DRAFT

Supplemental Environmental Assessment

for

Ongoing and Future Military Training, Support Operations, and Resource Management at the Marine Corps Air Ground Combat Center

April 2023

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CHAPTER 1 – PURPOSE AND NEED

1.1 INTRODUCTION

The Marine Air Ground Task Force Training Command (MAGTFTC) has prepared this Supplemental Environmental Assessment (SEA) in accordance with the National Environmental Policy Act (NEPA) (42 U.S.C. Ch. 55), Council on Environmental Quality's (CEQ) implementing regulations (40 C.F.R. Parts 1500 to 1508), Department of the Navy NEPA regulations (32 C.F.R. Part 775), Marine Corps