducted since November 2022 has not noted any additional roads nor increased OHV activity in the model footprint (Vernadero Group Inc. [Vernadero] 2024a).

Raven Nest Site Density – Common ravens (*Corvus corax*) have long been considered one of the important threats to tortoise populations throughout the Mojave Desert (Berry 1986; USFWS 1994; Tracy et al. 2004; Holcomb et al. 2021). A raven nest site density model created by Xiong (2020) was used to predict nesting sites on anthropogenic and natural areas that are associated with evidence of tortoise predation.

Connectivity – Tortoise populations may be isolated by a variety of factors, including habitat loss, degradation, and fragmentation, which can result in reduced population-level connectivity and decreased gene flow (Hand et al. 2014; Haddad et al. 2015, Dutcher et al. 2020, Hromada et al. 2020, 2023). The connectivity model incorporated here (Gray et al. 2019) uses tortoise movement data to estimate connectivity across the landscape via a circuit-theoretic approach.

Precipitation – Precipitation is essential for tortoise survival, supporting growth of herbivorous forage. Water must be balanced with food intake for positive nitrogen and energy balances (Medica et al. 1975; Nagy 1988; Peterson 1996; Esque et al. 2014). Average winter precipitation was taken from the PRISM dataset at 800-m resolution between the months of November through February for years 2013 to 2018 (Daly et al. 2008; Xiong 2020; Zylstra et al. 2023). The layer was rescaled with a cubic spline resampling method to a common resolution of 250-m.

Terrestrial Development Index – The terrestrial development index (TDI) was derived from the surface disturbance footprint of terrestrial development for the western USA. This includes urban areas, roads, highways, and agriculture, among other disturbances (Carr and Leinwand 2020).

Relative Weighting Criteria

In the shiny application, we used a form of Ordered Weighted Averaging (OWA; Yager 1988) to create user guided decisions and scenarios for site selection using input raster layers (criteria) that could be considered beneficial or detrimental to tortoise translocation in a specified area (Malczewski 2006). In the model, positive influences included desert tortoise habitat suitability (Nussear et al. 2009), desert tortoise movement potential (Gray et al. 2019), and average winter precipitation. Negative influences included raven nest density (considering both anthropogenic and natural nest densities; Xiong 2020), distance to roads (including paved or dirt public, and BLM designated trails and primitive roads, and private roads), and TDI (a measure of the cumulative anthropogenic influences within a 1-km window; Carr et al. 2017; Carr and Leinwand 2020; Carter et al. 2020). Each of the criteria were rescaled from 0 to 1 for analysis. Variance inflation factors (VIFs) were calculated for the set of criterions used in the model to exclude highly correlated variables (VIF > 3) through a stepwise procedure using the vifstep () function in the R package usdm (Naimi et al. 2014; R Core Team 2022).

Each of the layers can be manipulated in two ways. First, layers were standardized to a range between 0 and 1 and then weighted within that range to indicate the relative effect/weight (i.e., importance; w_i in equations 1 and 2 below) in the overall model. For example, habitat suitability may be set to have a large effect (w_i = 1), TDI as a small effect (w_i = 0.2), and precipitation as another large effect (w_i = 0.8) on the overall model. Next, the layers were scaled (q_i in equations 1 and 2) by user-defined parameters that adjusted the values of the raster via a beta probability distribution, which necessarily restricted possible values to between 0 and 1. Linear or nonlinear scaling of each raster can be implemented by changing the two shape parameters (α, β) of the beta probability distribution (via the pBETA() function in the R package fitODBOD [v1.5.0]; Mahendran and Wijekoon 2019; R Core Team 2022), where the shape parameters were allowed to vary between 1 and 5 (Figure 5). For example, increasing the scale on lower bound values such that α = 4, increases the probability of lower values in the weighted raster, resulting in higher values having less consideration because the upper bound remains unscaled (β = 1; Figure 5B).

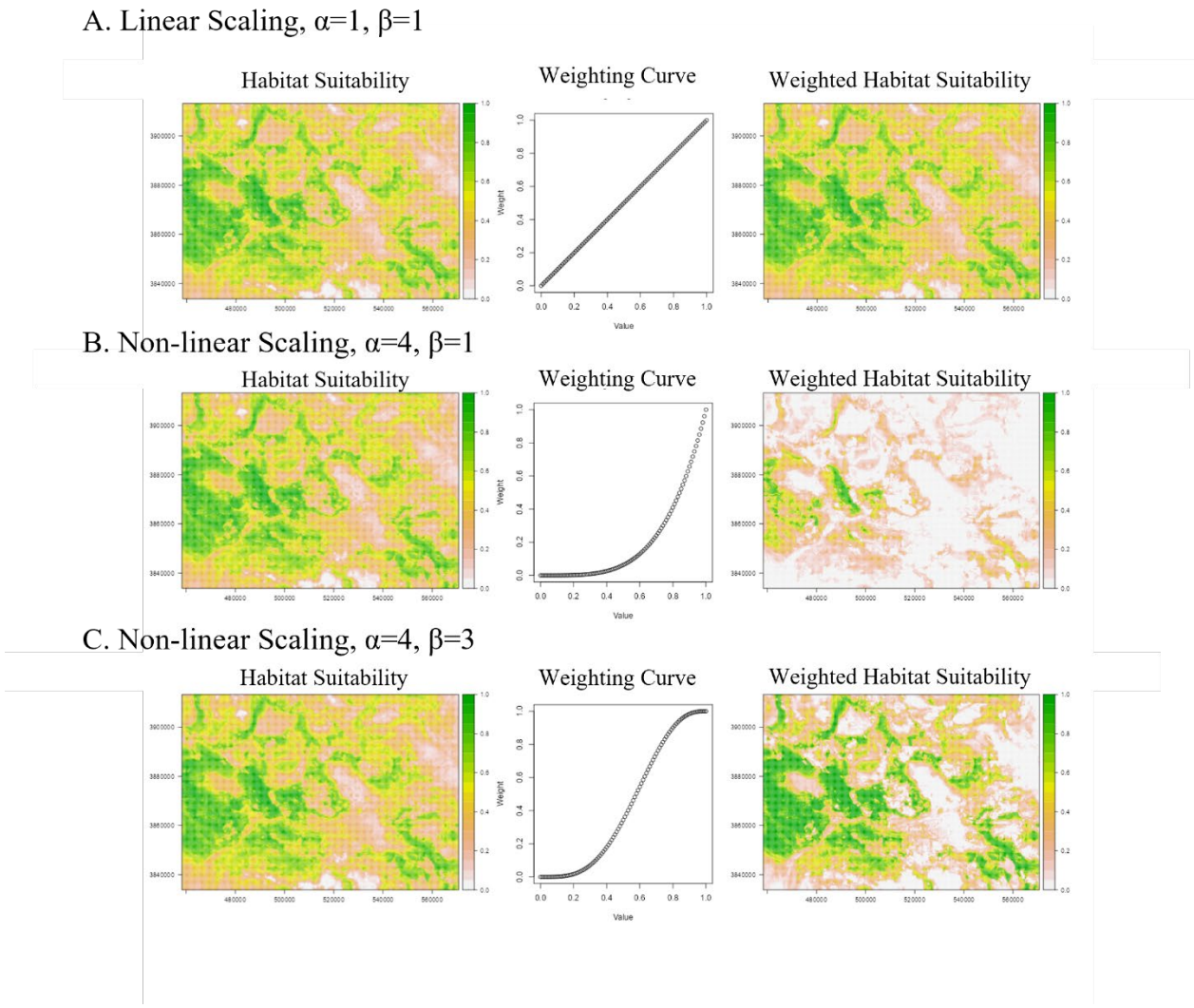

Figure 5. The left figure panels represent the original non-weighted and non-scaled criteria (e.g., *i* = Habitat suitability). The middle figure panels display the weighting curve of the probabilistic change of the criterion in the model (p_i in equation 1) by multiplying the raster weight (scaled 0-1; w_i in equations 1 and 2) and scaling parameters (q_i, where α and β scores can range from 1 to 5). This example of weighting profiles with a linear 1:1 weighting function (Figure 5A) and a nonlinear weighting function (Figure 5B and 5C), which demonstrates how stakeholders and experts are able to create multiple scenarios by assigning weights (w_i in equations 1 and 2) and scaling parameters (q_i).

Each of the weighted layers was then multiplied by the respective weighting curve. The positive and negative effects on desert tortoise populations were each summed and scaled from 0 to1, then negative effects were subtracted from the positive effects, yielding a final weighted layer used as the model for consideration.

$$p_i = \sum_{i=1}^{n} q_i * w_i \qquad \textit{(Eq 1. Positive influence)}$$

$$k_i = \sum_{i=1}^{n} q_i * w_i \qquad \textit{(Eq 2. Negative influence)}$$

$$S = \sum_{i=1}^{n} \frac{p_i}{\max(p_i)} - \sum_{i=1}^{n} \frac{k_i}{\max(k_i)} \qquad \textit{(Eq 3. Suitability probability)}$$

where p_i = score of positive influence raster; k_i = score of negative influence raster; and each raster (i) has an associated weight (w_i) and a probabilistic weighting function based on a vector of probability density function where $q_i = \frac{x^{\alpha-1}(1-x)^{\beta-1}}{\mathrm{B}(\alpha,\beta)}$, α and β can range from 1 to 5, and where α = lower bounds of the scaling parameter, and β = upper bounds of the scaling parameter; and S = suitability probability.

4.2 Decision Scenarios

Five variations of the raster scaling were combined to create modeling scenarios thought to be important for desert tortoise translocation success (Appendix B, C). For each scenario, the set weight and bounds of each criterion were developed using information based on expert knowledge of the authors. These scenarios were discussed with personnel from agencies with administrative responsibilities for the study area (BLM – Chris Otahal, Jeffrey Childers, Amy Fesnock, Mark Massar; NTC – David Housman, Penn Craig, and David Davis; USFWS – Brian Croft and Kristina Drake); and feedback on guidelines for appropriate areas in relation to agency policies were shared. Staff from California Department of Fish and Wildlife were contacted but no response was received.

Our base model included all input rasters which were represented by their baseline values of "1" after being standardized (Appendix B, C; Table 2). The second model was focused on urban and disturbed areas in the study site (Appendix B, C; Table 2). The urban areas included cities such as Barstow, Lenwood, and Hinkley, which are all close to major roads and located in the southern region of the study area. The roads layer also included a large network of paved and dirt roads (including BLM-designated trails and unmaintained dirt roads). The third scenario focused on raven nest density (Appendix B, C; Table 2), given ravens are well-known predators of the desert tortoise (Boarman et al. 2006; Holcomb et al. 2021; McIntyre et al. 2010; Xiong 2020), and the eastern part of the study area contains a large network of transmission lines that are used by ravens for nesting (Xiong 2020). Recent raven monitoring and management efforts have focused on reducing raven populations throughout the desert tortoise Critical Habitat Units (Shields et al. 2019; Dettenmaier et al. 2021; Currylow et al. 2021; Holcomb et al. 2021; Sanchez et al. 2021). Although the results of those efforts have been positive across the desert in every CHU besides Superior-Cronese (K. Holcomb; USFWS *personal comm*.), this scenario provides

an optimistic consideration of the future effects of these management actions by including a decreased probability of raven predation pressure on desert tortoises. Increased management activities through adaptive management may be necessary if predation pressure increases prior to or after translocation (see Section 11.0: Adaptive Management). The fourth scenario focused on the probability of suitable tortoise habitat (Appendix B, C; Table 2). One important aspect of improving habitat suitability includes restoration efforts that have been conducted in the area to reclaim road incursions. BLM has committed to continue restoration and maintenance of these sites with the goal of increasing habitat quality, and this raster was designed to test the impact of this on-site selection. Additionally, the fourth scenario prioritizes areas with a higher probability of precipitation during drought years. The fifth scenario was a synthesis of scenarios 2 through 4 (Appendix B, C; Table 2, 3; Figure 6)

Table 2. Initial scenarios included for prioritizing areas for desert tortoise translocation sites. Each scenario builds upon previous scenarios, resulting in the final selected model. Weights (*w*) were determined by expert knowledge and remained consistent throughout each scenario. The lower (α) and upper (β) bounds for each criterion were manipulated for each scenario (Appendix B).

1. Base scenario includes all criteria at the set weights and base raster values.
2. Decreasing site suitability in disturbed areas and increasing suitable areas located further away from urban areas and roads.
3. Decreasing the probability of raven predation due to raven nest control efforts.
4. Increased probability of suitable habitat due to restoration efforts in the area and considering possible drought.
5. A combination of scenarios 2, 3, and 4.

Table 3. Set weights and bounds used for scenario 5, which was selected as the chosen possible outcome that was believed to be most biologically important and possible outcome for tortoises in the study area. The site selection model was used to develop different scenarios that built upon each other to create the final model used to select suitable sites for translocated tortoises in the Western Training Area Translocation Site (WTATS). Expert knowledge on desert tortoise ecology and habitat, as well as on-the-ground knowledge of the WTATS determined the set weights (*w*) and manipulated lower (α) and upper (β) bounds for each criterion. Areas with suitable habitat for tortoises with low raven nest densities (potential predators) were highly considered for recipient sites. Distance to urban areas had a lower weight because NTC-owned mitigation parcels were located in areas with low urban development.

Criterion	***w***	***α***	***B***
Habitat Suitability	1	2	3
Raven Nest Density	0.7 (negative influence)	2	3
Total Disturbance Index	0.7 (negative influence)	1	3
Connectivity	0.5	1	3
Winter Precipitation	0.5	1	3
Distance to Roads	0.3	1	3
Distance to Urban Areas	0.1	1	4

To identify the sites that met selection criteria in the most robust way, the results from scenario 5 were then analyzed to identify which areas received higher ratings as suitable translocation sites. From the combined analysis, eight potential recipient sites and two potential reference areas that contained large contiguous parcels and were ranked as highest suitable habitat for tortoises by the model were selected (Figures 6 and 7). A majority of the selected parcels from scenario 5 were also repeatedly selected from other scenarios; except for parcels R3b, 5b, and R8a. Selected recipient sites are owned by the NTC (Fort Irwin mitigation parcels) and in areas outside of the excluded habitat (see Section 2.1: Site Selection Guidance from BLM).

The model output and selected sites were interpolated to color maps for discussion with the BLM, NTC, USFWS. Selected recipient sites (R1–R8b) were grouped together to form three translocation sites (TS1–TS3) based on intersecting 6.5-km movement buffers. Recipient sites and translocation sites which are numbered and alphabetized ('a' is chosen before 'b') based on model value (1 = higher value, 8 = lower value) and in the order of which to release translocated tortoises. For example, the NTC could release tortoises in TS1 first and in the following order for recipient site: R1, R2a, R2b, R3a, and lastly R3b. Furthermore, chosen reference areas (C1, C2) highlight the general tortoise population that can be used as reference populations and would be dependent on where translocation actually occurs.

Reference sites would be a minimum distance of 10 km away from an unfenced recipient site that has no substantial barriers to tortoise movement (USFWS 2020). For example, if tortoises are released in TS1, then the reference population would be either in the southern region of C1 or anywhere in C2, such that the sample number of required tortoises (n=75–100) are met. However, if only TS1 and/or TS2 is chosen as the designated translocation site for all tortoises in

the WTA, then TS3 could be chosen as the reference site. If only TS3 is chosen, then TS1 or TS2 could be used as reference sites. Reference tortoises should not have overlapping home ranges with translocated tortoises. Therefore, tortoise home ranges would be analyzed every 3 months during the first 3 years of translocation, and annually after the fourth and fifth years, then as directed under the RASP as directed by the Service. If home ranges overlap, then the overlapped reference tortoises are then considered residents. Status of translocated tortoises do not change.

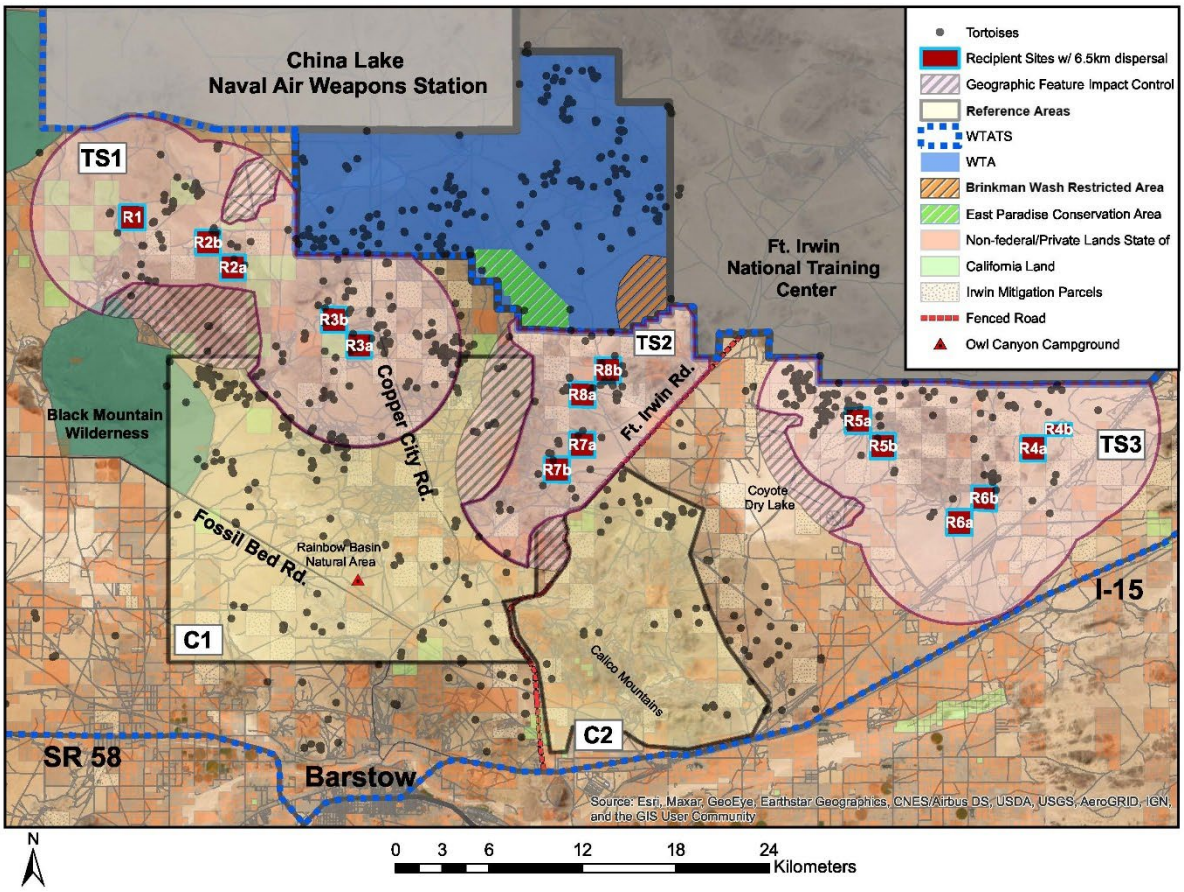

Figure 6. A total of 15 Fort Irwin mitigation parcels within the WTATS were selected for potential recipient sites (R1 through R8b) for translocated tortoises. Two additional areas in the WTATS were selected as tortoise reference areas (C1 and C2). Recipient sites were ranked in order from highest priority (R1) through lowest priority (R8b, where 'a' is higher than 'b'). A 6.5-km movement buffer was created from the centroid of each selected Fort Irwin mitigation parcel (recipient sites), resulting in three potential translocation sites for translocated tortoises (TS1, TS2, TS3; may vary depending on exact release site of translocated tortoises). Geographic impact control demonstrates areas where tortoise movements may be limited by geographic features, such as mountain ranges and fenced roads, if released at recipient sites. For example, tortoises released at R5a and R5b may have limited movement to areas within the 6.5 km to the west due to Coyote Dry Lake.

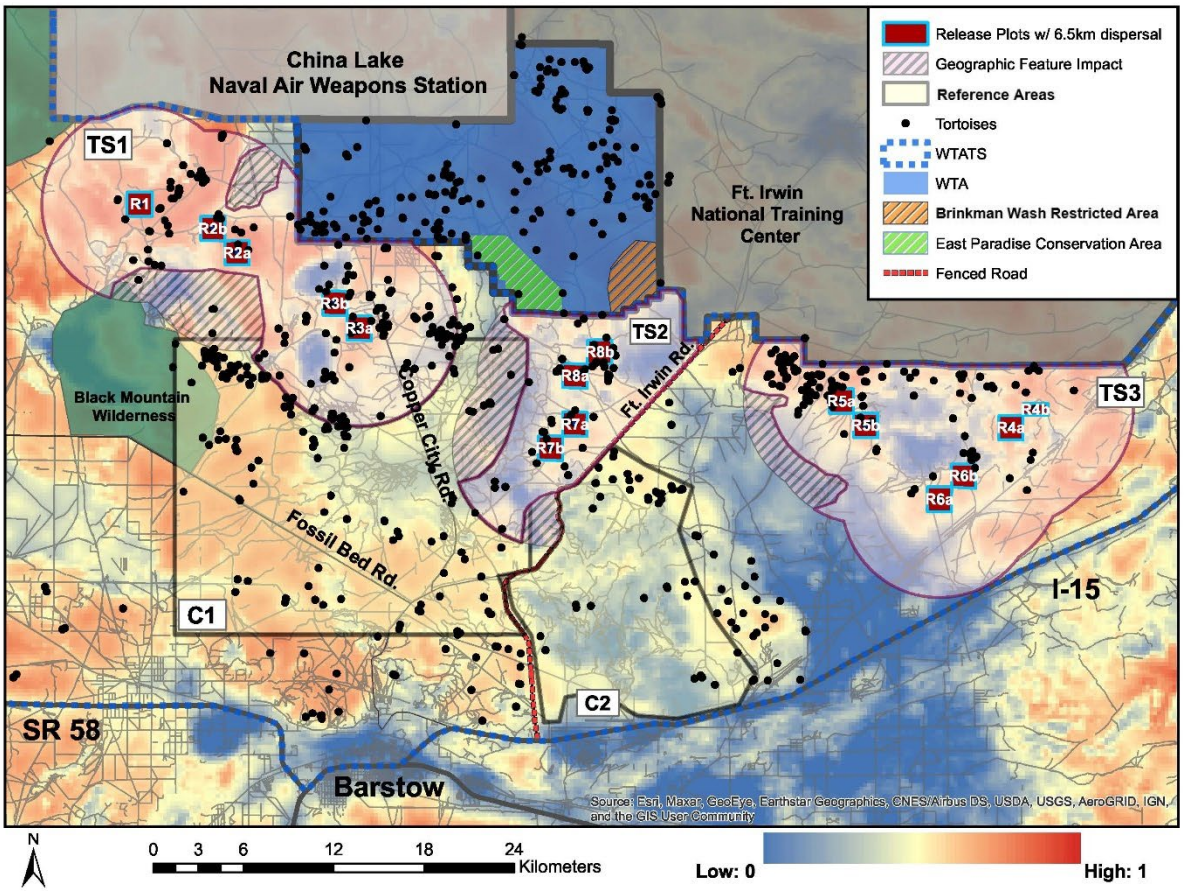

Figure 7. The site suitability model (low suitability = 0 to high suitability = 1) for the WTATS contained six criteria: Desert tortoise habitat potential (Nussear et al. 2009), desert tortoise movement potential (Gray et al. 2019), average winter precipitation, raven nest density (considering both anthropogenic and natural nest densities; Xiong 2020), distance to roads (including highway, public and field roads), and Terrestrial Development Index (TDI, a measure of the cumulative anthropogenic influences within a 1-km window; Carter et al. 2020). Parcels, owned by the NTC, with a suitability value greater than or equal to the mean model value (i.e., ≥0.39) were considered as potential recipient sites for translocated tortoises from the WTA.

4.3 Site Visitation

Potential recipient and reference sites were visited extensively by authors of this plan and USGS staff members from Spring 2020 through Fall 2022. Representative digital photographs were recorded at the center of each proposed recipient and reference site or grouped sites on October 22, 2022 (Appendix D). Field crew members visited each site on BLM designated open routes. During site visits, some were determined to be unsuitable and disqualified for tortoise translocation because of excessive OHV use or other anthropogenic influences (e.g., private property, radio tower access, and utility corridors). Selected recipient and reference areas are described below and were typified by typical desert tortoise habitat in mixed shrub communities mostly dominated by *Larrea tridentata* (creosote bush) and *Ambrosia dumosa* (burro bush)

(Nussear and Tuberville 2014). BLM, NTC, and non-government organizations have cooperated to make substantial investments in habitat restoration throughout large parts of the general site, and reduce road incursions, leaving access on a network of designated roads.

Additionally, since the transition of the monthly tortoise tracking efforts from USGS to Vernadero (November 2022 through present), predation has remained low in the WTA, Translocation Sites, and Control Sites (Vernadero 2024a). In total, eight predations have been recorded on project animals since November 2022, with no predations occurring since September 2023.

Translocation Site 1

Recipient site R1 - Easily accessible from a designated two-track dirt road (Figure 6; Appendix D - site photos). There was no evidence of recent (since 2020) unauthorized OHV use at the site center; however, several designated BLM roads and established campsites are in the general area closer to the dry lake and east of the recipient site. The center of this recipient site is on a gentle hill that slopes into a wide, flat, and open expanse to the northeast. Medium-sized rolling hills of moderate slope are to the southwest. The soil is soft, sandy loam topped with gravel composite and suitable for tortoise burrows. Small mammal burrows were present in high density throughout the site. Vegetation consisted primarily of *Larrea tridentata*, *Ambrosia dumosa*, and *Ephedra californica* and *E. nevadensis* (California and Nevada jointfir; respectively), as well as several other less dominant species, such as *Acamptopappus sphaerocephalus* (rayless goldenhead) and *Thamnosma montana* (turpentine broom).

Recipient sites R2a and R2b – Accessible from designated two-track dirt roads and are 1.5 to 3 km south of a dry lake (Figure 6; Appendix D – site photos). Like R1, designated BLM roads and established campsites are concentrated further north from R2a and R2b, towards the dry lake. Both sites are in generally flat areas that gently slope down in their northern sections towards the dry lake. At these sites, sandy soil is interspersed by rocks. The dominant vegetation is comprised of *Larrea tridentata*, *Ephedra californica, E. nevadensis*, and saltbush species (*Atriplex* spp.).

Recipient sites R3a and R3b - Are 3 to 6 km south of the southern fenced WTA border and off two-track dirt roads just west of the graded Copper City Road (Figure 6; Appendix D - site photos). There are more trafficked designated two-track dirt roads that skirt the boundaries of R3a and R3b. These sites are comprised of low hills with sandy soil containing some gravel. Vegetation is dominated by *Larrea tridentata* and *Ambrosia dumosa*. Joshua trees (*Yucca brevifolia*) are present but more numerous in the southern region of R3a at higher elevation.

Translocation Site 2

Recipient sites R7a and R7b - Easily accessible from a dirt BLM road from the north and west with only moderate OHV use noted (Figure 6; Appendix D - site photos). The sites were ~3 km from a major paved tortoise-fenced road (Fort Irwin Road). Private properties with trailers are east of the recipient sites, but within the translocation site on the northeast boundary, just off Fort Irwin Road. A private property with dozens of trailers in the recipient site area is located closer to Fort Irwin Road. The site is surrounded by mountains with moderate eastward facing slopes. Soil is characterized as sandy-gravelly-loam. The shrub community is dominated by relatively

small *Larrea tridentata* (most ≤1 m tall) and *Ambrosia dumosa*. Annual vegetation from the previous year was present on the landscape.

Recipient sites R8a and R8b - Are within 1.5 to 4 km of the WTA to the north (Figure 6; Appendix D – site photos). Between these sites is two-track Paradise Valley Rd., which connects Fort Irwin Road to the gated southern edge entrance to the WTA. The sites are moderately sloped from mountains to the west and east, consisting of semi-rocky and sandy soil with outcrops of fine-grained consolidated sediments in the north. R8a and R8b contain the densest and tallest vegetation (*Larrea tridentata* and *Ambrosia dumosa)* of all the recipient sites.

Translocation Site 3

Recipient sites R4a and R4b – Accessible via an unmarked two-track road, ~3 km from a major transmission utility corridor that occurs to the south and ~ 300 m up a gentle slope (Figure 6; Appendix D – site photos). Although there are marked BLM roads south of these sites, minimal to no OHV disturbance was observed in these recipient areas. These sites are east of the Alvord Mountain Range and west of a plateau with a radio tower, located ~60 m from the site center. The sites are typified by low gravelly and sandy hills with outcrops of fine-grained consolidated sediments and several moderately deep (2 to 5 m) washes. R4a and R4b are dominated by mixed *Larrea tridentata* and *Lycium cooperi* (peach thorn) as well as *Ambrosia dumosa* and *Senna armata* (desert senna). Vegetation at this site was sparser than most other recipient sites.

Recipient sites R5a and R5b – Accessible from a two-track road off graded Manix Trail Rd., which is used by the NTC to transport military equipment to and from the southern NTC border and the I-15 (Figure 6; Appendix D – site photos). There was only one OHV trail running through R5a with other trails ending just to the southwest of these sites. R5a and R5b are west of the Alvord Mountain Range and northeast of Coyote Dry Lake (~4 km) and are characterized by low hills. Soil is mostly sandy, littered with surface rocks near the bajada to the south and east, and dense volcanic gravel covers the hillsides. Vegetation is primarily *Larrea tridentata*, *Ambrosia dumosa*, and *Senna armata*.

Recipient sites R6a and R6b - Are located just south of the Alvord Mountain Range and north of a major utility transmission corridor (Figure 6; Appendix D). Additionally, the Old Spanish Trail is marked on the west side of the sites. The sites are on low hills and generally slope down to the south. The soil is very sandy with relatively sparse vegetation on the southern end of the site. Dominant vegetation included *Larrea tridentata*, *Ambrosia dumosa*, and *Senna armata*, but vegetation is the sparsest of all the recipient sites.

Reference sites C1 and C2

The potential reference sites (C1 and C2) are separated by Fort Irwin Road, located to the south of R1, R2, R3, R7, and R8, with their southernmost borders and closer to the city of Barstow than the reference sites (~7 km) (Figure 6; Appendix D – site photos). However, the reference sites also stretch northwest, north, and northeast from Barstow and areas within them are as far or farther (~26 km at furthest point) from the cities than the release sites (Figure 6; Appendix D – site photos). C1 contains the more private land holdings to the south, but also Black Mountain Wilderness (BLM), BLM recreation areas (Rainbow Basin Natural Area, Owl Canyon Campground) to the southeast, and two graded dirt roads (Fossil Bed Road and Copper City

Road). C1 has variable terrain, soil, and vegetation; areas with larger hills and canyons; rockier soils and denser *Larrea tridentata, Ambrosia dumosa,* and *Yucca brevifolia* in the north. The southern portion of C1 has smaller rolling hills, sandier soil, and sparser vegetation. C2 is bordered by the tortoise-fenced I-15 highway to the south and has more private properties and motorized recreation areas in the south and west. C2 also encompasses the Calico Mountains and is southwest of Coyote Dry Lake (unsuitable for tortoises; Figure 7). In C2, soil is coarse, sandy loam with a mixed shrub *Larrea tridentata* and *Ambrosia dumosa* community among large hills and canyons, turning to medium grade slopes to the north and south.

5.0 Tortoise Density Estimates

Populations of reptiles such as desert tortoises are most efficiently surveyed with spatially structured transects or spatially unstructured area searches (Allison and McLuckie 2018; Mitchell et al. 2021b; Royle and Turner 2022; Zylstra et al. 2023). To produce reptile population density and abundance estimates, detection data from transect surveys are typically analyzed with distance sampling models, whereas detection data from area/plot searches are typically analyzed with nonspatial capture-recapture models. However, many reptiles exhibit characteristics that present challenges when attempting to use those models to estimate density and abundance. For example, conventional line-distance sampling models assume that detection at distance = 0 from the transect is perfect (e.g., $g_0 = 1$) and that all individuals in the target population are available for detection. However, some species, such as desert tortoises, violate these assumptions because a portion of individuals are likely to be in burrows and not visible to observers (detectors) when a given transect is surveyed (Allison and McLuckie 2018). In contrast, spatial capture-recapture (SCR) models overcome many of those issues by incorporating the spatiotemporal information about survey effort and the locations where individual animals were detected in estimations. These data are accommodated in SCR models with a spatially explicit observation submodel and an ecological submodel that describes animal distribution (density) as a realized Poisson point process (Efford 2004; Borchers and Efford 2008; Royle et al. 2014)

5.1 Technological Framework

Seasonal tortoise densities and abundances were estimated from spatially structured plot surveys and spatially unstructured area searches using SCR models in a spatially explicit search area-encounter approach (Efford 2011; Royle et al. 2011; Russell et al. 2012; Thompson et al. 2012; Royle and Turner 2022). To accomplish this, tortoise detection data were converted to three-dimensional spatially explicit detection histories comprised of individual × location × survey occasion detections (Royle and Turner 2022).

To facilitate estimation of season × year-specific tortoise densities and abundances, tortoise detections were subset by year and season (Spring 2020, Fall 2020, Spring 2021, Fall 2021, Spring 2022). Surveyors' GPS search tracks were also subset by year and season to account for the spatially and temporally varying survey effort within each season × year combination. Season × year detections and surveyor search tracks in were then plotted in ArcMap 10.4 (ESRI, *Redlands, USA*). The *Create Fishnet* tool was used to discretize ad hoc survey grids that encompassed the detections and search tracks for a given season × year combination. Each grid

cell represented an 'effective detector' to which tortoise detections and occasion-specific surveyor effort (meters searched) that occurred within that cell were assigned (Russell et al. 2012; Thompson et al. 2012; Royle and Turner 2022).

Desert tortoise home range sizes and mean daily movements often differ considerably between spring and fall seasons (Harless et al. 2010; Franks et al. 2011; Averill-Murray et al. 2020). Therefore, to prevent discretization bias in density and abundance estimates (Russell et al. 2012; Thompson et al. 2012), season-specific grid cell spacings were specified based on mean seasonal range size estimates that were generated from VHF and GPS telemetry monitoring of tortoises in the study area via 95% autocorrelated kernel density estimates (AKDE), which were produced using continuous-time movement models (Fleming et al. 2014, 2015; Calabrese et al. 2016; Averill-Murray et al. 2020). From those mean seasonal 95% AKDEs, approximate SCR model spatial scale of detection parameter (σ) values were derived for each season, assuming a bivariate normal distribution (Efford et al. 2013; Royle et al. 2014; Sun et al. 2015). These derived season-specific σ values to were then used to discretize the grids of 'effective detectors' with a cell spacing of 1.5–3 × σ_{Season}, which is the range of detector spacings within which SCR models have been shown to produce unbiased parameter estimates (Sun et al. 2015; Milleret et al. 2018; Clark 2019).

Observation Model – A Poisson observation model was used for the detection process for two primary reasons: 1) the close 10-m spacing between transects relative to the coarser discretized grid cell spacings resulted in the potential for multiple tortoises to have been detected within a given grid cell during a given survey occasion (Royle et al. 2014); and 2) in contrast to the oft-employed Bernoulli observation model, the Poisson observation model retains all detections and produces SCR model parameter estimates that are nominally biased when detections are spatially aggregated within discretized grid cells (Milleret et al. 2018). Detection probability in the Poisson observation model is often best parameterized as exposure, or cumulative hazard, for which we specified a hazard half-normal detection function. This detection function described the rate of decay in baseline detection rate at an individual's activity center (λ_0) as a function of distance between the activity center and grid cell in which the individual was detected, represented by the σ parameter (Royle and Gardner 2011). The baseline detection rate, λ_0, is easily converted to the binomial detection probability g_0 that is used in conventional line-distance sampling models via the following formula (Royle et al. 2014; Crum et al. 2021; Efford 2022a): $g_0 = 1 - \exp(-\lambda_0)$.

Spatially and temporally varying survey effort were accounted for by first summing the occasion-specific total track lengths (m) that surveyors walked within each grid cell, and then calculating the track length quartiles and classifying effort into five classes to improve model fitting. Hazard-based survey effort effects were specified in all models to denote during which occasions each grid cell was surveyed or not (Thompson et al. 2012; Russell et al. 2012; Efford et al. 2013; Royle and Turner 2022). Considering the well-documented sex discrepancy in home range sizes and movements of desert tortoises (e.g., Averill-Murray et al. 2020), detection rates and movements would differ between sexes were anticipated, so a two-class sex effect on both the λ_0 and σ parameters (Gardner et al. 2010; Mitchell et al. 2021b) was modeled.

Ecological Process Model – A primary assumption of SCR models is that individual animals in a population have activity centers, or home range centers, around which their activities are primarily concentrated. The collection of those activity centers is a realization of a statistical point process probability model that characterizes the number and spatial distribution of activity centers within an explicit spatial region, termed the state space or area of integration (*S*; Efford 2004; Borchers and Efford 2008; Royle et al. 2014). *S* is analogous to the ad hoc 'effective sampling area' that is used to derive density from abundance that is estimated by nonspatial models, except that *S* is explicitly defined in SCR, based largely on the movement distances of individual animals among the locations at which they were detected (e.g., spatial recaptures; Borchers and Efford 2008; Royle et al. 2014).

To ensure that *S* was large enough to contain all individuals that had a non-negligible probability of detection while also preventing truncation bias in density and abundance estimates, the discretized grid cells were buffered by 3–5 × σ_{Season} to define the spatial extent of *S* (Royle et al. 2014; Efford 2022b). However, multiple anthropogenic and natural landscape barriers existed in the study area that impeded tortoise movements, such as tortoise exclusionary fencing along major roads and unvegetated dry lake beds/playas. If such movement barriers were not accounted for, density and abundance estimates would be negatively biased (Royle et al. 2014; Efford 2022b). Those barriers effectively divided the larger NTC into three smaller study areas (WTA, WTATS-West, and WTATS-East), and tortoise movement among those three areas was not possible because of the barriers. Therefore, the spatial extent of each *S* was adjusted to reflect those barriers and improve accuracy of SCR model parameter estimates. Additionally, for likelihood evaluation, *S* must be comprised of a discrete mesh of latent points that constitute potential animal activity center locations. Therefore, mesh point spacings of 0.6–0.9 × σ were specified for each *S*, per the recommendations from prior SCR model development and validations (Royle et al. 2014; Sutherland et al. 2019; Efford 2022b).

Two separate ecological point process models were used to describe the number and distribution of tortoise activity centers (or home range centers) in each parameter estimation area, or *S* (Borchers and Efford 2008; Royle et al. 2014). All SCR models that included the aforementioned observation model effects were first fit with a homogeneous Poisson point process ecological model, which assumed that individual tortoise activity centers were randomly distributed throughout each *S* (Borchers and Efford 2008; Royle et al. 2014). This allowed for efficient identification of the most supported sources of variation in the observation model's detection function parameters. SCR models were then fit that included those supported observation model effects but used an inhomogeneous Poisson point process ecological model that allowed the number and spatial distribution of tortoise activity centers to spatially vary as a function of an ecological covariate (Murphy et al. 2016, 2017; Laufenberg et al. 2018; Stetz et al. 2019). The predicted raster from the existing desert tortoise habitat suitability model (Nussear et al. 2009) was used as a covariate for describing spatial variation in tortoise density, and tortoise density as a log-linear function of the habitat suitability index was modeled (Murphy et al. 2016, 2017, 2023; Laufenberg et al. 2018; Stetz et al. 2019).

Model Fitting and Model Selection

SCR models were fit via maximum likelihood using the package *secr* in the R statistical computing environment (Borchers and Efford 2008; Efford 2022a; R Core Team 2022). Each

study area × season × year dataset was analyzed separately, fitting the same suite of a priori SCR models to each of the 10 datasets (i.e., 10 separate SCR analyses were conducted). For each analysis, information-theoretic model selection was performed using Akaike's Information Criterion corrected for small sample size (AIC_c; Burnham and Anderson 2002). This produced parameter estimates from the top-ranked, most parsimonious SCR model for each area × season × year analysis. The base SCR model parameters that were estimated were tortoise density (D), λ_0, and σ, whereas tortoise abundance (N) was derived from estimated D as the expected number of individuals in each S (e.g., $E[N] = D \times S$; Borchers and Efford 2008). The R package raster (Hijmans and van Etten 2012) was used to produce predicted density surfaces of supported area × season × year spatial relationships between tortoise density and habitat suitability that were estimated by the inhomogeneous Poisson point process SCR models (Murphy et al. 2016, 2017, 2023; Laufenberg et al. 2018; Stetz et al. 2019).

Post-hoc Analyses – The temporal span and spatial extent of surveys allowed for production of 10 separate density estimates that represented three distinct study areas. Therefore, estimates of average seasonal study area-specific population growth rates were derived using the exponential growth equation described by Gotelli (2008). Additionally, to investigate potential trends or sources of bias in density estimates relative to the characteristics of survey results, post-hoc analyses were performed using generalized linear models (GLMs; Tobler and Powell 2013; Jędrzejewski et al. 2018; Murphy et al. 2022; Schmidt et al. 2022). Four separate GLMs were fitted with the SCR-estimated densities as the response variable and the total numbers of tortoises detected, recaptures, spatial recaptures, survey occasions, and S sizes as the predictor variables. Four models were required to be fit because of moderate to high correlation between the number of tortoises detected and S extents ($r = 0.58$) and between the numbers of recaptures and spatial recaptures ($r = 0.95$), which prevented inclusion of those pairs of predictors in the same GLMs (Zuur et al. 2010). For all four models, all predictor variables were centered and scaled prior to model fitting, specifying a Gamma error distribution with a log link function (Schmidt et al. 2022), and fit models using the glmmTMB package in R (Brooks et al. 2017). From the resulting coefficient estimates, marginal effects were predicted using the package ggeffects (Lüdecke 2018).

5.2 Spatial capture-recapture and Survey Results

Movements and Detection Rates

The number of survey occasions ranged from 28 to 55 days, depending on season, year, and study area (Table 4). Mean search effort per grid cell ranged from 247 m/cell during Spring 2022 at WTA to 1,625 m/cell during Spring 2020 at the WTATS-West. The average number of tortoises detected during a survey in a given study area was 117 individuals (range: 52–180), and an average of 6 individual tortoises were detected per day. The average number of recaptures obtained during a survey in a given study area was 108 (range: 6–266), whereas the average number of spatial recaptures (i.e., tortoise detected in >1 grid cell) obtained during a given survey in a given study area was 43 (range: 2–143).

Table 4. Study area-specific detection results and survey design metrics for ground-based surveys of adult Mojave desert tortoises at Fort Irwin, USA.

Study Area	Year	Season	Occasions (Days)	Tortoises Detected	Recaptures	Spatial Recaptures	Cell Spacing (m)	Mean Search Effort (m/cell)
WTA	2021	Spring	55	52	36	10	200	1,117
	2021	Fall	52	107	175	92	374	1,274
	2022	Spring	28	111	22	11	320	247
WTATS-East	2021	Fall	52	57	58	10	374	1,304
	2022	Spring	28	131	123	24	320	729
WTATS-West	2020	Spring	40	96	266	143	320	1,625
	2020	Fall	31	122	154	64	374	1,153
	2021	Spring	55	180	6	2	320	1,180
	2021	Fall	52	156	152	51	374	732
	2022	Spring	28	153	85	22	320	318

Male tortoises tended to have significantly larger σ estimates and, therefore, range sizes than females, whereas females tended to have higher λ_0 estimates and, therefore, detection probabilities than males. Mean σ across all 7 of the analyses in which sex-varying σ was present in the top-ranked model were 211.14 m and 149.74 m for males and females, respectively. Assuming home ranges were bivariate normally distributed (i.e., approximately circular; Royle et al. 2014; Sun et al. 2015), those σ values corresponded to average seasonal range sizes of 0.84 km^2 and 0.42 km^2 for males and females, respectively. Among the 4 analyses in which sex-varying λ_0 was present in the top-ranked model, mean λ_0 was 0.09 and 0.16 for males and females, respectively. In contrast, among the 6 analyses in which the top-ranked model indicated that λ_0 did not differ between sexes, the mean λ_0 was 0.15. Across all 10 analyses, each area was estimated to have a male-biased sex ratio within each season × year, ranging from 53% to 71% males versus 29% to 47% females. For the entirety of NTC across all areas, seasons, and years, the mean sex ratio was 64% males versus 36% females.

Spatial variation of tortoise density as a function of habitat suitability was included in the top-ranked model for 3 of the analyses, and all 3 of those estimated relationships were positive (Table 5, 6, 7; Figure 8). Among the 7 analyses in which a density-habitat relationship was not present in the top-ranked model, a competing model ($\Delta AICc < 2$) contained that relationship in 6 of those analyses, suggesting that said relationship was supported for nearly all areas within each season across years. However, in one case (WTA during Spring 2021), the competing model with the density-habitat suitability relationship had a coefficient estimate with 95% CI that overlapped zero, a nominal change in model log-likelihood relative to the top-ranked model, and the same model weight as the top-ranked model, all of which indicated that the habitat suitability covariate was uninformative for that particular dataset (Arnold 2010). The completely null model (i.e., spatially random density, λ_0 and σ shared between sexes) was the top-ranked model for 3 of the analyses, which were also the 3 datasets with the fewest total number of recaptures (WTA Spring 2021, WTA Spring 2022, and WTATS-West Spring 2021).

Table 5. Spatial capture-recapture model selection results for the WTA study area in each season × year combination from surveys of Mojave desert tortoises at Fort Irwin, USA (2020–2022). Estimated model parameters were density (*D*), baseline detection rate (λ_0), and spatial scale of detection (σ). Models were considered in which tortoise density was spatially random (~1) or density varied spatially as a log-linear function of habitat suitability that estimated from a previous analysis (Habitat; Nussear et al., 2009); and λ_0 and σ differences between sexes (Sex) or sharing between sexes (~1) was allowed.

Season × Year	Model	*K*[a]	logLik[b]	AICc[c]	ΔAICc[d]	*w*[e]
Spring 2021	D~1 λ_0~1 σ~1	4	-349.92	711.17	0.00	0.35
	D~Habitat λ_0~1 σ~1	5	-351.17	711.21	0.04	0.35
	D~1 λ_0~Sex σ~1	5	-350.77	712.87	1.70	0.15
	D~1 λ_0~1 σ~Sex	5	-351.11	713.55	2.39	0.11
	D~1 λ_0~Sex σ~Sex	6	-350.73	715.37	4.21	0.04
Autumn 2021	D~1 λ_0~1 σ~Sex	5	-860.66	1731.93	0.00	0.48
	D~Habitat λ_0~1 σ~Sex	6	-860.10	1733.06	1.13	0.27
	D~1 λ_0~Sex σ~Sex	6	-860.47	1733.79	1.86	0.19
	D~1 λ_0~1 σ~1	4	-864.40	1737.21	5.27	0.03
	D~1 λ_0~Sex σ~1	5	-863.75	1738.10	6.17	0.02
Spring 2022	D~1 λ_0~1 σ~1	4	-542.61	1093.60	0.00	0.33
	D~Habitat λ_0~1 σ~1	5	-541.76	1094.11	0.51	0.26
	D~1 λ_0~Sex σ~1	5	-542.28	1095.15	1.55	0.15
	D~1 λ_0~Sex σ~Sex	6	-541.32	1095.46	1.86	0.13
	D~1 λ_0~1 σ~Sex	5	-542.51	1095.60	2.00	0.12

Table 6. Spatial capture-recapture model selection results for the WTATS-East study area in each season × year combination from surveys of Mojave desert tortoises at Fort Irwin, USA (2021–2022). Estimated model parameters were density (*D*), baseline detection rate (λ_0), and spatial scale of detection (σ). Models were considered in which tortoise density was spatially random (~1) or density varied spatially as a log-linear function of habitat suitability that estimated from a previous analysis (Habitat; Nussear et al., 2009); and λ_0 and σ differences between sexes (Sex) or sharing between sexes (~1) was allowed.

Season × Year	Model	*K*[a]	logLik[b]	AICc[c]	ΔAICc[d]	*w*[e]
Autumn 2021	*D*~Habitat λ_0~1 σ~Sex	6	-385.30	784.29	0.00	0.82
	D~1 λ_0~1 σ~Sex	5	-388.93	789.04	4.75	0.08
	D~1 λ_0~1 σ~1	4	-390.43	789.63	5.34	0.06
	D~1 λ_0~Sex σ~Sex	6	-388.85	791.38	7.09	0.02
	D~1 λ_0~Sex σ~1	5	-390.20	791.57	7.28	0.02
Spring 2022	*D*~Habitat λ_0~Sex σ~Sex	7	-920.97	1856.87	0.00	0.95
	D~1 λ_0~Sex σ~Sex	6	-925.14	1862.96	6.09	0.05
	D~1 λ_0~1 σ~Sex	5	-932.20	1874.88	18.01	0.00
	D~1 λ_0~1 σ~1	4	-944.99	1898.32	41.45	0.00
	D~1 λ_0~Sex σ~1	5	-944.81	1900.12	43.25	0.00

Table 7. Spatial capture-recapture model selection results for the WTATS-West study area in each season × year combination from surveys of Mojave desert tortoises at Fort Irwin, USA (2020–2022). Estimated model parameters were density (*D*), baseline detection rate (λ_0), and spatial scale of detection (σ). Models were considered in which tortoise density was spatially random (~1) or density varied spatially as a log-linear function of habitat suitability that was estimated from a previous habitat suitability analysis (Habitat; Nussear et al., 2009); and λ_0 and σ differences between sexes (Sex) or sharing between sexes (~1) was allowed.

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Season × Year	Model	*K*[a]	logLik[b]	AICc[c]	ΔAICc[d]	*w*[e]
Spring 2020	*D*~Habitat λ_0~Sex σ~Sex	7	-1124.47	2264.24	0.00	0.75
	D~1 λ_0~Sex σ~Sex	6	-1127.21	2267.39	3.15	0.16
	D~1 λ_0~1 σ~Sex	5	-1129.25	2269.18	4.94	0.06
	D~1 λ_0~1 σ~1	4	-1131.37	2271.18	6.94	0.02
	D~1 λ_0~Sex σ~1	5	-1131.35	2273.39	9.15	0.01
Fall 2020	*D*~1 λ_0~Sex σ~Sex	6	-924.70	1862.13	0.00	0.71
	D~Habitat λ_0~Sex σ~Sex	7	-924.49	1863.97	1.84	0.29
	D~1 λ_0~1 σ~Sex	5	-931.92	1874.36	12.23	0.00
	D~1 λ_0~1 σ~1	4	-946.70	1901.74	39.61	0.00
	D~1 λ_0~Sex σ~1	5	-946.67	1903.86	41.72	0.00
Spring 2021	*D*~1 λ_0~1 σ~1	4	-856.95	1722.13	0.00	0.41
	D~1 λ_0~1 σ~Sex	5	-856.72	1723.78	1.65	0.18
	D~1 λ_0~Sex σ~1	5	-856.75	1723.84	1.71	0.17
	D~Habitat λ_0~1 σ~1	5	-856.75	1723.85	1.72	0.17
	D~1 λ_0~Sex σ~Sex	6	-856.67	1725.83	3.70	0.06
Fall 2021	*D*~1 λ_0~Sex σ~Sex	6	-1161.56	2335.68	0.00	0.49
	D~1 λ_0~Sex σ~1	5	-1163.41	2337.22	1.54	0.23
	D~Habitat λ_0~Sex σ~Sex	7	-1161.51	2337.77	2.09	0.17
	D~1 λ_0~1 σ~Sex	5	-1164.19	2338.78	3.10	0.10
	D~1 λ_0~1 σ~1	4	-1168.21	2344.68	9.00	0.01
Spring 2022	*D*~1 λ_0~1 σ~Sex	5	-961.09	1932.59	0.00	0.55
	D~1 λ_0~Sex σ~Sex	6	-960.97	1934.51	1.92	0.21
	D~Habitat λ_0~1 σ~Sex	6	-960.97	1934.52	1.93	0.21
	D~1 λ_0~Sex σ~1	5	-964.42	1939.24	6.65	0.02
	D~1 λ_0~1 σ~1	4	-966.29	1940.85	8.26	0.01

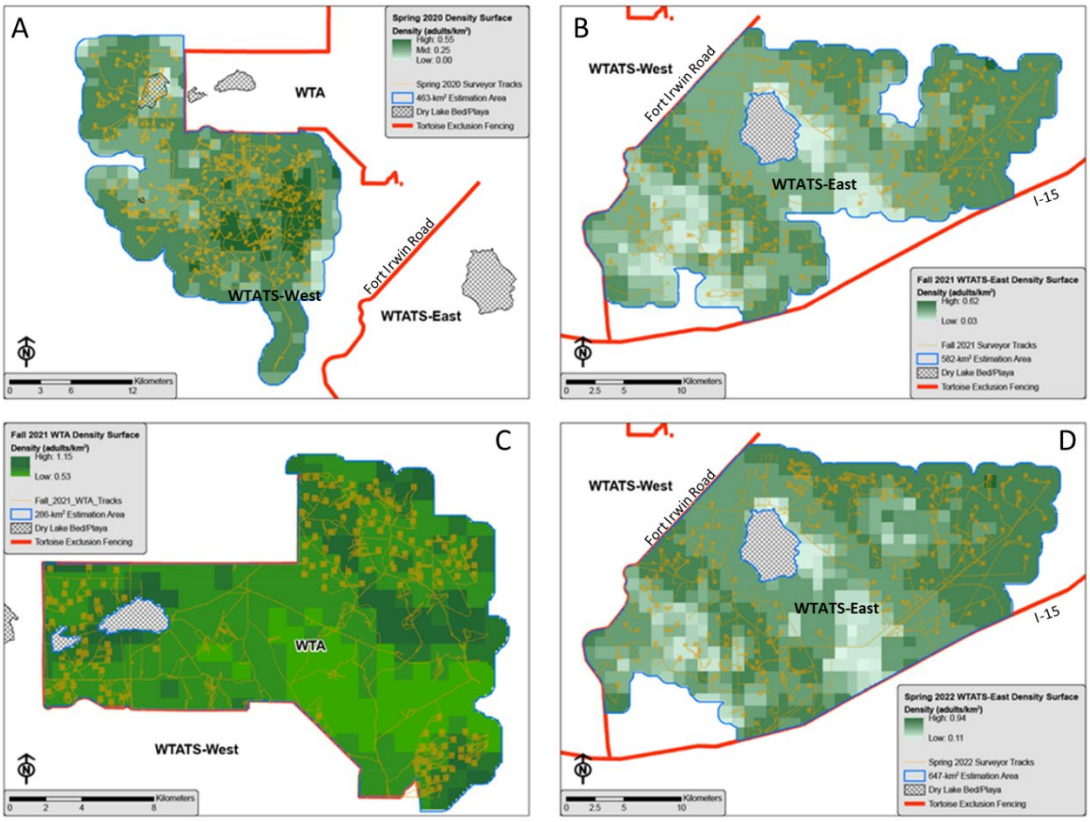

Figure 8. Estimated tortoise density surfaces for survey areas (Western Training Area, WTA; Western Training Area Translocation Site, or WTATS, split into WTATS – West and WTATS – East) within the year (2020-2022) and season (Spring or Fall) combinations for which spatial variation in density (adults/km^2) as a function of Habitat Suitability Index was supported.

Density Estimates for WTATS and WTA

Accounting for the spatiotemporally varying survey effort (meters searched/grid cell/occasion) resulted in, on average, 16% increases in mean density estimates. Point estimates of mean density ranged from 0.27 to 1.85 adult tortoises/km^2, with an average for the entire NTC across all 10 area × season × year estimates of 0.95 adult tortoises/km^2 (Figure 9). All of the SCR density estimates are within the range of densities predicted for the Superior-Cronese TCA (range: 0.24 - 3.99) for a similar timeframe (2020; Zylstra et al. 2023). Study area-specific mean densities, averaged across seasons and years, were 1.08, 0.51, and 0.95 adult tortoises/km^2 at WTA, WTATS-East, and WTATS-West, respectively. Density estimates were generally lower during the fall season than the spring season, differing by as much as 105% between seasons within a study area, and density estimate precision (coefficient of variation; CV) ranged from 0.10 to 0.19, with a mean of 0.14 across all 10 area × season × year estimates.

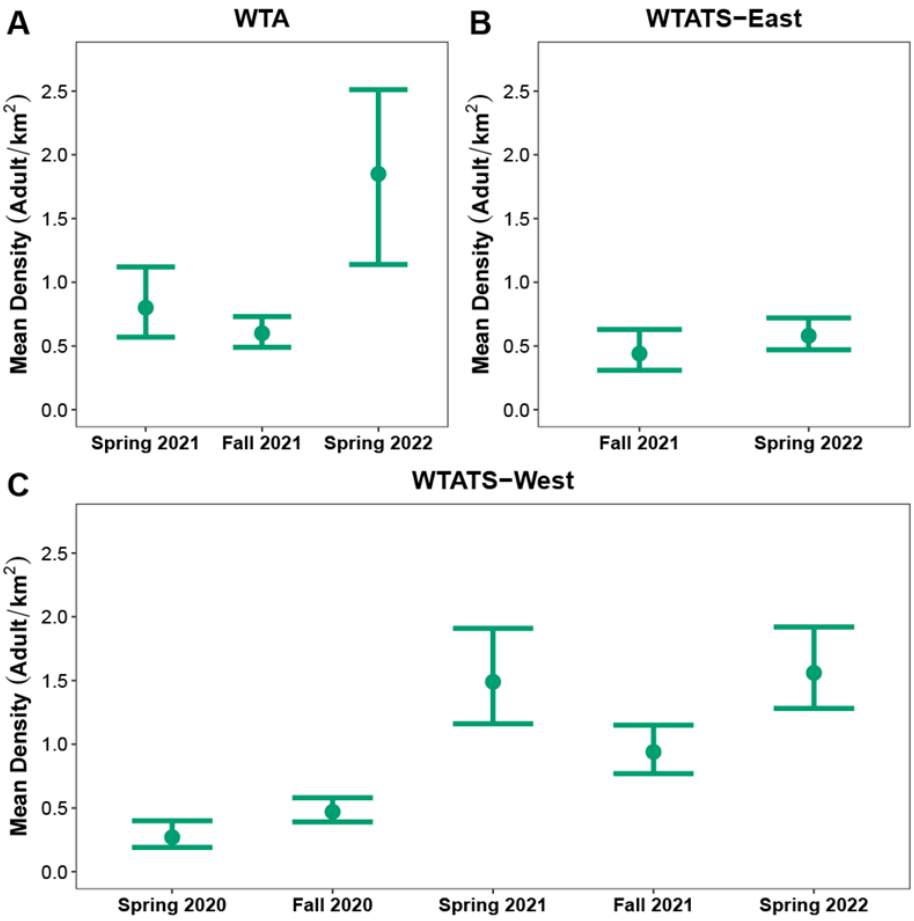

Figure 9. Point estimates, with 95% confidence intervals (CI), of spatially explicit mean density (adults/km^2) of Mojave desert tortoises in the Western Training Area (WTA; NTC Fort Irwin, CA), Western Training Area Translocation Site East (WTATS-East), and Western Training Area Translocation Site West (WTATS-West) during 2020–2022 from the top-ranked spatial capture-recapture models.

Post-hoc Analyses – Estimated density increased over time in all three study areas such that the derived average seasonal population growth rates across the entire duration of sampling were 1.52 (95% CI: 1.19, 1.77), 1.32 (95% CI: 1.07, 1.64), and 1.55 (95% CI: 1.48, 1.63) at WTA, WTATS-East, and WTATS-West, respectively. Results from Gamma GLMs indicated a strong positive relationship between tortoise density and number of tortoises detected ($\beta = 0.29$; 95% CI: 0.1, 0.48; $p = 0.003$), whereas strong negative relationships existed between tortoise density and numbers of recaptures and spatial recaptures ($\beta_{Recaps} = -0.47$; 95% CI: -0.65, -0.29; $p < 0.0001$; $\beta_{SpatRecaps} = -0.42$; 95% CI: -0.64, -0.20; $p = 0.0002$). Density estimates were invariant to both the number of survey occasions and the study area (state space) sizes ($\beta_{Occasion} = -0.06$; 95% CI: -0.29, 0.16; $p = 0.57$; $\beta_{Area} = -0.002$; 95% CI: -0.26, 0.25; $p = 0.99$).

Predicted Densities for WTATS Translocation Sites

Mean spatial tortoise densities were predicted for each translocation site by converting the habitat suitability index raster (Nussear et al. 2009) into spatially explicit densities using coefficient estimates from the top-ranked SCR-Habitat Suitability Index models for season ×

year combinations. SCR model-predicted density surfaces were created by using ArcMap's Raster Calculator function using the following conversion equation for log-linear relationships:

$$\text{Density}\left(\text{adults/km}^2\right) = \exp\left(\beta_{\text{Density}} \pm \beta \times \text{CovariateRaster}\right) \times 100$$

a. Spring 2020 WTATS-West:
exp(-8.3568271 + 3.0753677 × "Habitat Suitability Index") × 100

b. Fall 2021 WTATS-East:
exp(-8.5557512 + 3.4784546 × "Habitat Suitability Index") × 100

c. Spring 2022 WTATS-East:
exp(-7.0513422 + 2.3790902 × "Habitat Suitability Index") × 100

New rasters of the mean cell values (densities) among the above 3 predicted density surfaces were produced for each Translocation Site (e.g., TS1, TS2, and TS3) using ArcMap's Cell Statistics function (Figure 10). The resulting mean values raster was clipped to each translocation site to obtain site-specific means, SEs, and 95% CIs.

a. TS1 (355 cells): Mean = 0.47 adults/km^2; SE = 0.0114; 95% CI = 0.46–0.48

b. TS2 (350 cells): Mean = 0.43 adults/km^2; SE = 0.0126; 95% CI = 0.42–0.44

c. TS3 (178 cells): Mean = 0.41 adults/km^2; SE = 0.0220; 95% CI = 0.39–0.43

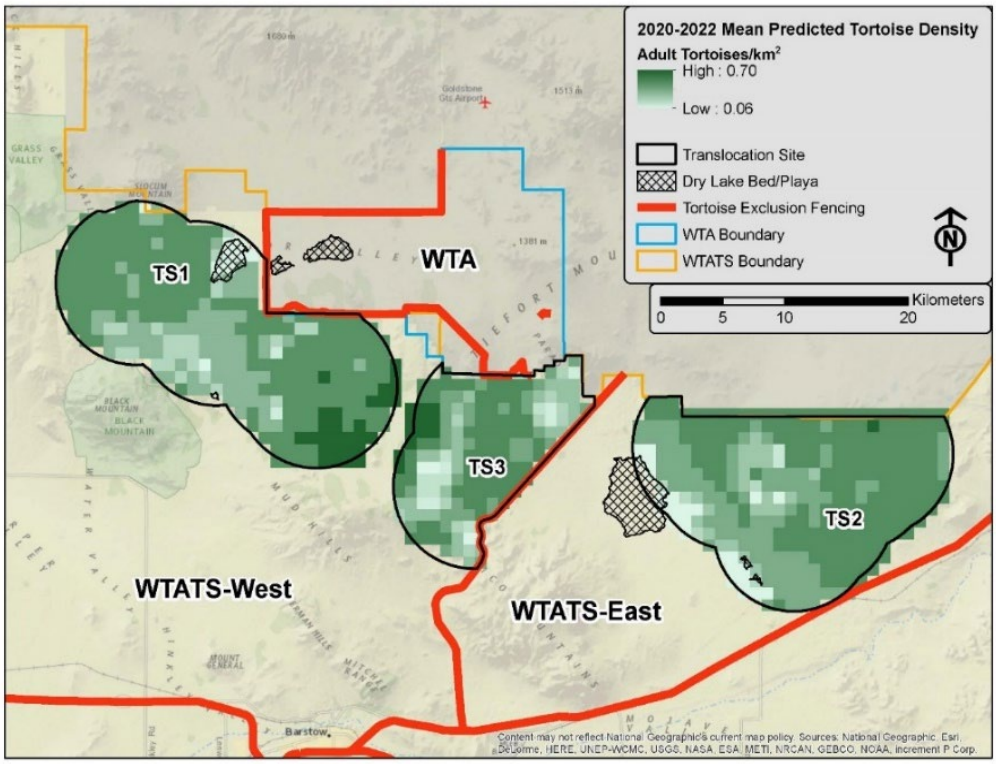

Figure 10. Predicted mean density surfaces for each Translocation Site (TS1-TS3) in the WTATS (2020–2022).

Post-Translocation Density Estimates for WTATS Translocation Sites

The mean estimated adult tortoise density at WTA, averaged among estimates produced during 2021–2022, was 1.08 adults/km^2 (95% CI: 0.44–1.73), which corresponds to 273 live adult tortoises (≥180 MCL) in WTA (95% CI: 111–438 adults) to be translocated to the WTATS. The density of tortoises in the translocation sites will not exceed 1 standard deviation above the mean density for that area (USFWS 2020). The estimated threshold for the Superior-Cronese is a density of 3.9 adult tortoises/km^2 and was calculated from the USFWS range wide monitoring program (Allison and McLuckie 2018; USFWS 2020). Currently, the estimated densities for WTATS-East, WTATS-West, combined, and within each translocation site are below the tortoise density threshold. Translocation into each site is estimated to increase local densities while not exceeding the threshold (Table 8).

Table 8. Adult tortoise density estimates before and after translocation in translocation sites (includes release areas and surrounding areas to which tortoises are expected to disperse). Post-translocation density and abundance are estimated based on a range of potential translocated animals to each site (from none to 438 animals; the upper confidence interval of estimated number of adult tortoises). Estimated density and number of adult tortoises are based on data collected from April 11, 2020, to Sept. 12, 2022.

Area	Area Size (km^2)	Mean Density (2020-2022) (# adults / km^2)	Estimated # Adult Tortoises	Post-translocation Density (# adults / km^2)	Estimated Post-translocation # of Tortoises
Western Training Area	253	1.08 (0.44 – 1.73)	111-438	0	0
WTATS-West Translocation Site 1	330	0.47 (0.46 – 0.48)	164	0.46 – 1.83	164 - 603
WTATS-West Translocation Site 2	159	0.43 (0.42 – 0.44)	64	0.42 – 3.16	64 - 503
WTATS-East Translocation Site 3	293	0.41 (0.39 - .043)	123	0.39 – 1.92	123 - 562

* Post-translocation density estimates and abundances for the WTA are based on clearance of all tortoises from the area.

6.0 Tortoise Clearance Protocols for the WTA

The procedures in sections 6-9 describe procedures from the USFWS translocation guidance (USFWS 2020). Tortoise clearance protocols include all activities to prepare for and implement relocation process including: 1) fencing boundaries to prevent tortoise movement in and out of the area; 2) conducting clearance surveys to find and attach radio transmitters to all tortoises when appropriate in the project area to monitor or place in enclosures; 3) temporarily holding tortoises outdoor, predator-proof pens if required due to injury, disease, or seasonal timing of discovery; 4) conduct health assessments and analyze samples on all tortoises to be translocated; 5) translocation of all eligible tortoises from the project area to designated approved release sites; 6) all tortoises too small for transmitters will be placed in a predator proof enclosure following a captive care husbandry plan in coordination with the USFWS; and 7) collapsing burrows once confirmed to be unoccupied, as specified by USFWS (2009 and 2020). Further details on clearance procedures are provided in the following sections.

Complete records of all tortoises found within the WTA after conducting clearance surveys, along with information collected upon encounters (e.g., attached unique identifier, radio transmitter, location, etc.) will be collated. Health screenings will be completed for all tortoises in the WTA, as well as for select resident and reference tortoises in the WTATS. Translocation release plans, landscape radio frequency plans, and captive care husbandry plans will be written; and all tortoise exclusionary fence work will be completed, including at tortoise containment facilities (see Appendix A). To acquire and compile baseline data on habitats and resident tortoises prior to translocations as recommended by USFWS (2020), surveys of recipient sites and tortoise monitoring (e.g., home range, density, health, etc.) were conducted by USGS from 2020 to 2022. Since November 2022 monthly tracking has continued on all transmittered tortoises. Additionally, health assessments occurred on these same animals in fall 2023. Health assessments have demonstrated a largely healthy population with only three percent of project

animals testing positive for *Mycoplasma agassizii* or *Mycoplasma testudineum*; only one of these three animals was found on the WTA (Vernadero 2024a).

In addition to the monthly tortoise tracking and annual health assessment work, habitat assessments occurred in the winter of 2023 (Vernadero 2024b). Habitat quality at all three proposed translocation sites continues to be suitable to support translocated desert tortoises. In addition to having adequate herbaceous plant and shrub cover, all three translocation sites have suitable soil types and suitable slopes to support desert tortoises. Most transects within the translocation sites crossed soil types suitable for desert tortoise burrowing and very few transects had extreme slopes where conditions would be less than suitable for tortoise movement and shelter. Signs of vehicle disturbance, mostly historic, were noted in numerous transects throughout the control sites, with less vehicle disturbance noted in the translocation sites. Additionally, the two control sites were determined to provide excellent sites to evaluate desert tortoise use in areas not involved with WTA desert tortoise translocation. The habitat quality of the control sites was similar to that of the translocation sites; the control sites had slightly higher average and total plant cover, similar soil types and slopes, but greater anthropogenic disturbances (i.e., signs of vehicle activity; Vernadero 2024b).

Monthly tracking will continue as will annual health assessments until translocations take place. These data will be used to provide the most up to date conditions of habitat and health for the translocation. During this time, new enclosures and tortoise exclusionary fencing around the WTA will be installed or repaired as needed, and tortoises housed in enclosures cared for and monitored.

All activities related to desert tortoise (capture, handling, and translocation) during clearance surveys will be done in accordance with the USFWS' 2021 Biological Opinion. Fort Irwin's USFWS' 10(a)(1)(A) permit will address post translocation monitoring. State permits will be obtained prior to translocation.

6.1 Tortoise Enclosures

To house tortoises within enclosures, Fort Irwin will prepare a tortoise husbandry plan, consistent with specifications in USFWS translocation guidance (2020) and recent captive care guidance (USFWS 2024). Enclosure facilities and husbandry plans will be approved by USFWS before clearance surveys occur (USFWS 2021a). Enclosure pens meant to hold tortoises will be constructed with tortoise exclusionary fencing and not be near active training (see Section 6.6: Fencing and Other Considerations). As an alternate to holding and maintaining tortoises on Fort Irwin deemed unsuitable (e.g., due to health issues) for translocation, the installation may use another facility with an animal husbandry plan, with prior approval from the USFWS.

Construction or modification of existing outdoor predator-proof tortoise enclosures will be necessary to temporarily house 1) tortoises too small for VHF radio transmitters (including hatchlings and juveniles, or tortoises < 300 g, or 150 mm; Medica et al. 1975); or 2) individuals with conditions that warrant additional husbandry or veterinary care as determined by USFWS guidance. If individuals do need to be held in enclosures, annual health assessments and veterinary visitations will be conducted per USFWS guidance, and individuals will be released once determined to be recovered with USFWS approval.

6.2 Habitat Clearance Surveys

Habitat clearance surveys of a proposed project area require 100% coverage to locate and remove tortoises above and below ground in areas where the NTC plan to conduct military activities (USFWS 2020). The USFWS requires that all areas of the WTA within and connected to high intensity training areas be completely searched for tortoises during tortoise clearance surveys. This is expected to start in Fall 2024 (Appendix A). All clearance surveys will follow protocols outlined in the USFWS' Desert Tortoise Field Manual (2009) and USFWS' Translocation of Mojave Desert Tortoises from Project Sites: Plan Development Guidance (2020) to effectively locate and handle tortoises appropriately in preparation for translocation. All telemetered tortoises and new tortoises (of all size classes) found during clearance surveys are projected to be removed from the WTA by Spring 2025.

Per USFWS guidelines (2020), clearance survey teams will conduct at least two complete consecutive survey passes throughout the WTA, with focused juvenile surveys conducted. Focused juvenile tortoise surveys will include concentric circles (25m radius) around small tortoises located during clearance surveys or around tortoise nests (DTRO, *personal comm*.). All clearance procedures will be conducted when ambient temperatures are below 95°F/35°C and in accordance with the USFWS's translocation planning guidance (USFWS 2020).

The clearance structure is projected to include a survey team, a telemeter/data team, and a field coordination team. Search teams focus on detecting desert tortoises of all sizes, and complete planned daily coverages that may vary depending on factors including weather, terrain, and tortoise densities (with maximum transect width of 5 meters). There may be multiple search teams assigned to survey sections as needed. USFWS (2009) requires that the telemeter/data team will consist of experienced desert tortoise Authorized Biologists that can efficiently and safely handle tortoises, attach radio transmitters, and perform necessary measurements and health assessments. A telemeter team is assigned for each search team, particularly during the first pass across sections of the WTA. Following USFWS handling guidance (2009), each telemeter team attaches a unique identifier (e.g., epoxy label) and radio transmitter (if tortoise is large enough) to each encountered tortoise to monitor them at least monthly until they are translocated to a release site. The field coordination team is expected to determine the required work force, maintain communications, provide oversight for the safety of tortoises and field teams, and collect data at the end of each field day. All work identified below is subject to Terms and Conditions of applicable state and federal permits and may be altered or modified by issuing agencies to meet these conditions.

6.3 Marking and Measuring Tortoises

Methods pertaining to tortoise monitoring, handling, and processing for sections 6.3, 6.4, and 6.5 are based on requirements from the recovery permits (#TE-63428D-0, -1) issued by the USFWS, and USFWS desert tortoise handling and health assessment protocols (USFWS 2009, 2019, 2020, 2022a).

Every tortoise encountered during surveys is assigned a unique identifier number and radio transmitter (if large enough). The observer, date and time, tortoise number, location (UTM, acquired by a handheld GPS unit and/or digital application), and radio frequency tracked/attached is to be recorded (USFWS 2022a). Additional necessary information for

translocation purposes such as physical measurements (mass and shell length), sex, and health assessment notes on appearance and condition will also be recorded. Microhabitat characteristics may be useful to evaluate tortoise habitat use. Characteristics such as the tortoise's cover type (e.g., burrow, open, vegetation, rock), burrow type (e.g., soil, rock, caliche), burrow number, and vegetation information including status (alive, dead), species, and dimensions (greatest width, perpendicular axis, and height) may be recorded. Photographs of individual tortoises, as specified on the health assessment datasheet, will be taken (USFWS 2020).

Tortoise measurements will include midline carapace length in millimeters (MCL; measured from the center tip of the nuchal and supracaudal scutes) and plastron length in millimeters (PL; measured between the notches of the gular and anal scutes) will be recorded in mm using metal tree calipers (tortoises ≥ 180 MCL) or digital calipers (tortoises < 180 MCL). Animal mass can be recorded using disposable flagging tape and a digital scale (e.g., hanging scales or top loading balances, such as from Ohaus™ or Escali™) and measured to the nearest gram (USFWS 2009).

All tortoises are to be marked with a unique identifier number by gluing a paper tag to a depressed portion of a vertebral or costal scute with clear epoxy (USFWS 2009, 2022a). Any numbering scheme used will be coordinated with the USFWS Desert Tortoise Recovery Office (DTRO) to avoid numbers previously assigned and distributed (USFWS 2009). Previously assigned identification numbers attached to tortoises in the WTATS and WTA include numbers in the following series: "FI" before a number in the 5000 – 5999 (WTA) and 7000 - 7999 (WTATS) range (e.g., FI7229) (Esque et al. 2005), or "FT" before a number in the 3000 - 3999 (WTATS) and 11000 – 11999 (WTATS and WTA) range (e.g., FT11224). Tortoises found during surveys may also have their shell scutes notched using the highly modified Honegger System (Appendix F; Honegger 1979; USFWS 2022a).

6.4 Monitoring of Tortoises via VHF Telemetry or Similar

Methods described in Boarman et al. (1998) highlight successful attachment of very high frequency (VHF) radio transmitters (models PD-2 [6 – 10- month battery (3.5 g)] or RI-2B [11-month battery (6 g); 12 month battery (9 g); 24 month battery (14.5 g)]; Holohil Systems Ltd., Carp, Ontario, Canada, or similar) on tortoise carapaces using QuikSteel putty epoxy (for RI-2B models on adult tortoises) or Devcon gel epoxy (for PD-2 models on juvenile tortoises) and silicone. Tortoises found during surveys that are too small for a radio transmitter (e.g., transmitter weight is ≤10% of the body mass of the tortoise) will be placed into individual enclosure pens so they may be released upon reaching sufficient size for tagging (USFWS 2020).

While handling for equipment attachment, tortoises may void their bladder contents which could be detrimental to their survival. If a tortoise voids during a handling encounter, rehydration via soaking, nasal-oral uptake, or epicoelomic (i.e., between the plastron and pectoral muscles) injections may be necessary or prescribed by USFWS (USFWS 2019; #TE-63428D-0, -1).

Translocated tortoises will be tracked within 1-2 days of release and undergo a follow-up clinical health assessment (USFWS 2020). A projected monitoring timeline of twice weekly for the first two weeks after release, weekly during the first active season, and twice monthly for the duration of the first year after release may reduce the number of missing translocated tortoises. Otherwise,

tortoises would be tracked at least monthly, including resident and reference tortoises in the WTATS.

6.5 Tortoise Health Assessments, Tissue Sampling, and Laboratory Diagnostics

In preparation for translocation, assessments of clinical health conditions and physiological health status in this section will follow methods detailed in *Health Assessment Procedures for the Desert Tortoise (Gopherus agassizii): a Handbook Pertinent to Translocation* (USFWS 2019). Tortoises will not be eligible for immediate translocation if health conditions show signs that may impact survival, including weakness/lethargy, moderate to severe serous or mild to severe mucoid nasal discharge, or crusts, plaques, or ulcers in the mouth (USFWS 2020).

Tortoises not eligible for translocation will be held in containment enclosures and will be cared for with the protocol outlined in a tortoise husbandry plan (see Section 6.1: Tortoise Enclosures). Tortoises with improved health may be eligible for translocation (case by case evaluation, approved by USFWS) in alternative suitable sites or in coordination with federal and state agencies.

Prior to translocation, health assessments must be completed: 1) within 1 year of translocation, and 2) at least 2 that are 14–30 days apart, with the last assessment occurring immediately prior to the translocation date (USFWS 2020). Biological tissue samples, including blood and oral epithelial cells (see below), will be collected within 1 year of translocation (USWFS 2020). Additional health assessments will be conducted on a subset of animals in the resident and reference populations, with a target sample subset size estimated as those needed to detect 10% prevalence at the 95% confidence level (CI) and 5% precision (see Figure 4 in USFWS 2020).

As part of the physical health assessment, general health signs will be described, including the animal's general posture, respiration, face (with specific attention to the eyes, periocular tissue, nares, mouth, tongue, and oral mucosa), skin, and shell for any clinical signs of disease, abnormalities, damage, or discoloration (USFWS 2020). The cloaca, eyes, nares, mouth, and skin will be examined for any evidence of lesions, ulceration, erythema, swelling, or discharge. Numerical body condition scores (BCS) will be used to assess the overall muscle condition and fat stores with respect to skeletal features of the head and limbs. BCS scores are first categorized as “under”, “adequate”, or “over” condition, and then numerical values are assigned to provide a precise and repeatable measurement (e.g., Under: 1–3, Adequate: 4–6, Over: 7–9; USFWS 2019). Tortoises that are eligible for translocation should exhibit normal behavior and respiration, have a BCS ≥4, display no evidence of active lesions (shell and oral) or mucoid discharge (ocular and nasal), and display no other health condition that may impact their survival (USFWS 2020; Figure 11).

Immediately following a physical assessment, tissues will be collected from each animal, when applicable (USFWS 2020). Other tissues may be collected, as needed, for associated research or monitoring purposes. Protocol for shipping samples will follow USFWS Health Assessment (2019) procedures. Aliquots of plasma will be shipped on dry ice to the Mycoplasma Laboratory at the University of Florida (UFL; Gainesville, FL) and screened for targeted immune responses (antibodies) specific to *Mycoplasma agassizii* (hereafter Myag) and *M. testudineum* (Myte) using

an enzyme-linked immunosorbent assay (ELISA measuring immunoglobulin M (IgM) and IgY light chains; Wendland et al. 2007; USFWS 2019). Results are typically reported from ELISA as negative (antibody titer <32), suspect (antibody titer ≥32 and <64), or positive (antibody titer ≥64). The associated absorbance (A405) values for each ELISA result may also be evaluated to better understand immune responses to *Mycoplasma* spp. within tortoise populations.

Sloughed epithelial cells from inside the buccal area will be collected using oral swabs (USFWS 2019). One oral swab from each sampling encounter will be shipped on dry ice to the San Diego Zoo Amphibian Disease Laboratory (Escondido, CA, USA) to detect and estimate the abundance of Myag, Myte, and Testudinid Herpesvirus 2 DNA present in the sample using quantitative polymerase chain reaction (qPCR) (Braun et al. 2014; USFWS 2019). Results for all qPCR tests will be reported as negative, positive, or equivocal (inconclusive) based on cycle threshold (Ct) values as indicated by USFWS guidance (2019) and experience of the USGS. The USGS recommends requesting Ct values and plasmid counts for each sample evaluated to better understand pathogen presence and pathogen load within tortoise populations. All remaining tissue samples that were collected will be stored in ultracold freezer storage (-70°C) or other conditions as appropriate.

Priority attention will be given to assessment and sample quality, collection, processing, and care during storage, shipping, and understanding of associated results for all health-related work. All measures needed to reduce disease and pathogen transmission between tortoises and populations will be taken (USFWS 2019). All tortoises that void bladder contents will be re-hydrated using permitted methods such as soaking, nasal-oral uptake, or epicoelomic injections (USFWS 2019) (see Section 6.4: Monitoring of Tortoises via VHF Telemetry or Similar).

Translocation of tortoises will focus on minimizing risk to other populations, especially relative to disease transmission. Prevalence of *M. agassizii* can be as high as 50-90% in healthy populations and exhibit no signs of poor body condition indices or signs of URTD that would result in an ineligible status for translocation (Weitzman et al. 2017; Sandmeier et al. 2017, 2018). Translocation of tortoises into recipient sites will maintain levels of *M. agassizii* and ELISA-positivity for the recipient population based on baseline health assessments (pre-translocation) to maintain disease resilient populations (USFWS 2020).

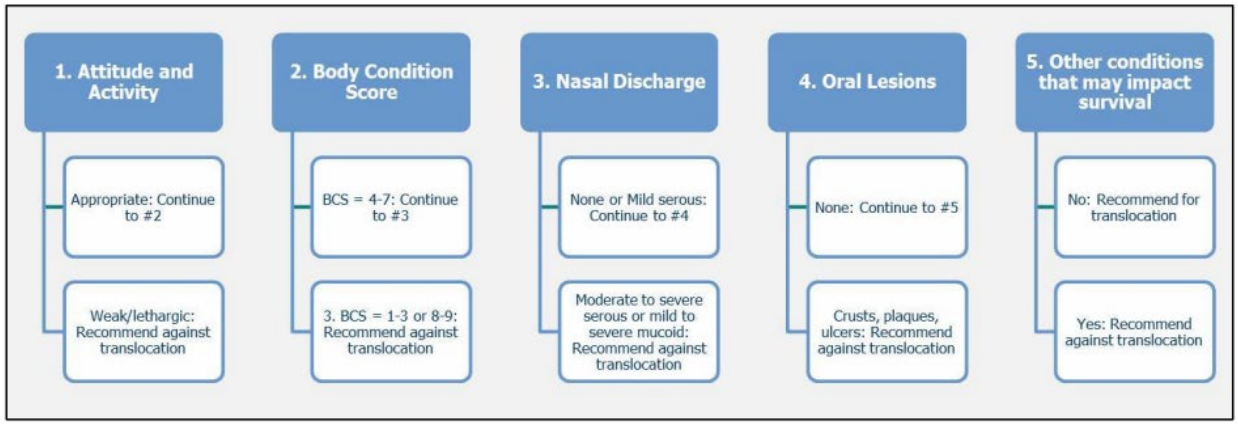

Figure 11. Algorithm followed during health assessments to determine suitability of translocation for individual tortoises (USFWS 2019).

6.6 Fencing and Other Considerations

Perimeter fencing, in the form of desert tortoise exclusionary fencing, is required around any area to which tortoises are to be confined or from which they are to be excluded. This is to prevent tortoises from moving into harmful situations (e.g., military training areas, roads, and highways) (USFWS 2009). Translocated tortoises are expected to move long distances immediately following translocation and may attempt to navigate back to their source location (Berry 1986; Field 1999; Nussear et al. 2012; Hinderle et al. 2015). In this case, tortoises may attempt to return to the WTA military training area if a fence does not prevent movement. The NTC has already separated the WTA from adjacent habitat with tortoise fencing to prepare for translocation of WTA tortoises originally slated for 2012. In 2014, the NTC created approximately 16, 3-meter-long openings in the fence to allow for tortoises to pass through, but they closed these openings in 2019 following formal consultation with the USFWS (USFWS 2021a). The need for additional desert tortoise fencing around or within the WTA, in adjacent habitat in the WTATS, and for any tortoise containment facilities will be identified so that construction or repair of those fences can be planned, contracted, implemented, and completed in time for the sites to receive tortoises during translocation. All construction, inspection, maintenance, and repair of desert tortoise exclusionary fencing will follow specifications outlined in the USFWS 2009 guide (Appendix E). If any new tortoise exclusionary fences are installed, they will be monitored daily during active tortoise seasons and when temperatures are expected to exceed 95°F (35°C); this is to ensure tortoises are not trapped within the fence or are traveling along the fence line. Otherwise, all tortoise exclusionary fencing will be inspected quarterly at minimum. Tortoises are known to pace along newly constructed fences (USFWS 2020). Fences will be checked within 24 hours of moderate to severe weather events for washouts or accumulated debris often caused by surface flow of precipitation that cause breaks in fences and allow tortoises to pass through. Any compromised areas of the fence will be repaired within 48 hours of discovery. Fence maintenance may involve debris removal, realignment, burying, and/or repairing gaps or holes. Shade structures (e.g., poly-vinyl chloride (PVC) half-pipes placed parallel and adjacent to fencing and covered with dirt) will be installed on the interior and exterior side (outside of the WTA) of the fence line at a maximum of 1,000 feet apart to provide cover for tortoises (USFWS 2020).

USFWS (2020) guidance suggests that any WTA border that is without appropriate tortoise fencing will require it be installed, monitored, and maintained. Ditches, berms, Seibert™ stakes, and/or barbed wire are insufficient. The Lane Mountain Milkvetch Conservation Area has desert tortoise fencing on the north, northeast, and east boundaries where it borders the WTA and does not appear to require desert tortoise fencing on its other boundaries (Figure 1). The Brinkman Wash Restricted Area also does not appear to require additional desert tortoise fencing either as its southern boundary connects with the WTA desert tortoise fencing to the west and east (Figure 1).

Major roads intersecting and bounding the WTATS, including the I-15 and Fort Irwin Rd. (Figure 1), are already enclosed with tortoise exclusionary fencing that is monitored/maintained by the California Department of Transportation (Caltrans). Any fence damage noted during monthly tortoise monitoring will be reported to Caltrans, who is responsible to make fence repairs). If the need for tortoise fencing in the WTATS arises in the future, and in coordination with appropriate land managers, fencing will be placed strategically, potentially incorporating natural barriers to tortoise movement as boundaries (e.g., mountain ranges) when possible

(Nussear et al. 2012). During discussions between the NTC and San Bernardino County regarding the proposed 2012 WEA translocation, the previously designated Conservation Management Working Group (CMWG) considered fencing the section of Fort Irwin Road that crosses the southeast corner of the WETA (now WTATS) (Esque et al. 2009). This was considered infeasible due to the propensity of the area to sheet flood, which was expected to result in extensive washouts of fencing.

Per USFWS (2020) guidelines, any enclosure pens meant to hold tortoises must also be constructed with tortoise exclusionary fencing. Containment enclosures for tortoises requiring quarantine will be double fenced to prevent contact between other tortoises and provide a backup fence should the first fail. It is estimated that approximately 6 miles of fencing would be required to build a double fence that covers ¾ of a square mile. Fences along tortoise enclosures will be monitored weekly when pens are occupied by tortoises.

7.0 Tortoise Disposition Plan and Translocation Package

After the tortoise clearance procedure is complete and prior to translocation, the partnering agencies (USFWS, CDFW, BLM) require the NTC to coordinate with them to finalize a tortoise disposition plan and a translocation package for all tortoises found in the WTA. The USFWS require that the tortoise disposition plan includes a step-by-step plan describing preparations for tortoises that will be translocated or temporarily housed in enclosures (including juveniles), in addition to highlighting translocation recommendations for each tortoise based on prior health assessments, lab results, and conditions of the habitat in which they were found. The plan is also required to specify locations (UTMs) at which tortoises will be released within a release site. (USFWS 2020). Tortoise sex ratio (2 Males:1 Female) will remain consistent at recipient sites during translocation planning.

The USFWS will receive the translocation disposition package at least 15 days prior to translocation for approval (USFWS 2020), and the translocation package will include, but will not be limited to: tortoise disposition plans, maps and GIS files of last known locations of tortoises within the WTA and planned release site locations, identification of resident and reference tortoises, health data and photographs of tortoises to be translocated and select resident and reference tortoises, and recipient site survey data.

Tortoises may be found in the WTA after clearance procedures and translocation have been completed and during military training activities. If so, Fort Irwin will coordinate the disposition of these animals with USFWS. If possible, these animals may be incorporated into one of the translocation research programs. Otherwise, animals are to be moved into enclosure pens or moved to a pre-determined location for tortoises found after the large translocation event, provided environmental conditions as described above are suitable for the release of tortoises (USFWS 2020).

8.0 Translocation of Tortoises from the WTA

Procedures in this section are prescribed by requirements in USFWS guidance documents (USFWS 2009, 2020) and the USFWS (2021a) Biological Opinion. Drought years with lower-than-average precipitation and annual biomass production have been observed to increase

predation rates on tortoises and decrease survival rates range-wide (Longshore et al. 2003; Esque et al. 2010). Initiation of translocation may need to be delayed to allow for prey base populations to recover following drought. Decisions on translocation during drought years would be coordinated with USFWS. In accordance with desert tortoise handling permits and regulations, no desert tortoise would be captured, moved, transported, released, or purposefully caused to leave its burrow for whatever reason when the ambient air temperature is above or anticipated to exceed 95°F/35°C before handling or processing can be completed (USFWS 2020).

Per published literature and our experience, translocations of tortoises are best done only in the spring (April – May) or fall (September – October) when the weather conditions are suitable for tortoise activity. In coordination with USFWS, translocation timeframes may be adjusted based on short- and long-term temperature and precipitation data (collected from weather stations on site with outsource supplementary data as needed; see Section 9.1: Measurements of Environmental Variables). Tortoises found in burrows during translocation can be "tapped out" by field crews to encourage them to exit (Medica et al. 1986) or they may require careful excavation (Desert Tortoise Council 1994; USFWS 2020). Multiple visits may be necessary if tortoises are inaccessible, such as within caliche caves. Following the removal of tortoises from burrows, burrows will be collapsed so they cannot be re-occupied by other tortoises during translocation activities.

All documented tortoises in the WTA that meet translocation criteria will be removed from the site. If additional tortoises that were not previously found during clearance surveys are located, they will have transmitters attached if they meet translocation criteria (USFWS 2020). Per USFWS requirements (USFWS 2019, 2020), tortoises are to be transported in vehicles (or via air) to designated release sites by permitted biologists and released in the same day. During transportation, care will be taken to avoid stressful conditions, such as high temperatures, while waiting for transport, travelling in vehicles, or while waiting at the release site for dispersal. Tortoises in any phase of the translocation will not be left unattended for any period of time. Juvenile tortoises (<300 g or <150 mm; Medica et al. 1975) or other individuals that may have been housed in enclosure pens but meet translocation criteria, may be translocated within the same season as other tortoises are being translocated from the WTA to the WTATS.

Tortoises will be transported in clean, protective, and ventilated containers to ensure their safety during translocation. Containers will be sterilized using a 10% bleach solution or diluted or ready-to-use Rescue™ requiring 1 to 5 minutes contact times (disinfection guidance found in USFWS 2019) before being used to translocate other tortoises. The area cleared and total number of tortoises found will be reported to the USFWS and CDFW (see Section 11.0: Adaptive Management).

Releases of tortoises will occur when temperatures range from 65–85°F (18 – 30°C) and are not forecasted to exceed 90°F (32°C) within three hours of release or 95°F (35°C) within one week of release (USWFS 2020). Tortoises will not be released when it will be cooler than 50°F (10°C) within one week post release (USFWS 2020). Tortoises will not be released in the summer (June-August) or winter (December-February) for any reason.

When released, translocated tortoises will be provided drinking water for 15 to 20 minutes and placed into unoccupied-shelter sites, such as a tortoise soil burrow (if available), caliche caves, or in the shade of a shrub (USFWS 2020). Releasing tortoises into unoccupied shelter sites within washes may contribute to increased site fidelity after translocation (Nafus et al. 2017a). In previous studies, tortoises released into artificially made burrows did not appear to show fidelity to those sites and left immediately to seek out or construct other suitable cover sites nearby (Field 1999; Nussear et al. 2012). Translocated tortoises rarely returned to burrows into which they were released during translocation. Instead, they found or constructed other suitable cover sites. Ambient temperatures at the time of translocation can also affect the success of the release. Tortoises released under similar conditions to those recommended by USFWS are typically able to find suitable shelter without exhibiting signs of overheating or thermal duress (Lohoefener and Lohmeier 1986; Corn 1991; Field 1999; Nussear et al. 2012).

Translocated tortoises can move long distances during the first year following translocation (Aiello et al. 2014), possibly moving outside the typical range of radio transmitters used for tortoise tracking (~700 – 900 m) (Esque 1994; Nussear et al. 2012). Therefore, all translocated tortoise locations are projected to be monitored within 24 hours of release, twice weekly for two weeks after release, weekly during the first active season, and twice monthly for the duration of the first year after release. After the first year of translocation, monitoring activities may be reduced to twice per month during active periods (April – October) and once per month during inactive periods (November – March) per tortoise. Any tortoises missing, either because their VHF signals could not be detected or their transmitters were recovered in the field, will be searched for within 24 hours since found missing then once per month thereafter by listening for signals throughout the project area and visiting burrows the tortoises previously used.

9.0 Post-Translocation Monitoring: Short and Long-term Success Criteria

An appropriately designed monitoring program includes: 1) standardized criteria for success, 2) hypotheses that are used to critically evaluate whether management goals have been met, and 3) provides additional guidance for adaptive management to inform future actions (Miller et al. 2014; Bell and Herbert 2017; Morrison 2002; USFWS 2020). The NTC and USFWS agreed to develop a monitoring program for tortoises translocated from the WTA to better understand short- and long-term tortoise responses to translocation and to contribute information toward the range-wide recovery of the species (USFWS 2021a). Monitoring of short- and long-term success criteria will contribute to tortoise recovery and minimize mortality of desert tortoises, as outlined in the USFWS Recovery Plan (2011) and Translocation Guidance (2020). Such monitoring also advances the DoD's contribution to recovery goals as part of the Recovery and Sustainment Partnership (RASP) Initiative (USFWS 2021a). The scope of the monitoring program for measuring the success metrics of the WTA translocation will be finalized by the NTC and USFWS prior to translocation. The program will be structured to ensure that there is coordination among all the monitoring activities conducted under this translocation plan. This translocation plan also aims to re-visit and expand upon previous goals and objectives outlined in the 2005 and 2009 NTC Translocation Plans that were not fully implemented during the original translocation in addition to following USFWS 2020 success criteria guidelines (Table 9; Esque et al. 2005; Esque et al. 2009). The evaluation of success metrics discussed below will allow the

NTC to both evaluate the success of the proposed translocation and continue progress on the obligations defined for the previous translocation.

Tortoise responses among study groups will be compared against a 20% differential and baseline measurements as necessary. All tortoises involved in the translocation monitoring and tortoises involved in the studies of cooperators will be sampled for multiple parameters (e.g., growth, presence/absence of disease, genetics) to determine study group responses (i.e., growth, survival, movements) that are within 20% of each other will be considered within the expected range of variation among groups (Esque et al. 2005; Brand et al. 2016; USFWS 2020). Evaluation of post-translocation data and baseline measurements (such as survival and health condition) may provide information on annual responses to environmental conditions that may be cause for concern. Effect sizes for success metrics are expected to vary. Therefore, a standardized 20% difference will be applied but subject to change as new data become available. Additionally, we hypothesize that a 20% differential will be detectable given the sample sizes that will be available. Though tortoise responses measured by various success metrics may differ from one another, and especially with regard to movements, translocated tortoises are generally expected to have similar responses to those of reference animals after they have had up to five years to acclimate to their new environments. If this is the case, translocations would be considered "successful" in the short-term. If metric responses are greater than 20% between study groups, then evaluation among all metrics (e.g., growth, survival, movement) will be triggered to assess factors that may cause a response difference greater than 20% and implement appropriate adaptive management actions. To assess compliance and continuity of translocation plan actions, Fort Irwin will create an advisory group (Fort Irwin, USFWS, CDFW, BLM, and others) that will meet annually to review and advise actions and results related to translocation, share the information gathered, and to determine if the monitoring activities remain within the thresholds bounded for each success criterion. In addition, the meeting will facilitate coordination and data dissemination among all stakeholders. A framework will be developed to collect and archive all field data so that the assessments of the long-term goals are accurate and to assure that the data from all activities conducted under this plan are archived for future use (Appendix A).

Table 9. Success criteria from the USGS following USFWS guidelines for desert tortoise translocation (2020). Specific parameters for each stage are described in sections 9.2 and 9.3 for this translocation plan. Timeframe described in this table and in sections 9.2 and 9.3 are for post-translocation years. Fort Irwin will track short-term translocation success criteria through six years post-translocation, after which responsibility will be turned over to the Recovery and Sustainment Partnership (RASP) partnership between DOI and DoD for continued long-term monitoring.

Stage	Metric	Post-Translocation Timeframe
1. Movement, site fidelity and home range	Movement of translocated population should not be greater than a 20% difference from resident and reference populations	1–3 years
2. Survival, disease, and growth	a. Survival and disease levels of translocated and resident individuals are within 20% of reference population b. Increase in MCL since release and growth rates should not be 20% different than resident population (translocated tortoises at <180 MCL)	a. 4–6 years b. 4–6 years
3. Evidence of reproduction	a. Female reproductive output (e.g., egg production, nest success) of translocated and resident tortoises should not differ by more than 20% of reference tortoise b. Juvenile segment of the size-class distribution is increasing	a. 4–6 years b. 7–18 years
4. Genetic Integration	Gene flow between translocated and resident tortoises assessed by the presence of juvenile tortoises of mixed parental lineages.	5–20 years
5. Population growth	Increasing trend in population size and distribution of gene flow via demography plot surveys and genetic sampling, respectively, in translocated, resident and reference populations.	15–20 years
6. Viable population	Adult density >> 4/km^2, excluding founders, via mark-recapture surveys and long-term radio telemetry monitoring of translocated and resident and reference populations.	20–30 years

Sample size is an important consideration for any monitoring plan, and this is especially true when the mortality of research animals is a certainty either by slow attrition or catastrophic events, such as drought and/or predation (Longshore et al. 2003; Esque et al. 2010). As previously discussed, (see Section 6.4: Monitoring of Tortoises via VHF Telemetry or Similar) all the translocated tortoises will be monitored simultaneously with 75 to 100 tortoises in each of the resident and reference tortoise groups. The estimated sample sizes were based on power analysis with 80% power, 0.10 significance level, and 20% difference in response rate between study groups. Sample size was increased to a maximum of 100 animals to account for animals that go 'missing', or chronic or acute mortality. The selected residents and reference population will be distributed across sites so that they represent locations where the translocated tortoises are released and sufficiently represent adult and non-reproductive size classes for meaningful analyses. Translocation studies have used 100–150 tortoise sample sizes previously, including for evaluating success of the previous 2008 NTC translocation (Mack and Berry 2023). However, sufficient samples of resident and reference animals are needed to compare with post-translocation tortoise response and to evaluate translocation success.

Generally, monitoring plans for large translocations include tracking each tortoise in each study group (e.g., translocated, resident, reference tortoises) and a sample population of resident and reference animals for the first six years of the program, followed by an additional 20–30 years of long-term monitoring of a subset population of translocated animals and biennial surveys of the recipient and reference populations (USFWS 2020). Long-term effects of translocation are still not well understood, and long-term monitoring is particularly needed to determine the effectiveness of translocations of long-lived species like the desert tortoise. The monitoring program for this plan includes success metrics from the first translocation (Esque et al. 2005) and USFWS guidelines (2020), which consist of five stages over an approximate 30-year period to adequately evaluate success criteria and to better address gaps in knowledge about tortoise translocation (Table 9). The success of this translocation will be based on the quantifiable and hypothesis-driven criteria (Tracy et al. 2004; Miller et al. 2014; Bell and Herbert 2017) that follow. The success metrics described in the following section are designed to measure responses of tortoises in relation to the range of environmental variation they are likely to encounter.

9.1 Measurements of Environmental Variables

Metrics used to evaluate success for this translocation plan must be considered relative to the responses among the three study groups (translocated, resident, and reference tortoises). Comparisons must be made among study groups to understand the direct effects of translocation as compared to responses due to other factors (e.g., prolonged drought or widespread predation linked to a drought; Esque et al. 2010). Examples of metrics used to evaluate success are survival, growth, reproduction, and genetic integration rates (see Table 9 and sections 9.2 and 9.3 below for detail).

Translocation of Tortoises and Habitat Quality

The Biological Opinion for the Recovery and Sustainment Partnership Initiative, Augmentation Strategy, updated Recovery Plan, and 5-Year species review (USFWS 2021a, 2021b, 2011, and 2022b, respectively) all suggest using translocated tortoises to augment areas with depleted populations. Possible implications of this action must be considered carefully and in consideration of future outcomes (Frazer 1992). Causes of depleted populations occurring at several locations across the West Mojave are currently unknown; however, relationships have been hypothesized (USFWS 2021b; Mack and Berry 2023). If an area selected for translocation has experienced or is currently experiencing population depletion, it is possible that translocated animals as well as the residents and reference population are being subjected to unknown or unquantified stress factors. Therefore, translocations must include monitoring and experimentation to ensure that the impacts to the existing population and translocated populations in that area can be identified (Tracy et al. 2004).

Fine-scale measurement of environmental variables, such as precipitation, temperature, and vegetation are vital to understanding the relationship between habitat and tortoise ecology and are to be recorded throughout all stages of the monitoring program. Weather stations measure fine-scale and daily changes in temperature, humidity, and precipitation, and rain gauges can be used to determine sporadic precipitation that may not be recorded otherwise due to the distance between publicly available weather stations. Perennial and annual vegetation surveys may be used to quantify habitat quality, available forage, and vegetative cover (see Section 9.1: Measurements of Environmental Variables).

It is difficult to design experiments or observational studies that assess all possible factors related to population fluctuations, particularly if multiple factors are suspected of causing change (Tracy et al. 2006; USFWS 2011). Factors that may be related to tortoise population declines include road mortality, development resulting in habitat destruction, predator subsidies, invasive plant species presence on the landscape, wildfire, contaminants, activities related to illegal marijuana growing operations, and climate change, among others (USFWS 2021a). Some populations that have been monitored for decades continue to decline despite years of increased conservation management (Tracy et al. 2004; Allison and McLuckie 2018; Averill-Murray et al. 2021) and restoration efforts (Esque et al. 2021b). This suggests that the suite of impacts that can cause tortoise populations to decline are still present (Frazer 1992; Zylstra et al. 2023). Along with this, the short- or long-term success of an experimental release of tortoises may depend on uncovering additional landscape stressors and adapting management actions to avoid or minimize them. Researchers will quantify as many impacts to tortoise survival as possible to ensure success after translocation.

Climate, soils, and vegetation in the Mojave Desert ecosystems are interrelated, and characterization of these variables is a critical part of understanding habitat suitability for desert tortoises. For long-lived desert plants and animals, such as the desert tortoise, climatic data are valuable for interpreting ecological patterns (Beatley 1974). Availability of precipitation is correlated with the growth of juvenile tortoises (Medica et al. 1975). Alternatively adult tortoises may show adverse responses to prolonged drought (Peterson 1994; Longshore et al. 2003). Vegetation and climate monitoring including percent perennial cover, composition and species richness will be conducted annually as part of determining quality of tortoise habitat within the

WTATS and WTA. The entire project area covers a landscape that varies in topography, substrate, and vegetative communities. To study how different habitat characteristics and conditions affect tortoises, climate and annual and perennial vegetation are best monitored at selected, randomly stratified points throughout the WTATS and WTA.

Climate monitoring stations (Upward Innovations, Inc., DGS-001, East Falmouth, MA, USA, or similar) are best distributed throughout the WTATS and WTA, assembled according to NOAA standards (NWS 2018), and outfitted with several climate sensors (rain gauges, thermometers, barometers, anemometers, and pyranometers to measure solar irradiance). Data collected from the stations are accessible through a web portal and analyzed annually. Cost-efficient rain gauge stations (Figure 12; TruCheck; Edwards Manufacturing Company, Albert Lea, MN, USA, or similar) may be placed randomly on the landscape to collect supplementary precipitation data. Rain gauge data are best recorded once per month (less frequently in cases when no precipitation was recorded by climate stations, or no storm cells moved through the area) and emptied. Mineral oil may be added to slow evaporation of precipitation collected in gauges. Wire mesh may be placed inside the top of the rain gauges (such that they do not interfere with the collection of precipitation) to reduce the accumulation of insects. During months of expected below-freezing temperatures (e.g., November through February), a small amount of antifreeze may be added to prevent freezing of any precipitation in gauges. Stations are best placed approximately 500-1000 m from roads and in areas with less evidence of human settlement (camps, trailers, etc.) or disturbance, when possible, to prevent tampering with or damage to the stations.

Capturing localized vegetation information to relate to tortoise landscape use, annual and perennial vegetation monitoring occur best through field sampling efforts and remote sensing. Forage availability for tortoises is best sampled by recording each species and its phenology and biomass of available annual and select perennial forage plants within quadrats (1 m^2 in size) while identifying and recording land cover strata (e.g., Upland, Wash, Rocky Slope, Dry Lake) at selected random points (Elzinga et al. 1998) within the WTATS. Sampling would occur in spring and fall when tortoises are active and annual plant growth is expected. A robust design includes recording all species of live forage plants and their phenology within each quadrat. Available biomass may be obtained within a 0.1-m^2 section of each quadrat, by clipping all live forage plants at ground level for collection. Clipped biomass samples are then sorted into monitored plant functional groups (e.g., native grasses, invasive grasses, native forbs, and invasive forbs) and weighed, both freshly clipped and dried, to quantify plant water content.

Figure 12. Rain gauges were randomly placed throughout the landscape to capture supplementary precipitation data. Gauge contains mineral oil to slow evaporation of precipitation and antifreeze to prevent freezing of precipitation. Photograph taken by S. Doyle, USGS.

Perennial plants provide essential cover resources for tortoises in the Mojave Desert (Nussear and Tuberville 2014). Perennial vegetation sampling within the WTATS will include points within each site that are randomly stratified and selected for repeated sampling over years. Perennial sampling will be conducted once per year at independently selected random points and randomly generated transect azimuths (Elzinga et al. 1998). To quantify cover and characterize the communities of perennials present at each site, line-intercept data would be recorded along the 50-m transect. Along each transect, observers record the species of each individual shrub that intersects the transect as well as the beginning and end marks (in cm) of that shrub's canopy along the transect (Elzinga et al. 1998). Height is recorded for each shrub encountered along the transect. Within belt transects, observers record the number of individuals of each perennial species rooted within the belt. If feasible, remotely sensed enhanced vegetation indices (EVI) from the Moderate Resolution Imaging Spectroradiometer satellite-based sensor or UAV-based sensors may improve analysis and evaluation of tortoise habitat quality at a finer resolution.

Introducing juvenile desert tortoises into translocation areas as part of the experimental design as biological probes can benefit this endeavor greatly (Nafus 2017a). Juvenile tortoises have greater sensitivity (growth and survival rates, and health responses) to disturbances resulting in larger and more detectable responses to treatment effects than adult tortoises (Drake et al. 2016). A

defined investment in habitat improvements, in coordination with the BLM, can be implemented to study habitat quality and effects of restoration efforts in augmented areas.

Roads, habitat fragmentation, and human impacts

NTC has invested in habitat improvements related to habitat restoration and roads in coordination with the BLM. Further investment in this commitment to intensive management actions may be necessary for the success of the relocation via the RASP Program in areas that are open to the public. Research on the impacts of roads and other disturbances is recommended by the Recovery Plan (USFWS 2011). Decreasing populations of Mojave desert tortoises can be directly or indirectly linked to presence of roads, habitat fragmentation, and other assorted anthropogenic threats across the range (Stebbins 1974; Bury et al. 1977; Boarman 2002a; Tracy et al. 2004; Custer et al. 2017; Allison and McLuckie 2018; Dutcher et al. 2020; USFWS 2021b; Averill-Murray and Allison 2023). Road presence may decrease tortoise populations through various mechanisms, including direct mortality from vehicle collisions, which reduces the number of larger reproductive animals that could contribute to population recruitment (Nafus 2013). Furthermore, roads across the Mojave Desert increase access to desert tortoise habitat and can introduce other human impacts, such as introduction and invasion of non-native plants and exposure to predation by feral dogs (USFWS 2021b).

The number of paved and unpaved roads and OHV routes, as well as off-road vehicle use and habitat degradation, have increased in the Mojave Desert, including in the WTATS (Tracy et al. 2004). Human development, including renewable energy, continues to expand throughout the Mojave Desert (Agha et al. 2020). A recent study indicated that 60–70% of tortoise habitat had human development within 1 km, and 43% of undeveloped tortoise habitat was outside of current federal, state, or local habitat protections (Carter et al. 2020). Cumulatively, these impacts will influence the success of the translocations unless conservation management actions are increased and well-coordinated.

Many metrics can be used to evaluate landscape patterns. Spatial pattern analysis may consider area/density/edge, shape, core area, isolation/proximity, contrast, contagion/interspersion, connectivity, and diversity (McGarigal et al. 2002). In addition, linear network pattern analysis may be useful with development of a variety of other metrics (Forman 1995). Measurement of road density may be used as a surrogate for fragmentation; road density can be measured by the number of miles or kilometers of roads and trails per unit area.

A long-term analysis from the Mojave Desert Tortoise Recovery Office found that no tortoise populations increased in areas with road density >0.75 km/km^2 (Averill-Murray and Allison 2023); Averill-Murray and Allison (2023) recommended management actions to reduce tortoise declines relative to road density, including increasing law enforcement, public outreach, and tortoise-exclusion fencing, as well as setting limits for road density (through communication and efforts between BLM and NTC). Mean patch size, number of patches, edge density, and landscape shape index related to road networks may also be measured and correlated with changes in the composition of native perennial plant communities, as well as with changes in the relative presence of exotic and native annual plants, which may influence tortoise diets (Oftedal et al. 2002; Drake et al. 2016). Designating closed OHV wash zones throughout the area may reduce impacts to suitable tortoise habitat. Current federal OHV policy and regulations have

shown positive effects of reasonable compliance on sensitive habitats when open versus closed routes were clearly marked (Custer et al. 2017), but other areas have experienced low compliance with road closures (Ouren et al. 2007).

9.2 Short-term Metrics: Success Criteria Stages 1–3a

Short-term metrics for the evaluation of translocation success will include, but are not limited to, coarse (e.g., monthly, inter-annually, decadal) analyses of tortoise movements, site fidelity, home range size and variation through time, egg production, nest survival, recruitment, growth rates, stress, disease, and survival rates. Short-term monitoring metrics occurs during the first six years of the translocation project, including the year tortoises are moved (Appendix A), and include three stages (i.e., stages 1, 2, and 3a). An interim report would be completed on Year 5 post-translocation that summarizes the results of the short-term monitoring program. This report and associated coordination meetings with USFWS and other potential cooperators would inform adaptive management actions and long-term monitoring options.

Movement, site fidelity, and home range

The analysis of animal movements provides a quantitative measure that can be used to relate desert tortoise population status to variation in their habitats. Movement and spatial use by animals can be analyzed by repeatedly recording locations using radio telemetry or satellite tracking techniques. Tortoise movement may vary in response to disturbances (e.g., new roads or other features introduced by construction), social interactions (e.g., translocation, or recent arrival of other translocated tortoises), natural landscape features (e.g., habitat and anthropogenic barriers), sex, age/size, season, environmental conditions (e.g., temperature and precipitation), reproductive status, or the availability of forage, water, and shelter (Nussear et al. 2012; Esque et al. 2014; Farnsworth et al. 2015; Todd et al. 2016; Nafus et al. 2017b; Averill-Murray et al. 2020; Dutcher et al. 2020; Hromada et al. 2020, 2023). Translocated and recipient tortoises can be expected to shift in relation to these factors for up to three years (Nussear et al. 2012; Farnsworth et al. 2015).

Therefore, the best way to evaluate translocation success may be to quantify when they "settle" into stable home ranges. Movements can be analyzed using many different methods (Turchin 1998; Doerr and Doerr 2004; Fleming et al. 2016; Patterson et al. 2017; Averill-Murray et al. 2020), including maximum tortoise distance displacement, the net distance displaced, the cumulative distance displaced, and the meander-ratio of movements over time have all been used to describe movements of translocated tortoises (Turchin 1998; Field 1999; Doerr and Doerr 2004; Nussear et al. 2012; Farnsworth et al. 2015; Fleming et al. 2016; Patterson et al. 2017; Averill-Murray et al. 2020). Movement analyses can be used to inform managers about tortoise habitat and resource selection, spatial use patterns, and areas of concern for conservation (Hromada et al. 2020; Nafus et al. 2022).

Animal movements are classified according to their timing, seasonality, repeatability, and associated behaviors. Assessing home range is important in understanding desert tortoise ecology (Burt 1943; Woodbury and Hardy 1948, Berish and Medica 2014). Previous translocation studies have indicated that tortoises moved to atypical habitat are less likely to establish home ranges and demonstrate site fidelity than tortoises moved to areas known to be desert tortoise habitat

(Nussear et al. 2012). In addition, home ranges may be influenced by seasonal vegetation availability (USFWS 1994; Nafus et al. 2017b). Desert tortoises translocated to most of the proposed recipient sites are expected to establish home ranges in the short-term. Every proposed recipient site has resident tortoises, thereby demonstrating that they are within suitable habitat. It is expected that translocated tortoises will establish a home range and show site fidelity similar to reference tortoises within 3 years of release.

Home range can be calculated using several methods (Worton 1987; O'Connor et al. 1994; Seeman and Powell 1996); however, sample size, smoothing parameters, and sampling regime introduce unknown bias among estimators (Kazmaier et al. 2002; Harless et al. 2010; Noonan et al. 2019), making estimates from multiple methods volatile (O'Connor et al. 1994) and difficult to compare statistically. Recently developed home range estimation methods, such as autocorrelated kernel density estimation (AKDE), can alleviate assumption violations identified for previous methods and produce more accurate home range size estimates (Noonan et al. 2019; Averill-Murray et al. 2020). AKDE accounts for autocorrelation in animal tracking data, small effective- sample size biases, irregular sampling, and telemetry error (Fleming et al. 2018; Averill-Murray et al. 2020). The home range concept assumes that animals are not dispersing (Burt 1943), and the comparison of movements by tortoises in the first three years of translocation compared to home ranges after that time (when home ranges are relatively stabilized in the area used) can be used to indicate how well the tortoises have responded to the translocation through the long-term duration of the program (via semi-variograms).

NTC acquisition of locational data may be used for movement and home range analyses. This would be accomplished through routine monitoring of all translocated, 75–100 resident, and 75–100 reference tortoises through VHF telemetry or GPS data-loggers (i-gotU, model GT-500, Mobile Action, or similar). A less than 20% difference in movement between translocated and recipient populations by Year 4 of monitoring post-translocation would meet success criteria for this metric.

Egg Production and Nest Success

Important components of tortoise population recruitment can be measured by successful egg production, survival of hatchling tortoises, and growth into larger size classes (USFWS 2011; Campbell et al. 2015). Previous research on tortoise recruitment at the NTC suggested a lack of recruitment into reproductive stages, resulting in low fecundity. Research hypothesized that low fecundity would result in reduced genetic variation (up to ~3% reduction in gene diversity with population separation maintained for 500 years) and increasing inbreeding coefficient (~2% increase with population separation maintained for 500 years) (Mulder et al. 2017). Nest success is a variable that can be used to measure the success of translocated populations assimilating into the recipient population, and to predict their potential effect on recipient site demographic patterns. In addition, reproductive success may indicate whether physiological stressors (e.g., precipitation, forage availability, stress, disease) are affecting tortoises at an ecological level (Lovich et al. 2015; Mitchell et al. 2021a). Egg production and oviposition are influenced by precipitation and spring temperature extremes (Turner 1982; Averill-Murray et. al 1996; Mitchell et al. 2021a). Consequently, egg production may be a measure of environmental influences and ecological performance that can be important indicators of translocation success. X-radiography

has been used to determine clutch size and frequency in turtles and tortoises for ~40 years and is not thought to place adult tortoises, embryos, or populations in jeopardy. However, further research into the long-term effects of this activity is still required (Hinton et al. 1997). Egg production is measured by taking X-rays of an experimental population of female tortoises in the field every two weeks (Turner et al. 1986; Henen 1997; Nussear et al. 2004). In addition, ultrasonography can be conducted in the fall to document the development of yolk follicles (Kuchling 1989; Rostal et al. 1994) and to reduce the need for extra X-rays in the spring. Monitoring of egg production of tortoises among all study groups may contribute to determine factors that may affect fecundity and growth among translocated, recipient, and reference tortoise populations.

The second component of measuring reproductive success is identifying the proportion of eggs that produce hatchling tortoises emerging from nests. Tortoise nests can have a high incidence of predation (Bjurlin 2001; Franks 2002). Predation rates may be higher in areas where greater predator densities occur (Bjurlin 2001), as predator and prey species' abundances vary, or where appropriate nesting substrates are not adequately available. Tortoise nests can be found by using fluorescing powder on gravid females with hard shelled eggs (as determined using x-rays) and following powder trails created to the nest (Keller 1993), or by attaching GPS loggers or thread trailers to gravid female tortoises near the time when shells form on the eggs (Bjurlin 2001). Increased monitoring and care for gravid females will be required to ensure tortoises are not entangled by attached threads if this method is used. Once nests are located, they can be monitored for hatchling success and nest predation (Bjurlin 2001). Nests may be caged to protect them from predators if necessary (Turner et al. 1986). In addition, egg orientation in nests should be maintained to promote embryo survival (Ewert 1979). Minimizing the number of times that a nest is visited may be beneficial in reducing the number of nests which that are depredated upon. Less intrusive methods will reduce the possible impacts on tortoise nests, such as installation of camera traps near nest sites to monitor nest use, including by predators. Transfer of human scent to nest sites will be minimized by using ground covering for sitting and equipment and altering daily tracking routes to nests.

Growth rates

Growth rates of vertebrates are highly variable and can be affected by environmental conditions, nutrition, health, sex, and age (Turner et al. 1984; Turner et al. 1987; Nagy et al. 2020). Even healthy tortoises may have little or no growth in some years from lack of resources, or because of resource expenditures. Growth rates also vary between adult male and female tortoises (Turner et al. 1987); while growth of males slows with age, adult reproductive females essentially stop growing and instead may redistribute most of their somatic growth potential into egg production (Medica et al. 2012). Growth rates can be measured by recording dimensions of the shell and the mass of animals over time (Woodbury and Hardy 1948; Turner et al. 1987). Mass measurements are important but can be confounded by hydration status of the tortoise. Tortoises that have consumed water recently gain a lot of weight. Alternatively, tortoises can be dehydrated, a condition that can be lethal, and thus, mass measurements can be used to assess the condition of tortoises during monitoring. Measurements of growth will primarily be evaluated based on plastron and carapace length.

Differences in growth rates will be difficult to detect among adult tortoises because of their slow growth rates (Medica et al. 2012). Therefore, estimating growth of pre-reproductive animals, or those generally ≤180 MCL, is more informative than estimating adult growth (Germano et al. 1994). Using growth as a success criterion would require captures (once during Spring and Fall) to estimate growth (Turner et al. 1987). Growth monitoring is conducted across study groups (reference, resident, translocated) to adequately document and compare growth over time. Growth as a success criterion requires that small size classes of tortoises be translocated in addition to adults to detect differences in growth rates among study groups. Growth of small tortoises can be correlated with precipitation (Berry 2002; Nagy et al. 2015b; Nafus et al. 2017b) and nutrition (Drake et al. 2016; Nagy et al. 2020). Thus, evaluating tortoise growth success would require the comparison of growth among smaller reference, resident, and translocated tortoises while also considering the environmental conditions among years and sites. This would result in seasonal and annualized growth estimates among tortoises by sex and size (age).

Precipitation and forage availability data (according to methods mentioned in Section 9.1: Measurements of Environmental Variables) in addition to tortoise measurements twice per year (Spring and Fall), can be used to identify the growth rate of all recently translocated tortoises in comparison to 75–100 resident and 75–100 reference tortoises under existing environmental conditions. After accounting for age, sex, and variation among sites in the amount of annual rainfall, forage availability, and other relevant factors, predicted growth rates of individual tortoises are not expected to vary by more than 20% between study groups after the first 3 years post-translocation. In this case, translocation can be considered a success with respect to this metric. If growth rates vary more than 20% during the first three years post-translocation, then potential causes for differences may be investigated.

Disease, Stress, and Survival rates

Mycoplasma agassizii and *Mycoplasma testudineum* are common bacteria detected in tortoises and are pathogens that play an important role in upper respiratory tract disease (URTD) (Brown et al. 1994, 1999; Jacobson et al. 2012; Drake et al. 2017). Testudinid herpesvirus (TeHV2) (Origgi et al. 2002) has also been detected in tortoises with respiratory disease; however, the significance of this virus to tortoise survival is still unknown (Jacobson et al. 2012; Burgess et al. 2021). Periodic tissue samples for analysis can be used to monitor the incidence of disease in translocated, resident, and reference populations, as described in Section 6.5: Tortoise Health Assessments, Tissue Sampling, and Laboratory Diagnostics.

Samples collected from tortoises during routine health assessments will be screened for the various pathogens that cause URTD and herpesvirus (USFWS 2020). Screening for other diseases could be done if definitive laboratory assays become available and the USFWS deems it necessary. Tortoises infected with *Mycoplasma* may take up to two years to develop a positive ELISA result (Aiello et al. 2014; Drake et al. 2019). Health assessments (blood samples, oral swabs, and physical assessments) conducted annually either in spring or fall on each experimental group during the first five years after translocation will compile a solid baseline of health status for long-term monitoring comparison, following protocols in *Health Assessment Procedures for the Desert Tortoise (Gopherus agassizii): a Handbook Pertinent to Translocation* (USFWS 2019; USFWS 2020; see Section 6.5: Tortoise Health Assessments, Tissue Sampling,

and Laboratory Diagnostics). Some disease exposure or transmission between translocated and resident tortoises is possible because of tortoise dispersal, change in tortoise contact frequency, and altered community network structure (Aiello et al. 2014, 2018). However, the levels of disease in the translocated and recipient populations should not differ greatly from the reference population in the short-term. Tortoises that tested positive for *Mycoplasma* antibodies were successfully maintained for over 10 years at the Desert Tortoise Conservation Center in Las Vegas, Nevada and produced the same number of eggs and clutch sizes as reference animals in a captive tortoise study (Rostal et al. 2001).

Recovery objectives in the tortoise Recovery Plan include measurable and objective documentation of tortoise demography, distribution, and habitat (USFWS 2011). One baseline population measurement required to model demography is tortoise survival rate. Survival rates are evaluated by quantifying survival or mortality over time by periodically monitoring marked individuals (e.g., monthly, and annually, or longer intervals). Survival rates may depend on weather conditions that vary annually (Turner et al. 1984; Peterson 1994), vary cumulatively across years as climate varies (Longshore et al. 2003), or are implicated as indirect threats to tortoises like predation (Esque et al. 2010). Precipitation data collected from weather stations and rain gauges will be analyzed annually to determine necessary actions (in coordination with USFWS) to minimize tortoise mortality due to drought.

Survival rates may also depend on the incidence of disease or other stressors, such as habitat disturbance covered above. In addition to annual responses to environmental conditions, survival among different populations may depend on long-term site conditions that vary spatially. Although it can be assumed that survival rates vary from place to place, acquisition of empirical data to determine the mechanisms causing such patterns are rarely acquired.

Disease levels, stress levels, predation, and survival varying less than 20% between translocated, resident, and control populations suggest translocation success for these metrics. If disease, stress, or survival rates for translocated animals vary more than 20% from those of residents or controls under similar conditions, then the apparent causes may be investigated so that adaptive management of the translocation program can potentially resolve the problem.

Predation

Survival and mortality rates in desert tortoise populations can be highly variable (Turner et al. 1984; Peterson 1994). To understand the relative success of a translocation, the mortality of all study groups should be similar under similar conditions (Esque et al. 2010). Drought, predation from ravens and mammalian carnivores, and human related activities (e.g., OHV, road kills,) may be the proximate causes of mortality in tortoises throughout the project area (USFWS 1994, Tracy et al. 2004, USFWS 2011). Ravens are known predators of tortoises and use transmission lines as nesting sites; these lines provide ravens opportunities to expand their range in areas that may not have been historically accessible (Boarman 2002b; Kristan and Boarman 2003; Boarman et al. 2006; USFWS 2011; Xiong 2020). Management actions in relation to raven populations (e.g., egg oiling, and physical/lethal removement of predators) throughout the Desert Tortoise Critical Habitat Units have attempted to reduce predation on desert tortoises (Boarman 2003; Xiong 2020; Currylow et al. 2021; Sanchez et al. 2021). Foxes, coyotes, and badgers are

also predators that prey on tortoises across size classes (Turner et al. 1984; Esque et al. 2010; Emblidge et al. 2015; respectively). Comparing mortality rates of translocated tortoises with resident and reference populations in similar habitats but with different predation pressures can help to understand these mechanisms. This approach was used at the NTC after the first translocation to explain how predation by subsidized predators within the first year after translocation was not directly related to the actual translocation, but instead reflected a range-wide phenomenon that was attributed to proximity to areas of higher density human populations (Esque et al. 2010). Sustainable populations of desert tortoises in a population represented by those >180 MCL should have annual mortality rates of <2% during average environmental conditions (Turner and Berry 1984).

NTC will document predation events and coordinate with USFWS if >2% of the study populations are lost to predation in a given season (Spring, Summer, Fall, Winter). Other options may include research on predation control or deterrence through the RASP program. All tortoise mortalities (including study animals and fresh incidental animals) will be reported immediately to USFWS within two business days. Photos of the carcass, location (UTMs), probably cause of death, and description of the carcass will be submitted to USFWS.

9.3 Long-term Metrics: Success Criteria Stages 3b – 5

Long-term monitoring and research projects described in this section will be executed and administered by Fort Irwin using operational funds, RASP program funding, or through other appropriate funding sources.

Long-term measures of success are evaluated differently from short-term measures. For short-term measures of success, the focus is on ensuring with some certainty that undue harm was not caused to the translocated or resident populations as measured by multiple correlates of fitness. Furthermore, if there are issues for which the success criteria are not met, then adaptive management will be implemented in a timely fashion to resolve whatever issues arise, and to inform subsequent desert tortoise management. Long-term metrics for evaluating success will assist in understanding the effects of translocation on desert tortoises by expanding on short-term quantification of fitness correlates. This work will include demographic parameters such as reproduction (i.e., genetics), recruitment, and survivorship (i.e., diseases).

Monitoring will occur for a minimum of 25 years (6 years of short-term monitoring and 19 years of long-term monitoring), which is the approximate length of a tortoise generation (e.g., up to 25 years), because recruitment and growth rates can be variable (Medica et al. 2012; Nafus et al. 2017b; USFWS 2020). Long-term metrics can be measured by: 1) less intensive radio telemetry monitoring of animals (in the three study groups) over longer periods of time than wild tortoises in this research design have been previously monitored and 2) conducting more intensive surveys of the recipient sites and surrounding areas (at minimum) to continue to gather comparative data among tortoise study groups and their habitats over at least one tortoise generation. A subset of 100 tortoises per study group that is stratified by sex and age class ratio using findings from baseline demographics (see Section 3.0: Baseline Habitat and Tortoise Investigations (2020–2022)) and by recipient site (2 Male:1 Female:1 Subadult/Unknown Sex; 2 Adults: 1 Juvenile) may be monitored for years 9–30 post-translocation (Table 9). The subset would be representative of the overall study group (e.g., sex, age-class, distribution). The sample size

would be based on a power analysis to ensure that the probability of detecting a difference is at least 80% (Lachin and Foulkes 1986). Biennial mark-recapture surveys on defined survey plots for the translocated, resident, and reference tortoises, may be conducted during the Fall season to evaluate the long-term metrics of success for the remainder of the 30-year post-translocation monitoring period and to refresh (by adding individuals to maintain adequate sample size) sample sizes of resident and reference populations (USFWS 2020). During population surveys, health assessments may also be conducted for any tortoises that are observed or processed. Throughout the long-term monitoring of tortoises, data on tortoise demographics, reproduction, genetics, survivorship, disease, and habitat quality can be collected using guidance provided below to aid in the interpretation of the long-term success of this proposed translocation and probability of success for future tortoise translocations.

Demographic surveys

Demography is the study of how population characteristics vary through time and across space. Having information about population demographics is fundamental to species management and the Recovery Plan emphasizes this need by calling for analysis of key vital rates through long-term, range-wide demographic monitoring (USFWS 2011). Demographic parameters of interest include population densities and size, growth, range, size class distributions, and vital statistics, such as generation time, reproductive rates, recruitment rates (i.e., rates at which individuals transition from one size class to another or move among populations), and survival and mortality rates (Gotelli 2008). Tortoise demographics have been monitored in two primary ways: permanent study plots (PSP; one-square mile in area) and distance sampling (Buckland et al. 2001). PSPs were established across the range in the 1970's (Berry and Nicholson 1984; Corn 1994; Tracy et al. 2004, Farwell and Wallace 2021). After the species' listing under the Endangered Species Act, those study plots were mostly replaced by line-distance sampling to estimate population density trends (Anderson et al. 2001; Allison and McLuckie 2018). Desert tortoise populations have low potential population growth rates due to the harsh desert environment they inhabit providing few resources and slow growth rates (Woodbury and Hardy 1948). For decades, populations have been declining and lower probabilities of occupancy have been documented (Doak et al. 1994; Inman et al. 2009; Allison and McLuckie 2018; Kissel et al. 2023). However, sampling methods have varied across the range and through time, resulting in variation in population growth rate estimates and densities (Tracy et al. 2004; Inman et al. 2009; Mitchell 2021b).

Comparisons of the population demographics among study groups can aid in evaluating the effects of this and other large translocations. The long-term monitoring program is designed to integrate the demographic parameters. Additional support, for studies of long-term post-translocation may be necessary to understand different aspects of tortoise demographics. Distance sampling methods can be continued as part of the long-running USFWS recovery monitoring program to monitor trends in population densities, while permanent study plots would provide life history statistics and be used to evaluate the contribution of translocated tortoises to recipient populations. New plots for this monitoring program are established in a spatially explicit capture-recapture framework (Royle et al. 2014) and recently published desert tortoise research in Nevada and California (Mitchell et al. 2021b). The methods require 100% study area coverage on mark-recapture surveys (1 km^2 plots) for three consecutive days (Mitchell et al. 2021b). Permanent locations of demography plots are best determined after short-

term movement and home range analyses have been completed. Plots are located in areas where translocated tortoises have settled to optimize their relevance to this project. Location of new plots is best coordinated with USFWS and can be incorporated into the network of previously established demographic plots. Data on sex-specific survivorship, reproductive success, parental contributions / genetics, juvenile recruitment, and transitions among age classes (e.g., egg, hatchling, juvenile, reproductive adult) can be gathered from these demographic plots. Improved demographic models using this combination of techniques may inform managers of tortoise population responses to translocation and restoration efforts and how best to manage and identify potential threats (Tracy et al. 2004; USFWS 2011; Mitchell 2021b). Field and analytical methods can be updated based on new application of these methods to desert tortoise demography questions via communication with USFWS.

Finally, locating and following desert tortoises with a carapace length of less than <180 mm through time can be challenging. For that reason, they are understudied. Specifically, studies are needed to know if these tortoises are rarer on the landscape or simply more cryptic, to understand how small tortoise abundance is temporally. Minimally, understanding the role of tortoises <180 mm MCL will likely require intensive surveys of the recipient sites and surrounding areas to compare data among translocated, resident, and reference populations. These and other demographic data may be linked to reproductive output and parental contributions among study groups.

Reproduction and Recruitment

Long-term monitoring of tortoise reproduction and recruitment is critical to understanding translocation success for desert tortoises because of their longevity and low population growth rates (Turner et al. 1987; Tracy and Tracy 1995; Medica et al. 2012). The USFWS provides guidelines for monitoring tortoise reproduction in the short- and long-term (at least 9–18 years) after translocation (Table 9; USFWS 2020). Post-translocation assessment of tortoise reproduction includes assessment of reproductive output among study groups and evaluating whether the juvenile size class is increasing through recruitment from egg inputs (Table 9). Methods to determine tortoise reproduction and recruitment success, including through evaluating tortoise egg production, survival of hatchling tortoises, and growth into larger size classes, will be the same for long-term monitoring as for short-term monitoring (see Section 9.2: Egg Production and Nest Success).

Genetics

Understanding the genetics of desert tortoise populations can inform translocation research in important ways. Foremost is whether translocated tortoises can meaningfully contribute to these augmented populations by becoming reproductively integrated and increasing population growth. Little is known about the effects of translocating tortoises to augment populations. Genetic contribution (male and female) from translocated tortoises to resident tortoises and the time it takes to for translocated populations to assimilate into the resident population are important to understand for long-term conservation of the tortoise. Parts of such a study were conducted after the first NTC Fort Irwin translocation in 2008 (Mulder et al. 2017). The short-term results suggested that translocated males had lower fitness than residents because there was no genetic evidence that offspring of translocated males were integrating into the population. However, mean clutch size and contribution from translocated female tortoises was similar to that of

resident females. This study was conducted after the fourth year of translocation. Therefore, it may not represent full potential for genetic contributions during the long-term integration of translocated desert tortoises (Mulder et al. 2017). It is especially important to quantify these relationships in relation to the background dynamics in desert tortoise populations that are not manipulated for comparison.

Genetic connectivity within and among tortoise populations can be assessed by genetic analyses and has become an important research and management topic in recent years because urban development, habitat fragmentation, and impenetrable barriers, such as roads or large burned areas, can impede gene flow (Storfer et al. 2007; Hagerty et al. 2011; Dutcher et al. 2020; Averill-Murray et al. 2021). The Revised Recovery Plan (USWFS 2011) focuses on determining the influence of corridors and barriers on tortoise distribution and gene flow (Recovery Action 5.5; USFWS 2011). These questions are also relevant here. The WTATS is split into east and west sections because of tortoise-proofed fencing along Fort Irwin Road, which unequivocally impedes genetic connectivity (Figure 6; Latch et al. 2011; Dutcher et al. 2020). Translocation of tortoises may increase genetic diversity in this area but for long-lived species, multi-generational sampling is needed to observe first-order relatives (full siblings or parents and offspring) and evidence of connectivity (Vandergast et al. 2019; Dutcher et al. 2020; Larson et al. 2021).

Genetic integration between translocated and resident tortoises is a metric for success that can be evaluated by the presence of juvenile tortoises of mixed parental ancestry between the study groups. This criterion can be measured by comparisons of unique alleles found in the offspring in the population and adult tortoises in the study groups over time. For example, if alleles that are unique to the translocated tortoises (compared to the resident and reference populations) are found in young tortoises that were not in the translocation cohort, then this metric demonstrates that the translocated tortoises are contributing reproductively to future generations of tortoises. Other parameters that can assist in understanding the effect of translocation on populations include effective population sizes (Ne), effective number of breeders (Nb), neighborhood size (NS), allelic diversity (Ar), and migration rates as evaluated in other wildlife population genetic studies (Vandergast et al. 2019).

Archived tissue samples from previously translocated tortoises may be used as a part of a baseline genetic evaluation. Furthermore, desert tortoises that were involved in the previous translocation (Esque et al. 2005, 2009) could be especially useful in tracking the genetic patterns in the populations because they had more than 15 years to assimilate into the population.

Genetic analysis would use blood samples taken from all the study groups, including before and after recruitment has occurred, and can incorporate samples collected during short-term monitoring (see Section 9.2: Egg Production and Nest Success). Analyses of microsatellite markers found in tortoise nuclear DNA from blood samples may be used to determine the amount of genetic variability that exists among animals from the WTA (prior to translocation) versus resident and reference animals in the WTATS. If significant genetic variation is not discernible between the samples from microsatellite markers (e.g., mtDNA, NRY, etc.), then higher resolution genomic markers (e.g., single nucleotide polymorphisms; SNPs) may be required (Harrison 1989; Ellegren and Galtier 2016; Zimmerman et al. 2020). There may be

more definitive analyses available to researchers in the future, and samples can be banked to take advantage of that possibility.

Survivorship and Disease

Monitoring survivorship and disease presence/absence provides basic information toward understanding population demography and health and may be especially important when disturbances, such as translocation, are introduced into populations (Esque et al. 2008, 2010; Aiello et al. 2014; Brand et al. 2016; Mack and Berry 2022). The Recovery Plan (sections 3.b.2 and 3.c, p. 54; USFWS 1994, 2011) recommends long-term research on survivorship and epidemiology and factors that contribute to mortality of desert tortoises, in addition to research on the long-term effect of translocation on population dynamics.

Long-term survivorship and disease would be quantified by tracking a portion of tortoises among the study groups to include all tortoises previously sampled in the WTA and WTATS during pre-translocation activities. Added to those data would be tortoises registered on the demographic study plots (see Section 9.3: Demographics), tortoises monitored among the translocation study groups, and working with other survey/research efforts in the release areas, such as incorporating information from line-distance sampling efforts as part of the USFWS' long-term program to understand range-wide tortoise density trends (Alison and McLuckie 2018). Cooperating with other tortoise monitoring efforts in the area could further enhance efforts to understand long-term survivorship (e.g., universities or other federal agencies may have tortoise monitoring programs in the surrounding area). Survivorship/mortality data could be collected on an ongoing basis under the RASP program with all the tortoises involved with the translocation through tracking their fates in the master database (see Section 11.0: Reporting and Data Storage).

During health assessments for all tortoises associated with this translocation, tissue samples are collected and submitted for testing and archived. These samples are sent to laboratories and screened for pathogens that cause Myag, Myte, herpesvirus (TeHV2). If assays become available, other transmissible diseases may be screened (see Section 9.2: Disease, Stress, and Survival Rates). It can take 1.5 years or more for tortoises to present with signs of disease and to yield pathogen presence or antibody responses to targeted pathogens. (Aiello et al. 2016; Drake et al. 2019).

Therefore, tortoise disease screening would be continued as part of the long-term post-monitoring efforts under the RASP program. Any tortoise monitored as part of the translocation in the recipient and reference sites would be surveyed every two years over the long-term. Tortoises that were marked during previous NTC translocations can be especially useful in interpreting long-term survivorship and disease prevalence among groups of tortoises identified in the short-term. If survivorship and disease does not differ by more than 20% among the study groups, as measured over the long-term, then the translocation may be considered successful for this criterion (Table 9; Esque et al. 2005; USFWS 2020).

10.0 Reporting and Data Storage

As required by the 2021 Biological Opinion (USFWS 2021a) and recovery permit (#TE-63428D-0, -1), the Army will provide electronic annual and comprehensive reports for all permitted activities by January 31 each year. Submission of the Annual Summary Report form

(FWS Form 3-2530 or similar) and comprehensive project report will be provided to USFWS that summarize all the desert tortoise, habitat, maps, health results, environmental data, and any additional information (i.e., relevant GIS layers, master data sheets, photographs, notes), required by the USFWS recovery permit (e.g., #TE-63428D-0, -1). Datasheets and electronic data collection used in the field will be developed in coordination with USFWS and entered into the USFWS/BLM-provided master database (USFWS 2020). Data may also be archived in a standardized data repository such as ServCat or ScienceBase or an approved repository from USFWS, such that data collected will be open, machine-readable, secure, and accessible. Health data collection will conform to the current translocation health assessment guidance (USFWS 2020).

Following the completion of the short-term and long-term post-translocation monitoring periods, final reports are to be completed to assess the overall success of the translocation and monitoring program. The final reports will summarize translocation monitoring activities and other compliance-related reporting as specified in the Biological Opinion (USFWS 2021a) and recovery permits, which discusses overall tracking of health assessments for each individual, and any adaptive management employed throughout the monitoring period with an assessment of the success of each adaptive management strategy. Reporting timelines and report content will be coordinated with USFWS guidance to ensure appropriate content is included per permit requirements (USFWS 2020).

11.0 Adaptive Management

This translocation plan describes procedures to plan, implement, and research translocation of tortoises by the NTC in the short-term (6 years), and conduct long-term monitoring (19 additional years) and other experiments (e.g., genetics, predator control) under USFWS guidance; however, adaptive management measures will be implemented during the translocation and monitoring processes after identifying concerns, immediately addressing issues in the field, and/or consultation with all involved agencies. Evidence of translocation project-related disturbance or increased risks to desert tortoises may necessitate discussions with the USFWS to outline these adaptive measures in translocation and monitoring procedures in additional or edited project documentation. Annual meetings between the NTC and the USFWS, along with the post-translocation Year 6 report, may also drive remedial management actions for subsequent years.

Adaptive management measures may include, but are not limited to, the following after consultation with agency representatives:

- Adjusted translocation activity timelines, dependent on environmental and personnel variables (e.g., staggered translocation of tortoises over more weeks or months).
    - Will be required if ambient temperatures are excessive during translocation period and require the release of animals during limited time windows each morning.
- Construction of additional tortoise exclusionary fencing (temporary, if needed).
    - Will be required if additional tortoise deaths are determined to be due to vehicle collisions aboard the WTA or Army-owned recipient sites.
- Temporarily penning or blocking a tortoise in its burrow.

    - Will be triggered if individual project animals are found to repeatedly return to harm's way aboard the WTA and the animal cannot be immediately moved.
- Supplementary personnel and outreach education.
    - Will be required if tortoise management and reporting of translocation monitoring information are not done in a timely manner and according to the management and monitoring schedules.
- Additional or altered vehicle escorts (pedestrian or vehicle).
    - Will be required if additional tortoise deaths are determined to be due to vehicle collisions aboard the WTA or Army-owned recipient sites.
- Decreased/Postponed/Altered project speed limits or expansion.
    - Will be required if additional tortoise deaths are determined to be due to vehicle collisions aboard the WTA or Army-owned recipient sites.
- Increased monitoring of individual tortoises repeatedly observed in harm's way.
    - Will be required if individual project animals are found to repeatedly return to harm's way aboard the WTA.
- Predator management (e.g., raven nest removals, coyote deterrence).
    - Will be required if repeat offender ravens are found to be targeting project animals for predation.
    - Will be required if predation numbers of translocated tortoises are 20 percent higher than control animals.
- Regional rehydration measures based on assessment or requested by the USFWS.
    - Will be required if requested by USFWS during transmitter replacement or health assessment activities.

Ultimately, any proposed adaptive management measure would be approved by agency representatives and should be consistent with the terms and conditions found in the Biological Opinion (USFWS-SB-20F0163-21F1366, December 13, 2021).

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Appendix A. Timeline of Activities

This appendix outlines activities and associated timelines related to the translocation of desert tortoises from the U.S. Department of Army National Training Center and Fort Irwin's Western Training Area (WTA) in San Bernardino County, California. Procedures are based on USFWS translocation guidance (USFWS 2020) and the USFWS (2021a) Biological Opinion. Habitats south and southwest of Fort Irwin comprised mostly of public lands were evaluated for suitability and proposed as translocation sites for WTA tortoises; collectively, they are referred to as the Western Training Area Translocation Site (WTATS). Research and monitoring for select resident and control tortoise populations and associated habitats in the WTATS was initiated first in 2020. The NTC will continue and repeat methods until translocation commences in Fall 2024. Methods may vary and any substantial deviations will be coordinated with USFWS in advance.

Post-translocation, monthly monitoring of all transmittered tortoises will occur per requirements of the USFWS permit. Annual tortoise health assessments will occur, along with vegetation monitoring in the WTATS. Monitoring may occur through direct funding from Fort Irwin, higher-level Department of Army funding to the RASP, or a combination of both, unless the Anti-Deficiency Act applies in a given year.

Monitoring will begin following the completion of translocation efforts. Monitoring is anticipated for a period of 25 years. More intensive short-term monitoring will begin in the summer of 2025 following completion of translocation and continue for six years before transitioning to long-term monitoring. Long-term monitoring will commence in Summer 2031 and continue for 19 years through summer 2050. Climate monitoring (rainfall, temperature) will occur for a similar period of 25 years post-translocation.

Pre-Translocation: Fall 2023 – Summer 2024

- Mark and measure all new encountered tortoises in the WTATS and WTA.
- Monitor telemetered tortoises each month via VHF telemetry in WTATS and WTA.
- Monitor climate conditions in WTATS and WTA.
- Obtain required permits and establish required MOAs with partner agencies
- Repair and order new equipment / supplies
- Prepare tortoise husbandry plan for juvenile, subadult, and adult tortoises housed in outdoor predator proof captive enclosures.
- Construct or modify existing outdoor predator-proof tortoise enclosures to temporarily house tortoises too small for VHF radio transmitters, individuals with conditions that warrant additional husbandry or veterinary care, or individuals deemed unsuitable for translocation.
- Install or repair required desert tortoise fencing in the WTA.
- Perform clinical health assessments, tissue collection, and immunological and physiological laboratory examinations for select tortoises in WTATS and WTA.
- Complete translocation planning documents including landscape radio frequency plan, tortoise disposition, translocation release plan, etc.
- Assess annual and perennial vegetation in the WTATS and WTA.
- Conduct Environmental Assessment for implementation of Desert Tortoise Relocation Plan and seek public comment.

Translocation: Fall 2024 and Spring 2025

- Conduct clearance habitat surveys (minimum of two passes using 5 m intervals) throughout WTA. All translocated tortoises in WTA are telemetered or moved to outdoor predator-proof enclosures if too small for radio transmitters or individuals warrant additionally husbandry or veterinary care.
- Consistent with translocation guidance, conduct a full clinical health assessment for each translocated tortoise within 14-30 days of the final assessment of release and within 1-2 days of release.
- Mark and measure all new encountered tortoises in the WTATS and WTA.
- Monitor telemetered tortoises each month via VHF telemetry in WTATS and WTA.
- Relocate tortoises to selected sites or temporary holding pens.
- Initiate post-relocation monitoring.
- Inspect and repair all outdoor predator-proof tortoise enclosures.
- Provide husbandry care for all tortoises held in captive enclosures.
- Translocate all eligible tortoises from the WTA eligible for translocation to selected recipient habitats in the WTATS.
- Monitor telemetered tortoises at least once each month via VHF telemetry in WTATS and WTA (translocated tortoises need monitored within 24 hours of release, twice weekly for the first two weeks after release, and then weekly during the first active season; all other tortoises need monitored once per month).
- Annual and perennial vegetation monitoring in the WTATS and WTA.
- Repair and monitor desert tortoise fencing within the WTA.
- Assess annual and perennial vegetation in the WTATS and WTA.
- Initiate short-term effectiveness monitoring plan.

Short-Term Monitoring Summer 2025 – Summer 2031 (6 Years)

- Monthly monitoring of all project animals.
- Annual transmitter replacement and health assessments of all transmittered animals.
- Vegetation assessments at control and recipient sites to assure they remain viable habitat for dessert tortoise.
- Monitor the survival/ reproduction metrics (see Section 9.3) and compare between Control and Translocation groups. If Translocation group sees a greater than 20 percent decrease in survival or reproduction metrics when compared to Control group, consult with USFWS to determine next steps to address discrepancy.
- Conduct assessment of short-term effectiveness monitoring plan and provide interim report after 6th year of short-term monitoring program of results and informed adjustments for long-term monitoring program or adaptive management activities. Include consultation with USFWS to assist in determining effectiveness of short-term monitoring.

Long-Term Monitoring Fall 2031 – Fall 2050 (19 Years)

These items will be informed by assessment of short-term monitoring program.

- Monthly monitoring of all project animals.
- Annual transmitter replacement.
- Annual vegetation assessments.
- Annual completion of survival/recruitment metrics mentioned in the plan.
- Conduct adaptive management based upon best available science (e.g., conduct raven/coyote predator control when predation on tortoises
- Land management (e.g., fencing, law enforcement).

Appendix B. Table of Site Selection Model Scenarios and Inputs

Set weights (w) and manipulated lower (α) and upper (β) bounds of the shape parameter for each criterion were analyzed to select suitable sites for translocated desert tortoises in the Western Training Area Translocation Site (WTATS). Weights and bounds were chosen based on reviewed studies and expert knowledge on desert tortoise ecology and habitat, as well as on ground knowledge of the WTATS. Criteria were given weights based on their effect (or relative importance) to the overall model. Each scenario builds up from the previous one, starting at the base scenario (#1) where lower and upper bounds were not manipulated. The final scenario (#5) was selected as the chosen possible outcome that was believed to be most biologically important and possible outcome for tortoises in the study area.

1. Base scenario where all criteria were included at the set weights and base raster values (Min. Site Value = 0.22)	w	α	β
Habitat	1	1	1
Raven Nest Site Density	0.7	1	1
Terrestrial Development Index	0.7	1	1
Connectivity	0.5	1	1
Precipitation	0.5	1	1
Distance to Roads	0.3	1	1
Distance to Urban	0.1	1	1

2. Decreasing site suitability in disturbed areas and increasing suitable areas located further away from urban areas and roads (Min. Site Value = 0.26)	w	α	β
Habitat	1	1	1
Raven Nest Site Density	0.7	1	1
Terrestrial Development Index	0.7	1	3
Connectivity	0.5	1	1
Precipitation	0.5	1	1
Distance to Roads	0.3	1	3
Distance to Urban	0.1	1	4

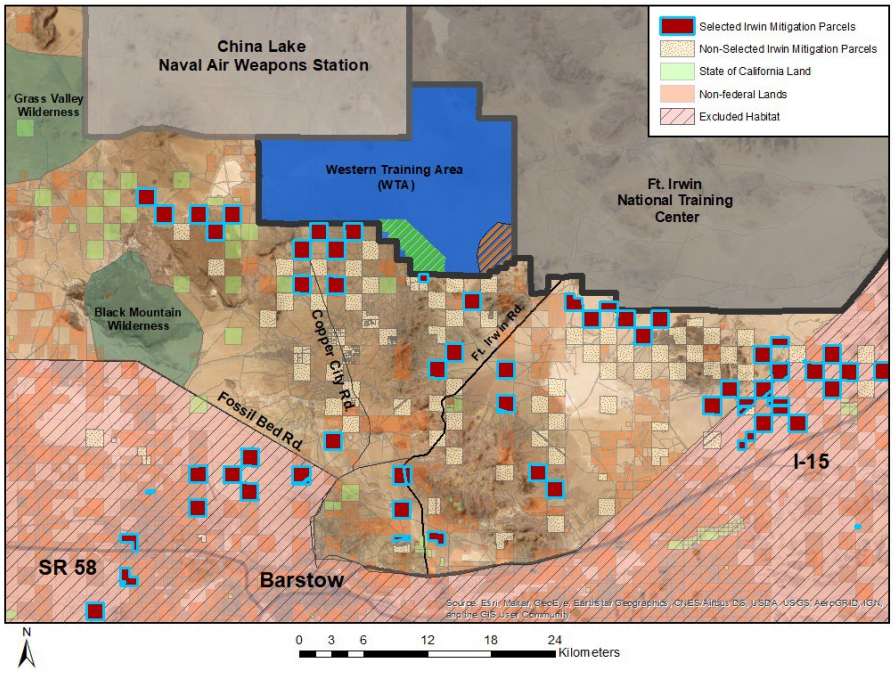
3. Increasing the probability of site suitability in relation to raven predation due to raven nest control efforts (Min. Site Value = 0.27)	w	α	β
Habitat	1	1	1
Raven Nest Site Density	0.7	2	3
Terrestrial Development Index	0.7	1	3
Connectivity	0.5	1	1
Precipitation	0.5	1	1
Distance to Roads	0.3	1	3
Distance to Urban	0.1	1	4

4. Increased probability of suitable habitat based on restoration efforts but considering drought years (Min. Site Value = 0.23)	w	α	β
Habitat	1	2	3
Raven Nest Site Density	0.7	1	3
Terrestrial Development Index	0.7	1	3
Connectivity	0.5	1	1
Precipitation	0.5	2	3
Distance to Roads	0.3	1	3
Distance to Urban	0.1	1	4

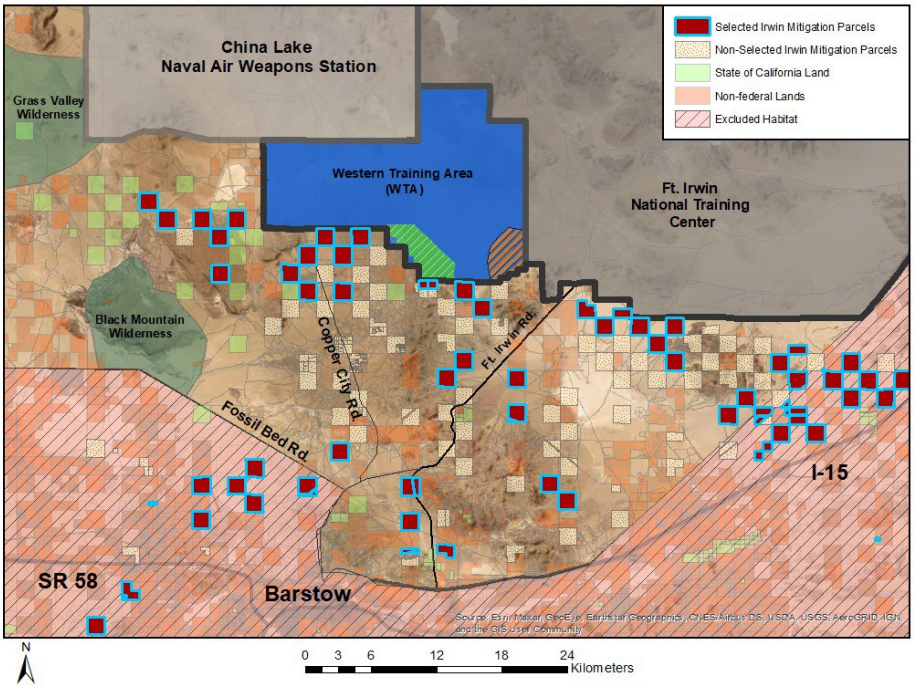
5. Combination of all scenarios (Min. Site Value = 0.39)	w	α	β
Habitat	1	2	3
Raven Nest Site Density	0.7	2	3
Terrestrial Development Index	0.7	1	3
Connectivity	0.5	1	3
Precipitation	0.5	1	3
Distance to Roads	0.3	1	3
Distance to Urban	0.1	1	4

Appendix C. Site Selection Model Scenarios: Selected Irwin Mitigation Parcels

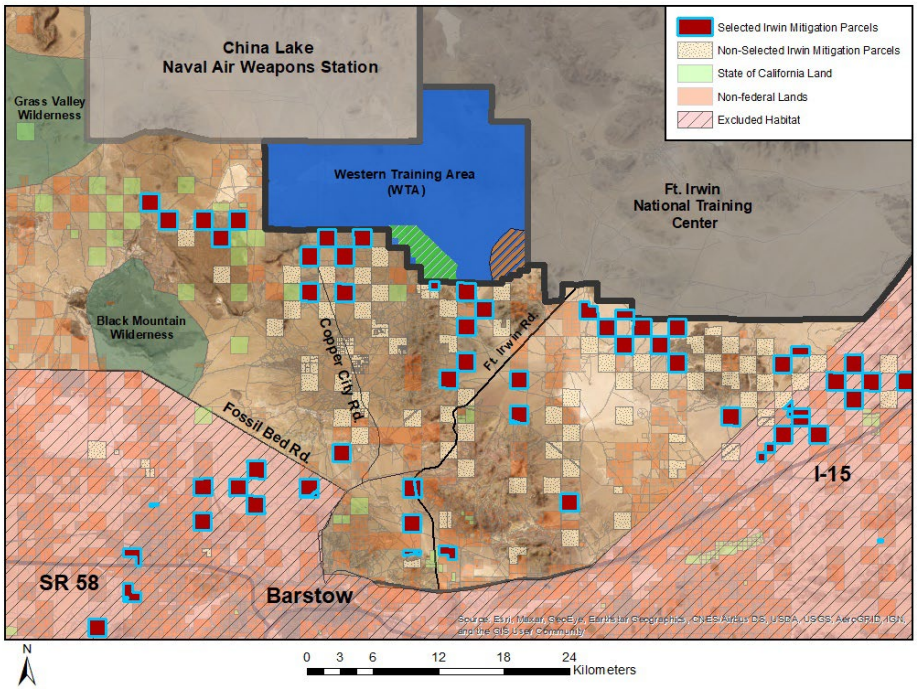
1. Base scenario where all criteria were included at the set weights and base raster values



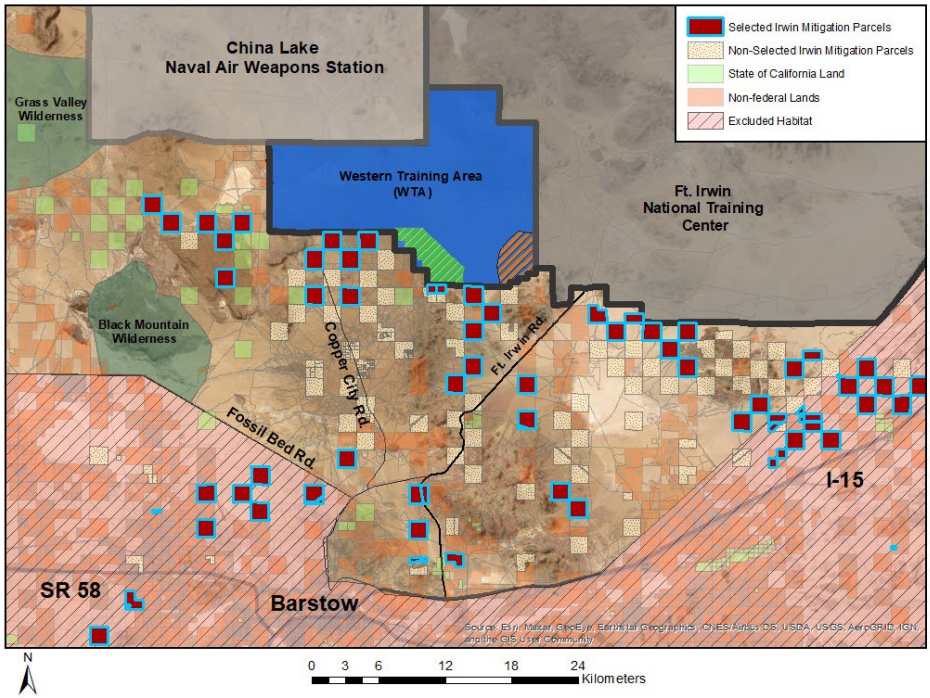
2. Decreasing the probability of site suitability to total disturbance, distances to urban areas, and roads



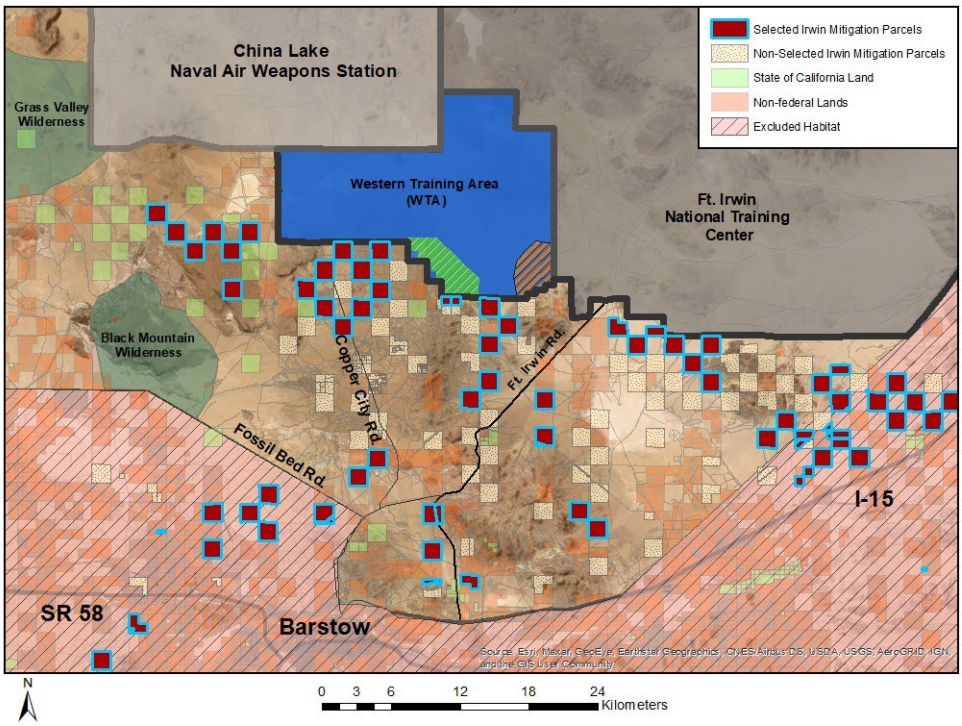
3. Increasing the probability of site suitability in relation to raven predation due to raven nest control efforts



4. Increased probability of habitat due to restoration efforts in the area and considering drought years



5. Combination of scenarios 2-4



Appendix D: Photographs of Proposed Recipient and Reference for Translocation of Tortoises from the NTC WTA. See also Figure 6 and 7.

Site C1

East

North

South

West

Site C2

East

North

South

West

Site R1

East

North

South

West

Site R2

East

North

South

West

Site R3

East

North

South

West

Site R4

East

North

South

West

Site R5

East

North

South

West

Site R6

East

North

South

West

Site R7

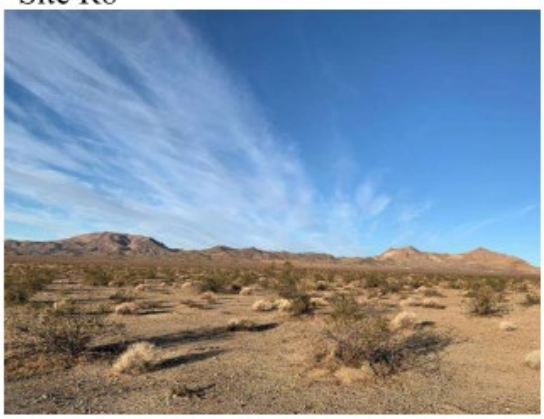
East

North

South

West

Site R8



East

North

South

West

Appendix E. Design of Desert Tortoise Proof Fencing

USFWS
RECOMMENDED SPECIFICATIONS FOR DESERT TORTOISE EXCLUSION FENCING
September 2005

These specifications were developed to standardize fence materials and construction procedures to confine tortoises or exclude them from harmful situations, primarily roads and highways. Prior to commencing any field work, all field workers shall comply with all stipulations and measures developed by the jurisdictional land manager and the U.S. Fish and Wildlife Service for conducting such activities in desert tortoise habitat, which will include, at a minimum, completing a desert tortoise education program.

FENCE CONSTRUCTION

Materials

Fences should be constructed with durable materials suitable to resist desert environments, alkaline and acidic soils, wind, and erosion. Fence material shall consist of 1-inch horizontal by 2-inch vertical, galvanized welded wire, 36 inches in width. Other materials include: Hog rings, steel T-posts, and smooth or barbed livestock wire. Hog rings shall be used to attach the fence material to existing strand fence. Steel T-posts (5 to 6-foot) are used for new fence construction. If fence is constructed within the range of bighorn sheep, 6-foot T-posts are required (see New Fence Construction below). Standard smooth livestock wire fencing will be used for new fence construction, on which tortoise-proof fencing will be attached.

Retrofitting Existing Livestock Fence

Option 1 (see enclosed drawing). Fence material will be buried a minimum of 12 inches below the ground surface, leaving 22-24 inches above ground. A trench is dug or a cut made with a blade on heavy equipment to allow 12 inches of fence to be buried below the natural level of the ground. The top end of the tortoise fence shall be secured to the livestock wire with hog rings at 12 to 18-inch intervals. Distances between T-posts should not exceed 10 feet, unless the tortoise fence is being attached to an existing right-of-way fence that has larger interspaces between posts. The fence must be perpendicular to the ground surface, or slightly angled away from the road, towards the side encountered by tortoises. After the fence has been installed and secured to the top wire and T-posts, excavated soil will be replaced and compacted to minimize soil erosion.

Option 2 (see enclosed drawing). In situations where burying the fence is not practical because of rocky or undiggable substrate, the fence material shall be bent at a 90° angle to produce a lower section approximately 14 inches wide which will be placed parallel to, and in direct

contact with, the ground surface; the remaining 22-inch wide upper section shall be placed vertically against the existing fence, perpendicular to the ground and attached to the existing fence with hog rings at 12 to18-inch intervals. The lower section in contact with the ground shall be placed within the enclosure in the direction of potential tortoise encounters and level with the ground surface. Soil and cobble (approximately 2 to 4 inches in diameter; can use larger rocks where soil is shallow) shall be placed on top of the lower section of fence material on the ground covering it with up to 4 inches of material, leaving a minimum of 18 inches of open space between the cobble surface and the top of the tortoise-proof fence. Care shall be taken to ensure that the fence material parallel to the ground surface is adequately covered and is flush with the ground surface.

New Fence Construction

Options 1 or 2 should be followed except in areas that require special construction and engineering such as wash-out sections (see below). T-posts shall be driven approximately 24 inches below the ground surface spaced approximately 10 feet apart. Livestock wire shall be stretched between the T-posts, 18 to 24 inches above the ground to match the top edge of the fence material; desert tortoise-proof fencing shall be attached to this wire with hog rings placed at 12 to 18-inch intervals. Smooth (barb-less) livestock wire should be used except where grazing occurs.

If fence is constructed within the range of bighorn sheep, two smooth-strand wires are required at the top of the T-post, approximately 4 inches apart, to make the wire(s) more visible to sheep. A 20 to 24-inch gap must exist between the top of the fence material and the lowest smooth-strand wire at the top of the T-post. The lower of the top two smooth-strand wires must be at least 43 inches above the ground surface.

(72-inch T-posts: 24 inches below ground + 18 inches of tortoise fence above ground + 20 to 24-inch gap to lower top wire + 4 inches to upper top wire = 66 to 70 inches).

INSPECTION OF DESERT TORTOISE BARRIERS

The risk level for a desert tortoise encountering a breach in the fence is greatest in the spring and fall, particularly around the time of precipitation including the period during which precipitation occurs and at least several days afterward. All desert tortoise fences and cattle-guards shall be inspected on a regular basis sufficient to maintain an effective barrier to tortoise movement. Inspections shall be documented in writing and include any observations of entrapped animals; repairs needed including bent T-posts, leaning or non-perpendicular fencing, cuts, breaks, and gaps; cattle-guards without escape paths for tortoises or needing maintenance; tortoises and tortoise burrows including carcasses; and recommendations for supplies and equipment needed to complete repairs and maintenance.

All fence and cattle-guard inventories shall be inspected at least quarterly and following significant rain events. Inspections will be conducted to identify and document breaches, and

problem areas such as wash-outs, vandalism, and cattle-guards that fill-in with soil or gravel. GPS coordinates and mileages from existing highway markers should be recorded in order to pinpoint problem locations and build a database of problem locations that may require more frequent checking. Following 2 to 3 years of initial inspection, subsequent inspections shall focus on known problem areas which will be inspected more frequently (monthly). In addition, problem areas prone to wash-outs shall be inspected following precipitation that produces potentially fence-damaging water flow. A database of problem areas will be established whereby checking fences in such areas can be done efficiently.

MAINTENANCE AND REPAIR OF DESERT TORTOISE BARRIERS

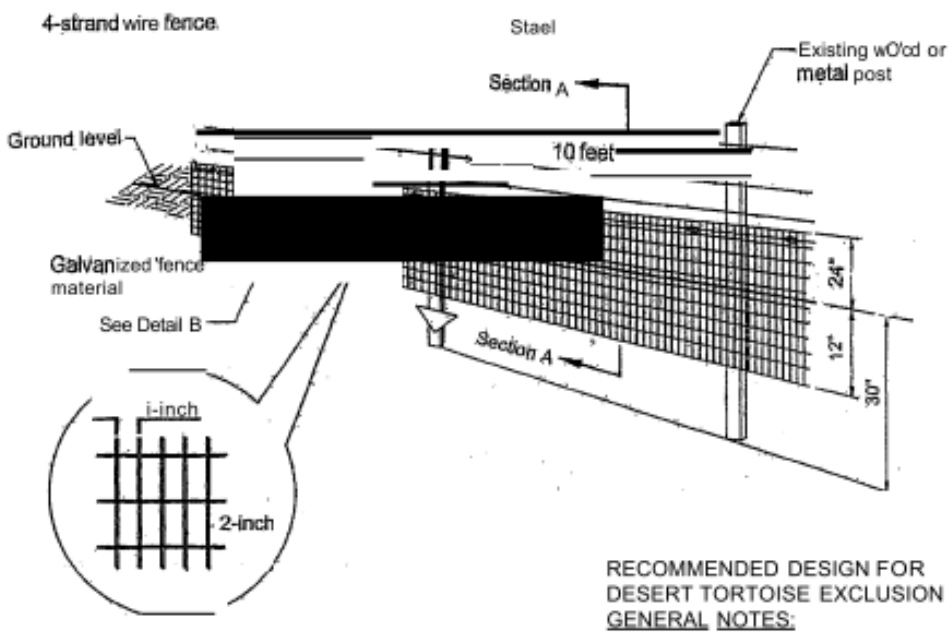
In addition to periodic inspections, debris shall be removed that accumulates along the fence.

Repairs of fence wash-outs: (1) realign the fence out of the wash if possible to avoid the problem area, or (2) re-construct tortoise-proof fencing using techniques that will ensure that an effective desert tortoise barrier is established that will not require frequent repairs and maintenance.

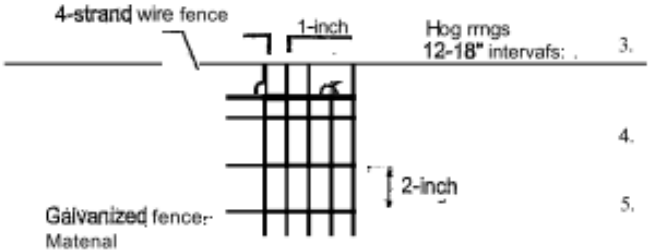
Gaps and breaks will require either: (a) repairs to the existing fence in place, with similar diameter and composition of original material, (b) replacement of the damaged section to the nearest T-post, with new fence material that meet original fence standards, (c) burying fence, and/or (d) restoring zero ground clearance by filling in gaps or holes under the fence and replacing cobble over fence constructed under Option 2. Tortoise-proof fencing shall be constructed and maintained at cattle-guards to ensure that a desert tortoise barrier exists at all times.

All fence damage shall be repaired in a timely manner to ensure that tortoises do not travel through damaged sections. Similarly, cattle-guards will be cleaned out of deposited material underneath them in a timely manner. All existing cattle-guards that serve as tortoise barriers shall be maintained to ensure that any tortoise that falls underneath has a path of escape without crossing the intended barrier. Any new projects would use tortoise turn-backs or V-track gates to exclude tortoises.

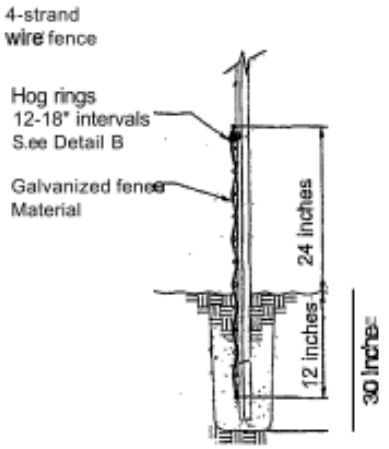
DESERT TORTOISE EXCLUSION FENCE (2005)



DETAIL A



DETAIL B



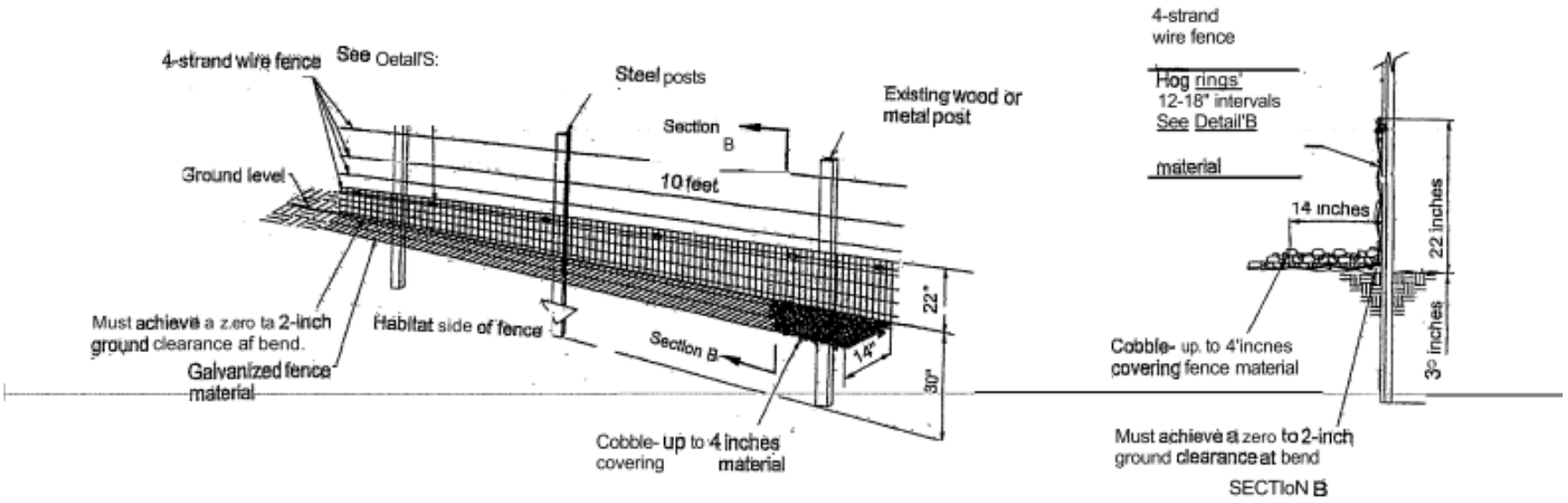
SECTION A

RECOMMENDED DESIGN FOR
DESERT TORTOISE EXCLUSION FENCE
GENERAL NOTES:

1. Ensure that fence posts and materials conform to the standards approved by the U.S. Fish and Wildlife Service.
2. Ensure that the height above ground level is no less than 18 inches and no higher than 24 inches.
3. Ensure that the depth of fence material below ground level is about 12 inches but no less than 6 inches. (See SECTION A above)
4. Install additional steel posts when between existing fence posts exceed 10 feet.
5. Attach fence material to existing fence or wire using hog rings at 12-inch intervals.
6. Fasten fence material to posts with 3 tie wires with a wire near the top, bottom, and center of the fence material.
7. Backfill trenches with excavated material and compact the material.
8. Attach fence material to all gates. Ensure that clearance at base of gate achieves zero ground clearance.
9. Substitute smooth wire for barbed wire if additional support wires are necessary.
10. The number placement of support wires may be modified to allow sheep and deer to pass safely.
11. Erosion at the edge of the fence' material where the fence crosses washes may occur and requires appropriate and timely monitoring and repair.
12. Tie the fence into existing culverts and cattleguards when determined necessary to allow desert tortoise passage underneath roadways.

FOR BEDROCK OR CALICHE SUBSTRATE

1. Use this fence design (see below) only for that portion of the fence where fence material cannot be placed 6 inches below existing ground level due to presence of bedrock, large rocks or caliche substrate.
2. Ensure that the fence height above ground level is no less than 22 inches.
3. Ensure that there is a zero to 2-inch ground clearance at the bend.
4. Ensure that the bent portion of the fence is lying on the ground and pointed in the direction of desert tortoise habitat.
5. Cover the portion of the fence that is flush with the ground with cobble (rocks placed on top of the fence material to a vertical thickness up to 4 inches).
6. When substrate no longer is composed of bedrock or caliche, install fence using design shown above.



Appendix F. Notching protocol for newly marked tortoises

Notching Protocol for Newly Marked Fort Irwin Tortoises

By A. Peter Woodman and William I. Boarman
September 11, 2007

All tortoises will be notched with the Highly-modified Honegger notching system (Fig. 3B-1; see below). The tortoise should be held firmly to the ground and the notches filed forcefully with a downward motion making sure that the animals head and legs are not in the path of the file strokes. All notches will be filed with a sharp, triangular file. Files will be replaced as they get dull or begin to rust (due to bleach used for sterilization). Notches will be filed deeply, but not so deeply as to scar the bone. The flat surface or "V" at the apex of the notch cut with a triangular file are diagnostic and will be more likely to be observable if deep. As much as possible, notches will be placed on the anterior or posterior portions of the scute to minimize impacts to the bone sutures. Locations of notches will be first marked with a felt pen or in a similar manner and double checked to help ensure that notches are made on the correct scutes.

A number of previous surveys have been conducted on the Southern Expansion and Translocation Areas and some tortoises have been notched using the Berry System. The notches used for the previous surveys were shallow nicks. All existing notches on relocated tortoises will be notched more deeply when part of the new tortoise ID number. Previous notches on scutes that do not need to be notched for the current effort will not be removed left, but noted on the data form.

At the time of notching, floy tags will be inspected to ensure they are legible. If not, they will be replaced with numbers printed on paper then epoxied onto the shell (fourth right costal). Epoxied and other numbers that are not legible will be replaced. Un-notched tortoises will be notched when they are re-transmittered, but not when they are translocated, since doing so may cause additional stress with unknown effects, potentially confounding interpretation of results.

One standard system for marking turtle shells was described by Rene Honegger (Marking amphibians and reptiles for future identification. International Zoo Yearbook 19:14-22; 1979) of the Zurich Zoological Garden and used widely throughout Europe. It apparently is a modification of a system developed by Froese and Burghart (A dense natural population of the common snapping turtle (Chelydra s. serpentina). Herpetologica 31:204-208; 1975). It uses the numbers 1, 2, 4, and 7 and marginals 1-4 and the last four marginals (Figure 1). At Fort Irwin, all tortoises will be marked using the following modification to the Honegger System (Fig. 1). The scute next to the supracaudal will be the number 1 (on right) and 10 (on left), the next one would by 2 (or 20), the third would be 4 and 40, and the fourth 7 and 70. This progression is somewhat more intuitive than the Honneger System and will likely reduce errors in notching and deciphering the code under field conditions. The four right front marginals will represent the hundreds (100, 200, 400, and 700), and the four left front marginals will represent the thousands (1000, 2000, 4000, 7000). In juvenile tortoises, the four bridge scutes (scute numbers 4, 5, 6, and 7, counted from the pygal scute, on right and left) will be avoided whenever possible. Hence, tortoise numbers in the 700, 800, 900, 1700, 1800, 1900, etc., and 7000, 8000, and 9000 series will be avoided

whenever possible. To minimize confusion, tortoises will be marked and notched using the number series (FW5000-FW5999) within the WEA and number series (FW7000-FW7999) within the WETA.

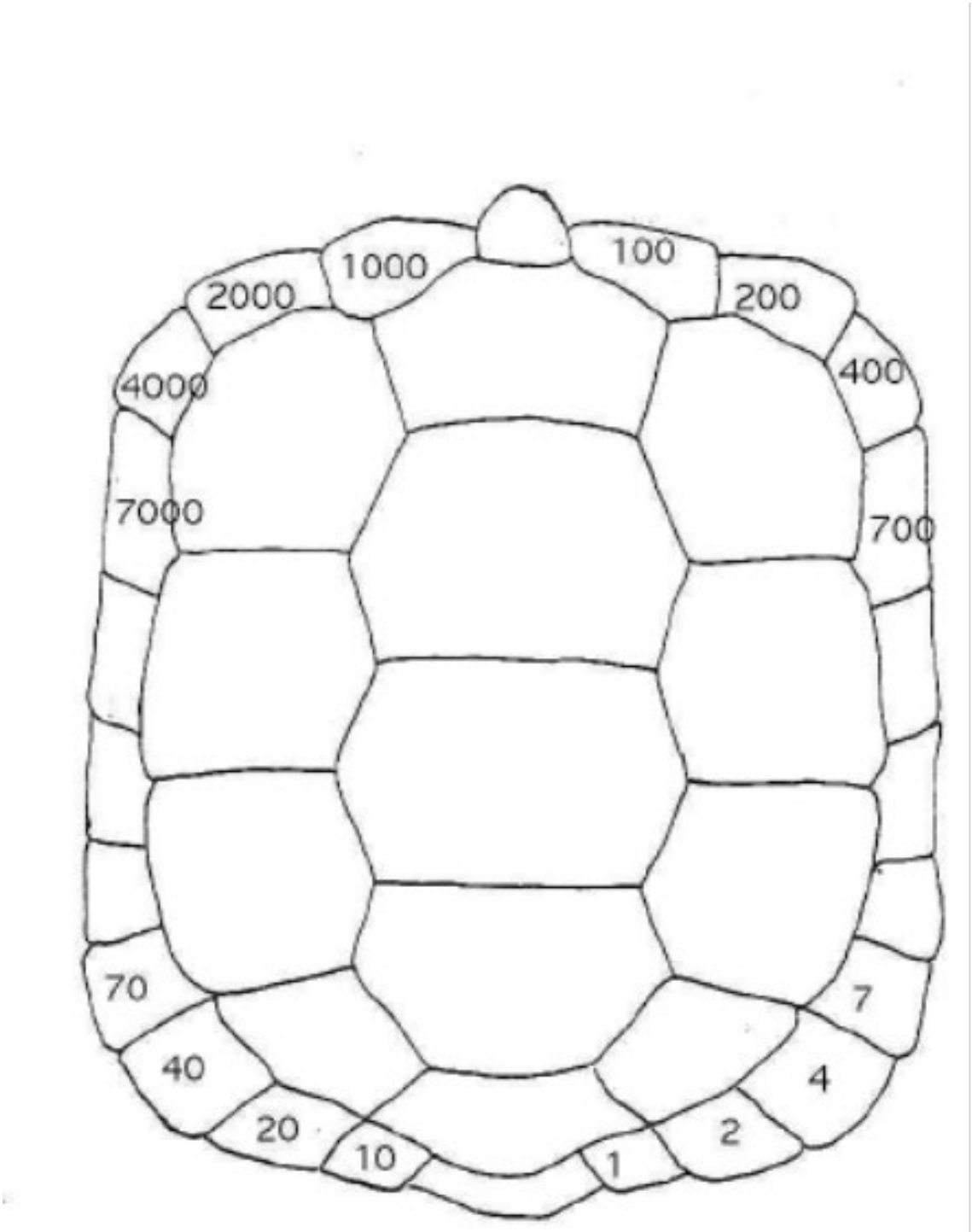


Figure 3B-1. Highly Modified Honegger System for marking desert tortoises at Fort Irwin, California.

Appendix D. Air Quality Modeling Results

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DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location

Base: AF PLANT 42
State: California
County(s): San Bernardino
Regulatory Area(s): San Bernardino Co, CA

- Action Title: Environmental Assessment for the Translocation Of Desert Tortoise in the Western Training Area (WTA) Fort Irwin, California

- Project Number/s (if applicable):

- Projected Action Start Date: 10 / 2024

- Action Purpose and Need:

In its 2020 Posture Statement, the Army described its primary goal by stating "It keeps the Army on a path to be ready today and in a future where we will be contested in every domain—land, sea, air, space, and cyber space". Therefore, the purpose of the Proposed Action is to support the National Training Center requirements to assist deployable units in preparing their soldiers and to serve as a leadership crucible before soldiers are deployed into combat.

The Proposed Action is needed to relocate desert tortoises from the WTA of Fort Irwin prior to initiating training in 2025 as required per the agreements in the 2014 and 2021 Biological Opinions. Training activities in the WTA as described in the 2023 Legislative Environmental Impact Statement cannot proceed until the requirements of the 2014 and 2021 Biological Opinions are met and desert tortoises translocated from the WTA to other suitable habitat.

- Action Description:

The Proposed Action would implement the Desert Tortoise Translocation Plan (DTTP) and would translocate Mojave desert tortoises that could be negatively affected by training activities in the WTA. The Proposed Action would conduct 100 percent clearance surveys in suitable desert tortoise habitat (which includes southwest exposures, loamy soils, adequate forage, and low predator densities) to detect desert tortoises in the WTA, translocate desert tortoises from the WTA to recipient sites, and monitor translocated tortoises. All healthy desert tortoises detected during 100 percent clearance surveys would be translocated to the Western Training Area Translocation Site (WTATS); sick and juvenile desert tortoises would be held temporarily in holding pens on Fort Irwin prior to being translocated to the WTATS. Two alternatives are considered in this EA: (1) the Preferred Alternative (which is the same as the Proposed Action) and (2) the No Action Alternative. Other alternatives were evaluated but dismissed from further evaluation because they did not meet the Proposed Action's purpose and need or the selection standards for alternatives. The following describes the Proposed Action and implementation alternatives.

- Point of Contact

Name: Eric Webb
Title: President
Organization: Vernadero
Email: ewebb@vernadero.com
Phone Number: 480-315-1000

Report generated with ACAM version: 5.0.23a

- Activity List:

Activity Type		Activity Title
2.	Aircraft	Helicopter Transport of DTs

3.	Personnel	Biologists commute to and from WTA
4.	Construction / Demolition	Travel off of the paved roads for desert tortoise translocation.

Emission factors and air emission estimating methods come from the United States Air Force's Air Emissions Guide for Air Force Stationary Sources, Air Emissions Guide for Air Force Mobile Sources, and Air Emissions Guide for Air Force Transitory Sources.

2. Aircraft

2.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: San Bernardino
Regulatory Area(s): San Bernardino Co, CA

- Activity Title: Helicopter Transport of DTs

- Activity Description:

- Activity Start Date
Start Month: 10
Start Year: 2024

- Activity End Date
Indefinite: No
End Month: 6
End Year: 2025

- Activity Emissions of Criteria Pollutants:

Pollutant	Total Emissions (TONs)
VOC	0.000000
SO_x	0.000000
NO_x	0.000000
CO	0.000000

Pollutant	Total Emissions (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Total Emissions (TONs)
CH_4	0.000754
N_2O	0.000147

Pollutant	Total Emissions (TONs)
CO_2	17.939264
CO_2e	18.001984

- Activity Emissions of Criteria Pollutants [DC Flight Operations part]:

Pollutant	Total Emissions (TONs)
VOC	0.000000
SO_x	0.000000
NO_x	0.000000
CO	0.000000

Pollutant	Total Emissions (TONs)
PM 10	0.000000
PM 2.5	0.000000
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses [DC Flight Operations part]:

Pollutant	Total Emissions (TONs)
CH_4	0.000754

Pollutant	Total Emissions (TONs)
CO_2	17.939264

N_2O	0.000147	CO_2e	18.001984

2.2 Aircraft & Engines

2.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: CV-22
Engine Model: T406-AD-400
Primary Function: Transport - Bomber
Aircraft has After burn: No
Number of Engines: 2

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? Yes
Original Aircraft Name: UH-1 Huey
Original Engine Name: GE Turboshaft

2.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Criteria Pollutant Emission Factors (lb/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Idle	362.00	0.10	1.07	4.15	8.35	1.58	1.42
Approach	663.00	0.02	1.07	6.05	3.47	1.58	1.42
Intermediate	948.00	0.02	1.07	7.87	1.82	1.58	1.42
Military	2507.00	0.01	1.07	18.03	0.29	1.58	1.42
After Burn	0.00	0.00	0.00	0.00	0.00	0.00	0.00

- Aircraft & Engine Greenhouse Gasses Pollutant Emission Factors (lb/1000lb fuel)

	Fuel Flow	CH_4	N_2O	CO_2	CO_2e
Idle	362.00	0.13	0.03	3203.44	3214.64
Approach	663.00	0.13	0.03	3203.44	3214.64
Intermediate	948.00	0.13	0.03	3203.44	3214.64
Military	2507.00	0.13	0.03	3203.44	3214.64
After Burn	0.00	0.13	0.03	3203.44	3214.64

2.3 Flight Operations

2.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 1
Flight Operation Cycle Type: DC (Destination Cycle)
Number of Annual Flight Operation Cycles for all Aircraft: 10
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 10
Approach [Approach] (mins): 10
Climb Out [Intermediate] (mins): 10
Takeoff [Military] (mins): 10
Takeoff [After Burn] (mins): 0

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
AfterBurn (mins):	0

2.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)
TIM: Time in Mode (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
FOC: Number of Flight Operation Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$AE_{FOC} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{FOC}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year

$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

AE_{TRIM}: Aircraft Emissions (TONs)

$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

3. Personnel

3.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: San Bernardino
Regulatory Area(s): San Bernardino Co, CA

- Activity Title: Biologists commute to and from WTA

- Activity Description:
Each biologist will commute to and from Fort Irwin daily for 200 days in a year to support translocation activities.

- Activity Start Date
Start Month: 10
Start Year: 2024

- Activity End Date
Indefinite: No
End Month: 6
End Year: 2025

- Activity Emissions of Criteria Pollutants:

Pollutant	Total Emissions (TONs)
VOC	0.031273
SO_x	0.000420
NO_x	0.015534
CO	0.214094

Pollutant	Total Emissions (TONs)
PM 10	0.002187
PM 2.5	0.000787
Pb	0.000000
NH_3	0.004559

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Total Emissions (TONs)
CH_4	0.002208
N_2O	0.001446

Pollutant	Total Emissions (TONs)
CO_2	42.499947
CO_2e	42.986026

3.2 Personnel Assumptions

- Number of Personnel
Active Duty Personnel: 0
Civilian Personnel: 10
Support Contractor Personnel: 0
Air National Guard (ANG) Personnel: 0
Reserve Personnel: 0

- Default Settings Used: No

- Average Personnel Round Trip Commute (mile): 60

- Personnel Work Schedule

Active Duty Personnel:	5 Days Per Week
Civilian Personnel:	5 Days Per Week
Support Contractor Personnel:	5 Days Per Week
Air National Guard (ANG) Personnel:	4 Days Per Week
Reserve Personnel:	4 Days Per Month

3.3 Personnel On Road Vehicle Mixture

- On Road Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	37.55	60.32	0	0.03	0.2	0	1.9
GOVs	54.49	37.73	4.67	0	0	3.11	0

3.4 Personnel Emission Factor(s)

- On Road Vehicle Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	NH_3
LDGV	0.11456	0.00288	0.06802	1.08340	0.01615	0.00571	0.03457
LDGT	0.17160	0.00353	0.13612	1.54778	0.01736	0.00626	0.03678
HDGV	0.21855	0.00488	0.22325	1.77962	0.02642	0.00935	0.03682
LDDV	0.02715	0.00228	0.21633	0.32996	0.03224	0.02119	0.00310
LDDT	0.01485	0.00296	0.06594	0.13236	0.02267	0.01159	0.00310
HDDV	0.06246	0.01289	2.20954	0.58506	0.12539	0.05862	0.20184
MC	5.04622	0.00205	0.66189	16.78635	0.01900	0.00801	0.00872

- On Road Vehicle Greenhouse Gasses Emission Factors (grams/mile)

	CH_4	N_2O	CO_2	CO_2e
LDGV	0.00993	0.00827	291.29644	294.00934
LDGT	0.01466	0.01186	357.18618	361.08703
HDGV	0.01867	0.01668	493.75683	499.19536
LDDV	0.00126	0.03796	240.96170	252.30638
LDDT	0.00069	0.04919	312.20079	326.87587
HDDV	0.00290	0.21437	1360.66149	1424.61710
MC	0.23904	0.04421	207.52096	226.67047

3.5 Personnel Formula(s)

- Personnel Vehicle Miles Travel for Work Days per Year

$VMT_P = NP * WD * AC$

VMT_P: Personnel Vehicle Miles Travel (miles/year)
NP: Number of Personnel
WD: Work Days per Year
AC: Average Commute (miles)

- Total Vehicle Miles Travel per Year

$VMT_{Total} = VMT_{AD} + VMT_C + VMT_{SC} + VMT_{ANG} + VMT_{AFRC}$

VMT_{Total}: Total Vehicle Miles Travel (miles)
VMT_{AD}: Active Duty Personnel Vehicle Miles Travel (miles)

VMT_C: Civilian Personnel Vehicle Miles Travel (miles)
VMT_{SC}: Support Contractor Personnel Vehicle Miles Travel (miles)
VMT_{ANG}: Air National Guard Personnel Vehicle Miles Travel (miles)
VMT_{AFRC}: Reserve Personnel Vehicle Miles Travel (miles)

- Vehicle Emissions per Year
$V_{POL} = (VMT_{Total} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{Total}: Total Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Personnel On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

4. Construction / Demolition

4.1 General Information & Timeline Assumptions

- Activity Location
County: San Bernardino
Regulatory Area(s): San Bernardino Co, CA

- Activity Title: Travel off of the paved roads for desert tortoise translocation.

- Activity Description:
Construction and demolition module is being used as a surrogate for up to 200 days of vehicle travel on unpaved roads on Fort Irwin and in the translocation sites.

- Activity Start Date
Start Month: 10
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 5
End Month: 2025

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.123640
SO_x	0.001688
NO_x	1.159704
CO	1.142368

Pollutant	Total Emissions (TONs)
PM 10	0.065549
PM 2.5	0.052803
Pb	0.000000
NH_3	0.000682

- Activity Emissions of GHG:

Pollutant	Total Emissions (TONs)
CH_4	0.007388
N_2O	0.001623

Pollutant	Total Emissions (TONs)
CO_2	182.520530
CO_2e	183.188823

- Global Scale Activity Emissions for SCGHG:

Pollutant	Total Emissions (TONs)
CH_4	0.007388

Pollutant	Total Emissions (TONs)
CO_2	182.520530

N_2O	0.001623	CO_2e	183.188823

4.1 Site Grading Phase

4.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 10
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 8
Number of Days: 0

4.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 100
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

4.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Graders Composite [HP: 148] [LF: 0.41]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5

Emission Factors	0.36076	0.00489	3.17634	3.40450	0.17539	0.16136
Other Construction Equipment Composite [HP: 82] [LF: 0.42]						
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**
Emission Factors	0.34346	0.00488	3.24084	3.56285	0.20853	0.19184
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]						
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**
Emission Factors	0.40864	0.00491	4.01022	3.25251	0.17852	0.16424
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**
Emission Factors	0.21500	0.00489	2.19159	3.49485	0.09716	0.08939

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Graders Composite [HP: 148] [LF: 0.41]				
	CH_4	**N_2O**	**CO_2**	**CO_2e**
Emission Factors	0.02151	0.00430	530.17041	531.98982
Other Construction Equipment Composite [HP: 82] [LF: 0.42]				
	CH_4	**N_2O**	**CO_2**	**CO_2e**
Emission Factors	0.02144	0.00429	528.45375	530.26726
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]				
	CH_4	**N_2O**	**CO_2**	**CO_2e**
Emission Factors	0.02159	0.00432	532.20301	534.02939
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH_4	**N_2O**	**CO_2**	**CO_2e**
Emission Factors	0.02150	0.00430	529.93313	531.75173

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**NH_3**
LDGV	0.11456	0.00288	0.06802	1.08340	0.01615	0.00571	0.03457
LDGT	0.17160	0.00353	0.13612	1.54778	0.01736	0.00626	0.03678
HDGV	0.21855	0.00488	0.22325	1.77962	0.02642	0.00935	0.03682
LDDV	0.02715	0.00228	0.21633	0.32996	0.03224	0.02119	0.00310
LDDT	0.01485	0.00296	0.06594	0.13236	0.02267	0.01159	0.00310
HDDV	0.06246	0.01289	2.20954	0.58506	0.12539	0.05862	0.20184
MC	5.04622	0.00205	0.66189	16.78635	0.01900	0.00801	0.00872

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH_4	**N_2O**	**CO_2**	**CO_2e**
LDGV	0.00993	0.00827	291.29644	294.00934
LDGT	0.01466	0.01186	357.18618	361.08703
HDGV	0.01867	0.01668	493.75683	499.19536
LDDV	0.00126	0.03796	240.96170	252.30638
LDDT	0.00069	0.04919	312.20079	326.87587
HDDV	0.00290	0.21437	1360.66149	1424.61710
MC	0.23904	0.04421	207.52096	226.67047

4.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
HP: Equipment Horsepower
LF: Equipment Load Factor
EF_{POL}: Emission Factor for Pollutant (g/hp-hour)
0.002205: Conversion Factor grams to pounds
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

AIR CONFORMITY APPLICABILITY MODEL REPORT
RECORD OF CONFORMITY ANALYSIS (ROCA)

1. General Information: The Air Force's Air Conformity Applicability Model (ACAM) was used to perform a net change in emissions analysis to assess the potential air quality impact/s associated with the action. The analysis was performed in accordance with the Air Force Manual 32-7002, *Environmental Compliance and Pollution Prevention*; the *Environmental Impact Analysis Process* (EIAP, 32 CFR 989); the *General Conformity Rule* (GCR, 40 CFR 93 Subpart B); and the *USAF Air Quality Environmental Impact Analysis Process (EIAP) Guide*. This report provides a summary of the ACAM analysis.

Report generated with ACAM version: 5.0.23a

a. Action Location:

Base: AF PLANT 42
State: California
County(s): San Bernardino
Regulatory Area(s): San Bernardino Co, CA

b. Action Title: Environmental Assessment for the Translocation Of Desert Tortoise in the Western Training Area (WTA) Fort Irwin, California

c. Project Number/s (if applicable):

d. Projected Action Start Date: 10 / 2024

e. Action Description:

The Proposed Action would implement the Desert Tortoise Translocation Plan (DTTP) and would translocate Mojave desert tortoises that could be negatively affected by training activities in the WTA. The Proposed Action would conduct 100 percent clearance surveys in suitable desert tortoise habitat (which includes southwest exposures, loamy soils, adequate forage, and low predator densities) to detect desert tortoises in the WTA, translocate desert tortoises from the WTA to recipient sites, and monitor translocated tortoises. All healthy desert tortoises detected during 100 percent clearance surveys would be translocated to the Western Training Area Translocation Site (WTATS); sick and juvenile desert tortoises would be held temporarily in holding pens on Fort Irwin prior to being translocated to the WTATS. Two alternatives are considered in this EA: (1) the Preferred Alternative (which is the same as the Proposed Action) and (2) the No Action Alternative. Other alternatives were evaluated but dismissed from further evaluation because they did not meet the Proposed Action's purpose and need or the selection standards for alternatives. The following describes the Proposed Action and implementation alternatives.

f. Point of Contact:

Name: Eric Webb
Title: President
Organization: Vernadero
Email: ewebb@vernadero.com
Phone Number: 480-315-1000

2. Analysis: Total reasonably foreseeable net change in direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" (highest annual emissions) and "steady state" (no net gain/loss in emission stabilized and the action is fully implemented) emissions. General Conformity under the Clean Air Act, Section 1.76 has been evaluated for the action described above according to the requirements of 40 CFR 93, Subpart B.

All emissions estimates were derived from various sources using the methods, algorithms, and emission factors from the most current *Air Emissions Guide for Air Force Stationary Sources*, *Air Emissions Guide for Air Force Mobile*

AIR CONFORMITY APPLICABILITY MODEL REPORT
RECORD OF CONFORMITY ANALYSIS (ROCA)

Sources, and/or *Air Emissions Guide for Air Force Transitory Sources*. For greater details of this analysis, refer to the Detail ACAM Report.

____ applicable
__X__ not applicable

Conformity Analysis Summary:

2024

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
San Bernardino Co, CA			
VOC	0.057		
NOx	0.440		
CO	0.500		
SOx	0.001		
PM 10	0.025	100	No
PM 2.5	0.020		
Pb	0.000		
NH3	0.002		

2025

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
San Bernardino Co, CA			
VOC	0.098		
NOx	0.735		
CO	0.857		
SOx	0.001		
PM 10	0.042	100	No
PM 2.5	0.034		
Pb	0.000		
NH3	0.003		

2026 - (Steady State)

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
San Bernardino Co, CA			
VOC	0.000		
NOx	0.000		
CO	0.000		
SOx	0.000		
PM 10	0.000	100	No
PM 2.5	0.000		
Pb	0.000		
NH3	0.000		

The Criteria Pollutants (or their precursors) with a General Conformity threshold listed in the table above are pollutants within one or more designated nonattainment or maintenance area/s for the associated National Ambient Air Quality Standard (NAAQS). These pollutants are driving this GCR Applicability Analysis. Pollutants exceeding the GCR thresholds must be further evaluated potentially through a GCR Determination.

AIR CONFORMITY APPLICABILITY MODEL REPORT
RECORD OF CONFORMITY ANALYSIS (ROCA)

The pollutants without a General Conformity threshold are pollutants only within areas designated attainment for the associated NAAQS. These pollutants have an insignificance indicator for VOC, NOx, CO, SOx, PM 10, PM 2.5, and NH3 of 250 ton/yr (Prevention of Significant Deterioration major source threshold) and 25 ton/yr for Pb (GCR de minimis value). Pollutants below their insignificance indicators are at rates so insignificant that they will not cause or contribute to an exceedance of one or more NAAQSs. These indicators do not define a significant impact; however, they do provide a threshold to identify actions that are insignificant. Refer to the *Level II, Air Quality Quantitative Assessment Insignificance Indicators* for further details.

None of the annual net change in estimated emissions associated with this action are above the GCR threshold values established at 40 CFR 93.153 (b); therefore, the proposed Action has an insignificant impact on Air Quality and a General Conformity Determination is not applicable.

Eric Webb, President	Mar 04 2024
Name, Title	**Date**

AIR CONFORMITY APPLICABILITY MODEL REPORT
GREENHOUSE GAS (GHG) EMISSIONS

1. General Information: The Air Force's Air Conformity Applicability Model (ACAM) was used to perform an analysis to estimate GHG emissions and assess the theoretical Social Cost of Greenhouse Gases (SC GHG) associated with the action. The analysis was performed in accordance with the Air Force Manual 32-7002, Environmental Compliance and Pollution Prevention; the Environmental Impact Analysis Process (EIAP, 32 CFR 989); and the USAF Air Quality Environmental Impact Analysis Process (EIAP) Guide. This report provides a summary of GHG emissions and SC GHG analysis.

Report generated with ACAM version: 5.0.23a

a. Action Location:

Base: AF PLANT 42
State: California
County(s): San Bernardino
Regulatory Area(s): San Bernardino Co, CA

b. Action Title: Environmental Assessment for the Translocation Of Desert Tortoise in the Western Training Area (WTA) Fort Irwin, California

c. Project Number/s (if applicable):

d. Projected Action Start Date: 10 / 2024

e. Action Description:

The Proposed Action would implement the Desert Tortoise Translocation Plan (DTTP) and would translocate Mojave desert tortoises that could be negatively affected by training activities in the WTA. The Proposed Action would conduct 100 percent clearance surveys in suitable desert tortoise habitat (which includes southwest exposures, loamy soils, adequate forage, and low predator densities) to detect desert tortoises in the WTA, translocate desert tortoises from the WTA to recipient sites, and monitor translocated tortoises. All healthy desert tortoises detected during 100 percent clearance surveys would be translocated to the Western Training Area Translocation Site (WTATS); sick and juvenile desert tortoises would be held temporarily in holding pens on Fort Irwin prior to being translocated to the WTATS. Two alternatives are considered in this EA: (1) the Preferred Alternative (which is the same as the Proposed Action) and (2) the No Action Alternative. Other alternatives were evaluated but dismissed from further evaluation because they did not meet the Proposed Action's purpose and need or the selection standards for alternatives. The following describes the Proposed Action and implementation alternatives.

f. Point of Contact:

Name: Eric Webb
Title: President
Organization: Vernadero
Email: ewebb@vernadero.com
Phone Number: 480-315-1000

2. Analysis: Total combined direct and indirect GHG emissions associated with the action were estimated through ACAM on a calendar-year basis from the action start through the expected life cycle of the action. The life cycle for Air Force actions with "steady state" emissions (SS, net gain/loss in emission stabilized and the action is fully implemented) is assumed to be 10 years beyond the SS emissions year or 20 years beyond SS emissions year for aircraft operations related actions.

GHG Emissions Analysis Summary:

AIR CONFORMITY APPLICABILITY MODEL REPORT
GREENHOUSE GAS (GHG) EMISSIONS

GHGs produced by fossil-fuel combustion are primarily carbon dioxide (CO2), methane (CH4), and nitrous oxide (NO2). These three GHGs represent more than 97 percent of all U.S. GHG emissions. Emissions of GHGs are typically quantified and regulated in units of CO2 equivalents (CO2e). The CO2e takes into account the global warming potential (GWP) of each GHG. The GWP is the measure of a particular GHG's ability to absorb solar radiation as well as its residence time within the atmosphere. The GWP allows comparison of global warming impacts between different gases; the higher the GWP, the more that gas contributes to climate change in comparison to CO2. All GHG emissions estimates were derived from various emission sources using the methods, algorithms, emission factors, and GWPs from the most current Air Emissions Guide for Air Force Stationary Sources, Air Emissions Guide for Air Force Mobile Sources, and/or Air Emissions Guide for Air Force Transitory Sources.

The Air Force has adopted the Prevention of Significant Deterioration (PSD) threshold for GHG of 75,000 ton per year (ton/yr) of CO2e (or 68,039 metric ton per year, mton/yr) as an indicator or "threshold of insignificance" for NEPA air quality impacts in all areas. This indicator does not define a significant impact; however, it provides a threshold to identify actions that are insignificant (de minimis, too trivial or minor to merit consideration). Actions with a net change in GHG (CO2e) emissions below the insignificance indicator (threshold) are considered too insignificant on a global scale to warrant any further analysis. Note that actions with a net change in GHG (CO2e) emissions above the insignificance indicator (threshold) are only considered potentially significant and require further assessment to determine if the action poses a significant impact. For further detail on insignificance indicators see Level II, Air Quality Quantitative Assessment, Insignificance Indicators (April 2023).

The following table summarizes the action-related GHG emissions on a calendar-year basis through the projected life cycle of the action.

Action-Related Annual GHG Emissions (mton/yr)						
YEAR	**CO2**	**CH4**	**N2O**	**CO2e**	**Threshold**	**Exceedance**
2024	80	0.00340917	0.00103398	81	68,039	No
2025	140	0.00598052	0.00188387	141	68,039	No
2026 [SS Year]	0	0	0	0	68,039	No

The following U.S. and State's GHG emissions estimates (next two tables) are based on a five-year average (2016 through 2020) of individual state-reported GHG emissions (Reference: State Climate Summaries 2022, NOAA National Centers for Environmental Information, National Oceanic and Atmospheric Administration. https://statesummaries.ncics.org/downloads/).

State's Annual GHG Emissions (mton/yr)				
YEAR	**CO2**	**CH4**	**N2O**	**CO2e**
2024	336,950,322	1,567,526	55,459	338,573,307
2025	336,950,322	1,567,526	55,459	338,573,307
2026 [SS Year]	0	0	0	0

U.S. Annual GHG Emissions (mton/yr)				
YEAR	**CO2**	**CH4**	**N2O**	**CO2e**
2024	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2025	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2026 [SS Year]	0	0	0	0

GHG Relative Significance Assessment:

A Relative Significance Assessment uses the rule of reason and the concept of proportionality along with the consideration of the affected area (yGba.e., global, national, and regional) and the degree (intensity) of the proposed action's effects. The Relative Significance Assessment provides real-world context and allows for a reasoned choice against alternatives through a relative comparison analysis. The analysis weighs each alternative's annual net change in GHG emissions proportionally against (or relative to) global, national, and regional emissions.

AIR CONFORMITY APPLICABILITY MODEL REPORT
GREENHOUSE GAS (GHG) EMISSIONS

The action's surroundings, circumstances, environment, and background (context associated with an action) provide the setting for evaluating the GHG intensity (impact significance). From an air quality perspective, context of an action is the local area's ambient air quality relative to meeting the NAAQSs, expressed as attainment, nonattainment, or maintenance areas (this designation is considered the attainment status). GHGs are non-hazardous to health at normal ambient concentrations and, at a cumulative global scale, action-related GHG emissions can only potentially cause warming of the climatic system. Therefore, the action-related GHGs generally have an insignificant impact to local air quality.

However, the affected area (context) of GHG/climate change is global. Therefore, the intensity or degree of the proposed action's GHG/climate change effects are gauged through the quantity of GHG associated with the action as compared to a baseline of the state, U.S., and global GHG inventories. Each action (or alternative) has significance, based on their annual net change in GHG emissions, in relation to or proportionally to the global, national, and regional annual GHG emissions.

To provide real-world context to the GHG and climate change effects on a global scale, an action's net change in GHG emissions is compared relative to the state (where action will occur) and U.S. annual emissions. The following table provides a relative comparison of an action's net change in GHG emissions vs. state and U.S. projected GHG emissions for the same time period.

Total GHG Relative Significance (mton)					
		CO2	**CH4**	**N2O**	**CO2e**
2024-2036	State Total	673,900,643	3,135,052	110,919	677,146,614
2024-2036	U.S. Total	10,272,908,358	51,253,823	3,001,415	10,327,163,597
2024-2036	Action	220	0.00939	0.002918	222
Percent of State Totals		0.00003271%	0.00000030%	0.00000263%	0.00003271%
Percent of U.S. Totals		0.00000215%	0.00000002%	0.00000010%	0.00000214%

From a global context, the action's total GHG percentage of total global GHG for the same time period is: 0.00000029%.*

* Global value based on the U.S. emits 13.4% of all global GHG annual emissions (2018 Emissions Data, Center for Climate and Energy Solutions, accessed 7-6-2023, https://www.c2es.org/content/international-emissions).

Climate Change Assessment (as SC GHG):

On a global scale, the potential climate change effects of an action are indirectly addressed and put into context through providing the theoretical SC GHG associated with an action. The SC GHG is an administrative and theoretical tool intended to provide additional context to a GHG's potential impacts through approximating the long-term monetary damage that may result from GHG emissions affect on climate change. It is important to note that the SC GHG is a monetary quantification, in 2020 U.S. dollars, of the theoretical economic damages that could result from emitting GHGs into the atmosphere.

The SC GHG estimates are derived using the methodology and discount factors in the "Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates under Executive Order 13990," released by the Interagency Working Group on Social Cost of Greenhouse Gases (IWG SC GHGs) in February 2021.

The speciated IWG Annual SC GHG Emission associated with an action (or alternative) are first estimated as annual unit cost (cost per metric ton, $/mton). Results of the annual IWG Annual SC GHG Emission Assessments are tabulated in the IWG Annual SC GHG Cost per Metric Ton Table below:

IWG SC GHG Discount Factor: 2.5%

AIR CONFORMITY APPLICABILITY MODEL REPORT
GREENHOUSE GAS (GHG) EMISSIONS

IWG Annual SC GHG Cost per Metric Ton ($/mton [In 2020 $])			
YEAR	**CO2**	**CH4**	**N2O**
2024	$82.00	$2,200.00	$29,000.00
2025	$83.00	$2,200.00	$30,000.00
2026 [SS Year]	$84.00	$2,300.00	$30,000.00

Action-related SC GHG were estimated by calendar-year for the projected action's lifecycle. Annual estimates were found by multiplying the annual emission for a given year by the corresponding IWG Annual SC GHG Emission value (see table above).

Action-Related Annual SC GHG ($K/yr [In 2020 $])				
YEAR	**CO2**	**CH4**	**N2O**	**GHG**
2024	$6.59	$0.01	$0.03	$6.63
2025	$11.62	$0.01	$0.06	$11.69
2026 [SS Year]	$0.00	$0.00	$0.00	$0.00

The following two tables summarize the U.S. and State's Annual SC GHG by calendar-year. The U.S. and State's Annual SC GHG are in 2020 dollars and were estimated by each year for the projected action lifecycle. Annual SC GHG estimates were found by multiplying the U.S. and State's annual five-year average GHG emissions for a given year by the corresponding IWG Annual SC GHG Cost per Metric Ton value.

State's Annual SC GHG ($K/yr [In 2020 $])				
YEAR	**CO2**	**CH4**	**N2O**	**GHG**
2024	$27,629,926.37	$3,448,557.38	$1,608,320.85	$32,686,804.60
2025	$27,966,876.69	$3,448,557.38	$1,663,780.19	$33,079,214.26
2026 [SS Year]	$0.00	$0.00	$0.00	$0.00

U.S. Annual SC GHG ($K/yr [In 2020 $])				
YEAR	**CO2**	**CH4**	**N2O**	**GHG**
2024	$421,189,242.68	$56,379,205.70	$43,520,521.44	$521,088,969.82
2025	$426,325,696.86	$56,379,205.70	$45,021,229.08	$527,726,131.63
2026 [SS Year]	$0.00	$0.00	$0.00	$0.00

Relative Comparison of SC GHG:

To provide additional real-world context to the potential climate change impact associate with an action, a Relative Comparison of SC GHG Assessment is also performed. While the SC GHG estimates capture an indirect approximation of global climate damages, the Relative Comparison of SC GHG Assessment provides a better perspective from a regional and global scale.

The Relative Comparison of SC GHG Assessment uses the rule of reason and the concept of proportionality along with the consideration of the affected area (yGba.e., global, national, and regional) and the SC GHG as the degree (intensity) of the proposed action's effects. The Relative Comparison Assessment provides real-world context and allows for a reasoned choice among alternatives through a relative contrast analysis which weighs each alternative's SC GHG proportionally against (or relative to) existing global, national, and regional SC GHG. The below table provides a relative comparison between an action's SC GHG vs. state and U.S. projected SC GHG for the same time period:

Total SC-GHG ($K [In 2020 $])					
		CO2	**CH4**	**N2O**	**GHG**
2024-2036	State Total	$55,596,803.05	$6,897,114.76	$3,272,101.05	$65,766,018.86
2024-2036	U.S. Total	$847,514,939.54	$112,758,411.39	$88,541,750.52	$1,048,815,101.45

AIR CONFORMITY APPLICABILITY MODEL REPORT
GREENHOUSE GAS (GHG) EMISSIONS

2024-2036	Action	$18.21	$0.02	$0.09	$18.32
Percent of State Totals		0.00003276%	0.00000030%	0.00000264%	0.00002786%
Percent of U.S. Totals		0.00000215%	0.00000002%	0.00000010%	0.00000175%

From a global context, the action's total SC GHG percentage of total global SC GHG for the same time period is: 0.00000023%.*

* Global value based on the U.S. emits 13.4% of all global GHG annual emissions (2018 Emissions Data, Center for Climate and Energy Solutions, accessed 7-6-2023, https://www.c2es.org/content/international-emissions).

Eric Webb, President — Mar 04 2024

Name, Title — **Date**

Appendix E. Cultural Resources Programmatic Agreement

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PROGRAMMATIC AGREEMENT
AMONG
THE DEPARTMENT OF THE ARMY NATIONAL TRAINING CENTER AND FORT IRWIN, THE CALIFORNIA STATE HISTORIC PRESERVATION OFFICER, AND THE ADVISORY COUNCIL ON HISTORIC PRESERVATION
REGARDING
MILITARY TRAINING ACTIVITIES AND SUPPORT OPERATIONS AT FORT IRWIN AND THE MANIX TRAIL, SAN BERNARDINO COUNTY, CALIFORNIA

WHEREAS, Fort Irwin is home to the Department of the Army (Army) National Training Center, located on approximately 753,537 acres in the Mojave Desert lying approximately 37 miles northeast of Barstow, San Bernardino County, California; and,

WHEREAS, the primary mission of Fort Irwin is to design and execute training that prepares the United States military and its multinational partners for successful operational deployments, on a worldwide scale, against opposing forces; and

WHEREAS, the Army, as the lead federal agency, proposes to continue this military training, making specific increases in training activities and support operations, and improvements to training infrastructure, to ensure the mission of Fort Irwin; and

WHEREAS, to ensure the mission of Fort Irwin, undertakings may be implemented under this PA as described in Attachment A and Attachment B and include: military and civilian training; operating, managing, and maintaining multiple training areas, ranges, and related infrastructure; and conducting activities to support military and civilian training; and

WHEREAS, Fort Irwin is a federally owned and operated facility, and the Army plans to carry out federally funded actions, making the undertakings subject to Section 106 of the National Historic Preservation Act (NHPA), U.S. Code Title 54, Sections 300101-300308, and its implementing regulations, 36 Code of Federal Regulations (CFR) Part 800, and Executive Orders 13007 and 13175; and

WHEREAS, the Army has determined the Area of Potential Effects (APE) to include all land used by Fort Irwin for training activities and support operations, including the potential well location, within the boundaries of Fort Irwin, in addition to the existing right-of-way for the Manix Trail from Fort Irwin to Interstate 15, as depicted in Attachment C (Figure 1); and

WHEREAS, the Army is also renewing the withdrawal of approximately 70,620 acres of Fort Irwin training lands within the Western Training Area (WTA) that are not yet open for full training and that are included within Fort Irwin's approximately 753,537 total acres, and which the approximately 70,620 acres were publicly withdrawn from all types of appropriation under Public Law (P.L.) 107-107 (2001), which is a type of administrative activity that does not have the potential to cause effects to historic properties, pursuant to 36 CFR Part 800.3(a)(1), and is not subject to further review under Section 106 of the NHPA; and

WHEREAS, the Army has determined that military training and support operations that shall occur within the WTA and land withdrawal once open for full training are considered undertakings; and

WHEREAS, the Army has determined that the undertakings noted above may have adverse effects on historic properties, as defined in 36 CFR Part 800.16(l)(1) and Army Regulation 200-1; and

WHEREAS, the Army has determined that the development of a Programmatic Agreement (PA), in accordance with 36 CFR Part 800.14(b)(2), is warranted because it involves recurring, consistent, and frequent military training and support operations activities as detailed in Attachment A and Attachment B, and is implementing a process that differs from the standard review process in Subpart B of the 36 CFR Part 800; and

WHEREAS, the Army has invited eleven federally-recognized and one state-recognized Indian Tribes (Tribes)—consisting of the Bishop Paiute Tribe, Colorado River Indian Tribes, Timbisha Shoshone Tribe, Morongo Band of Mission Indians, Big Pine Paiute Tribe of Owens Valley, Fort Independence Reservation, Yuhaaviatam of San Manuel Nation (formerly known as San Manuel Band of Mission Indians), Cabazon Band of Mission Indians, Chemehuevi Indian Tribe, Fort Mojave Indian Tribe, Lone Pine Paiute Shoshone Reservation, and Kern Valley Indian Council—who may attach traditional religious and cultural importance to Fort Irwin lands or historic properties therein that may be affected by the undertakings—to participate in the development of the PA in accordance with 36 CFR Part 800.14(b)(2)(i); and

WHEREAS, the Cahuilla Band of Mission Indians were not consulted with since they indicated prior to the development of the draft PA that Fort Irwin is not located within an area of interest for their Tribe; and

WHEREAS, the Cabazon Band of Mission Indians indicated on May 25, 2021 that Fort Irwin is not located within the area of interest for their Tribe; and

WHEREAS, Fort Irwin respectfully acknowledges that the Fort Mojave Indian Tribe (FMIT), whose traditional name is AhaMakav, meaning, "People of the River," has, due to a continued spiritual connection with the Mojave desert environs in which Fort Irwin resides, chosen to participate in the development of the PA as an Invited Signatory; and

WHEREAS, in addition, Fort Irwin respectfully acknowledges the tribal statement provided by FMIT that *from the FMIT Tribe's perspective, physical and cultural landscapes within Fort Irwin provide a sense of place and identity to their relationship to such homelands; and FMIT history and what they experienced as a people from the time of first contact, did not take from them the spirit of who they always have been and; Mojave's resilience and deep cultural identity prevail because their ancestral homelands, the essence of who they are, was given to them by their Creator, Matavilya, which cannot be taken away or assimilated; and while these homelands are currently in the stewardship of Fort Irwin, the Aha Makav are also stewards of these lands; to protect their traditions, cultural values, and spiritual ways, and be it known that, all Aha Makav carry this knowledge from the past, and it is acknowledged here that they will continue to pass on this knowledge to their children ensuring their rights and responsibilities as their ancestors have done from time immemorial and; therefore they remain to this present day, AhaMakav, the People of the River;* and

WHEREAS, the Yuhaaviatam of San Manuel Nation have indicated they would like to consult only on undertakings within the WTA, Goldstone Complex, Central Corridor, Southern Corridor, and Eastern Training Area which are located within the boundaries of the Serrano ancestral territory, and chose to participate as an Invited Signatory; and

WHEREAS, the Timbisha Shoshone Tribe chose to participate in the development of the PA as an Invited Signatory; and

WHEREAS, the other tribes, consisting of the Bishop Paiute Tribe, Colorado River Indian Tribes, Morongo Band of Mission Indians, Big Pine Paiute Tribe of Owens Valley, Fort Independence

Reservation, Chemehuevi Indian Tribe, Lone Pine Paiute Shoshone Reservation, and Kern Valley Indian Council, that the Army consulted with chose not to participate as Invited Signatories and participated instead as Consulting Parties; and

WHEREAS, the Army invited the Bureau of Land Management (BLM) Barstow Field Office to participate in the development of the PA because Fort Irwin maintains a segment of the Manix Trail, an unpaved road on BLM-administered land used to transport military equipment to Fort Irwin (the BLM is the lead agency for actions on BLM-administrated lands), and because the BLM is also a cooperating agency for the project's Environmental Impact Statement, and they declined to participate as a Concurring Party or a Consulting Party (see Abbreviations, Acronyms, and Definitions for explanations of these terms); and

WHEREAS, the Army invited the National Park Service (NPS), National Trails Office, to participate in the development of the PA due to the presence of the Old Spanish National Historic Trail (part of the National Trails System) corridor within the APE, in accordance with P.L. 90-453, as amended through P.L. 116-9, and they agreed to participate as a Concurring Party; and

WHEREAS, the Army invited Naval Air Weapons Station (NAWS) China Lake and National Aeronautics and Space Administration (NASA) Goldstone Deep Space Communications Complex to participate in the development of the PA and they declined to participate as a Concurring Party and participated instead as a Consulting Party; and

WHEREAS, the Army invited Death Valley National Park, Nellis Air Force Base, County of San Bernardino, and Desert Managers Group to participate in the development of this PA and each has declined to participate as a Concurring Party or Consulting Party; and

WHEREAS, in summary, there are three (3) Invited Signatories, consisting of the Fort Mojave Indian Tribe, the Yuhaaviatam of San Manuel Nation, and the Timbisha Shoshone; one (1) Concurring Party, which is NPS, National Trails Office; and, ten (10) Consulting Parties consisting of the Bishop Paiute Tribe, Colorado River Indian Tribes, Morongo Band of Mission Indians, Big Pine Paiute Tribe of Owens Valley, Fort Independence Reservation, Chemehuevi Indian Tribe, Lone Pine Paiute Shoshone Reservation, Kern Valley Indian Council, NAWS China Lake and NASA Goldstone Deep Space Communications Complex; and

WHEREAS, the Army held six (6) consultation meetings—on February 5, 2021; March 11, 2021; April 16, 2021, May 20, 2021, June 30, 2021, and March 28, 2022—as part of the Section 106 of the NHPA consultation process, to review the development and content of the PA; and

WHEREAS, Attachment D includes a list of invited participants and attendees for the six (6) consultation meetings; and

WHEREAS, the Army invited the public to participate in both the Section 106 of the NHPA consultation process and the public scoping for the Draft Environmental Impact Statement for the undertakings through placing notifications in the *High Desert Warrior* newspaper on August 12, 2020 (Fort Irwin circulation), the *San Bernardino Sun* newspaper on August 14, 2020 (San Bernardino County and Riverside County circulation), and *The Desert Dispatch* newspaper on August 18, 2020 (San Bernardino County circulation), and by holding public scoping meetings on August 25 and 27, 2020, and no comments were received; and

WHEREAS, in accordance with 36 CFR Part 800.6(a)(1)(i)(C), the Army has notified the Advisory Council on Historic Preservation (ACHP) of its decision to prepare an agency program PA as described in

36 CFR Part 800.14(b)(2) and provided the required documentation and invited them to participate in the PA, and the ACHP has chosen to participate in accordance with 36 CFR Part 800.6(a)(1)(iii); and

WHEREAS, the Army conducted cultural resource surveys of approximately 360,796 acres within the APE from 1979 to 2020 (Attachment C, Figure 2) and identified 158 historic properties, comprised of two properties listed in the National Register of Historic Places (NRHP), one of which is a National Historic Landmark (NHL); 48 additional historic properties determined eligible for listing in the NRHP through SHPO consultation (with concurrence generally received in 2002 and later); and 108 recommended historic properties found eligible for listing in the NRHP for which the SHPO has not yet provided concurrence and for which the Tribes will be asked to provide input when SHPO concurrence is sought(Attachment E); and

WHEREAS, the NHL is the Pioneer Deep Space Station, which is part of the Goldstone Deep Space Communication Complex (complex) and is located on land owned by Fort Irwin but the NHL, consisting only of the antenna, the tower, and the base, is owned by NASA, which is responsible for NHPA compliance and is covered by NASA's 1989 Nationwide *Programmatic Agreement among the National Aeronautics and Space Administration, the National Conference of State Historic Preservation Officers, and the Advisory Council on Historic Preservation* and its management will not be covered by this PA; and

WHEREAS, the Army is responsible for management of the site (land) on which the complex is located and ancillary buildings and supporting structures to the antenna located at the site, but neither the site nor any of the ancillary buildings or structures are part of the NHL, nor are these other components individually eligible for the NRHP or contributing elements to any NRHP-listed or eligible historic district and management actions involving this site and ancillary buildings and support structures are covered by this PA; and

WHEREAS, the Army will not conduct training within off-limits/non-maneuver areas, including certain areas with sensitive natural resources or historic properties managed by Fort Irwin, desert tortoise mitigation lands, a potential well location, or playas (dry lake beds) or other areas of high dust potential, as depicted in Attachment C (Figure 2); therefore, training- and support operations-related cultural resources surveys in these areas are not anticipated; and

WHEREAS, the density of military training activities at Fort Irwin is also limited by other factors, such as terrain and proximity to cantonment areas not used for training (e.g., housing), and can be sub-divided into areas that have high, medium, low, or restricted/limited maneuver intensity uses as further described and depicted in Attachment C (Figure 3), based on Fort Irwin's increases and changes in military training activities; and

WHEREAS, the Army is currently conducting and plans to continue conducting annual large-scale cultural resource surveys (see SOP 9), as depicted in Attachment C (Figure 2) with other surveys, including surveys to provide for opening the WTA to full training, with needed historic property protection measures to be put in place prior to opening the WTA to full training; therefore, the Army will continue to complete Section 106 consultation with the SHPO and the Tribes, as surveys are completed and/or concurrence is needed regarding NRHP eligibility in accordance with this PA; and

WHEREAS, SHPO concurrence is needed for NRHP eligibility determinations completed for properties within the APE, the SHPO will work with the Army to achieve consensus determinations of NRHP eligibility (where possible; if no concensus can be reached Fort Irwin will request a determination from the Keeper of the National Register) in accordance with the regulatory responsibilities under 36 CFR 800.4(c)(2); and

WHEREAS, the potential historic properties mentioned in the previous clause may include properties of traditional religious and cultural importance to Tribes, and this information or other tribal input may identify the NRHP criteria under which these properties qualify as historic properties, and the Army therefore requests that the Tribes provide input, if desired, to inform eligibility determinations for sites that have not previously receivedSHPO concurrence or where new information indicates that past concurrences must be revisited; and

WHEREAS, undertakings on properties for which effects have been taken into account through the Programmatic Memorandum of Agreement among the United States Department of Defense, the ACHP, National Conference of State Historic Preservation Officers, and the Historic American Buildings Survey/Historic American Engineering Record, regarding Demolition of World War II Temporary Buildings; the Program Comment for Capehart and Wherry Era Army Family Housing and Associated Structures and Landscape Features (1949–1962); the Program Comment for World War II and Cold War Era (1939-1974) Ammunition Storage Facilities; the Program Comment for Cold War Era Unaccompanied Personnel Housing (1946-1947); the Program Comment for Army Inter-War Era Historic Housing, Associated Buildings and Structures, and Landscape Features (1919-1940); the Program Comment to Exempt Consideration of Effects to Rail Properties within Rail Rights-of-Way; and any other applicable Program Comment that is issued by the ACHP subsequent to this PA, are excluded from further consideration under this PA

NOW, THEREFORE, the Army, the SHPO, and the ACHP agree that this PA shall be implemented in accordance with the following stipulations in order to take into account the effects of undertakings on historic properties, and that these stipulations shall govern the undertakings until this PA expires or is terminated.

STIPULATIONS

The Army shall ensure that the following measures are carried out:

I. Applicability of the PA

A. The Army shall utilize this PA to fulfill its Section 106 of the NHPA responsibilities, including responsibilities for multi-agency undertakings for which the Army is the lead Federal agency, pursuant to 36 Part CFR 800.2(a)(2).

B. This PA shall only apply to training activities or support operations, per the examples in Attachment A, that qualify as potential undertakings, as defined in Stipulation III.A.1, within the Northern, Central, and Southern Corridors; Eastern and Western Training Areas; Range Complex; Cantonment; Leach Lake, limited to targetry for aircraft operations and indirect fire activities (no ground maneuver activities shall occur at Leach Lake); Goldstone Complex, limited to the Goldstone Airstrip and areas used to support the Gray Eagle Unmanned Aerial Vehicle mission; the potential well area; and the Manix Trail right-of-way between Fort Irwin and Interstate 15. Non-training-related activities or non-support operations are not subject to this PA, and Section 106 of the NHPA responsibilities for these activities shall be fulfilled through compliance with Subpart B of 36 CFR Part 800 by the Army or other Federal agencies or through development of another NHPA Section 106 agreement document, pursuant to 36 CFR Part 800.6 and 36 CFR Part 800.14(b).

II. Roles and Responsibilities of Participating Parties

A. Signatories

1. Army
   a. The Fort Irwin Garrison Commander is responsible for all decisions regarding the applicability of this PA to undertakings within the APE pursuant to *Army Regulation 200-1: Environmental Protection and Enhancement*.

   b. The Fort Irwin Garrison Commander shall designate a Cultural Resources Program Manager (CRPM) and Cultural Resources Manager (CRM) at Fort Irwin to implement this PA and conduct the stipulated coordination and consultation with the Signatories, as well as other concerned Tribes, agencies, organizations, and the public. The implementation of this agreement shall be primarily executed on a day-to-day basis by the CRM, under the authority of the Garrison Commander, who is ultimately responsible for ensuring that the stipulations herein are met. Given the CRM's responsibilities, only individuals who meet the Secretary of the Interior's standards in either archaeology or history shall be designated.

   c. As the CRM would not be expected to possess professional expertise in all of the listed fields, the CRM shall provide or Fort Irwin shall employ, maintain a contract with, or obtain through other means professional expertise that meets the Secretary of the Interior's Professional Qualification Standards for archaeology, history, architecture, historic architecture, or architectural history, pursuant to 36 CFR Part 61, Appendix A, as appropriate for each of the undertakings.

   d. The CRM shall ensure that efforts to identify, evaluate, and treat historic properties under the stipulations of this PA meet the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation.

   e. For non-linear resources that extend onto land occupied or administered by BLM Barstow Field Office, NAWS China Lake, Death Valley National Park, or other federal agencies, the Army shall consult with the appropriate agency regarding NRHP eligibility determinations and shall provide the SHPO with documentation of the consultation regarding the determinations of eligibility, and shall seek a consensus on NRHP eligibility. In the event consensus can be not be reached on an eligibility determination, the Army shall follow the processes outlined in Standard Operating Procedure (SOP) 2 within Attachment F.

   f. For linear resources, the Army shall consider available information regarding the resource as a whole and shall consider whether a given segment has potential to be a contributing element to the resource as a whole. Also, the Army shall consult with the NPS and BLM (as the co-administrators for the Old Spanish National Historic Trail) regarding NRHP eligibility determinations and treatment for the congressionally designated alignment of the Old Spanish National Historic Trail located within the Bitter Spring area of Fort Irwin, as appropriate. Bitter Spring, which is listed in the NRHP, has been previously identified by NPS and BLM as a *high potential site,* and the Red Pass area has been previously identified as a *high potential segment* within a National Historic Trail as defined by the National Trails System Act, pursuant to P.L. 90-543, as amended through P.L. 116-9. Portions of the Old Spanish Trail in Nevada and Utah have been listed in the NRHP. However,

no contributing elements or visible surface evidence of the historic trail (although Bitter Spring remains an active spring) have been identified within the APE to date, and neither of the identified high potential areas are currently suited to public interpretation due to restricted access. Off-site interpretation, including virtual interpretation, will be further explored as part of the Army's ongoing public interpretation efforts, and may include participation by NPS and BLM, Tribes, and other interested groups, as necessary.

g. This PA specifies how the Army shall provide notification to the SHPO, Tribes, ACHP, or other Concurring and Consulting Parties according to the event, such as recognition of an emergency, and in accordance with SOPs 6 and 8, included in Attachment F. For urgent notifications, multiple methods of contact may be used in an attempt to reach the parties to be notified as quickly as possible.

2. California State Historic Preservation Officer

a. The SHPO may raise objections according to Stipulation XII, may amend this agreement according to Stipulation XIII, or may terminate this agreement according to Stipulation XIV.

b. The SHPO shall respond within the timeframes of this agreement after notifications are received.

c. The SHPO shall review findings of NRHP eligibility determinations, as part of their regulatory responsibilities under 36 CFR 800.4(c).

d. A full list of SHPO roles and responsibilities pertaining to Section 106 can be found in 36 CFR 800 Subpart B; these also apply unless alternative processes have been specified in this PA.

3. Advisory Council on Historic Preservation

a. The ACHP may raise objections and/or resolve objections according to Stipulation XII, may amend this agreement according to Stipulation XIII, or may terminate this agreement according to Stipulation XIV.

b. The ACHP shall not participate in identifications, evaluations, or reviews described under Stipulations III, IV, and V unless requested in writing from the Army, the SHPO, Invited Signatories or the other Concurring or Consulting Parties.

4. Invited Signatories

a. The Fort Mojave Indian Tribe, the Yuhaaviatam of San Manuel Nation, and the Timbisha Shoshone as Invited Signatories, recognizing the important partnership developed between the Army and each of these tribes (the "Tribes") through consultation to develop the PA, may raise objections according to Stipulation XI, may amend this agreement according to Stipulation XIII, or may terminate the agreement according to Stipulation XIV.

b. Invited Signatories shall participate in identification of historic properties (of traditional, religious, and cultural importance) as requested, and participate in reviews for activities described in Stipulations III, IV, and V.

B. Concurring Parties

1. NPS as a Concurring Party may raise objections according to Stipulation XII.

C. Consulting Parties

1. Bishop Paiute Tribe, Colorado River Indian Tribes, Morongo Band of Mission Indians, Big Pine Paiute Tribe of Owens Valley, Fort Independence Reservation, Chemehuevi Indian Tribe, Lone Pine Paiute Shoshone Reservation, Kern Valley Indian Council, NAWS China Lake and NASA Goldstone Deep Space Communications Complex may raise objections according to Stipulation XII.

III. Historic Property Identification and Evaluation for Undertakings

A. Determine the Undertaking

1. The Army (the CRPM if authority is so delegated) shall determine if the proposed activity is an undertaking as defined in 36 CFR Part 800.16(y) and SOP 1, included in Attachment F.

a. If the Army determines the proposed activity is not an undertaking, as defined in 36 CFR Part 800.16(y) and SOP 1, the Army shall document this determination for inclusion in the Annual Report, which will be shared as described in Stipulation X; the Army has no further obligations under this stipulation.

b. If the Army determines that the proposed activity is an undertaking listed in Attachment B as an activity that has no effect on historic properties, the Army shall document this determination for inclusion in the Annual Report and the Army has no further obligations under this stipulation.

c. If the Army determines the proposed activity is an undertaking not listed in Attachment B, the Army shall continue the Section 106 of the NHPA process following the streamlined procedures detailed in Stipulations III.B and III.C.

B. Define the Area of Potential Effects and Identify Historic Properties

1. The CRM shall determine and document the project APE for each specific undertaking, appropriate to the scope and scale of the undertaking, and consider direct, indirect, and cumulative effects, pursuant to 36 Part CFR 800.4(a)(1) and SOP 1, included in Attachment F.

a. For purposes of the PA and pursuant to SOP 1, direct effects are defined as those effects resulting from an action, without separation in space or time, and include effects such as physical, visual or atmospheric, or auditory effects that may affect the setting, feeling, or character of a historic property; indirect effects are defined as those effects resulting from an action, but separated from it by time or distance; and

cumulative effects are defined as incremental effects resulting from past, present, and reasonably foreseeable future projects, regardless of the agency or person involved.

2. Background research regarding the APE shall include a review of previously conducted investigations, site records, geological information (including soils, geomorphological, geoarchaeological, geochronological, and other applicable data), information provided by the Tribes, historic maps, and similar information, as detailed in SOP 2, included in Attachment F. Professionals who meet the qualifications included in Stipulation II.A.3 shall determine the level and type of background research necessary for each undertaking, based on their expertise.

3. The CRM shall determine if cultural resource surveys and investigations are required, and if so, the type and level of analyses that are necessary, depending on the location of the APE and nature of the proposed activity, using the following parameters as well as guidance detailed in SOP 2, included in Attachment F.

    a. Determine whether the APE has been completely and adequately previously surveyed in accordance with SOP 2, or is within an area that cannot be surveyed due to safety considerations (see Attachment C, Figure 2—the major area of safety concerns is Leach Lake).

        i. The Army shall take into account tribal input regarding the identification of properties of religious and cultural importance and other relevant historic properties, including a review of testing methods and plans. Such reviews may be categorical (based on general concerns) rather than being project-specific.

        ii. Whether or not the SHPO has commented on theadequacy of the survey efforts, if the APE has been completely and adequately previously surveyed, as described in SOP 2 and based on the CRM's determination, then no further survey shall be required and the CRM shall proceed to Stipulation IV.

4. If determined necessary by the CRM, cultural resource surveys and investigations shall be conducted pursuant to 36 Part CFR 800.4(b) and SOP 2. Such surveys may include participation by representatives of Invited Signatory and/or Consulting tribes who can provide assistance in identifying properties of traditional religious and cultural importance. Identified properties shall be recorded on the appropriate Department of Parks and Recreation 523 series forms. Recordation shall be completed in accordance with SOPs 2 and 3. Locational data shall be collected and added to the Fort Irwin Cultural Resources Database and shall comply with the Spatial Data Standards for Facilities, Infrastructure, and Environment as detailed in SOP 4. Refer to Attachment F for SOPs 2, 3, and 4.

    a. Identified archaeological resources shall be recorded based on the definitions of a "site" and "isolate" provided in SOP 2, included in Attachment F.

    b. Properties of traditional religious and cultural importance may or may not include an archaeological component. Definitions will follow guidance put forth in National

Register Bulletin 38: *Guidelines for Evaluating and Documenting Traditional Cultural Properties*, and will take into account any input regarding property identification from the affiliated cultural group(s), such as the definition of Tribal Cultural Values included in SOP 2 (provided by the Fort Mojave Indian Tribe).

5. In some situations, it may not be feasible to complete an archaeological survey due to access restrictions, operational constraints, human life and safety issues as determined by the Fort Irwin Garrison Commander, or environmental protection/avoidance restrictions; therefore, under the direction of the CRM, additional analysis, such as the research discussed in Stipulation III.B.2, may be completed that determines the potential for buried or otherwise unidentified cultural resources having the potential to quality as historic properties to exist in the APE. In accordance with the specific circumstances, alternatives to standard survey methods may apply. Following completion of the additional analysis, NRHP eligibility evaluations shall occur under Stipulation III.C.

C. NRHP Eligibility Evaluations

1. Evaluations shall be conducted in accordance with the NRHP eligibility criteria, pursuant to 36 CFR Part 63; the bulletins, guidance, and documents produced by NPS; and SOP 2, included in Attachment F. In some instances, the CRM may, as part of the eligibility evaluation, determine sub-surface testing or additional analyses of a property's geological context is necessary to assess the potential for significant buried deposits to be present. The CRM shall approve testing methods and plans prior to completion of any type of sub-surface investigation.

   Testing methods and plans may, time permitting, be provided to the Tribes for comment. The Tribes shall provide comments within five (5) calendar days of receiving the testing methods and plans. The testing methods and plans shall be provided electronically and shall specify the due date for comments. Where possible, a longer time period may be provided for larger testing efforts. The Army shall take into consideration any comments received by the Tribes. The SHPO may also be asked to provide input. (See SOP 2 for further information.)

2. The CRM shall seek input regarding eligibility considerations from Tribes and, as applicable, other groups that consider particular historic properties to be of traditional religious and cultural importance. The Army shall take into consideration any input received by the affiliated group(s) regarding such properties.

3. Following the completion of NRHP eligibility determinations for properties within the APE, the Army shall as needed (see Stipulation IV) seek concurrence on the eligibility determinations.

IV. Assessment of Effects

A. Following the identification and evaluation efforts described in Stipulation III, the CRM shall assess the effects of the undertaking to historic properties using the criteria of adverse effects in 36 CFR Part 800.5(a)(1) and SOP 5, included in Attachment F, and shall make one of the following findings. Results will be documented in the Annual Report to be shared with the

Concurring and Consulting Parties. Fort Irwin acknowledges that the 30-day consultation periods specified below are initial consultation periods. If the information provided for consultation does not support the agency's findings in accordance with 36 CFR 800.11, the SHPO, or any Tribe that attaches religious and cultural significance to the historic property, may request additional information. Receipt of adequate information then initiates a new 30-day consultation period.

1. No Historic Properties Affected

a. A finding of "No Historic Properties Affected" shall be used by the CRM under the following circumstances.

i. *Previous or new survey, only isolates present.* The APE has been completely and adequately previously surveyed or the Army completes a new survey, and the only properties identified in the APE are limited to those that meet the definition of an isolate, as described in Stipulation III.B.4.a and SOP 2, included in Attachment F and considered not eligible for listing in the NRHP. The Army shall document this finding for inclusion in the Annual Report, and the Army has no further obligations under this circumstance. Appropriate documentation shall be provided to the SHPO, Tribes, and the California Historical Resources Information System, as necessary.

ii. *Previous survey with SHPO consultation, no properties present or those present do not qualify as historic properties.* The APE has been completely and adequately previously surveyed and no properties were identified, or properties were present but did not qualify as historic properties per previous consultation with the SHPO and the Tribes. The Army shall document this finding for inclusion in the Annual Report, and the Army has no further obligations under this circumstance. Appropriate documentation shall be provided to the SHPO, Tribes, and the California Historical Resources Information System, as necessary. Fort Irwin has a very limited number of eligibility determinations completed prior to 2002, and the current tribal role in providing input regarding properties of traditional religious and cultural importance was defined in an amendment to Section 106 in 1992. Given this, in theory almost of the past eligibility concurrences on Fort Irwin should reflect tribal input in accordance with the amended Section 106 process. However, Fort Irwin recognizes that exceptions may have occurred. Given this, Army personnel will review past eligibility determinations having SHPO concurrence to explore whether or not there is documentation of tribal consultation and will summarize the results in the Annual report for further discussion during the first Annual Meeting.

iii. *Previous survey, properties present within the APE do not qualify as historic properties but the SHPO has not provided concurrence regarding eligibility, or the SHPO previously provided comments expressing concern regarding the adequacy of the survey and those concerns have not been resolved by previous consultation.* The Army will conduct new survey as needed and submit all pertinent documentation to the SHPO and the Tribes, as described in Stipulation

IV.B. The SHPO shall provide a response to the Army finding within thirty (30) calendar days of receipt of said documentation. Tribes choosing to provide input should also respond within thirty (30) calendar days.

iv. *New survey or investigation (a literature search is one example), no properties present or those present do not qualify as historic properties*. The Army completes a new survey or investigation for the APE and no properties were identified or properties were present but found not to qualify as historic properties. The Army shall submit all pertinent documentation to the SHPO and Tribes, as described in Stipulation IV.B. The SHPO shall provide a response to the Army finding within thirty (30) calendar days of receipt of said documentation. Tribes choosing to provide input should also respond within thirty (30) calendar days.

v. *New survey or investigation (a literature search is one example), historic properties present but not affected.* The Army completes a new survey or investigation for the APE and historic properties are present within the APE but will not be affected by the undertaking. The Army shall determine if further consultation is necessary, per 36 CFR Part 800.3(a)(1).

A. To aid this determination, the Army may propose—in consultation with the SHPO, Invited Signatories, Consulting Parties, and (regarding the Old Spanish Trail) Concurring Party—that no indirect effects (as defined elsewhere in this PA) to specific property types are reasonably anticipated under specific circumstances.

B. Otherwise, the Army shall submit all pertinent documentation to the SHPO and Tribes, as described in Stipulation IV.B. The SHPO shall provide a response to the Army finding within thirty (30) calendar days of receipt of said documentation. Tribes choosing to provide input should also respond within thirty (30) calendar days.

2. *No Adverse Effect*

a. A finding of "No Adverse Effect" shall be used by the CRM if the undertaking's effects do not alter or diminish, directly or indirectly, any of the characteristics of a historic property that qualify it for inclusion in the NRHP. The Army shall submit all pertinent documentation to the SHPO, as described in Stipulation IV.B. The SHPO shall provide a response to the finding made by the Fort Irwin CRMP within thirty (30) calendar days of receipt of said documentation.

i. The Army shall also provide all pertinent documentation describing the finding to the Tribes. The Tribes also have thirty (30) calendar days to provide input.

A. The Tribes are under no obligation to provide comments on the effect determination; however, if they wish the Army to consider their comments regarding the effect determination, Tribes should submit comments in writing within thirty (30) calendar days of receipt. The Army shall take any tribal comments received into consideration before concluding the

consultation and shall notify the SHPO of any tribal concerns and the Army's response to those concerns.

B. If the SHPO does not respond to the finding of "No Adverse Effect" within thirty (30) calendar days of receipt of all pertinent documentation, the CRM shall make a second attempt to contact the SHPO (via telephone or email) before proceeding to the next step in the process based on the finding.

C. If the SHPO does not concur with the finding of "No Adverse Effect," the CRM shall consult with the SHPO for no more than a total of thirty (30) calendar days (or other timeframe as agreed to between the SHPO and the CRM) from receipt of the SHPO notification of non-concurrence, to attempt to resolve the concerns identified by the SHPO.

ii. If, at the end of the thirty (30) calendar days, or the time agreed upon, the SHPO concurs with the finding of "No Adverse Effect," the CRM shall document this concurrence for inclusion in the Annual Report, and the Army has no further obligations under this finding.

iii. If, at the end of the thirty (30) calendar days, or the time agreed upon, the SHPO does not concur with the finding of "No Adverse Effect," the CRM shall notify the ACHP, pursuant to 36 CFR Part 800.4(d)(1)(iv), and in accordance with Stipulation XII.

3. Adverse Effect

a. It is the Army's preference to avoid effects to historic properties whenever feasible; however, a finding of "Adverse Effect" shall be used by the CRM if the undertaking may alter or diminish, directly or indirectly, any of the characteristics of a historic property that qualify it for inclusion in the NRHP. The Army shall submit all pertinent documentation to the SHPO, as described in Stipulation IV.B. The SHPO shall provide a response to the Army finding within sixty (60) calendar days of receipt of said documentation.

i. The Army shall also provide a all pertinent documentation to the Tribes describing the finding. The Tribes are under no obligation to provide comments on the effect determination; however, if they wish the Army to consider their comments regarding the effect determination, the Tribes should submit comments in writing within thirty (30) calendar days of receipt.

ii. The Army shall take any tribal comments received, including recommendations for resolving adverse effects in a culturally appropriate manner, into consideration before concluding the consultation and shall notify the SHPO of any tribal concerns, or concerns from other interested Consulting Parties, and the Army's response to those concerns. If no response is received after thirty (30) calendar days of providing said documentation to SHPO, then the Army may conclude consultation.

b. If the SHPO does not concur with the finding of "Adverse Effect," the CRM shall consult with the SHPO to attempt to resolve the concerns identified by the SHPO.

i. If the SHPO concurs with the finding of "Adverse Effect," the CRM shall document this concurrence for inclusion in the Annual Report, and follow the process included in Stipulation V. The Army has no further obligations under this finding.

ii. If the SHPO does not concur with the finding of "Adverse Effect," the CRM shall notify the ACHP, pursuant to 36 CFR Part 800.4(d)(1)(iv), and in accordance with Stipulation XII.

iii. If the SHPO conclusions or recommendations differ from those provided by the Tribes, the Army will share the conclusions and recommendations with the Tribes for their reference (if desired).

B. To initiate consultation, the Army shall submit the following documentation to the SHPO and the Tribes under Stipulations IV.A.1, IV.A.2, and IV.A.3.

1. A project description, including the depth, horizontal extent, and type of ground disturbance anticipated.

2. An APE map showing the project location, survey boundaries, and locations of historic properties.

3. Descriptions of historic properties affected and summaries of their NRHP eligibility (under all criteria) and historic integrity.

4. A summary of effects and explanation of why the effects are adverse or not adverse.

a. For "Adverse Effect" findings, the Army shall provide documentation of alternatives considered to avoid or minimize the adverse effect and why they could not be accomplished.

5. Photographs of the APE and historic properties.

6. Additional information as appropriate, including site forms, results of sub-surface testing, historic maps, background information, geographic information system data, and geological and soil information.

V. Resolution of Adverse Effects

A. Using the following process, the CRM shall notify the other Concurring and Consulting Parties and the public within fifteen (15) calendar days of notifying the SHPO and Tribes of an adverse effect finding for an undertaking:

1. The CRM shall prepare and send a notification package to the Concurring and Consulting Parties that includes the documentation specified in Stipulation IV.B., as well as the SHPO and Tribes' comments received by the Army regarding the undertaking, an invitation to participate in consultation to resolve adverse effects, and proposed dates for a consultation meeting. Confidential information provided by the Tribes shall not be distributed to parties outside Fort Irwin without prior consent from the relevant Tribe(s).

The Concurring and Consulting Parties shall respond to the consultation invitation within thirty (30) calendar days of receipt.

a. The Concurring and Consulting Parties may choose to not participate in the consultation regarding the assessment of effects but may want to provide comments on the resolution of adverse effects. The Army shall take into consideration any comments received in writing within thirty (30) calendar days of the Concurring and Consulting Parties receiving the notification package before concluding the consultation, and shall notify the SHPO of any concerns and the Army's response to those concerns.

2. The CRM shall invite the Tribes to participate in consultation to resolve adverse effects. The Tribes are under no obligation to provide comments; however, if they wish the Army to consider their comments regarding the resolution of adverse effects, the Tribes should submit comments in writing within thirty (30) calendar days of receipt. The Army shall take any tribal comments received, including recommendations for resolving adverse effects in a culturally appropriate manner, into consideration before proceeding with consultation.

a. All tribal comments will receive a response from the Army, with consultation on a case-by-case basis, if needed, regarding the incorporation of the comments into the resolution. If no response is received within the 30-day timeframe, then the Army may proceed with the consultation without additional involvement from that Tribe.

b. Fort Irwin will track tribal (and other received) comments and concerns in comments matrices and summaries, addressing all comments/concerns received, the source, and the response.

c. Comments and responses will be summarized in the annual report documenting the results of the PA.

3. The ACHP will only participate in the resolution of adverse effects for individual undertakings if a written request is received from the Army, the SHPO, a Tribe, a Concurring Party, or another Consulting Party.

4. The CRM shall post a notice of the adverse effect finding on the official Fort Irwin and AEC websites, to include a description of the undertaking, a list of identified historic properties, an explanation for the finding of adverse effect, steps taken or considered by the Army to avoid or minimize the adverse effect, any SHPO comments received by the Army regarding the undertaking, and an invitation to provide written comments within thirty (30) calendar days. Confidentiality of historic properties will be maintained such that the locations and nature of the historic properties will not be included as part of the notice, in accordance with Section 304 of the NHPA and to preserve Controlled Unclassified Information.

B. The CRM shall organize a consultation meeting, to include the SHPO, Tribes, and other Concurring and Consulting Parties that responded under Stipulations V.A.1 and V.A.2, to be

held no later than sixty (60) calendar days after notifying the Concurring and Consulting Parties of the adverse effect. The meeting will discuss avoidance, minimization, and mitigation of the adverse effect. Additional meetings shall be scheduled as needed.

C. If, through consultation with the SHPO, Tribes, or other Concurring and Consulting Parties that responded under Stipulations V.A.1 and V.A.2, the undertaking avoids an adverse effect, the CRM shall document the alternatives utilized to reduce the effects of the undertaking to a "No Adverse Effect" finding and include this documentation in the Annual Report. The Army has no further obligations under this stipulation.

D. When avoidance of an adverse effect is not feasible, the Army shall resolve the adverse effect through one of the following processes.

1. The Army shall prepare for the SHPO, Tribes, and other Concurring and Consulting Parties that responded under Stipulations V.A.1 and V.A.2 a treatment plan to reduce or resolve adverse effects. The treatment plan shall be submitted within thirty (30) calendar days of the last consultation meeting described in Stipulation V.B. The treatment plan shall include one or more of the treatment measures included in Attachment G, depending on the nature and severity of the adverse effect, and will provide sufficient detail on the treatment measures proposed.

    a. Unless the SHPO, Tribes, or other Concurring and Consulting Parties that responded under Stipulations V.A.1 and V.A.2 object in writing to the treatment measures plan, the Army shall proceed with implementation of the treatment measure(s), and Section 106 of the NHPA consultation is considered completed.

        i. If the SHPO, Tribes, or other Concurring and Consulting Parties that responded under Stipulations V.A.1 and V.A.2 object in writing, then the Army shall resolve adverse effects using the procedures outlined in Stipulation V.D.2.

    b. The Army shall provide written notification to the SHPO, Tribes, or other Concurring and Consulting Parties that responded under Stipulations V.A.1 and V.A.2 that the treatment measures for the undertaking have been implemented and completed. This notification shall be provided within sixty (60) calendar days of completion of the treatment measure(s). The Army shall also include this information in the Annual Report.

2. The Army, in consultation with the SHPO, Tribes, or other Concurring and Consulting Parties that responded under Stipulations V.A.1 and V.A.2, may choose to resolve adverse effects through development of a memorandum of agreement, pursuant to 36 CFR 800.6(c) and filed with the ACHP upon execution, per 36 CFR 800.6(b)(1)(iv).

    a. If the Army and the SHPO, Tribes, or Concurring and Consulting Parties that responded under Stipulations V.A.1 and V.A. fail to agree on the terms of a memorandum of agreement (or, if mutually agreed upon, a project-level PA), the CRM shall notify the ACHP in accordance with Stipulation XII.

VI. Native American Consultation

The Army shall continue conducting government-to-government consultation with the 10 federally recognized Tribes who attach traditional, religious, and/or cultural significance to Fort Irwin lands, or historic properties, in accordance with 36 CFR Part 800 and the processes outlined in SOP 6 (included in Attachment F). For purposes of this PA, consultation refers to the process of seeking, discussing, and considering the views of others, and, where feasible, seeking agreements on how cultural resources should be identified and how historic properties should be considered and managed.

VII. Treatment of Human Remains and Funerary Objects

The Army shall treat all Native American human remains and funerary objects, sacred objects, and/or objects of cultural patrimony encountered during any activities covered by the PA in accordance with the Native American Graves Protection and Repatriation Act (NAGPRA) and its implementing regulations, 43 CFR Part 10, and SOP 7, included in Attachment F.

A. Following a potential discovery, the Army shall immediately stop all activity in the area to protect the discovery and take every effort to avoid disturbing known burial sites or locations where funerary objects or sacred objects have been encountered. A minimum buffer of 30 meters around the potential discovery shall be established and demarcated with flagging tape or other appropriate materials.

B. The CRM, with qualified professionals such as an osteologist, the San Bernardino County Coroner, or law enforcement personnel, shall determine if the remains are human, and if so, whether they are recent and whether they are Native American.

    1. If recent human remains are discovered, then the CRM shall contact the appropriate authorities (military law enforcement, the San Bernardino County Sheriff, or the medical examiner) to determine if the remains should be considered part of a crime scene or police investigation.

    2. In the event that the remains are not part of a crime scene or police investigation and the discovery yields Native American remains or funerary objects, sacred objects, and/or objects of cultural patrimony, The Army shall continue following the processes outlined in 43 CFR Part 10.3 through 10.6, and SOP 7, including contacting consulting Tribes as soon as possible, as detailed in Attachment F

    3. No photographs for purposes of archaeological documentation shall be taken of Native American human remains or associated funerary objects. No type of destructive analysis shall occur, and no soil or residue sampling (e.g., flotation or pollen) from burial pits or cremation vessels shall occur without tribal consultation.

    4. Fort Irwin will provide a copy of our standard operating procedures for responding to inadvertent discoveries to the San Bernardino County Coroner's Office.

C. A summary of any discoveries of human remains or NAGPRA itemsshall be included in the Annual Report per Stipulation X.

VIII. Post-Review Discoveries

A. For purposes of this PA and pursuant to 36 CFR 800.13 and SOP 8, included in Attachment F, post-review discoveries are defined as the following:

1. Discovery of a potential historic property not previously identified in project review, after project approval and initiation.

2. Discovery of an effect (using the language of 36 CFR 800.13(b) , not previously identified in project review, that occurs to a previously known historic property after project approval and initiation.

B. In the event of discovery of a potential historic property not previously identified in project review after project approval and initiation, the following actions shall be taken, in accordance with SOP 8, included in Attachment F:

1. Avoid further direct effects and develop a suitable buffer area (to be determined on a case-by-case basis with 30 meters a commonly used minimum distance) around the discovery, demarcated with flagging tape or other suitable materials.

2. Contact the CRPM, who shall notify the CRM and the Garrison Commander.

3. Upon notification or as soon as possible, the CRM shall perform a National Register of Historic Places evaluation, as well as an analysis of the effects and identification of any necessary protection or treatment measures. This information, along with a report of findings prepared in conformance to Stipulation IV.B, shall be provided to the SHPO, Tribes, and other Concurring and Consulting Parties for comment within thirty (30) calendar days from the notification of the discovery.

a. If Fort Irwin determines the discovery is not a historic property, the SHPO, Tribes, and other Concurring and Consulting Parties shall have ten (10) business days from receipt of the report to comment on the findings; however, this period may be shortened depending on the urgency of the undertaking. The available period will be clearly identified in the notification. If the discovery is not a historic property and no objections are received, the Army has no further obligations under this stipulation. If the discovery is a historic property and no objections are received, then the Army may proceed with implementing any necessary protection or treatment measures included in Attachment G, depending on the nature and severity of the adverse effect. Following completion of the protection or treatment measures, the Army has no further obligations under this stipulation.

b. If the SHPO, other Signatory, or a Consulting Party objects or does not concur with the Army's findings, the Army shall proceed to Stipulation XII.

4. Any post-review discoveries shall be summarized in the Annual Report.

C. In the event of a post-review discovery of an effect to previously known historic property that was not previously identified in project review, and that occurs to the historic property after project approval and initiation, the following actions shall be taken, in accordance with SOP 8, included in Attachment F:

1. Avoid further direct effects and develop a suitable buffer area (to be determined on a case-by-case basis with 30 meters a commonly used minimum distance) around the historic property and/or portion of the historic property that was affected, demarcated with flagging tape or other suitable materials.

2. Contact the CRPM, who shall notify the CRM. The CRM shall then immediately notify the Garrison Commander.

3. The CRM shall determine if the effects are adverse or not adverse.

    a. If the CRM determines the effect is not adverse, the SHPO, Tribes, and other Concurring and Consulting Parties shall receive a written notification within three (3) calendar days of the discovery, summarizing the historic property and effects determination. All parties shall have ten (10) calendar days from receipt of the notification to object to the findings. If no objections are received, the Army has no further obligations under this stipulation.

    b. If the effect is determined to be adverse, in consultation with the SHPO, the CRM shall prepare and send a notification package to the SHPO, Tribes, and other Concurring and Consulting Parties within five (5) calendar days of the discovery. Notification shall include a summary of the undertaking and how it was previously reviewed under this PA, an illustration of the buffer established, a list of identified historic properties within the buffer, and the treatment plan to address effects.

        i. The SHPO, Tribes, and other Concurring and Consulting Parties shall have ten (10) business days to comment on the finding. If no response is received, then the Army may proceed with implementing the treatment measures it has identified, in conformance with the measures included in Attachment G, depending on the nature and severity of the adverse effect. Following completion of the treatment measures, the Army has no further obligations under this stipulation.

        ii. If Tribes (or other culturally affiliated parties) choose to respond regarding culturally appropriate measures to resolve adverse effects to Traditional Cultural Properties (defined as properties eligible for inclusion in the National Register based on association with cultural practices or beliefs of a living community that are rooted in the community's history, and that are important in maintaining the community's cultural identity) , the Army shall seek to accommodate such measures where possible.

    c. If the SHPO, a Tribe, or another Signatory or Consulting Party objects or does not concur with the Army's findings, the Army shall proceed to Stipulation XII.

3. The post-review discovery of an effect and the Army's response, including any protection or treatment measures, shall be summarized in the Annual Report.

IX. Emergency Undertakings

A. Emergency undertakings are those deemed necessary by the Army as an immediate and direct response to a disaster or emergency declared by the President of the United States or Governor of California. They may also include responses to National Security threats, as

discussed in SOP 8. Emergency undertakings pursuant to a response to a declared disaster or emergency include only such actions implemented within thirty (30) calendar days from the declared disaster or emergency unless an extension, in accordance with SOP 8, included in Attachment F, is granted.

B. Immediate rescue and salvage operations to preserve life or property are exempt from Section 106 of the NHPA and are outside the scope of this PA. (However, Section 110 of the NHPA, and other laws, including the Archaeological Resources Protection Act and the Native American Graves Protection and Repatriation Act, may apply.)

C. The CRM shall notify the SHPO and the Tribes via telephone or email, followed by written confirmation, of a declared emergency as soon as practicable after the emergency has been declared.

D. Emergency undertakings shall take into consideration that historic properties may be affected by recovery or emergency repair efforts. (See SOP 8.)

E. When possible, such emergency actions will be conducted in a manner that does not foreclose future preservation of historic properties.

F. As soon as practicable after the emergency, the Army shall notify the SHPO and the Tribes via email and will follow up with written documentation if any historic properties were discovered or disturbed as a result of emergency response actions. This information shall also be included in the Annual Report. If necessary, consultation with the SHPO and the Tribes will be conducted thereafter.

X. Annual Reporting

A. The Army shall prepare an annual report, covering the previous calendar year, and distribute it to SHPO, the Tribes, and other Concurring and Consulting Parties prior to March 16th each year during the life of this PA. The report shall includethe following:

1. Actions reviewed but not considered undertakings.
2. Actions that were reviewed but had no potential to affect historic properties.
3. Project descriptions for actions falling within the categories identified in Attachment B.
4. Actions that were reviewed but had no adverse effect on historic properties.
5. Actions that had an adverse effect on historic properties; steps taken to avoid, reduce, or resolve adverse effects; and, the results of those steps.
6. A list of surveys completed and a map showing these areas and operational constraints and environmental avoidance/protection areas.
7. A summary of newly identified sites and isolates, revisited previously identified sites (and isolates if applicable), and monitored historic properties located within off-limits areas.
8. A summary of NRHP evaluations completed and the results of project monitoring (see SOP 10).

9. A summary of any emergency undertakings, actions taken, and effects that may have occurred to historic properties.

10. A list/summary of all post-review discoveries.

11. A list of memoranda of agreement and treatment plans developed, including progress reports on the completion of mitigation measures and treatment measures.

12. Any changes the Army might consider toward improvement in implementation of any stipulations.

13. Issues or objections raised, and how they were addressed (with the provision that confidentiality will be respected).

14. Other information identified as useful or necessary in our ongoing discussions of the PA.

B. The Army requests SHPO, Tribes, and other Concurring and Consulting Parties provide comments to the Army regarding the Annual Report within thirty (30) calendar days of receipt.

C. The Army shall post the Annual Report (redacted as necessary to preserve Controlled Unclassified Information) on the Fort Irwin and AEC websites, indicating that interested members of the public are invited to provide comments within thirty (30) calendar days of the report being made available.

XI. Annual Meeting

The Army shall hold an Annual Meeting with the SHPO, Tribes, and other Concurring and Consulting Parties to review the implementation of this PA and any amendments that may be proposed no earlier than April 15th each year for the duration of this PA. The meeting shall provide an opportunity to discuss the successes and shortcomings of the PA, its general implementation, and any proposed changes, including consideration of exempting activities that result in a finding of no adverse effect. In addition, the meeting may also include information-gathering discussions. The meeting may be held in-person, via teleconference, and/or via web conference. Personnel from the Fort Irwin G3 Force Integration office shall participate in the annual meeting at their discretion.

XII. Dispute Resolution

A. Should any Signatories to this PA object at any time to any actions proposed or the manner in which the terms of this PA are implemented, the Army shall consult with such parties to attempt to resolve the objection. If the Army determines that such objection cannot be resolved, the Army shall:

1. Forward all documentation relevant to the dispute, including the Army's proposed resolution, to the ACHP. The ACHP shall advise the Army within thirty (30) calendar days of receipt of adequate documentation. Prior to reaching a final decision on the dispute, the Army shall prepare a written response that takes into account any timely opinion or comments regarding the dispute from the ACHP or Concurring and Consulting Parties, and provide them with a copy of this written response. The Army will then proceed according to its final decision.

2. If the ACHP does not provide its comments regarding the dispute within the 30-day time period, the Army may make a final decision on the dispute and proceed accordingly. Prior to reaching such a final decision, the Army shall prepare a written response that takes into account any timely comments regarding the dispute from the Concurring and Consulting Parties, and provide them and the ACHP with a copy of such written response.

B. The responsibilities of the Army to carry out all actions subject to the terms of this PA that are not the subject of the dispute remain unchanged.

XIII. Amendments

A. Any Signatory to this PA may propose an amendment in writing to the Army, including the extension of this PA and changes to the SOPs.

B. The Army shall consult with the Signatories to this PA to consider the proposed amendment. If there is no objection to the proposed amendment, the document shall be amended accordingly and the amendment shall be effective on the date of the last authorizing signature and is filed with the ACHP.

D. Proposed updates reflecting changes to the information included in Attachment C (Maps) and Attachment E (Historic Properties within Fort Irwin) will be amended in accordance with XIII(B) and as dated additions rather than changes.

XIV. Termination

A. If a Signatory to this PA determines it is not being implemented in accordance with its terms, that party may propose that the agreement be terminated.

B. The party proposing termination shall notify all Signatories, explain the reasons for the proposed termination, and afford all Signatories thirty (30) calendar days from receipt of the notification to recommend alternatives to termination. The consultation shall include all other Concurring and Consulting Parties and other parties that may be affected by the termination.

C. If the consultation fails to find alternatives to termination, then any Signatory may terminate the PA upon written notification to the other Concurring and Consulting Parties, and to other parties that may be affected that this PA is terminated.

D. Once the PA is terminated, and prior to work continuing on any undertaking, the Secretary of the Army must take into account, and respond to the comments of the ACHP under 36 CFR Part 800.7(c)(4), in accordance with the *Army Procedures and Responsibilities for Adverse Effect Determinations and Termination of Consultation under the National Historic Preservation Act*, dated October 5, 2020. The Army shall notify the Signatories in writing as to the course of action it shall pursue. Pursuant to Section 110 of the NHPA, the Secretary of the Army, as the agency head, cannot delegate this responsibility to another agency or party. Following the termination of the PA, the Army shall follow the procedures outlined in 36 CFR 800 and 43 CFR 10 for undertakings.

XV. Programmatic Agreement Monitoring

The SHPO, ACHP, and any other Signatories may monitor the manner in which this PA is carried out, and the ACHP shall review any activities if so requested. (Monitoring as used here refers to review of project files and correspondence records.) The Garrison Commander shall cooperate with the SHPO, the ACHP, and any other Signatories should they request to monitor or to review project files for activities carried out pursuant to this PA. Any concerns regarding the manner in which this PA is being carried out will be addressed in accordance with the dispute resolution process discussed in Stipulation XII.

XVI. Duration

A. This PA shall become effective on the date of the final signature and continue in force for five (5) years.

B. At least one year prior to the end of the five (5)-year period, the Signatories shall consult to determine whether this PA remains satisfactory. If there is agreement, the Army shall revise and update the PA as needed through development of an amendment that adds, removes, or revises the stipulations of the PA, and consult with all Concurring and Consulting Parties, and any parties that may become additional Concurring Parties. The amended agreement shall be signed and executed by all Signatories prior to the expiration of the five (5)-year period.

C. If an extension of time is warranted, all Signatories shall agree in writing until such time as this PA may be revised and updated.

XVII. Anti-Deficiency Act

The Army's obligations and stipulations under this PA are subject to the availability of funds and the provisions of the Anti-Deficiency Act, pursuant to 31 U.S. Code 1341. The Army shall make reasonable and good faith efforts to secure the necessary funds to implement this PA in its entirety. If compliance with the Anti-Deficiency Act alters or impairs the Army's ability to implement the stipulations of this PA, the Army shall consult with the SHPO and the ACHP in accordance with the amendment and termination procedures in Stipulations XIII and XIV.

EXECUTION of this PA by the Army, the SHPO, and the ACHP and implementation of its terms evidence that the Army has taken into account the effects of these undertakings on historic properties and afforded the ACHP a reasonable opportunity to comment.

SIGNATORIES

DEPARTMENT OF THE ARMY:

CURTIS D. TAYLOR
Brigadier General, USA
Commanding

JASON A. CLARKE
COL, SF
Commanding

SIGNATORIES

CALIFORNIA STATE HISTORIC PRESERVATION OFFICER:

[redacted] Date: 12/6/2022

State Historic Preservation Officer

SIGNATORIES

ADVISORY COUNCIL ON HISTORIC PRESERVATION:

[redacted] Date: 12/15/2022

[redacted]
Vice Chairman

INVITED SIGNATORIES

FORT MOJAVE INDIAN TRIBE:

[redacted] Date: 6-30-22

[redacted]
Chairman

INVITED SIGNATORIES

YUHAAVIATAM OF SAN MANUEL NATION:

[redacted] Date: 7/11/2022

Chairwoman

INVITED SIGNATORIES

TIMBISHA SHOSHONE TRIBE:

[redacted]
Chairman

Date: July 20, 2022

CONCURRING PARTY

NATIONAL PARK SERVICE, NATIONAL TRAILS:

[redacted] Date: _____

[redacted]
Acting Superintendent

Attachments:

List of abbreviations, acronyms, and definitions.

Attachment A:
Examples of Military Training Activities and Support Operations

Attachment B:
Activities Determined to Have No Effect to Historic Properties

Attachment C:
Figure 1, APE Map
Figure 2, Previously Conducted Cultural Resources Survey and Off-Limits/Non-Maneuver Areas
Figure 3, Maneuver Intensity Areas and Survey Areas
Figure 4, Setting

Attachment D:
Consulting Party Meeting Participants

Attachment E:
Historic Properties within Fort Irwin

Attachment F:
SOPs:
SOP 1: Identifying Undertakings and Defining Areas of Potential Effect
SOP 2: Identifying and Evaluating Historic Properties
SOP 3: Site and Isolate Field Data Collection
SOP 4: GIS Data Collection and Processing
SOP 5: Assessing Effects of Undertakings on Historic Properties
SOP 6: Government-to-Government Consultation with Tribes
SOP 7: Procedures Applicable to the Inadvertent Discovery of Native American Human Remains and Related Cultural Items
SOP 8: Inadvertent Discoveries and Emergency Action
SOP 9: Assessing Risk and Identifying Large-Scale Survey Priorities
SOP 10: Project Monitoring*

*Denotes archaeological monitoring.

Attachment G:
Protection and Treatment Measures

Abbreviations, Acronyms, and Definitions

The following presents abbreviations, acronyms, and definitions used in the Programmatic Agreement.

ACHP	Advisory Council on Historic Preservation
APE	Area of Potential Effects
BLM	Bureau of Land Management
CBRN	Chemical, Biological, Radiological, and Nuclear
CFR	Code of Federal Regulations
Complex	Goldstone Deep Space Communication Complex
CRM	Cultural Resources Manager
CRPM	Cultural Resources Program Manager
DoD	Department of Defense
EOD	Explosive Ordinance Disposal (Attachment A)
IAW	In Accordance With
ICRMP	Integrated Cultural Resources Management Plan
JPADS	Joint Precision Air Drop System (Attachment A)
NAGPRA	Native American Graves Protection and Repatriation Act
NASA	National Aeronautics and Space Administration
NAWS	Naval Air Weapons Station
NHL	National Historic Landmark
NHPA	National Historic Preservation Act
NPS	National Park Service
NRB	National Register Bulletin
NRHP	National Register of Historic Places
NTC	National Training Center (at Fort Irwin)
PA	Programmatic Agreement
P.L.	Public Law

playa	dry lake bed
PRTCI	Properties of traditional religious and cultural importance; Traditional Cultural Property
SF	Special Forces
SHPO	California State Historic Preservation Officer
SOP	Standard Operating Procedure
TCP	Traditional Cultural Property; properties of traditional religious and cultural importance (Attachments B and F, and see below)
Tribes	Native American Tribes
UAS	Unmanned Aircraft Systems (Attachment A)
USAF	United States Air Force (Attachment A)
USAEC	United States Army Environmental Center
U.S.	United States
WTA	Western Training Area

Selected Cultural Resource Definitions

The following definitions are provided to distinguish among key terms that are sometimes conflated in cultural resources management literature.

Consultation Terms

Concurring Party – A concurring party is a consulting party invited to concur in the agreement document but who does not have the authority to amend or terminate the agreement, in accordance with 36 CFR 800.6(c)(3). All consulting parties were invited to sign as concurring parties.

Consulting Party – For purposes of this PA, a consulting party is an agency, tribal group, or individual that participated in the development of the PA through attendance at consulting party meetings, provided input and comments on the PA, and/or has expressed an interest in continuing to participate in Section 106 consultations with Fort Irwin.

In Consultation – For the purposes of this PA, "in consultation" in consultation with the SHPO, culturally affiliated federally recognized Tribes, and other interested consulting parties.

Types of Cultural Resources

Cultural Resources – Under AR 200-1, the Army defines cultural resources as historic properties as defined by the NHPA, cultural items as defined by NAGPRA, archaeological resources as defined by ARPA, sacred sites as defined in EO 13007 to which access is afforded under AIRFA, significant

paleontological items as described by 16 USC 431-433 (Antiquities Act of 1906), and collections and associated records as defined in 36 CFR 79.

Historic Properties – Any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places (NRHP) maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties.

Properties of Traditional Religious and Cultural Importance/Significance (PRTCI) – a subset of Traditional Cultural Properties, associated specifically with Tribes.

Traditional Cultural Property (TCP) – the National Park Service defines a TCP as "a property that is eligible for inclusion in the NRHP based on its associations with the cultural practices, traditions, beliefs, lifeways, arts, crafts, or social institutions of a living community. TCPs are rooted in a traditional community's history and are important in maintaining the continuing cultural identity of the community" (see also National Register Bulletin 38). While often associated with Tribes, TCPs may also be associated with other cultural groups.

Tribal Cultural Resources (TCR) – the California Environmental Quality Act (Section 21074) defines these resources as "sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American Tribe" that are listed in or determined eligible for the California Register of Historical Resources or a local historical resources register. The category also includes resources determined by the lead agency at its discretion and supported by substantial evidence to meet at least one of the National Register of Historic Places criteria (PRC 5024.1(c)).

Monitoring and Related Topics

Monitoring (Archaeological) – project monitoring conducted during project implementation by Fort Irwin employees or contractors to fulfill the following purposes, in accordance with SOP 10:

1. Identifying (and documenting and protecting) potential historic properties where pre-implementation survey could not be completed effectively.
2. Ensuring that protection measures for historic properties are carried out.
3. Evaluating the effectiveness of a subsurface testing strategy applied to a site that was determined ineligible.
4. Evaluating the effectiveness of a subsurface testing strategy applied to a project area, where no subsurface resources were identified despite an unusually high potential.

Off-Limits Monitoring – Fort Irwin conducts Off-Limits Monitoring of historic properties on a regular schedule. The frequency is set depending upon the degree to which the site is at risk of damage from human activities, with most of the sites monitored annually or twice per year. The monitoring interval is re-evaluated during each monitoring cycle for the site, and adjusted as needed according to changing risk levels. Historic properties that are not considered to be at risk at a given time may not receive monitoring on a regular schedule.

Project Monitoring (Tribal) – project monitoring conducted during project implementation by tribal monitors to identify and communicate tribal concerns/assist with the identification of cultural resources important to Tribes. It should be noted that the Army does not currently provide funding for tribal monitors, and Fort Irwin prefers (in keeping with written tribal comments regarding this PA) to identify and address concerns prior to project implementation. The latter approach recognizes that Tribal representatives can

offer traditional knowledge not available from other sources, and that it is important to incorporate it at the earliest possible stage in project planning.

Site Monitoring – monitoring associated with specific projects (e.g., to determine site condition, fill in apparent gaps in the site record) or for cultural resources purposes.

Tribal Participation – based on tribal consultation conducted for this Programmatic Agreement, tribal participation is defined as activities that allow the Tribes to learn more about potential historic properties managed by Fort Irwin, and for Fort Irwin to learn about these properties from the Tribes.

Attachment A

Examples of Military Training Activities and Support Operations

Tables 1 and 2 include examples of the military training activities and civilian support operations that may occur at Fort Irwin and are consistent to the activities and operations analyzed in the Environmental Impact Statement for Military Training and Public Land Withdrawal Extension. This attachment covers the activities and infrastructure associated with military training at Fort Irwin, and the associated support operations. The amount of disturbance that may occur varies based on the activities and operations location, intensity, and extent.

Table 1. Examples of Military Training Activities at Fort Irwin

Maneuver Training *Tactical exercise that is carried out in the air or on the ground to imitate combat.*		
Activity	**Description**	**Location**
Mounted Maneuver	Includes the movement of troops and the use of heavy mechanized vehicles, such as tanks, High Mobility Multipurpose Wheeled Vehicles, and paladins.	• Northern Corridor • Central Corridor • Southern Corridor • Eastern Training Area • Western Training Area
Aviation	Aviation operations include the use of drop zones and landing zones, aerial supply, and evacuation.	• Northern Corridor • Central Corridor • Southern Corridor • Eastern Training Area • Western Training Area
Fire and Movement	Activities involving mortars, field artillery, close combat attack and close air support integration and the tactical movement of combat forces.	• Northern Corridor • Central Corridor • Southern Corridor • Eastern Training Area • Western Training Area • Leach Lake
Maneuver Support Operations *Integrates the reinforcing capabilities of mobility, protection, and sustainment tasks.*		
Activity	**Description**	**Location**
Engineer Support	Engineer units construct roadways, berm obstacles, anti-tank ditches, or runways in support of the larger unit mission.	• Northern Corridor • Central Corridor • Southern Corridor • Eastern Training Area • Western Training Area

Explosive Ordinance Disposal (EOD)	Specially trained EOD units detect, identify, evaluate, and render safe unexploded ordnance.	• Northern Corridor • Central Corridor • Southern Corridor • Eastern Training Area • Western Training Area
Chemical, Biological, Radiological, and Nuclear (CBRN)	Operations that employ tactical capabilities to counter the entire range of CBRN threats and hazards through weapons of mass destruction proliferation prevention, weapons of mass destruction counterforce, CBRN defense, and CBRN consequence management activities. Training does not involve viable CBRN agents.	• Northern Corridor • Central Corridor • Southern Corridor • Eastern Training Area • Western Training Area
Cyber	These activities occur in cyberspace, which includes the Internet, telecommunications networks, computer systems, and embedded processors and controllers.	• Northern Corridor • Central Corridor • Southern Corridor • Eastern Training Area • Western Training Area • Cantonment
Unmanned Aircraft Systems (UAS)	Training activities involving an aircraft that does not carry a human operator and is capable of flight with or without human remote.	• Northern Corridor • Central Corridor • Southern Corridor • Eastern Training Area • Western Training Area • NASA Goldstone
Sustainment *Sustainment training replicates the various challenges faced when deployed, including the provisions of logistics, personnel services, and health services necessary to maintain operations until successful mission completion. Sustainment units provide support to local units located in, or passing through, their assigned areas.*		
	Description	Location
Rearming	Replenishing ammunition supplies to support combat operations.	• Northern Corridor • Central Corridor • Southern Corridor • Eastern Training Area • Western Training Area
Refueling	Replenishing fuel supplies, which is a temporary facility organized, equipped, and deployed as a far forward or widely dispersed, as tactically feasible to provide fuel and ammunition necessary for the sustainment of aviation maneuver units in combat.	• Northern Corridor • Central Corridor • Southern Corridor • Eastern Training Area • Western Training Area Eastern Corridor
Field Maintenance	System maintenance and repair.	• Northern Corridor • Central Corridor

		• Southern Corridor • Eastern Training Area • Western Training Area Eastern Corridor
Medical	Army Health System support provided across the range of military operations and various types of missions.	• Northern Corridor • Central Corridor • Southern Corridor • Eastern Training Area • Western Training Area
Military Working Dogs	Working dog teams are used in garrison and combat support missions including area security; movement and mobility support operations; law and order; and force protection, including narcotic, human, landmine, firearm, ammunition, and explosive detection	• Northern Corridor • Central Corridor • Southern Corridor • Eastern Training Area • Western Training Area
Special Forces Operations *Require unique modes of employment, tactical techniques, equipment and training. Often these operations are time sensitive, clandestine, low visibility, and conducted with and/or through indigenous forces, which require forces who are organized, trained, and equipped to conduct and/or support special operations.*		
Airborne Operations	Involves the movement of Special Forces (SF) units by air.	• Northern Corridor • Central Corridor • Southern Corridor • Eastern Training Area • Western Training Area
Joint Precision Air Drop System (JPADS)	Provides rapid, precise, high-altitude delivery capabilities that do not rely on ground transportation.	• Northern Corridor • Central Corridor • Southern Corridor • Eastern Training Area • Western Training Area
High angle movement	A form of dismounted movement used to operate across steep and complex mountainous terrain and may involve technical climbing and repelling.	• Northern Corridor • Central Corridor • Southern Corridor • Eastern Training Area • Western Training Area
Non-Rotational Training *Home station units, other DoD organizations (Marine Corps, Navy, Air Force, National Guard, and Reserve Component) and law enforcement may also use the training areas to accomplish mission essential training when not being occupied for rotational training.*		
USAF Task Force Operations	USAF Task Force Operations involves combat aircraft engaged in close air support and other offensive air operations.	• Northern Corridor • Central Corridor • Southern Corridor • Eastern Training Area

		• Western Training Area
Personnel Recovery Operations	Combat search and rescue and civil efforts to prepare for, and execute, the recovery of isolated personnel.	• Northern Corridor • Central Corridor • Southern Corridor • Eastern Training Area • Western Training Area
Home Station Off-rotation Training	These activities include other Fort Irwin units using the training areas when they are not being used for rotational training.	• Northern Corridor • Central Corridor • Southern Corridor • Eastern Training Area • Western Training Area
Other Organization Austere Training Requirements	Joint military branches, Army Reserve, National Guard units, regular and transitional law enforcement units use the training areas when they are not being used for rotational training.	• Northern Corridor • Central Corridor • Southern Corridor • Eastern Training Area • Western Training Area

Table 2. Examples of Civilian Support Operations at Fort Irwin

Civilian Maneuver Support Operations: Integrated Training Area Management *Provides land maintenance support that allows training activities to continue.*		
Activity	**Description**	**Location**
Range and Training Land Assessment	Personnel monitor permanent plots, map heavy use areas, monitor trails and culverts, and assess fire risk, in order to track training land conditions. Actions include driving trail networks, driving around the perimeter of heavy use sites, and walking transects (currently at 100-meter spacing) to collect small soil samples.	• Northern Corridor • Central Corridor • Southern Corridor • Eastern Training Area • Western Training Area
Off Limits Marking	Completed to install and maintain markings at off limits areas, hazardous sites, and similar areas. Activities include installing, repairing (as applicable), and removing metal pickets, with or without barbed wire; "dragon's teeth" (angle iron obstacles set on the ground surface; sometimes called tank jacks); Seibert stakes and signs; and boulders and other surface barriers (to block trails). Actions include driving around sensitive areas; however, off limit areas are designed to avoid disturbances to historic properties.	• Northern Corridor • Central Corridor • Southern Corridor • Eastern Training Area • Western Training Area
Maneuver Area Clearance	Involves removal of old obstacles and debris to facilitate maneuvers. Activities may consist of picking up and hauling off flattened cars, old pickets, wire, scrap metal, etc. Activities involve vehicle operation/road use and shallow disturbance (such as not to exceed six (6) inches) typically in previously disturbed areas.	• Northern Corridor • Central Corridor • Southern Corridor • Eastern Training Area • Western Training Area

Training Land Repair	Fix maneuver damage that creates safety or environmental hazards or limits training. Personnel may plant vegetation, construct v-shaped catchments, construct erosion-control features (such as rock wattles, straw wattles, rock check dams, and detention basins), create berms, sand fencing (such as wooden slat or construction fencing, placed on the surface with t-posts placed for support), ripping/disking, leveling, and amendment. Amendment involves adding materials—such as rice hulls or perlite—to make the soil more friable.	• Northern Corridor • Central Corridor • Southern Corridor • Eastern Training Area • Western Training Area
Site Stabilization	Maintenance of training lands to prevent deterioration to unsafe conditions. Personnel complete seeding, application of straw or gravel mulch, and watering of the root crowns of damaged shrubs. May involve shallow disturbances associated with heavy equipment operation in previously disturbed areas.	• Northern Corridor • Central Corridor • Southern Corridor • Eastern Training Area • Western Training Area
Site Improvement	Reconfigure and improve frequently used sites to encourage and support future training use. Activities may include leveling, erosion control, application of gravel mulch, dust control, installation of berms, and perimeter control (using signs, rocks, berms, misc.).	• Northern Corridor • Central Corridor • Southern Corridor • Eastern Training Area • Western Training Area
Site Maintenance	Maintenance of previously implemented work. Activities may include monitoring plant survival, maintenance watering, repair to erosion control structures, removal of plant cages, and removal of site markings. Limited to disturbed areas.	• Northern Corridor • Central Corridor • Southern Corridor • Eastern Training Area • Western Training Area
Trail Improvement	Involves upgrades, improvements, and repair to secondary trails to support continued use. May include grading; installation of check dams, level spreaders, gabions (at washouts); filling and capping rough spots; and installation of low-water crossings, culverts, geoweb (mesh which will have local or non-local sediments placed within its cells), or wood chips. Improvements typically limited to the footprint of established trails with a buffer to account for features such as upslope erosion control and downslope water diversion.	• Northern Corridor • Central Corridor • Southern Corridor • Eastern Training Area • Western Training Area
Trail Maintenance	Maintenance of secondary trails in safe condition for training use. Includes light grading, small erosion control repairs, watering, and dust control. Generally limited to areas already disturbed.	• Northern Corridor • Central Corridor • Southern Corridor • Eastern Training Area • Western Training Area

Civilian Maneuver Support Operations: Range *Associated with ongoing maintenance of training areas.*		
Activity	**Description**	**Location**
Unexploded Ordnance Detection, Detonation, and Removal (Surface)	This activity is removal of surface/shallowly buried unexploded ordnance throughout the base. If it is safe to do so, munitions may be detonated in place. If not, they will be removed and shipped off-base, in accordance with federal safety guidelines.	• Northern Corridor • Central Corridor • Southern Corridor • Eastern Training Area • Western Training Area
Unexploded Ordnance Detection, Detonation, and Removal	Intended to maintain safety for range use. This activity is removal of ordnance from existing ranges. Limited areas (may walk a grid). May reach a depth of several feet.	• Northern Corridor • Central Corridor • Southern Corridor • Eastern Training Area • Western Training Area
Main Route Repair and Maintenance	Work necessary to repair or maintain approximately 440 miles of roads. Work is generally limited to existing corridors.	• Northern Corridor • Central Corridor • Southern Corridor • Eastern Training Area • Western Training Area Eastern Corridor
Town and Logistical Staging Area Structure Relocations	Providing structures for logistical facilities as training scenarios change. Removal, transportation, and/or relocation of structures, including storage containers and tents, and associated ground preparation. Generally limited to areas within or in the immediate vicinity of mock towns, logistical areas, and bivouac (temporary camp) areas, which may include airfields and machine shops. .	• Northern Corridor • Central Corridor • Southern Corridor • Eastern Training Area • Western Training Area Eastern Corridor
Berm Construction, Maintenance, and Removal	Construct, maintain, and remove berms at site-specific locations. Intended to control water, protect targets, etc.	• Northern Corridor • Central Corridor • Southern Corridor • Eastern Training Area • Western Training Area
Obstacle Removal	Assist with filling in tank traps when a training unit departs to prepare training areas for future use. Involves limited areas having previous disturbances.	• Northern Corridor • Central Corridor • Southern Corridor • Eastern Training Area • Western Training Area
Barrier Movement	Intended to protect infrastructure, provide for safety by restricting access to training areas, adapt to changing training scenarios. Moving fences and other barriers; sign installation. Typically placed	• Northern Corridor • Central Corridor • Southern Corridor

	in existing locations or may have minor disturbance.	• Eastern Training Area • Western Training Area
Flood Mitigation	Prevent future flooding of towns and logistical staging areas. Activities may include grading to redirect water; typically limited to small areas.	• Northern Corridor • Central Corridor • Southern Corridor • Eastern Training Area • Western Training Area
Civilian Maneuver Support Operations: Communications *Management of communication infrastructure in support of training.* *(Other towers are maintained on base, by various agencies, for other purposes. Currently, 19 are directly related to training. Additional towers may be added within the Western Training Area.)*		
Tower Maintenance	Maintain towers in functional condition. Includes modifications, painting, and reinforcement of existing towers.	• Northern Corridor • Central Corridor • Southern Corridor • Eastern Training Area • Western Training Area • Goldstone
Fiber Optic Lines	Maintain approximately 500 miles of buried fiber optic line associated with training. Repairs could result in ground disturbance in the footprint of the previous disturbance. Vaults are accessed for maintenance, which may require removal of sediments covering the vaults. (New lines would require new trenching.)	• Northern Corridor • Central Corridor • Southern Corridor • Eastern Training Area • Western Training Area • Goldstone

Attachment B

Activities Determined to Have No Effect to Historic Properties

As defined for Section 106 purposes, historic properties include prehistoric and historic-era buildings, structures, objects, sites, and districts, that are listed in or eligible for inclusion in the National Register of Historic Places (NRHP). For purposes of this attachment, non-historic-era refers to buildings, structures, and objects less than 45 years of age. While Section 106 applies specifically to historic properties, Fort Irwin recognizes that Tribes may define their cultural heritage more broadly. For example, the Fort Mojave Indian Tribe provided the following definition:

> Cultural resources and properties of traditional religious and cultural importance include both tribal values and archaeological, historical, cultural, and sacred sites. These elements involve tribal cultural values embodied within both tangible and intangible domains. Traditional Cultural Properties (TCPs), Ethnographic Landscapes, cultural landscapes, archaeological sites and districts, objects, and places of natural and spiritual sacred significance, are the main components of Native American cultural heritage.

While other laws and regulations may be pertinent to some of these concepts, Section 106 articulates with the definition above in several ways, although its focus remains on tangible domains and locations.

The activities listed below have been determined by Fort Irwin, the State Historic Preservation Officer (SHPO), the Fort Mojave Indian Tribe, the Yuhaaviatam of San Manuel Nation, the Timbisha Shoshone Tribe, and the Advisory Council on Historic Preservation to have no effect to historic properties, pursuant to 36 Code of Federal Regulations Part 800.3(a)(1), and do not require further Section 106 of the National Historic Preservation Act (Section 106) review, so long as the activity is limited to the types listed below and is not a part of a larger undertaking that requires Section 106 review. If at any time in the course of the activity information becomes available that would make this procedure inapplicable, including but not limited to inadvertent (referring to human remains or funerary objects) or post-review discoveries, Fort Irwin shall initiate Section 106 review or the Native American Graves Protection and Repatriation Act protocol in accordance with Stipulations VII and VIII and SOPs 7 and 8 of the Programmatic Agreement.

Generally, considerations in defining these activities include whether (1) the area of potential effects (APE) has been completely and adequately surveyed (limited areas cannot be surveyed for human health and safety reasons); (2) there is a low potential for intact buried cultural resources to exist based on a review of previously conducted investigations, site records, or geological information (including but not limited to soils, geomorphology, geoarchaeological, and geochronological data); (3) no concerns are raised by information previously provided by the Tribes, or by historic maps, and similar information; and (4) no known historic properties are present, or effects to historic properties can be avoided with project design, as needed. Discussions of historic buildings and infrastructure apply mainly to the greater cantonment area of Fort Irwin.

Additionally, training will not occur in certain areas. (Other activities may occur and will be covered by standard Section 106 consultation until a PA covering them is in place.) These areas include sensitive natural resource areas and historic properties, desert tortoise mitigation lands outside the main boundary of Fort Irwin, a potential well location south of Fort Irwin (this location could be associated with training support activities at some future date), and playas or dry lake beds/other areas of high dust potential. The areas that have been previously surveyed along with the areas off-limits to training are depicted in Attachment C (Figure 2). Fort Irwin will continue to update this map as part of the Annual Report, in accordance with Stipulation X of the PA.

A. General

Activities that do not require review by the CRM:

1. Actions that are a continuation or an extension of existing training activities without changes in areas used or increases in the intensity of use. This does NOT apply if there are changes in maneuver intensity or in the types of equipment/machinery employed.
2. Installation of stormwater sampling equipment in the floors of active washes or arroyos.
3. Continued use of existing roads, test courses, gun positions, and test sites for routine test activities where operations are limited to existing facilities and no new ground disturbance will occur.
4. Tours of Fort Irwin offered to visitors, military, and non-military personnel, provided no ground disturbance occurs and vehicle use is limited to existing roads and trails and the tours do not involve revealing Controlled Unclassified Information (involving locations and site components) pertinent to cultural resources.

Activities that require review by the CRM (to determine whether the qualifying conditions apply):

The following apply only in areas where complete survey coverage of the APE has occurred at an interval reasonably expected to identify any historic properties that may be present (not greater than 30 meters) with no historic properties or unevaluated cultural resources (other than isolates), present. Newly created access routes and staging areas are a part of the APE.

1. Removal or in-place disposal of unexploded ordinance.
2. Activities required and regulated by the California Department of Toxic Substances Control and the Department of the Army's Defense Environmental Restoration Program. These include background research; geophysical characterization; and remediation of Solid Waste Management Units, Military Munitions Response Program locations, and Comprehensive Environmental Response, Compensation, and Liability Act locations. May include ground-disturbing activities such as installation of monitoring equipment, soil sampling, coring, or boring
3. Operations within currently permitted landfills that are in active use, dump and disposal areas, and borrow pits, provided there is no horizontal or subsurface vertical expansion, or, for subsurface expansion, the material is rock or is too old to contain in situ cultural deposits. If soils from a location on Fort Irwin (e.g., from a borrow pit) are to be used for capping an archaeological site, then those soils shall require archaeological survey prior to their use unless the soils come from a permitted borrow pit that has been previously adequately surveyed with no site deposits identified. (Does not apply to historic-era landfills, dumps, and disposal areas that are not in current use.)
4. Continued use of small arms impact areas for small arms range activities, including repair and maintenance of existing targets. New uses within existing dig restriction areas or changes in the range boundaries or firing direction require survey and cultural resources investigations, and the APE includes any potential backstop locations. Does not apply to historic-era ranges that qualify as historic properties, based on previous SHPO consultation.
5. Continued use of dedicated impact areas for routine military weapons testing and training. Does not apply to remediation or clean-up actions, or the relocation of existing targets or addition of new ones, unless relocation or addition of targets occur within the existing footprint of a target area. New uses within existing dig restriction areas. Does not apply to new uses within existing dig restriction areas.
6. Routine maintenance in-kind improvements and continued use of existing non-historic-era improved or unimproved roads, tank trails, or similar infrastructure where ground disturbance is limited to the existing previously maintained road and shoulders
7. Routine maintenance, including but not limited to sediment and debris removal or clean-outs, and minor repairs to non-historic-era ditches, culverts, or other water conveyance structures.

8. Studies, data collection, and monitoring (not associated with cultural resources activities, e.g. biological or geological), provided any ground disturbance is limited to completely and adequately surveyed areas and no historic properties have been previously identified.
9. Installation, replacement, and operation of above-ground and buried non-historic-era utility and communication systems such as fiber optics, natural gas, and single pole electric lines in existing Fort Irwin rights-of-way, easements, distribution systems, or facilities' footprints. Buried components shall be located within completely and adequately surveyed areas and outside the boundaries of any known historic properties. Access roads and staging areas must remain within completely and adequately surveyed areas or within existing staging and road surfaces.
10. Removal of dead, diseased, or damaged ornamental trees and shrubs, and trees and shrubs in the cantonment areas, with the following provisions. First, that the trees and shrubs are not a related feature in or a contributing element to a historic property based on previous SHPO consultation. Second, that they are either located in completely and adequately surveyed areas where no historic properties are present or effects to known historic properties can be avoided, or are within a developed area covered with hardscape or landscape materials, or that has been previously graded, or is used as an existing staging area.
11. Non-ground disturbing treatment for insect-infested plants and invasive species, provided the plants and invasive species are not a related feature in or a contributing element to a historic property based on previous SHPO consultation, with the following provisions. First, that the plants are not a related feature in or a contributing element to a historic property based on previous SHPO consultation. Second, that they are either located in completely and adequately surveyed areas where no historic properties are present or effects to known historic properties can be avoided, or are within a developed area covered with hardscape or landscape materials, or that has been previously graded, or is used as an existing staging area.

B. Maintenance, Repair, Renovation, Replacement, New Construction, and Demolition

Activities that do not require review by the CRM:

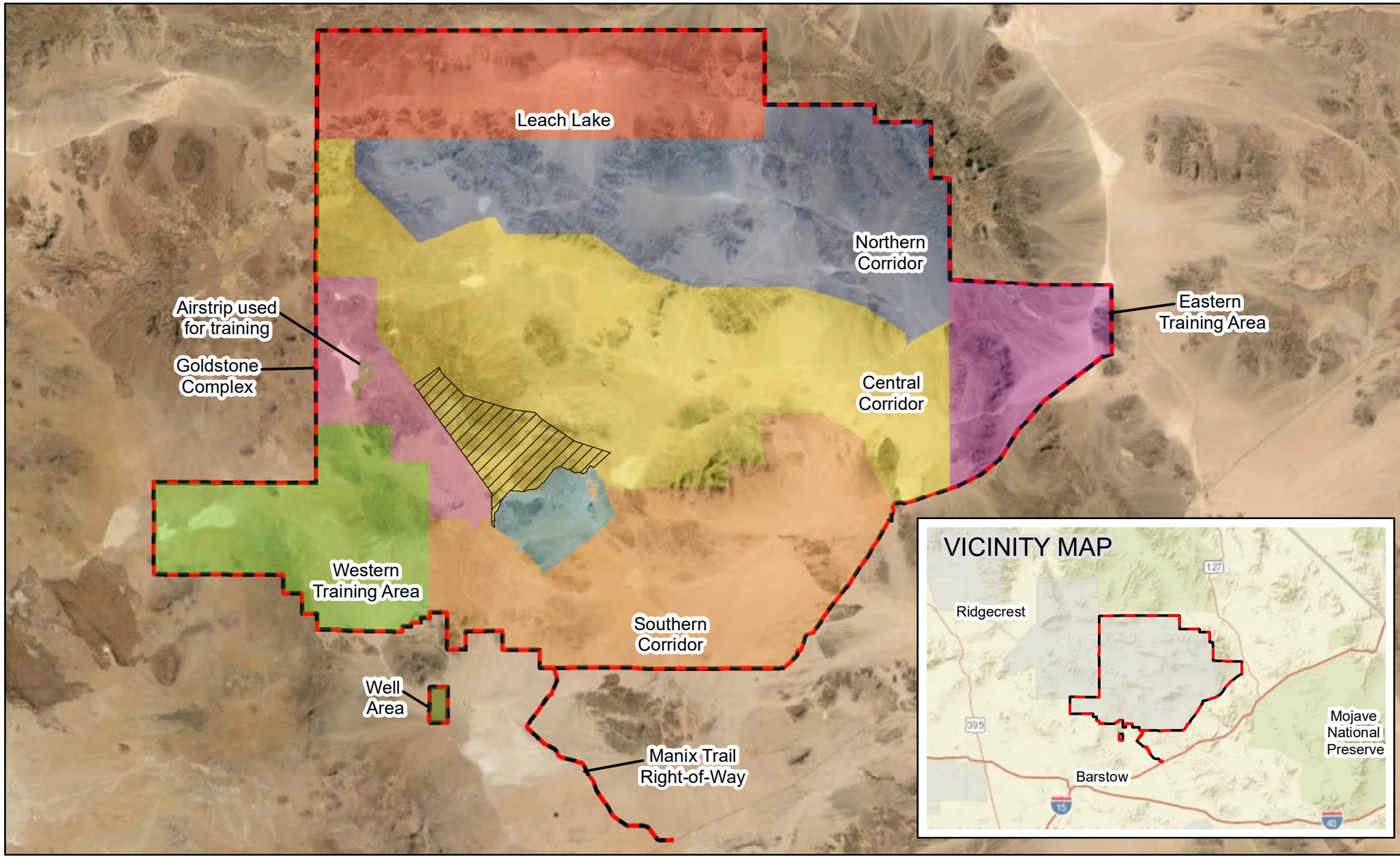
1. Removal of animals, birds, insects, and their associated debris from a component of the built environment, when there is no ground disturbance and the building or structure is not affected.
2. Routine debris removal and collection, including removal of snow, uprooted trees, and limbs and branches from Fort Irwin right-of-way areas, as well as the transport and disposal of such waste to landfills in current use. Does not apply to historic-era landfills that are not in continued use.
3. Tree and shrubbery trimming and mowing within the cantonment areas.

Activities that require review by the CRM (to determine whether the qualifying conditions apply):

The following apply only in areas with complete previous survey of the area of potential effects (APE), at an interval (not greater than 30 meters) reasonably expected to identify any historic properties that may be present with no historic properties, or cultural resources that are not isolates and that still require SHPO concurrence and/or tribal consultation present. Newly created access routes and staging areas are a part of the APE.

1. Repair or replacement of existing site improvements within developed areas of the cantonment and within the existing footprint of a facility. This includes but is not limited to roads, parking areas, fences, and signs.
2. Repair or replacement of existing water, electric, gas, sanitary, cable, and underground or surveyed areas or within existing footprints where the structures are not greater than 45 years old or have previously and in consultation with the SHPO been determined not eligible for the NRHP.
3. Disturbance involving a total area of less than one square meter, such as placement of fence posts.

4. New construction or alterations to buildings and other above and below ground infrastructure, and related activities.
5. Maintenance, renovation, repair, and related activities to existing facilities and infrastructure not greater than 45 years old, and to those facilities older than 45 years but previously determined, in consultation with the SHPO, not eligible for listing in the NRHP.
6. Demolition of buildings and other infrastructure not greater than 45 years old or older than 45 years but previously determined not eligible for listing in the NRHP in consultation with the SHPO.
7. Stockpiling and staging of construction, road repair, and paving materials in completely and adequately surveyed areas where no historic properties are present or effects to known cultural resources will be avoided, or within a paved area.
8. Landscape activities and improvements within the main cantonment and associated with tree and shrubbery planting or removal; sod or artificial turf installation; irrigation installation and maintenance; rip rap, gravel, cobble, and boulder installation and removal; and pathway and trail construction and maintenance, in completely and adequately surveyed areas, within a developed area covered with hardscape or landscape materials, or in an area that has been previously graded, or used as an existing staging area, and in an area where no historic properties are present or effects to known historic properties will be avoided.
9. In-kind replacement of culvert systems beneath roads or within associated drainage systems, including provision of headwalls, riprap, and any modest increase in capacity, provided that the work substantially conforms to the existing footprint, is in completely and adequately surveyed areas, and is in an area where no historic properties are present (including the culvert system) or effects to known historic properties can be avoided.
10. Routine repair and maintenance of airfields and associated equipment, provided the relevant portion of the airfield has been completely and adequately surveyed, and is in an area where no historic properties are present or effects to known historic properties can be avoided.
11. Maintenance and repair to existing communications towers, provided that the tower does not qualify as a historic property, based on previous SHPO consultation, and the work does not diminish the setting, feeling, and association of a historic property. Additions to towers that meet the stated conditions, as long as they do not change the height or established footprint of the tower.



Legend

- Area of Potential Effects
- Fort Irwin Boundary
- Cantonment
- Range Complex

N

0 3 6 12 Miles

1 in = 7 miles

Service Layer Credits: ESRI Imagery and Street Map

Attachment C:
FIGURE 1
Area of Potential Effects
Fort Irwin, CA

Legend

- Area of Potential Effects
- 2021 Completed Survey (report pending)
- Previously Conducted Survey Areas
- Previously Conducted Survey Areas (report pending)
- Off-Limits/Non-Maneuver Areas

Off-Limits/Non-Maneuver Areas consist of portions of Fort Irwin that are not available for training, and typically include sensitive natural resources or historic properties, desert tortoise mitigation lands, a potential well location, or playas (dry lake beds) or other areas of high dust potential.

Outlines thickened slightly to show more survey details.

N

0 2 4 8 Miles

1 in = 4 miles

Attachment C:
FIGURE 2
Previously Conducted Cultural Resources Survey and Off-Limits/Non-Maneuver Areas
Fort Irwin, CA

Legend

- Area of Potential Effects
- Previously Conducted Survey Areas
- High Maneuver Intensity
- Medium Maneuver Intensity
- Low Maneuver Intensity
- Restricted/Limited-Maneuver
- Off-Limits/Non-Maneuver Areas

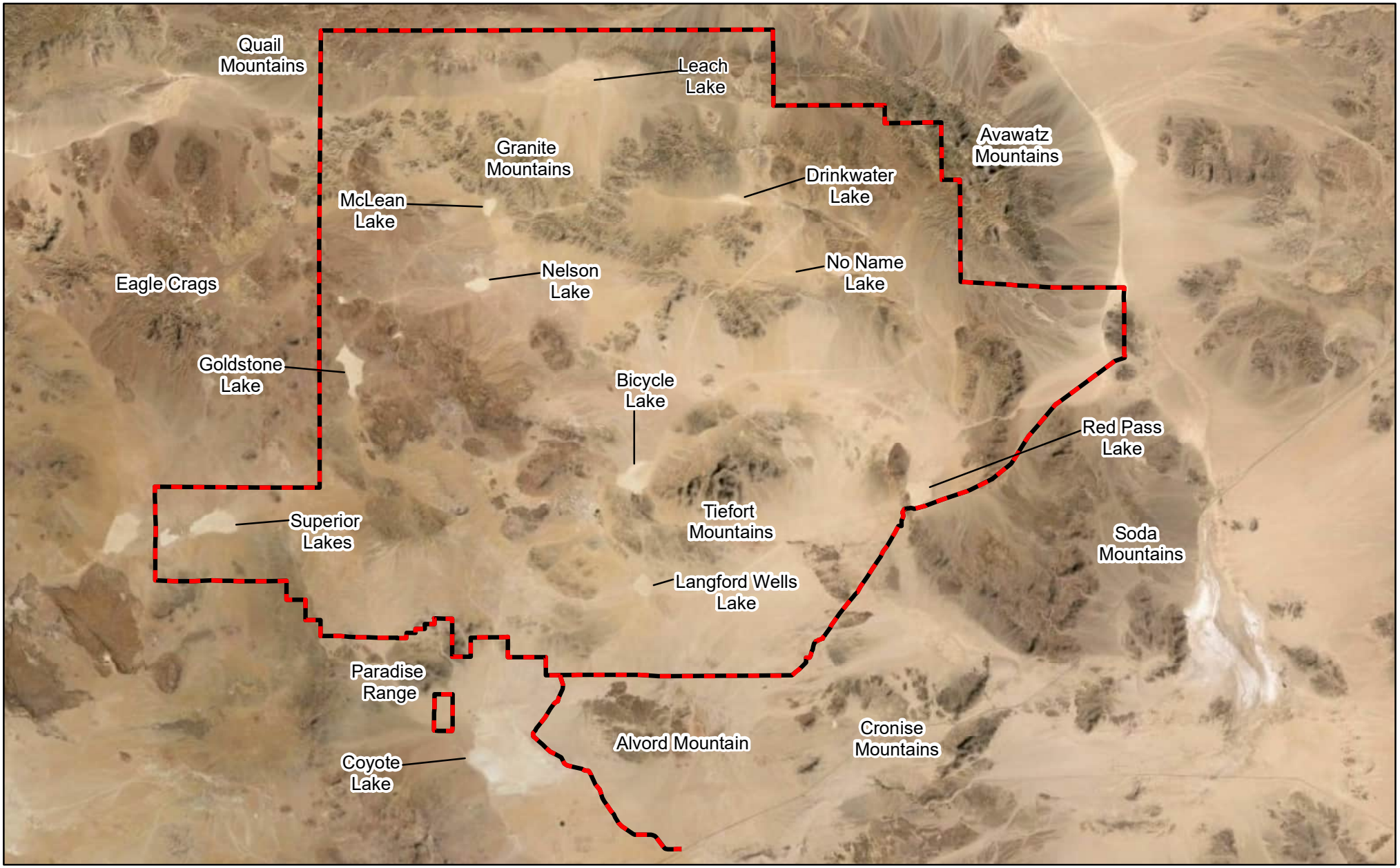
***High-Maneuver Intensity**: Unlimited cross-country movement by all vehicle types;*
***Medium-Maneuver Intensity**: Movement by all vehicle types restricted to roads, staging or assembly areas;*
***Low-Maneuver Intensity**: All vehicle types on roads, dismounted traffic (e.g., foot soliders) off roads, and no staging areas. Restrictions due to terrain constraints;*
***Restricted/Limited-Maneuver**: All vehicle types on roads, dismounted traffic off roads, and no staging areas. Restrictions due to administrative constraints.*
***Off-Limits/Non-Maneuver Areas**: No entry to vehicles except as authorized. Includes desert tortoise mitigation lands.*

N

0 2 4 8 Miles

1 in = 4 miles

Attachment C:
FIGURE 3
Maneuver Intensity Areas and Survey Areas
Fort Irwin, CA



Legend

Area of Potential Effects

Fort Irwin Boundary

Note: all lakes are currently playas.

N

0 3 6 12 Miles

1 in = 7 miles

Service Layer Credits: ESRI Imagery and Street Map

Attachment C:
FIGURE 4
Setting
Fort Irwin, CA

Attachment D

Consulting Party Participant Lists

The following presents the invited participants for the six (6) consulting party meetings that were held on February 5, 2021; March 11, 2021; April 16, 2021; May 20, 2021; June 30, 2021; and March 28, 2022. Names that are included in **bold** indicate attendance at each meeting. Due to COVID-19, these meetings were virtually via Microsoft Teams and telephone.

February 5, 2021 meeting, 12:30 PM to 2:00 PM, PST

- [redacted], **San Manuel Band of Mission Indians**
- [redacted] **San Manuel Band of Mission Indians**
- [redacted], **Fort Mojave Indian Tribe**
- [redacted], Fort Mojave Indian Tribe
- [redacted], **Morongo Band of Mission Indians**
- [redacted], **Lone Pine Paiute Tribe**
- [redacted] Big Pine Paiute Tribe of the Owens Valley
- [redacted] **Fort Independence Indian Reservation**
- [redacted], Cabazon Band of Mission Indians
- [redacted], Chemehuevi Indian Tribe
- [redacted], Colorado River Indian Tribe
- [redacted] Timbisha Shoshone Tribe
- [redacted], Bishop Paiute Tribe
- [redacted], Kern Valley Indian Community
- [redacted] **Advisory Council on Historic Property**
- [redacted] **California Office of Historic Preservation**
- [redacted] California Office of Historic Preservation
- [redacted], **National Park Service**
- [redacted], **NASA**
- [redacted] **NASA Contractor**
- [redacted], Bureau of Land Management
- [redacted], NAWS China Lake
- [redacted], Nellis Air Force Base
- [redacted] IMCOM
- [redacted] **USAEC**
- [redacted] **USAEC**
- [redacted] **USAEC**
- [redacted], **Fort Irwin**
- [redacted] **NTC**
- [redacted], **Fort Irwin**
- [redacted] **Fort Irwin**
- [redacted], **Fort Irwin**
- [redacted] **Fort Irwin**
- [redacted] **Fort Irwin (G3)**

- [redacted] **Fort Irwin (G3)**
- [redacted], Fort Irwin
- [redacted], **Fort Irwin**
- [redacted], **Fort Irwin**
- [redacted] **USACE**
- [redacted] **Jacobs Engineering Group**
- [redacted] **Jacobs Engineering Group**
- [redacted] **Jacobs Engineering Group**
- [redacted] **Jacobs Engineering Group**

March 11, 2021 meeting, 1:30 PM to 3:00 PM, PST

- [redacted] San Manuel Band of Mission Indians
- [redacted], **San Manuel Band of Mission Indians**
- [redacted], **Fort Mojave Indian Tribe**
- [redacted], **Fort Mojave Indian Tribe**
- [redacted] **Morongo Band of Mission Indians**
- [redacted], Lone Pine Paiute Tribe
- [redacted] Big Pine Paiute Tribe of the Owens Valley
- [redacted] **Fort Independence Indian Tribe**
- [redacted] Cabazon Band of Mission Indians
- [redacted] Chemehuevi Indian Tribe
- [redacted], Colorado River Indian Tribe
- [redacted] Timbisha Shoshone Tribe
- [redacted], Bishop Paiute Tribe
- [redacted] **Kern Valley Indian Council**
- [redacted] **Advisory Council on Historic Preservation**
- [redacted] **California State Office of Historic Preservation**
- [redacted] California State Office of Historic Preservation
- [redacted], **National Park Service, National Trails**
- [redacted] NASA
- [redacted] **Jet Propulsion Laboratory**
- [redacted], Bureau of Land Management
- [redacted] NAWS China Lake
- [redacted] IMCOM
- [redacted] **USAEC**
- [redacted] **USAEC**
- [redacted] USAEC
- [redacted] Fort Irwin
- [redacted], **NTC**
- [redacted] **Fort Irwin**
- [redacted], **Fort Irwin**
- [redacted] **Fort Irwin**
- [redacted] **Fort Irwin**
- [redacted] **Fort Irwin**
- [redacted] **G3**
- [redacted] **G3**
- [redacted] **Fort Irwin**

- [redacted] **Fort Irwin**
- [redacted], **Fort Irwin**
- [redacted] **Jacobs Engineering Group**
- [redacted] Jacobs Engineering Group
- [redacted] **Jacobs Engineering Group**
- [redacted] **Jacobs Engineering Group**
- [redacted], **Jacobs Engineering Group**

April 16, 2021 meeting, 10:30 AM to 12:00 PM, PST

- [redacted] San Manuel Band of Mission Indians
- [redacted] **San Manuel Band of Mission Indian**s
- [redacted], **Fort Mojave Indian Tribe**
- [redacted], **Fort Mojave Indian Tribe**
- [redacted] **Morongo Band of Mission Indians**
- [redacted], **Morongo Band of Mission Indians**
- [redacted] Lone Pine Paiute Tribe
- [redacted], Big Pine Paiute Tribe of the Owens Valley
- [redacted], Fort Independence Indian Tribe
- [redacted], Cabazon Band of Mission Indians
- [redacted], Chemehuevi Indian Tribe
- [redacted], Colorado River Indian Tribes
- [redacted], **Colorado River Indian Tribes**
- [redacted], Timbisha Shoshone Tribe
- [redacted], Bishop Paiute Tribe
- [redacted], **Kern Valley Indian Council**
- [redacted], **Advisory Council on Historic Preservation**
- [redacted], **California State Office of Historic Preservation**
- [redacted] California State Office of Historic Preservation
- [redacted] **National Park Service, National Trails**
- [redacted], NASA
- [redacted], **Jet Propulsion Laboratory (Contractor)**
- [redacted], Bureau of Land Management
- [redacted] NAWS China Lake
- [redacted], **USAF (Nellis)**
- [redacted], IMCOM
- [redacted], USAEC
- [redacted], **USAEC**
- [redacted], USAEC
- [redacted], Fort Irwin
- [redacted], NTC
- [redacted], Fort Irwin
- [redacted], Fort Irwin
- [redacted], Fort Irwin
- [redacted], **Fort Irwin**
- [redacted], **Fort Irwin**
- [redacted], **Fort Irwin**
- [redacted], G3

- [redacted], **G3 (for Ron Gardner)**
- [redacted], G3
- [redacted] Fort Irwin
- [redacted], **Fort Irwin**
- [redacted], **Fort Irwin**
- [redacted], **Jacobs Engineering Group**
- [redacted], Jacobs Engineering Group
- [redacted], **Jacobs Engineering Group**
- [redacted], Jacobs Engineering Group
- [redacted], Jacobs Engineering Group
- [redacted], **Jacobs Engineering Group**

May 20, 2021 meeting, 1:00 PM to 2:30 PM, PST

- [redacted] San Manuel Band of Mission Indians
- [redacted], **San Manuel Band of Mission Indians**
- [redacted] **Fort Mojave Indian Tribe**
- [redacted], Fort Mojave Indian Tribe
- [redacted] **Morongo Band of Mission Indians**
- [redacted] **Morongo Band of Mission Indians**
- [redacted], Lone Pine Paiute Tribe
- [redacted], Big Pine Paiute Tribe of the Owens Valley
- [redacted], **Fort Independence Indian Tribe**
- [redacted], Cabazon Band of Mission Indians
- [redacted], Chemehuevi Indian Tribe
- [redacted], Colorado River Indian Tribe
- [redacted], **Timbisha Shoshone Tribe**
- [redacted], Bishop Paiute Tribe
- [redacted] Kern Valley Indian Council
- [redacted], **Advisory Council on Historic Preservation**
- [redacted], **California State Office of Historic Preservation**
- [redacted] California State Office of Historic Preservation
- [redacted], National Park Service, National Trails
- [redacted], NASA Jet Propulsion Laboratory
- [redacted] **NASA Jet Propulsion Laboratory (Contractor)**
- [redacted], Bureau of Land Management
- [redacted], NAWS China Lake
- [redacted] IMCOM
- [redacted], **USAEC**
- [redacted], USAEC
- [redacted] USAEC
- [redacted], Fort Irwin
- [redacted], **NTC**
- [redacted], Fort Irwin
- [redacted], Fort Irwin
- [redacted], Fort Irwin
- [redacted], **Fort Irwin**
- [redacted] **Fort Irwin**

- [redacted] Fort Irwin
- [redacted], G3
- [redacted] G3
- [redacted] **Fort Irwin**
- [redacted] **Fort Irwin**
- [redacted], **Fort Irwin**
- [redacted] **Jacobs Engineering Group**
- [redacted], Jacobs Engineering Group
- [redacted], **Jacobs Engineering Group**
- [redacted] **Jacobs Engineering Group**
- [redacted] Jacobs Engineering Group

June 30, 2021, 11:00 AM to 12:30 PM, PST

- [redacted], San Manuel Band of Mission Indians
- [redacted] San Manuel Band of Mission Indians
- [redacted] **Fort Mojave Indian Tribe**
- [redacted], Fort Mojave Indian Tribe
- [redacted] **Morongo Band of Mission Indians**
- [redacted], **Morongo Band of Mission Indians**
- [redacted] Lone Pine Paiute Tribe
- [redacted], **Big Pine Paiute Tribe of the Owens Valley**
- [redacted], Fort Independence Indian Tribe
- [redacted] Cabazon Band of Mission Indians
- [redacted] Chemehuevi Indian Tribe
- [redacted], Colorado River Indian Tribe
- [redacted], Timbisha Shoshone Tribe
- [redacted] Bishop Paiute Tribe
- [redacted], **Kern Valley Indian Council**
- [redacted], **Advisory Council on Historic Preservation**
- [redacted] **California State Office of Historic Preservation**
- [redacted] California State Office of Historic Preservation
- [redacted], **National Park Service, National Trails**
- [redacted], NASA
- [redacted], Jet Propulsion Laboratory
- [redacted] Bureau of Land Management
- [redacted], NAWS China Lake
- [redacted] IMCOM
- [redacted], **USAEC**
- [redacted], USAEC
- [redacted], USAEC
- [redacted], Fort Irwin (new Garrison Commander is Colonel Jason A. Clarke)
- [redacted], **NTC**
- [redacted], Fort Irwin
- [redacted] Fort Irwin
- [redacted] **Fort Irwin**
- [redacted], **Fort Irwin**
- [redacted], **Fort Irwin**

- [redacted] G3
- [redacted], G3
- [redacted], **Fort Irwin**
- [redacted], Fort Irwin
- [redacted], Fort Irwin
- [redacted] **Jacobs Engineering Group**
- [redacted], Jacobs Engineering Group
- [redacted] **Jacobs Engineering Group**
- [redacted] **Jacobs Engineering Group**

March 28, 2022, 3:30 PM to 4:30 PM, PST

- [redacted] San Manuel Band of Mission Indians
- [redacted], **San Manuel Band of Mission Indians**
- [redacted], **Fort Mojave Indian Tribe**
- [redacted], Fort Mojave Indian Tribe
- [redacted], **Morongo Band of Mission Indians**
- [redacted], **Morongo Band of Mission Indians**
- [redacted], Lone Pine Paiute Tribe
- [redacted], Big Pine Paiute Tribe of the Owens Valley
- [redacted] Fort Independence Indian Tribe
- [redacted], Chemehuevi Indian Tribe
- [redacted], Chemehuevi Indian Tribe
- [redacted], Colorado River Indian Tribe
- [redacted], **Timbisha Shoshone Tribe**
- [redacted] Bishop Paiute Tribe
- [redacted] Kern Valley Indian Council
- [redacted] **Advisory Council on Historic Preservation**
- [redacted], California State Office of Historic Preservation
- [redacted] **California State Office of Historic Preservation**
- [redacted], **California State Office of Historic Preservation**
- [redacted] **National Park Service, National Trails**
- [redacted] Jet Propulsion Laboratory
- [redacted], NAWS China Lake
- [redacted] **NTC**
- [redacted], **NTC, Fort Irwin**
- [redacted] **NTC**
- [redacted], **NTC**
- [redacted] **NTC**
- [redacted] **NTC**
- [redacted], NTC
- [redacted], NTC
- [redacted], **Jacobs Engineering Group**
- [redacted], **Jacobs Engineering Group**
- [redacted] **Jacobs Engineering Group**

Attachment E

Attachment E contains a listing of historic properties within Fort Irwin. Due to the confidential nature of these resources, the listing has been removed from public distribution, in accordance with Section 304 of the National Historic Preservation Act.

Attachment F

Standard Operating Procedures

INTRODUCTION

Fort Irwin has previously included Standard Operating Procedures (SOPs) as part of the Installation's Integrated Cultural Resources Management Plan (ICRMP). In the interests of providing a more complete PA, the SOPs initially developed for the updated ICRMP, but most directly related to the Section 106 process, have been moved to the current document. Additional SOPs are anticipated to address other program aspects, and may be consulted upon either individually (as needed) or as part of an ICRMP.

The current document is designed to be incorporated as part of an ICRMP, with the ICRMP extending the contents of these SOPs to all activities on Fort Irwin. We therefore anticipate that the contents of any future ICRMP and the contents of the SOPs will be in accordance with each other. If initial consultation for an ICRMP or for subsequent changes to that ICRMP result in the conclusion that changes to these (Attachment F) SOPs are needed, Fort Irwin (or, if they so desire, another Signatory or Invited Signatory) will propose the changes as an amendment to the PA, in accordance with the amendment process set forth in the PA.

SOP 1: IDENTIFYING UNDERTAKINGS AND DEFINING AREAS OF POTENTIAL EFFECT

The Army shall determine whether a project or activity qualifies as an undertaking. If the project qualifies as an undertaking, then the Cultural Resources Manager (the CRM is a subject matter expert) will determine whether the undertaking is the type that has the potential to affect historic properties and will define the area(s) of potential effect (APE). The results of the undertaking determination and definition of the APE will be maintained in an electronic database. Supporting documentation and the rationale used in making determinations will be retained by the CRM.

1.1 Identify the Undertaking

An undertaking may be defined as a project, activity, or program that is funded in whole or in part by the Army, or is under the direct or indirect jurisdiction of the Army (whether carried out by or on behalf of the Army), or is carried out in whole or in part with Army funds, or requires Army approval.

- If a project or activity is transmitted to the CRM but found upon further review not to qualify as an undertaking, the finding will be documented for program records and included in the Section 106 Annual Report, or other program review documents as appropriate.

- If a project or activity is transmitted to the CRM but is related to training or training support and exempt from project-specific consultation under Attachment B of the 2022 Section 106 Programmatic Agreement, the finding will be documented for program records and included in the Section 106 Annual Report.

- The next step is the definition of the Area of Potential Effect.

1.2 Define the Area of Potential Effect (APE)

The APE is the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of any historic properties present. The size of the APE is determined on a case-by-case basis and includes in its calculation the scale and nature of the undertaking. Generally, the size of the APE will be commensurate with the size of the project, plus an additional buffer to account for maneuvering of personnel and equipment.

Definition of the APE must take into account effects that are direct (resulting from an action, without separation in space or time), indirect (resulting from an action, but separated from it by time or distance), and cumulative (incremental effects resulting from past, present, and reasonably foreseeable future projects, regardless of the agency or person involved).

To determine the project area, the Project Manager shall:

- Include staging areas and access routes that are newly constructed or that will be substantively modified for the project.

- Identify the materials sources (specifically if the area(s) are on base, otherwise “imported materials” may be used).

To determine the project area of potential effects, the CRM shall:

- Categorize the undertaking by considering the type of activity.
- Determine whether the effects typically associated with this category of undertaking are expected effects for the project.
- Based on anticipated effect(s), determine where those effects might occur in relation to the project. Account for an additional buffer, generally 10 to 50 m in width depending on the size and complexity of the undertaking and proposed equipment, to accommodate the maneuvering of personnel and equipment. The areas where these effects might occur constitute the APE.
- Examine the APE with respect to the anticipated possible effects to determine whether the undertaking activities are likely to affect historic properties.
- Complete this process for all potential project locations.
- Include all APE definitions on a project map, delineating the areas of direct and indirect effect.
- Determine whether the scope and/or nature of the project might result in additional effects.
- Consider potential visual effects to historic districts or sites for which the viewshed contributes to eligibility. Note that these resources may be outside the project area.
- Consider that properties of traditional religious and cultural importance (referring specifically to properties important to Tribes) or Traditional Cultural Properties may involve additional considerations, such as noise or atmospheric effects. (Indian Sacred Sites may also involve specific considerations.)
- Consider, as needed, direct effects (such as the effects of helicopter downdraft on petroglyph/pictograph sites or buildings) and indirect effects (such as the effects vibrations from nearby munitions impacts to petroglyphs or rockshelters) that may not be well-defined for historic properties.
- Take the depth of the proposed disturbances into account, since an APE has a vertical as well as a horizontal component.

Upon determination of the APE, the APE shall be documented by the CRM and retained for program review. The next step is identifying and evaluating historic properties.

SOP 2: IDENTIFYING AND EVALUATING HISTORIC PROPERTIES*

Once an undertaking has been determined under SOP 1, and the Cultural Resources Manager (CRM) has determined the undertaking is not an activity determined to have no effect in accordance with Attachment E of the Section 106 Programmatic Agreement, the CRM must identify any historic properties within the APE and document findings derived from background research and inventory surveys. The CRM performs the procedures in this SOP in consultation with the SHPO (as delegated by the ACHP) and affiliated federally recognized Tribes.

2.1 Identification and Recordation of Historic Properties within the Area of Potential Effect

2.1.1 Identification

The CRM uses existing historic contexts, predictive models (where developed and consulted upon), geological data, and site and survey records and reports to identify potential historic properties within an APE. Background research should also include other resources, such as available historic maps (e.g., General Land Office plats, historic topographic maps) and aerial photographs, in addition to other reference materials. (As of 2022, Fort Irwin is in the process of acquiring on-line historic maps so that they can be georeferenced for easy use as GIS layers.) The environmental context, including geological aspects of the setting, may have implications for the potential for buried deposits and the need for subsurface site testing.

The steps are as follow.

1. Determine whether the area has been previously, completely surveyed for cultural resources in a manner sufficient to identify any reasonably anticipated historic properties. This includes determining that the report clearly identifies the transect intervals used, the coordinate system employed, and information sufficient to identify on a map any areas that were not systematically surveyed or that were surveyed at an interval differing from the rest of the project area.

2. Employ a suitable records search area (RSA) to provide a context for expected (or identified) resources in the project area(s), and to consider indirect effects. Fort Irwin typically uses 200m due in part to the degree of local variation based upon topography, the presence of playas, and other factors.

3. Determine whether additional investigations are required, considering (1) whether new survey has the potential to yield information not available from the previous survey(s); (2) whether other types of investigation might yield information not available from the previous work; (3) whether any applicable historic contexts or program comments have been developed in the interim; and (4) whether the transect interval used was sufficient to identify historic properties likely to be present (considerations may include the types of cultural resources identified in the records search area).

   Fort Irwin currently uses transect spacing of 15m as standard; exceptions may be made based on factors such as slope. Previous survey intervals generally do not exceed 30m, potentially with exceptions made based on factors such as slope.

   Information not available from the previous work may reflect a variety of conditions. For example, the study type may not have been focused on identifying all types of resources (e.g., an inventory of the built environment would not necessarily identify a prehistoric archaeological site), resources may be present that reached the 50-year mark in the interim, or disturbances may have increased the potential to identify buried site deposits in areas considered likely to have them. If potential historic

properties are reasonably likely to have been missed by the previous survey, and survey can safely be completed, the relevant areas will be re-surveyed.

4. Additional investigations may also include preliminary tribal consultations to identify Properties of Traditional Religious and Cultural Importance (PTRCI), considered herein as a subset of Traditional Cultural Properties (TCP) as defined by the National Park Service (NPS).

    a. The Fort Mojave Indian Tribe has provided the following definition of Tribal Cultural Resources (defined within the California Environmental Quality Act; Section 106 or other cultural resources legislation may apply):

        > Tribal cultural resources and properties of traditional religious and cultural importance include both tribal values and archaeological, historical, cultural, and sacred sites. These elements involve tribal cultural values embodied within both tangible and intangible domains. Traditional Cultural Properties (TCPs), Ethnographic Landscapes, archaeological sites and districts, objects, and places of natural and spiritual sacred significance are the main components of Native American cultural heritage.

    b. For Section 106 purposes, the definition provided immediately above will be taken into account in attempting to identify potential historic properties. (For training and training support activities, see also the discussion of Tribal Cultural Resources in the Abbreviations, Acronyms, and Attachments section of the 2022 Section 106 PA.)

    c. Laws and regulations other than Section 106/the National Historic Preservation Act (e.g., Indian Sacred Sites, the Archaeological Resources Protection Act, and the Native American Graves Protection and Repatriation Act may also apply, and), and other opportunities to address tribal concerns (such as project modification that does not impact the mission) should be considered if relevant.

5. The Installation Archaeologist will need to make periodic contact with the Advisory Council on Historic Preservation and US Army Environmental Center (USAEC) to determine whether any applicable nationwide historic contexts or program comments have been developed.

6. If the APE has not been previously and adequately inventoried, the area not covered will be inventoried in accordance with Fort Irwin's standards.

7. Areas having a high potential for subsurface deposits may require subsurface testing to be considered adequately surveyed. However, it should be remembered that subsurface testing, even within a known site, may only (as a function of artifact/feature distribution relative to sampling) serve to better characterize the geological potential to serve as a matrix for archaeological deposits. Thus, areas for which adequate previous survey has been conducted may still warrant targeted project monitoring.

8. Any previously recorded cultural resources must also be reviewed for adequate documentation and the potential for changed conditions as related to National Register eligibility/any other applicable management considerations. Currently, the majority of eligible and potentially eligible sites are monitored, so current data will generally be available. (Note that the number changes annually, or more frequently, as a result of program review and the identification of previously unrecorded sites.)

    For sites previously deemed not eligible, determine whether the horizontal site extent has been completely documented (moving sand sheets can make this task especially difficult, such that

boundaries for relevant sites may change over time); whether the geological context is adequately described to determine whether or not buried deposits are likely; whether, in light of geological factors, subsurface testing sufficient (in extent, including depth and placement) to identify the site's potential for significant buried deposits has been conducted; whether the interpretation of the site is inconsistent with the description (e.g., if the site is interpreted as a hunting camp but has pottery); and whether site constituents were adequately documented. Eligibility should also be considered in light of current contexts, recent developments in technology and methods, and whether tribal consultation has been completed.

9. For previously recorded isolates, consider whether the designation is the appropriate one (For example, is there potential for them be surface representatives of a subsurface site, or should they be regarded as secondary deposits of a site?). Also, consider their potential for eligibility under all four criteria.

10. When SHPO concurrence regarding eligibility for previously recorded sites has not been received, it will be requested. Tribal input shall also be requested (with the documentation provided at least equivalent to that provided to the SHPO) and taken into account, unless the resource type is one that is determined in consultation not to have the potential to be of interest to the Tribes.

These actions will be conducted in accordance with (IAW) SOP 6; the mining Historic Context developed for Fort Irwin; and, once consulted upon and accepted, any future historic contexts developed for Fort Irwin.

2.1.2 Recordation

Cultural resources will be recorded on the appropriate DPR forms, and in accordance with the historic preservation review process mandated by Section 106 as outlined in regulations issued by the ACHP ("Protection of Historic Properties" (36 CFR Part 800)). Details included in recordation are subject to justifiable decisions of the field professional and the nature of the resource in question. Fort Irwin will record archaeological sites as follows:

- Site: A site is constituted by the presence of midden soils or features, or at least three classes of prehistoric artifacts, e.g., flakes, modified flakes, bifaces, projectile points, cores, ceramics, and/or historic artifact classes, e.g., domestic, military, and architecture, or the presence of at least 20 cultural items within a 10 meter radius (these can all be of a single class of artifact, but not from the same object, such as the results of a pot drop).. Significant features are features reasonably considered to be at least 50 years of age and of cultural origin.

- Sites will be recorded on the appropriate DPR form sets, to include, at minimum: a Primary Record (DPR 523A); a Building, Structure, Object (DPR 523B) for historic resources or an Archaeological Site Record (DPR 523C) for prehistoric resources; and a Location Map (DPR 523J).

- Additional forms, such as specific artifact-type records or continuation sheets, will be utilized as needed to document the site.

- National Register Bulletin 38 guidance will be used in documenting Traditional Cultural Properties.

Use of the above definition provides for consistent site identification. However, it is recognized that, in certain cases, low-density sites provide information about an aspect of area archaeology, such as an activity type, cultural group, or time period that is poorly known for the area. In such cases, the recorder must

provide an explicit justification for documenting the resource as a site.

- Isolate: An isolate is defined as the occurrence of less than 20 artifacts within a 30-meter radius, assuming that the artifact types do not qualify the resource under the above definition of a site. Individual pieces that were part of the same item (sherds from a pot drop, pieces of a single glass bottle) will be treated as a single artifact.

- An individual Primary Record form will be completed for each noteworthy prehistoric isolate, e.g., those including time-diagnostic, rare, or culturally or functionally diagnostic artifacts.

- Other prehistorical isolates may be grouped by type (e.g., groundstone; fine-grained volcanic debitage; crypto- to microcrystalline sedimentary debitage; obsidian debitage; other debitage; formal tools, use-modified tools). The information included will be as for the combined Primary Record.

- Historic isolates that are associated with the same theme (such as mining or military activities) may be documented together on a single Primary Record form where doing so facilitates contextual discussions. The information included will be as for the combined Primary Record.

- A combined Primary Record form with a map and table will be completed for all other isolates within a discrete survey area, e.g., a project APE, a survey area, a drainage basin (potentially archaeologically meaningful divisions are preferred for larger-scale surveys), or a square kilometer of a large area. The table will minimally include the following: isolate type, UTMs, setting (landform, soils, vegetation), and a brief description. Attachments will include photographs of each isolate.

- The project report shall summarize the number and types of isolates found and discuss any conclusions suggested by the presence and distribution of the materials.

- The potential for isolates to be eligible will be considered under all four criteria and will be explicitly discussed.

If cultural resources are identified in the APE, this finding shall be documented and retained for future program review of the undertaking. Potential historic properties are not considered to be actual historic properties until they have been evaluated and recommended for inclusion in the NRHP. Cultural resources awaiting evaluation will be treated as historic properties until official eligibility determinations (see 2.2 below) have been made.

2.2 Evaluation of Historic Properties and Eligibility Determinations

Once cultural resources have been identified in an APE, the CRM will evaluate previously unevaluated properties for NRHP eligibility. Previously evaluated properties (meaning those for which SHPO concurrence has been received) will be reviewed to determine whether there has been any change in relevant circumstances. A few examples are the development of techniques or applications that increase a site's information potential, the determination that a resource should be considered as part of a larger whole, a substantive loss of integrity, or the potential for use of absolute dating methods not previously considered) that could affect their eligibility recommendations. They will also be reviewed to determine whether

documented tribal consultation has occurred.

The CRM shall use the National Register criteria (36 CFR 60.4), National Register Bulletins (including NRB 15, 36, 38, 41, and 42), historic contexts, other assessment documentation, models, and reports as the basis for recommendations of eligibility. If information regarding the potential property is found to be non-existent, insufficient, or inaccurate, the CRM shall evaluate the property using, as appropriate, the mining Historic Context developed for Fort Irwin, or any future Historic Contexts developed, consulted upon, and approved for Fort Irwin.

- All four criteria shall be considered and discussed for all resources. If the geological context and cultural resources type warrants it, subsurface testing may be applied in evaluating cultural resources.

- Such testing will consider the number/size of tests needed to characterize the geological setting as it pertains to the potential for buried cultural deposits.
- Such testing will consider the potential of all subareas of the site in identifying areas for testing to identify subsurface archaeological deposits no.

- It will also take into account both potential surface indicators of subsurface deposits and the potential for buried cultural deposits to have different spatial patterning than surface deposits.

- Tribal and SHPO input regarding the testing strategy may be requested prior to testing.

The CRM will notify the SHPO and affiliated federally recognized Tribes of any newly proposed or updated eligibility recommendations. Once any Tribal input is taken into account and the SHPO has concurred with Fort Irwin's recommendation, the site will be recorded as officially determined ineligible or eligible and managed accordingly. If the SHPO or a Tribe does not agree with the recommendation, dispute resolution may be necessary.

- Where applicable, see Stipulation IV of the 2022 Section 106 PA. Otherwise, the process described in Section 2.3 will be followed.

2.3 Determination of Eligibility Dispute Resolution with no Applicable Agreement

If the SHPO or a Tribe expresses disagreement, within the 30-day NHPA review period, with the recommendation made by the CRM for historic property eligibility, or if the parties are unable to reach concurrence after consultation, the recommendation of eligibility will be forwarded to the Secretary of the Interior for additional information and a request will be made by Fort Irwin directly to the Keeper of the National Register for a final determination. The Secretary/Keeper will respond to a request for a formal determination of eligibility within 45 days of receipt of the request. If there is no response within the allotted time, Fort Irwin will manage the property according to the CRM's eligibility determination. . Determination of eligibility disputes and the process for requesting resolution are addressed in 36 CFR 63.

2.4 Documenting the Decision

If no historic properties are located within the APE, this determination shall be documented and retained for future program review.

If historic properties are located within the APE, this determination shall be documented and the CRM shall proceed to SOP 5: Assessing Effects of Undertakings on Historic Properties.

*Although none have currently been identified on Fort Irwin, another type of cultural resource that could require consideration is Indian Sacred Sites. These are considered under the American Indian Religious Freedom Act and EO 13007 rather than the NHPA, and thus would be considered separately from historic properties. Note that SOPs 6 and 7 may apply. Such resources would typically be identified via tribal input stemming from tribal participation, such as project review or field visits.

SOP 3: SITE AND ISOLATE FIELD DATA COLLECTION

Adequate, consistent field data provides information necessary for making accurate eligibility determinations. Fort Irwin's limited artifact collection policy must be taken into account in determining the data to collect and how to collect it, keeping in mind that field personnel may not have expertise in documenting certain types of artifacts and that some types of data require specialized analyses. Adequate field data also provides for what may be the only documentation of ineligible/non-contributing sites in a manner that helps clarify the overall use of the landscape at varying spatial scales.

Older reports sometimes inaccurately stated that a site's data potential had been completely exhausted. Archaeologists do not collect all the available information from sites, instead using professional judgment and standard practices to determine what is important (and feasible) to record. Examples of traits not typically recorded include sources for ubiquitous lithic raw materials or platform types for individual flakes.

New analytical techniques (or applications thereof), recognition of new patterns, and development of specific questions that may shed light on major themes could all result in changed understanding of a site's data potential. Therefore, the following specifications are intended to be flexible as information needs may change, yet provide a baseline for documenting the most common artifact types on Fort Irwin.

Details regarding the site and isolate data collection policy are provided to contractors verbally and through written documents. In general, the following parameters apply.

3.1 Debitage (photograph distinctive materials and a sample for #4-#6.)

For larger Fort Irwin sites (potentially with hundreds of single reduction loci) it may be appropriate to record only a statistically significant sample of the debitage at the level of detail noted below. The type of sample and an archaeological justification for the type and size of the sample are required, including a statement of why the sample is considered representative of the whole. In counting flake types (and noting specialized flakes such as notching flakes), **identify the source of the terms used for classes such as primary, secondary, tertiary, and shatter, or define the terms.**

- Documentation must include the following.

  - Numbers, sizes, and material types for SRLS and concentrations.
  - Maximum density per square meter of background materials.
  - Visually identified material types, noting the distinctive materials that might benefit from chemical (or other geological) source analysis.
  - Potential technological markers (for example, possible indicators of heat-treatment, bipolar flaking, or the use of indirect percussion), as related to raw materials.
  - Potential indicators of exposure to fire other than that associated with heat-treatment, where the raw material type is suitable for thermoluminescence dating.
  - Potential indicators of post-depositional effects (potlid fractures, breaks).

- Manufacturing characteristics such as unexpectedly high percentages of manufacturing errors or flakes in a particular size class in the assemblage, or other distinctive characteristics.

- Whether further analysis would provide any significant information.

3.2 Flaked Stone Tools (photograph; see 3.3 for cores and indeterminate bifaces)

♦ The following are to be recorded (for isolates, in background scatters, and in SRLs and concentrations):

- Inferred functional type (point, scraper, utilized flake).

- Cortex (amount, locations).

- Visually identified material type.

- Potential macroscopic indicators of use-wear, including the location, type (such as step fractures, polish, or striations), dimensions, and the shape of the working edge (concave, convex, straight, other).

- Dimensions (length, width, thickness, edge angle for cutting or scraping margins).

- Projectile point attributes in addition (use current guide): completeness and locations of damage; type(s) of damage, type(s) of use wear, flaking style, long section, cross section, shoulder width, neck width, base width and height; beveling fluting, serrations, or spurs; tip type, blade characteristics, shoulder form(s) with length of barbs if present, notch placement and type with opening width and notch orientation.

3.3 Bifaces and Cores (no evidence of use-wear; otherwise, treat as a tool. Photograph.)

♦ The following are to be recorded (for isolates, in background scatters, and in SRLs and concentrations):

- Stage (biface) or type (core). Core types are unidirectional, multidirectional, bidirectional, bipolar, unpatterned, or other (specify). Where Stage 1 and 2 bifaces are considered bifacial cores; document as a biface but note use as a core.

- Dimensions (length, width, thickness.)

- Visually identified raw material type.

- Cortex type (water-worn, primary geological, none).

- Potential manufacturing errors or breaks; whether exhausted (core).

3.4 Tested Cobbles (Photograph)

♦ Document:

- Dimensions.
- Visually identified material type.
- Number of flakes removed.

3.5 Hammerstones (Photograph)

♦ Document:

- Visually identified material type.
- Type and location(s) of use damage. (Photograph.)

3.6 Groundstone (photograph to show overall shape and areas of use wear)

♦ Document:

- Whether shaped and, if shaped, technique (for example, percussion or grinding).
- Visually determined material type.
- Whether the rock is vesicular or has large phenocrysts.
- Evidence of resharpening.
- Other use-wear (note size of area, placement, type (e.g., grain shear), and photograph).
- Dimensions (length, width, thickness).

3.7 Bone

♦ Document:

- Type (minimally bird or other).
- Size (e.g., small mammal, deer-sized mammal).
- Evidence of burning and associated color (such as blue, white, black).
- Other damage (breaks, weathering, gnawing marks).
- Deliberate modifications.

- For faunal materials identified as such, photographs should be used to document modifications and potentially condition. However, bone (including burned bone, given that cremation was practiced in the area) that cannot be identified as non-human is not to be photographed. An osteologist will need to visit the site.

3.8 Historic Debris (photograph a general sample and distinctive/time-diagnostic artifacts)

- Document:

  - Grouping (multiple piles, a single concentration, a background scatter) and size (including depth) of each grouping.

  - Context (for example, near a former dwelling—indicate the distance and direction, along a road, in a drainage cut).

  - Material categories (glass, ceramics, metal, and so forth) and functional categories (bottles, plates, cans). Provide actual (<=100) or estimated counts of each.

  - Functional subcategories, where evident (food cans, milk cans, beer bottles). Describe the evidence (labels, embossing, opening or closure types, and so forth).

  - Record potentially time-diagnostic attributes (for example glass color, maker's marks, recessed panels, embossed lettering, manufacturing attributes, and designs for bottle glass; ware, patterns, and maker's marks for ceramics; technological attributes and a sample of sizes for milk cans that have solder; patent dates).

SOP 4: GIS DATA COLLECTION AND PROCESSING

This SOP provides data standards and practices.

4.1 General Data Requirements

- The data must comply with the Spatial Data Standards for Facilities, Infrastructure, and Environment (SDSFIE).

- The projection and datum to be used are those in general use by Fort Irwin, currently Universal Transverse Mercator (Zone 11N) and World Geodetic Survey 1984 (WGS84).

- Each feature class requires metadata conforming to the Federal Geographic Data Committee (FGDC) Content Standards for Digital Geospatial Metadata (CSDGM) and the current Army Metadata Standard.

4.2 Site and Isolate Data

- For sites, separate layers must be maintained for (1) site boundaries, (2) features/ diagnostic artifacts/samples, and (3) the locations of shovel tests/test units. Photo points may be included as an additional layer.

- Attribute tables will be provided for site boundaries and will include the associated Fort Irwin project number, site location information, any temporary site numbers, the permanent trinomial (when available), the DPR primary record number, the date recorded, the name of the recorder, the resource attributes (California codes), the site type (Fort Irwin), the site condition, the period of use, and any additional useful information.

- For features, diagnostic artifacts, and samples in a site, or for isolates, each location will correspond to an entry in the attribute table that includes the artifact/feature/sample number, the artifact/feature/sample type, the materials, and any additional useful information. For artifacts, the collection status is to be indicated. If appropriate, the layer will be cross-referenced with the entries in #3.

- For shovel test and test unit locations, the attribute table must indicate the type of test (rarely, with justification, techniques such as surface scrapes or auger tests might also be applied), and dimensions (including depth).

SOP 5: ASSESSING EFFECTS OF UNDERTAKINGS ON HISTORIC PROPERTIES

If the CRM, in consultation with the SHPO and affiliated Native American Tribes, determines that historic properties are present within an APE (SOP 2), it must be determined if the undertaking will have an effect upon those historic properties. Effect is defined as alterations to the characteristics of a historic property that qualify it for inclusion in, or make it eligible for, the National Register. Based on the evaluation of effect, the CRM will make one of the following determinations.

5.1 No Historic Properties Affected

If the CRM finds that either there are no historic properties present or there are historic properties present but the undertaking will have no effect upon them, the CRM will determine that there will be no historic properties affected.

If no historic properties are affected, this determination shall be documented and retained for future program review.

5.2 Historic Properties Affected

If the CRM finds that historic properties are present in an APE and may be affected by the undertaking, the CRM shall determine if these effects are adverse. Adverse effects are those effects of an undertaking that may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the NRHP in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association (36 CFR 800.5(1)). The criteria of adverse effect also require consideration of all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the NRHP. Adverse effects include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance, or be cumulative. In keeping with legal requirements, the public will also be consulted regarding potential effects to historic properties. Confidentiality of information supplied during tribal consultation would be preserved in keeping with Section 304 of the NHPA.

5.2.1 Finding of No Adverse Effect

The CRM shall make a finding of no adverse effect when the undertaking's effects do not alter or diminish, directly or indirectly, any of the characteristics of a historic property that qualify it for inclusion in the National Register. If there is a finding of no adverse effect, this determination shall be documented and retained for future program review. The CRM will consult regarding this determination with affiliated federally recognized Native American Tribes, and will request SHPO concurrence.

5.2.2 Finding of Adverse Effect

The CRM shall find an adverse effect when the undertaking may alter or diminish, directly or indirectly, any of the characteristics of a historic property that qualify it for inclusion in the NRHP. Adverse effects may include reasonably foreseeable effects caused by the undertaking that (1) may occur later, (2) be outside of the current APE, or (3) be cumulative.

The findings of adverse effect shall be documented and provided to the proponent. The proponent will then work with the CRM through the procedures set forth in the Section 106 Programmatic Agreement.

SOP 6: GOVERNMENT-TO-GOVERNMENT CONSULTATION WITH TRIBES

The federally recognized Native American Tribes with historic ties to the Fort Irwin region are recognized by the U.S. government as sovereign nations with status as unique political entities in a government-to-government relationship with the United States. Fort Irwin is involved in consultations and decision-making regarding tribal interests. Formal government-to- government consultation with Tribes occurs at the Garrison Commander level. At present, Fort Irwin consults with the 10 Tribes listed below. However, preliminary discussions with the current contacts have indicated that not all of these Tribes may have an interest in the entire Fort Irwin area. (Maps and/or shapefiles provided by the Tribes are anticipated to provide guidance.) In addition, other contact lists (for example, those used by neighboring installations) for the area include Tribes not listed below. It is possible that such Tribes may request addition to the consultation list. Review and outreach should be conducted as appropriate.

- Big Pine Paiute Tribe of the Owens Valley
- Bishop Paiute Tribe
- Chemehuevi Indian Tribes of the Chemehuevi Reservation, California
- Colorado River Indian Tribes
- Death Valley Timbisha Shoshone Tribe
- Fort Independence Community of Paiute Indians of the Fort Independence Reservation, California
- Fort Mojave Indian Tribe of Arizona, California and Nevada
- Lone Pine Paiute-Shoshone Reservation
- Morongo Band of Mission Indians
- Yuhaaviatam of San Manuel Nation (formerly San Manuel Band of Mission Indians)

Prior to 2020, Fort Irwin also consulted with the Cahuilla Band of Mission Indians. No responses to consultation letters were being received. The Installation Archaeologist contacted the tribal specialist, who indicated that Fort Irwin is not currently within the Tribe's area of interest. The Cabazon Band of Mission Indians similarly indicated that Fort Irwin is not within the Tribe's current area of interest.

6.1 Government to Government Communication

See also SOP 25 (Hosting Tribal Representatives).

6.1.1 Written Communication

Each federally recognized Native American Tribe is a separate nation and is treated as such. All communications with the Tribes (with the exception of responses to individual communications from the Tribes) shall occur between Fort Irwin and each individual Tribe. Written communications shall be as follows:

- Correspondence sent to the tribal government head (e.g., Chief, Governor, or Chair) is signed by the Garrison Commander or his/her designated representative upon agreement with the Tribe;

- Correspondence sent to the tribal cultural resource coordinator/representative is signed by the Garrison Commander's appointed representative, the CRM;

- Copies of any document intended for review during face-to-face consultation will be provided to the tribal government head (e.g., Chief, Governor, Chair) and designated tribal cultural resources representatives in advance of the consultation meetings, with the goal of providing sufficient time for review.

6.1.2 Telephonic or Electronic Communication

The following guidance addresses telephonic and electronic communication. Fort Irwin will:

- Document telephonic or other informal consultation communication in order to maintain a record of the consultation process. Such documentation shall include the date of the communication, the names and titles of the participants, and the topic(s) discussed. Once completed, it will be provided to the participating tribal representatives for review and input. Any comments will be addressed and a copy of the document will be provided to all participating Tribes and placed on file at Fort Irwin.

6.1.3 Face-to-Face Meetings

Face-to-face meetings may involve one, some, or all of the Tribes with which Fort Irwin consults.

6.1.3.1 Participation

Face-to-face meetings will involve government-to-government participation between Fort Irwin and federally recognized Tribes. The Cultural Resources Manager/Installation Archaeologist may provide support.

6.1.3.2 Scheduling

Fort Irwin will work to achieve consensus regarding meeting dates, to provide the greatest opportunity for full representation by all Tribes that wish to participate. If possible, scheduling discussions will begin least two months prior to the meeting to allow time for maximum representation.

6.1.3.3 Coordination

Fort Irwin will solicit topics important to the Tribes in order to facilitate dialogs, limit the number of items discussed in face-to-face consultation meetings, and program sufficient time to allow for adequate coverage of each item of concern. Fort Irwin will, when possible, publish a proposed agenda and itinerary for the meeting/visit at least three weeks in advance so that all parties have an opportunity to edit/add to the agenda before its finalization (which shall occur no less than 7 calendar days prior to the scheduled meeting) and so that all parties arrive informed of the purpose and subject of the meetings.

6.1.3.4 Attendance

Whenever possible, Fort Irwin will open or close the meeting with appropriate comments from the Garrison Commander or his/her designee. The Garrison Commander or his/her designee may chair the meetings and may facilitate the discussions during the meeting. Tribal representatives may wish to offer opening and closing remarks also, and if so Fort Irwin will coordinate participation prior to the meeting.

6.1.3.5 Site Visits

In advance, Fort Irwin will determine whether attendees wish to participate in a site visit during the consultation meeting. Any site visits must be scheduled well in advance. Knowledgeable Fort Irwin staff representatives will accompany tribal representatives and make appropriate logistical arrangements including the provision of appropriate transportation, maps, and background data.

6.1.3.6 Documentation

A written summary providing a detailed overview of the meeting will be prepared following each face-to-face consultation. If appropriate, due to the nature of the discussion, a verbatim transcript of the meeting may be prepared, as long as no tribal representatives object to such a transcription. Regardless of tribal participation in the face-to-face meetings, a meeting summary/transcript and copies of meeting handouts prepared by Fort Irwin will be sent to each affiliated Tribe for multi-Tribal meetings. Meetings held between Fort Irwin staff and individual Tribes will be held as confidential and any summaries, transcripts, handouts, etc. shared during that meeting will only be provided to the Tribe who was party to that conversation, field visit, meeting, etc.

SOP 7: PROCEDURES APPLICABLE TO THE INADVERTENT DISCOVERY OF NATIVE AMERICAN HUMAN REMAINS AND RELATED CULTURAL ITEMS

Fort Irwin shall treat all Native American human remains and associated funerary objects, sacred objects, and/or objects of cultural patrimony discovered on lands under Fort Irwin management with respect and in accordance with the Native American Graves Protection and Repatriation Act (NAGPRA) and its implementing regulations (43 CFR 10). When such items are encountered inadvertently, all use of the immediate area (including an appropriate buffer, a minimum of 30 meters) by Fort Irwin shall be suspended.

The remains and associated cultural items will be protected in place to the greatest extent possible, and the immediate area will be secured until the potentially affiliated, federally recognized Tribes are contacted and consultation is undertaken to determine appropriate methods for the disposition of the human remains and associated cultural items. All such consultation and subsequent actions shall be conducted in full accordance with the provisions of 43 CFR 10 and this SOP. A flow chart, produced by the ACHP and detailing the overall process, follows this SOP.

7.1 Initial Discovery

Any person who knows, or has reason to believe, that he or she has inadvertently discovered potential NAGPRA items—bone material and or human remains, funerary objects, sacred objects, or objects of cultural patrimony—on Fort Irwin lands must provide immediate telephone notification of the inadvertent discovery, with written confirmation, to the Fort Irwin Cultural Resources Program Manager, who will notify the Garrison Commander and the Cultural Resources Manager (CRM). The CRM will immediately notify NTC G3 and, if the CRM is not the Installation Archaeologist (IA), will also notify the IA. The requirements of 43 CFR 10.4 regarding inadvertent discoveries apply whether or not an inadvertent discovery is duly reported. If written confirmation is provided by certified mail, the return receipt constitutes evidence of the receipt of the written notification by the Fort Irwin CRPM.

If the inadvertent discovery occurred in connection with an on-going activity on Fort Irwin, the finder, in addition to providing the notice described above, must stop the activity in the area of the inadvertent discovery and make a reasonable effort to protect the human remains, funerary objects, sacred objects, or objects of cultural patrimony in place. This may include placing barriers to deter access or visual screens to limit the visibility of the discovery.

The CRM and IA will make every effort to visit the site as soon as possible after initial notification by the discoverer, but they or their qualified representative shall do so no later than 72 hours after receipt of the written confirmation of notification. Further, the CRPM shall:

- Certify receipt of the notification; and
- Take immediate steps, if necessary, to further secure and protect inadvertently discovered human remains, funerary objects, sacred objects, or objects of cultural patrimony, including, as appropriate, providing stabilization or covering;

The CRM, with qualified professional assistance such as IA, a professional osteologist, and if needed law enforcement personnel, will (when bone is present) determine:

- Whether the remains are human.*
    - If human, whether the remains are recent (i.e., less than 50 years) and, in coordination with

installation law enforcement personnel, whether a crime scene is involved;* and

- Whether the remains are Native American.

[Note: Fort Irwin shall arrange for a qualified professional, such as the IA or the county coroner, to perform in situ identifications in assistance to the CRM.]

The results of these identification procedures will determine whether NAGPRA provisions apply to the discovered remains. With regard to Native American human remains discovered on federal lands, NAGPRA and 43 CFR 10 make no distinction concerning their temporal context (i.e., recent or archaeological in nature) or whether a potential crime scene exists. This provision of the SOP combines the affirmative provisions of NAGPRA concerning tribal consultation with conventional Installation law enforcement mandates. The following results are thus possible:

- Result 1: Remains are non-human and no funerary objects, sacred objects or objects of cultural patrimony are present.

- Result 2: Recent human remains are present, meaning that the potential for a crime scene needs consideration.

- Result 3: Archaeological but non-Native American human remains are present.

- Result 4: Archaeological and Native American human remains and/or funerary objects, sacred objects, or objects of cultural patrimony are present.

If Result 4 is determined, neither the remains nor funerary objects will be photographed. Sketches will be completed instead, only where needed to aid in necessary documentation.

7.2 Notification, Consultation, Treatment, and Disposition Procedures

In the event that the discovery yields Result 1 (non-human remains), Result 2 (modern human remains), or Result 3 (archaeological non-native human remains) above, the following actions will be taken:

- Result 1: Within three (3) working days of this determination, the CRM shall notify the NAGPRA Coordinator (or other tribally designated representative) of each affiliated federally recognized Native American Tribe, via telephone or email, that a reported inadvertent discovery of bone was non-human and that no funerary objects, sacred objects or objects of cultural patrimony were present. See paragraph 7.4 regarding resumption of activities.

- Result 2: If the discovery results in the identification of recent human remains, then the CRPM shall notify the Installation's Directorate of Emergency Services (DES), which assumes jurisdiction and responsibility. DES personnel will ensure that all installation activities cease within a 30-meter radius of the site and declare the site off limits to everyone except authorized personnel. DES personnel will investigate any potential criminal wrongdoing and carry the case to closure. Forensic examination of the remains will be conducted in accordance with local criminal investigative procedures. If evidence is present that the recent human remains are Native American, then the Tribes will be notified by the DES following appropriate next-of-kin notification. Final disposition of the remains will be arranged by the next-of-kin. Otherwise, final disposition of the remains will be arranged in accordance with 43 CFR 10.5 and 10.6.

- Result 3: The CRM, through the IA and cultural resources staff, will take administrative measures to protect the discovery site, including entering the site into the Fort Irwin Cultural Resources

Database and informing the SHPO and federally recognized affiliated Tribes of the discovery. The CRM will also assess the need for physical protection measures, such as barriers to exclude traffic from the burial location. Cultural resources personnel will also attempt to identify potential descendants and, if it is determined appropriate to leave the remains in place, elevate the potential for designating the location a cemetery to command.

7.3 Required Procedures when Native American Human Remains and/or Funerary Objects, Sacred Objects or Objects of Cultural Patrimony are Identified

Fort Irwin's preference is to leave NAGPRA items in place, as long as protection can provided for the foreseeable future. If such protection cannot be provided, Fort Irwin will explore options to provide for reburial in a location as close as reasonably possible to the original.

In the event that the discovery yields Result 4 (archaeological Native American human remains) above, the following actions will be taken:

- As noted above, no photographs will be taken.

- The CRM or, if the CRM is not available, an individual within the same chain of command shall, within three (3) working days, provide initial notification by telephone, with written confirmation, to each of the Native American Tribes regarding the discovery of human remains, funerary objects, sacred objects, or objects of cultural patrimony. This notification must include pertinent information as to kinds of human remains, funerary objects, sacred objects, or objects of cultural patrimony discovered inadvertently, their condition, and the circumstances of their inadvertent discovery;

- The CRM will then initiate consultation on the inadvertent discovery pursuant to 43 CFR 10.5 and this SOP;

- If the human remains, funerary objects, sacred objects, or objects of cultural patrimony must be excavated or removed, the CRM will ensure the requirements and procedures in 43 CFR 10.3(b) and the provisions of this SOP are followed; and

- The CRM will ensure that the disposition of all inadvertently discovered human remains, funerary objects, sacred objects, or objects of cultural patrimony is carried out following the provisions of 43 CFR 10.6.

- At least 30 days prior to transferring the human remains and other cultural items to the claimant entitled to custody, the responsible Federal agency must first publish a Notice of Intended Disposition. The Notice must:

  - be published two times (at least a week apart) in a newspaper of general circulation in the area in which the human remains and other cultural items were discovered;

  - be published two times (at least a week apart) in a newspaper of general circulation in the area or areas in which the affiliated Tribes now reside;

  - provide information as to the nature and affiliation of the human remains and other cultural items, in keeping with Section 304 of the NHPA and other pertinent laws; and

  - solicit further claims to custody.

- The Federal agency official must send a copy of the notice and information on when and where it was published to the National Park Service's National NAGPRA Program.

7.4 Resumption of Activity

The activity that resulted in the inadvertent discovery may, if otherwise lawful, resume thirty (30) days after verification, through receipt of written confirmation or registered receipt, by the Garrison Commander and CRPM, of notification to the Tribes of the inadvertent discovery. "Otherwise lawful" requires fulfilling the provisions of NAGPRA as related to the area of the inadvertent discovery. Resolving treatment and disposition typically requires longer than 30 days.

The activity may also resume, if otherwise lawful, at any time that a written, binding agreement is executed, between Fort Irwin and the Native American Tribes, that authorizes a recovery plan for the excavation or removal of the human remains, funerary objects, sacred objects, or objects of cultural patrimony following 43 CFR 10.3 (b)(1) The disposition of all human remains, funerary objects, sacred objects, or objects of cultural patrimony must be carried out following 43 CFR 10.6.

Compliance with the provisions of this SOP does not relieve Fort Irwin of the requirement to comply with Title 54, 306108 (replaces 16 U.S.C. 470 (f) *et seq*.), and addresses taking into account the effects of an action upon historic properties and allowing the ACHP a reasonable opportunity to comment; 36 CFR 800.11 (addresses documentation standards); or Section 3 (a) of the Archaeological and Historic Preservation Act (16 U.S.C. 469 (a-c)), discussing the preservation of archaeological and historical data. The CRM shall ensure that all such compliance requirements are met.

Until control and custody have been transferred, Fort Irwin has responsibility for NAGPRA cultural items found on Fort Irwin lands. If NAGPRA items cannot be protected in place, Fort Irwin will follow NAGPRA and the procedures developed in the Plan of Action. If temporary storage is necessary, Fort Irwin will arrange for such storage, requesting tribal approval of the proposed facility, in a facility that meets 36 CFR 79 standards for security and protection. In keeping with 10.6(c), transfer of custody procedures will respect traditional customs and practices of affiliated Tribes.

7.5 General Consultation Procedures

- **7.5 (b) (1) -** Upon receiving notice of, or otherwise becoming aware of, an inadvertent discovery or planned activity that has resulted or may result in the intentional excavation or inadvertent discovery of human remains, funerary objects, sacred objects, or objects of cultural patrimony on Fort Irwin lands, the CRPM must, as part of the procedures described in 10.3 and 10.4, take appropriate steps to identify the lineal descendant and Native American Tribe entitled to custody of the human remains, funerary objects, sacred objects, or objects of cultural patrimony pursuant to 10.6 and 10.14. The CRPM shall notify in writing the Tribes that have a demonstrated cultural relationship with the human remains, funerary objects, sacred objects, or objects of cultural patrimony that have been or are likely to be excavated intentionally or discovered inadvertently.

- **7.5 (b) (2) -** The notice must propose a time and place for meetings or consultation to further consider the intentional excavation or inadvertent discovery; Fort Irwin's proposed treatment of the human remains, funerary objects, sacred objects, or objects of cultural patrimony that may be excavated; and the proposed disposition of any intentionally excavated or inadvertently discovered human remains, funerary objects, sacred objects, or objects of cultural patrimony.

As appropriate during the consultation process, the Tribes will provide the CRM with the names, telephone numbers, and addresses of the Executive Council Chairperson, the Tribal NAGPRA Representative, and the Tribal Historic Preservation Officer and thereafter will notify the Installation when tribal officers and/or contact information changes. In turn, Fort Irwin will provide the same information regarding the CRPM, CRM, and IA.

Following consultation, the CRPM, through the CRM/IA, shall prepare a written plan of action in accordance with 43 CFR 10.5. The plan must be approved and signed by the Garrison Commander or his/her designee. It will establish provisions for the identification, treatment, and disposition of Native American human remains, funerary objects, sacred objects or objects of cultural patrimony recovered by intentional excavations or inadvertent discovery. The Tribes will receive a copy of this document and have the option to be signatories to this document, which can be developed pro forma to facilitate its use as needed. All subsequent actions will be in accordance with this plan. In accordance with 43 CFR 10.5 (e), the action plan must include:

- Any kinds of material to be considered as cultural items as defined in 43 CFR 10.2 (b).
- Specific information used to determine custody pursuant to 43 CFR 10.6.
- Treatment, care, and handling of human remains and other cultural items.
- Planned archaeological recording of human remains and other cultural items.
- Kinds of analyses planned for identification of human remains and other cultural items.
- Steps to be followed to contact tribal officials before any excavation.
- Steps to incorporate compliance with Section 106 of the National Historic Preservation Act and 36 CFR 800, as appropriate, including contact with California Office of Historic Preservation.
- Kind of traditional treatment to be afforded human remains or other cultural items.
- Nature of reports to be prepared.
- Disposition of human remains and other cultural items in accordance with 43 CFR 10.6.
- Fort Irwin will offer an invitation for involvement of a Native American representative during excavation and post-excavation, including reburial on site as applicable.
- Issuance of a permit pursuant to ARPA and 32 CFR 229, if applicable.

7.6 Other Consultation Procedures

If more than one Tribe simultaneously claims affiliation with any Native American human remains and/or funerary objects, sacred objects or objects of cultural patrimony discovered on Fort Irwin lands, the installation shall follow dispute resolution procedures as stated in NAGPRA and 43 CFR 10.17, as required.

If no Tribe claims affiliation with any Native American human remains and/or funerary objects, sacred

objects or objects of cultural patrimony discovered on Fort Irwin lands within 30 days of notification of such discovery, the installation shall cause a public notice to be published for fifteen (15) days in a regional newspaper(s) of general circulation seeking such claim from the general public. If no claim is then received within fifteen (15) days of the completion of that notice period, Fort Irwin shall either: curate the materials in a manner compliant with provisions of NAGPRA, 43 CFR 10, and 36 CFR 79; leave the remains in place (if still in situ) and seek a cemetery designation; transfer the remains in keeping with 43 CFR 10.7; or reinter the remains in keeping with 43 CFR 10.7.

If remains must be exposed (which may be required by the Fort Irwin mission or the inability to protect the remains in place), removed, or reburied (including reburial in place), Fort Irwin will invite consulting Tribes to be present and make every effort to support a tribal presence. If remains cannot be left in place, the Army shall follow the procedures for NAGPRA, and its implementing regulations, 43 CFR Part 10, as well as the procedures in this SOP.

7.7 Reburial and Cemeteries (Army Regulation 290-5(3-14))

Interpretation of the cemeteries-related guidance for inadvertent discoveries (and previously known burial locations) is still being developed as of May 2022. The points below are expected to apply to inadvertent discoveries and should be taken into account in the planning process.

- Reburial of remains on Army property can only be authorized if the remains were originally recovered from within the Army installation's boundaries, and have been repatriated in compliance with 25 USC 32 (the Native American Graves Protection and Repatriation Act). Garrison commanders must otherwise re-inter the remains in a local cemetery.

- Locations of remains not previously identified as a cemetery will, once reburial has occurred, be designated private cemeteries or plots.

- Documentation—including re-internment details, grave marker information, and the geospatial location—will, if the Army is responsible for the respective activities, be provided through the chain of command to the Executive Director, Office of Army Cemeteries.

Inadvertent Discoveries on Federal Lands
After November 16, 1990

An *inadvertent* discovery is one for which no plan of action was developed prior to the discovery.

Notification

The person who makes the discovery must **immediately notify the responsible Federal official** by telephone and provide written confirmation to the responsible Federal official.

Stop Work

If the inadvertent discovery occurred in connection with an on-going activity, the person must **cease the activity** in the area of the inadvertent discovery and **make a reasonable effort to protect the human remains and other cultural items.**

Initiating Consultation

No later than three working days after receiving written confirmation of the notification, the responsible Federal agency official must **certify receipt of the notification**, and take immediate steps, if necessary, to **further secure and protect the human remains and other cultural items. NOTE:** activity that resulted in the discovery may resume thirty days after the Federal agency official certifies receipt of the notification.

The responsible Federal agency official must also **notify by telephone** (with written confirmation) and **initiate consultation** with **any known lineal descendant** and the **Indian tribes and Native Hawaiian organizations –**

- **who are or are likely to be culturally affiliated with the human remains and other cultural items:**
- **on whose aboriginal lands the remains and cultural items were discovered: and**
- **who are reasonably known to have a cultural relationship to the human remains and other cultural items.**

Consultation is initiated with a written notification. The written notification must propose a time and place for meetings or consultation.

During Consultation

The **purpose** of consultation is to **help the Federal agency determine who is entitled to custody** of the human remains and other cultural items under NAGPRA so that the disposition process can be completed, and **to discuss the Federal agency's proposed treatment** of the human remains and other cultural items pending disposition.

The Federal agency official must **provide in writing –**

- a list of all lineal descendants, Indian tribes, or Native Hawaiian organizations that are being, or have been, consulted; and
- an indication that additional documentation will provided on request.

The Federal agency official **must request, as appropriate –**

- names and addresses of the Indian tribe official who will act as the tribe's representative in consultation;
- names and appropriate methods to contact lineal descendants;
- recommendations on how consultation should be conducted; and
- the kinds of cultural items that are considered to be unassociated funerary objects, sacred objects, or objects of cultural patrimony.

After Consultation – Written Plan of Action

The Federal agency official must prepare, approve, and sign a written plan of action. The plan of action must document the kinds of objects to be considered as cultural items; the planned treatment, care, and handling, including traditional treatment, of human remains and other cultural items; the planned archeological recording of the human remains and other cultural items; the kinds of analysis planned for each kind of object; and the nature of reports to be prepared.

The written plan of action must also include –

- the **specific information used to determine custody** of the human remains and other cultural items; and
- the **planned disposition** of the human remains and other cultural items.

Custody must determined in accordance with 25 USC 3002 (a), "Priority of Ownership," and 43 CFR 10.6, "Priority of Custody."

(over)

SOP 8: POST-REVIEW DISCOVERIES AND EMERGENCY ACTIONS

This SOP sets forth a process for addressing both post-review discoveries and emergency actions that could affect historic properties. While emergency actions require an expedited process to address undertakings that respond to an emergency, post-review discoveries can be associated with both emergency and non-emergency actions.

8.1 Post-Review Discoveries

Post-review discoveries, as defined in in 36 CFR 800.13, may involve either discoveries of historic properties that were not identified prior to completion of the Section 106 process, or unanticipated effects to a historic property that were not identified prior to completion of the Section 106 process. Post-review discoveries typically involve archaeological remains rather than historic buildings because archaeological sites may not be readily apparent prior to project commencement.

While archaeological investigation methods are designed to identify material evidence of past cultural activities, it is always possible that deeply buried archaeological deposits may remain undetected during the inventory process and may come to light during construction and/or other ground disturbing activities. This SOP will be coordinated with all other installation staff offices responsible for carrying out ground-disturbing activities.

In the event that previously unidentified, potential historic properties are encountered, work in the area of discovery will cease immediately and the following actions will be taken:

- Further direct effects to the vicinity of the site or deposits will be avoided by halting all project work within the discovery area and a suitable buffer area (to be determined on a case-by-case basis, with 30 meters a commonly used minimum). The area will be demarcated with flagging tape or other suitable materials.

- At the time of discovery, the project proponent will immediately contact the Directorate of Public Works in order to notify the Cultural Resources Program Manager (CRPM), who will notify the Cultural Resources Manager (if not the CRPM, who is the person with delegated authority from the Garrison Commander) and (if different) the Installation Archaeologist.

- The CRPM shall immediately notify, in writing, the Garrison Commander, or his/her official designee and NTC G3. The CRPM shall also notify the Installation Directorate of Emergency Services (DES) that NHPA and/or NAGPRA compliance procedures are in effect per this SOP and 43 CFR 10.

  Upon notification, or at the soonest possible time, the Cultural Resources Manager (CRM) and the IA will make a field evaluation of the context of the site, deposit, or PRTCI to ascertain its probable age and significance, record the findings in writing, and document the resource with appropriate photographs and drawings. The result of this field evaluation, for which the timeframe will be in keeping with 36 CFR 800.13, will be a recommendation or provisional determination of National Register eligibility.
- Following the evaluation by the CRM, all consulting parties including SHPO, affiliated federally recognized Tribes, and appropriate stakeholders will be notified, in keeping with 36 CFR 800.13, and provided an opportunity to comment on the content of the evaluation and the resulting recommendations/provisional determinations. The standard comment period provided to all parties for post-review discoveries is ten calendar days, although it may be necessary in limited cases to

shorten this period due to the urgency of the undertaking. The comment period will be clearly identified in the notification.

- If bone is present within the deposit, the CRM will ensure that a qualified professional accompanies him/her to the work site to assist in determining whether any of the bone is human. If human remains or other cultural materials that may fall under the provisions of NAGPRA are present, the CRPM will complete the NAGPRA process (SOP 7).

- If disturbance to the site or deposit is minimal (meaning that there is no substantive damage to any reasonably anticipated NHPA values) and further project work can be relocated to avoid the cultural resource, the cultural resource will be avoided and the CRM will conclude this procedure and notify the consulting parties.

- If, following consultation, the site is determined eligible for the National Register and the activity cannot be relocated, the CRM will apply the provisions of the 2022 Section 106 Programmatic Agreement to review alternative treatments and treat adverse effects in the most expeditious manner, providing for timely completion of the undertaking with impacts to the resource minimized to the extent possible, and with cultural protocols recommended by the affiliated consulting Tribes incorporated to the extent possible.

- Fort Irwin will consult with appropriate consulting parties in all actions during the review process.

- Documentation of post-review discoveries will occur and be retained in the file for the subject project.

The same steps will be followed for the discovery of unanticipated effects, except that the effects will be documented and consulted upon.

8.2 Emergency Actions and Historic Properties

There may be times when Fort Irwin must respond to disasters or emergencies that affect the operations and missions of the Installation. Activities and actions undertaken to respond to disasters and emergencies can have an adverse effect on documented or undocumented historic properties located on the Installation. Immediate rescue and salvage operations conducted to preserve life or property are exempt from the provisions of Section 106. Section 110 still applies, unless a waiver is requested and received under 36 CFR 78.3(a), and other cultural resources laws, such as NAGPRA and ARPA, still apply.

Emergencies can be natural, or in response to situations that result from human events. Under 36 CFR 800.12(a), a disaster or emergency under Section 106 is declared by the President, a tribal government, or the governor of a state, or involves an immediate threat to human life or property. They may also include those actions necessary to respond to a threat to national security, including short-term mission-essential activities for deployable troops. The emergency situations section of the Section 106 regulations applies only to undertakings that will be implemented in response to the disaster or emergency within 30 days after the disaster or emergency has been formally declared by the appropriate authority or, in the case of an immediate threat to life or property, within 30 days after such an event occurs.

As with inadvertent discoveries, emergency actions require an expedited process for handling historic properties, including properties of traditional religious and cultural importance, which may be affected. After an unanticipated disaster or emergency has been declared, the CRM will consult with the ACHP, SHPO, and affiliated federally recognized Tribes for undertakings that will be implemented within 30 days.

A reasonable extension may be requested from the ACHP within the original 30-day timeframe. It is

generally expected not to last longer than six months.

8.2.1 Notification to Tribes and SHPO

- The CRM shall notify the SHPO and the Tribes, via telephone or email and followed by written confirmation, of a declared emergency as soon as practicable (meaning that the emergency has been confirmed and that the means of communication are available) after the emergency has been declared.
- In cases where an emergency can be anticipated but has not yet been declared, the CRM will invite the ACHP, SHPO, and affiliated federally recognized Tribes to comment on the undertaking at least seven days prior to the undertaking, if possible, or, if it is not possible to wait seven days, within the time available.
- As soon as practicable after the emergency, the Army will notify the SHPO and Tribes via email, and will follow up with written documentation if any historic properties were discovered or disturbed as a result of emergency response actions. Consultation will be completed as necessary.

- Each emergency undertaking, including its effects, will be summarized, as will consultation efforts, for external and upwards reporting, as well as Fort Irwin records.

8.2.2 Emergency Actions Affecting Historic Properties

Where possible, emergency actions will avoid foreclosing future preservation of a historic property. If an emergency undertaking has damaged or will damage a historic property, Fort Irwin will take the following actions once it is feasible and safe to do so:

- Previously unrecorded sites will be recorded and their conditions documented; previously documented historic properties and potential historic properties will be monitored and their conditions documented. Results would be included, minimally, in the annual PA report.

- If a known historic property has minor damage (minor meaning that the National Register values are not substantively diminished), the CRM and the IA will determine whether measures to prevent further degradation are needed. Such measures could include the application of ground cloth, straw bales or "snakes," or mulch to prevent erosion in disturbed areas; or application or re-application of signage, markers, or barriers to prevent vehicle access to the property.

8.2.3 Emergency Stabilization of Historic Properties

- In the event the damage to a historic property is severe and the property is eligible under criterion d, a report will be prepared documenting the damage and the potential for salvage of data that cannot otherwise be conserved. If the potential for salvage is high, a research design will be prepared and provided to the Tribes and SHPO for review and input prior to implementation. Salvage or rehabilitation may proceed when normal conditions are restored (subject to availability of funds). If there is little or no potential for salvage or if salvage is not possible, the damage will be documented in photographs, and artifacts at the site may be documented and collected. Where other criteria apply, these will be treated on a case-by-case basis, and taken into account in developing the research design;

- If destruction of a National Register-listed or eligible historic property is necessary due to life/safety issues resulting from a disaster or emergency, recordation may be limited to photographs of all exterior surfaces and features. Only those interior features that may be safely accessed will be documented with photographs;

- Fort Irwin will consult with appropriate Consulting Parties (excepting those who have indicated that they do not want to hear about any actions in the area, or that they have no interest in the resource type) in all actions during the review process; and

- The occurrence of all emergencies will be documented and retained in the files, and described as appropriate in upwards reporting, the 2022 Programmatic Agreements' annual report, and so forth. The annual report will also discuss any stabilization or rehabilitation efforts and their results.

SOP 9: ASSESSING RISK AND IDENTIFYING LARGE-SCALE SURVEY PRIORITIES

For the Western Training Area (WTA), not yet open to full training as of 2022, risk management emphasizes the early identification of historic properties and the application of protection measures prior to opening the area to full training. For other areas associated with training, risk is considered in terms of the potential for one or more undocumented or incompletely documented historic properties to be present.

Some areas, such as the desert tortoise mitigation areas, are not expected to have training-related activities (except perhaps in general terms of water supply and utility lines, with associated projects likely to be surveyed and consulted upon on an individual basis) occurring within their boundaries.

For large-scale surveys in the remaining areas of Fort Irwin, risk analysis is somewhat more complex, with factors including the potential for historic properties to be or have been present, the geological setting, and training activity intensity and types. These factors are, as noted below, not independent of each other.

The annual target is 10,000 acres, in keeping with past survey efforts on Fort Irwin, subject to the availability of funding. Survey will be conducted according to the methods detailed in SOP 2.

9.1 Cultural Resource/Historic Property Potential

Fort Irwin has considered various approaches to considering site potential and patterning on Fort Irwin, including the use of predictive modeling; a predictive model was developed in 2003 (Ruiz 2003). Conclusions from the 2003 modeling effort included that landform and geological data, better fault maps (to help understand differences in microenvironments), and other types of data were needed to better portray the area.

While the model used four site types—lithic, habitation, petroglyph and pictograph/rockshelter, and historic—Ruiz also noted that other forms of breakdown might be useful. Her geological emphasis and recognition that different factors would be expected to condition the locations of different site types found on Fort Irwin suggest that a landscape-level geoarchaeological perspective should be helpful in understanding observed site patterning. This may in turn have the potential to contribute to a better understanding of site interrelationships.

Subsurface sampling and project monitoring in selected areas may also help clarify the potential for buried deposits (even in areas where no previously known sites are present). Fort Irwin is currently employing a heuristic approach, emphasizing geological factors, to determine how these tools can most effectively and efficiently be applied.

- Ensure accurate locational data for new (and, when revisited, previously recorded) sites and isolates.
- Consider sampling underrepresented environments to obtain a more complete understanding of spatial patterning.
- Examine what is expected for areas in light of what is actually found.
- Employ limited subsurface testing, followed by project monitoring as needed, to better understand geological contexts and the potential for associated cultural deposits in given settings.
- Where past surveys provide a geological assessment pertinent to the project area (see R-130 for an example), use this information in assessing the subsurface potential of relevant project areas.

9.2 Geological Setting

Fort Irwin's geological setting can interact with the other factors in several ways. A review of available geological and geoarchaeological data indicates, at a minimum, the following considerations.

- Identify and take into account geological resource locations/geological data regarding the past presence of resources. Examples include the locations and quality of potential lithic raw materials and minerals/ores, the availability of rock formations suitable for use as rockshelters and images, and the availability of water in springs and playas at given points in time.

- Identify geomorphological constraints that may have affected landscape use (for example, obstacles to travel).

- Where possible, take into account whether given landforms are erosional, stable, or depositional; soil types (including the chemical composition and erodibility); and other factors related to the geological potential for the presence and preservation of buried deposits, considered in terms of information potential and/or site integrity.

- Consider the potential relationships between each of the above and the various types of training activities.

9.3 Training Type and Intensity

The Section 106 PA for training and support activities, and the associated Environmental Impact Statement, describe various activities. In addition, the various training areas are broken into the following use intensity categories:

1. **High use:** unlimited cross-county use by all vehicle types.
2. **Medium use:** movement by all vehicle types restricted to roads, staging, or assembly areas. These features may be located throughout the area.
3. **Low use:** all vehicle types on roads, with no staging areas, and dismounted (e.g., foot soldier) traffic off roads.
4. **No use:** off-limits (no entry to vehicles involved in the rotation except as authorized).

Although specific areas have been given the applicable designations, it may not always be the case that the actual use is as intensive as the designation. Use of current aerial photographs should provide for considering actual as opposed to designated uses. The Range and Training Land Assessments completed by ITAM should also be taken into account.

9.4 Implications of Mentioned Factors for Survey Priorities

The categories provided below will continue to be evaluated as new information becomes available.

- Based on the previously noted considerations, high-risk areas to be prioritized for survey include (but are not limited to) locations within designated high use areas where historic properties may still be present; areas where higher levels of use may be expanded; areas offering resources that would have been present and desirable in the past; areas where environmental constraints would be

expected to focus activities in particular locations; and areas of known sites that may be incompletely recorded.

- Areas that currently appear to be at lower risk include steeper areas that have no good access routes to provide for training activities and that are not expected to serve as backstops; areas of intensive past disturbances coupled with shallow deposition; and consistently erosional environments such as washes.

SOP 10: PROJECT MONITORING*

Program review, and recent requests by Tribes for project monitoring during ground-disturbing projects where there is a risk of inadvertent or unanticipated discoveries, demonstrate the need to conduct appropriate project monitoring. (Currently, this effort involves archaeological monitoring, as noted in the footnote.) Many geological contexts on Fort Irwin are not likely to have buried features or significant archaeological deposits, based on factors such as soil depth or presence in an erosional environment. Such factors may be examined on a case-by-case basis for areas having existing geoarchaeological or geological analysis that assesses the potential for buried deposits, or soils map data where it has been determined to be consistent with location-specific field observations.

Other contexts call for due consideration of project monitoring. Cases in which monitoring should be considered involve environments where the geological deposition is sufficiently recent and deep enough to allow for the presence of buried cultural materials, and where one of the following conditions is met:

10.1 Pre-Implementation Survey Is Not Possible

In very limited cases, this form of project monitoring may be appropriate. **It is not to be used as a substitute for Section 106 survey.** However, it may apply in the following cases:

- The area has the potential for deeply buried cultural materials and the depth of project activities exceeds that which could be reached using standard subsurface testing procedures.

- Section 106 has been waived in an Emergency as defined in SOP 8, and one of the following applies:

    - Project monitoring can be conducted safely and may allow collection of information not otherwise available.

    - The presence of a monitor may help prevent or limit damage to previously unknown cultural materials if present; provides for avoidance of or limitation of damage to known historic properties; or may provide for avoidance of or limitation of damage to documented potential/known historic properties when the potential for project effects cannot be clearly identified in advance.

    - The need for immediate action was such that no archaeological monitor was present (due to immediate threat to human life and safety or to property, or because monitor could not be conducted safely), but post-implementation monitoring for effects can safely be conducted.

10.2 Known Historic Properties Are Present, but Are Not Expected to be Affected

- Project monitoring may be used to ensure that projects occurring in close proximity to a known historic property avoid the property or, if activities extend into the property, do not affect the property's National Register values. An example would be having a monitor present to ensure that equipment avoids at-risk features during installation of safety grates over mine shafts.

10.3 The Effectiveness of the Subsurface Testing Strategy for a Site is Being Evaluated

- Project monitoring may be used for sites that are not considered historic properties, as a check on the effectiveness of previously conducted, good faith subsurface testing. Selected sites must have the geological potential for buried features or substantial artifact deposits.

10.4 No Known Site is Present, but the Potential for Buried Sites is Unusually High

- Project monitoring may be used where no known site is present if the potential for buried cultural materials is unusually high (but none were revealed during subsurface testing), as indicated by factors such as the presence of eligible sites with buried deposits in close proximity, settings which represent unexplained gaps among eligible sites, or settings in close proximity to a water source where any sites present would be buried.

Results of project monitoring will be documented in a Project Monitoring Report to include the dates of monitoring, the name of the monitor, a summary of the project monitored, and monitoring goals, observations, and conclusions. Accompanying data will include maps showing the area(s) monitored, photographs (with a scale) documenting the geological deposits observed and archaeological artifacts or features **other than human remains or funerary objects**.

*Refers to archaeological monitoring as defined in the Abbreviations, Acronyms, and Definitions section.

REFERENCE CITED

Ruiz, Dr. Marilyn O.

2003 The Development and Testing of an Archaeological Predictive Model for Fort Irwin, California. Report provided to Mr. J. Tad Britt, United States Army Corps of Engineers. On file with the Fort Irwin Cultural Resources Program, Fort Irwin, California (R-122).

Attachment G

Protection and Treatment Measures

Fort Irwin's preference is to avoid effects to historic properties whenever feasible. This is typically accomplished through preservation in place, which may involve site protection measures. Such measures may include (but are not limited to):

1. Fencing to block access;
2. Tank jacks (angle iron obstacles set on the ground surface), boulders, or other obstacles used to block access points;
3. Signage indicating areas off-limits for training (without specifying that a site is present; these signs are also used to protect other resources);
4. Seibert stakes (the reflective markings increase visibility);
5. Inclusion on maps and in shapefiles as off-limits areas;
6. Designation as no-fire or restricted-fire areas;
7. Off-site or surface erosion control measures;
8. Covering sites with mulch or other culturally sterile materials. .

Additionally, project monitoring may be used to ensure that sites/sensitive site components are avoided, and annual condition monitoring may be employed to determine whether further efforts are needed.

If undertakings may or will result in adverse effects, Fort Irwin may develop a treatment plan that includes one or more of the following treatment measures, depending on the nature of historic properties affected and the severity of adverse effects, as detailed in Stipulation V.D.1. Other measures, including creative measures identified in consultation, may be developed and, as applicable, added to the list of standard measures or consulted upon on a case-by-case basis, per V.D.2. This Attachment may be amended in accordance with Stipulation XIII.

1. Historic American Buildings Survey (HABS)/Historic American Engineering Record (HAER)/Historic American Landscapes Survey (HALS) or Equivalent Documentation
2. Public Interpretation
3. Historic Context Statements
4. Oral History Documentation
5. National Register of Historic Places Nomination (in keeping with Army policy, this applies only when a historic property is transferred from Army ownership and listing in the National Register is considered likely to provide an additional layer of protection).
6. Capping and Hardening*
7. Data Recovery

8. Archaeological Treatment Plan
9. Ethnographic Studies

*This work will be designed to maintain the permeability of the layer above the site, but will also use measures—such as planting native vegetation—to help anchor the capping materials as needed.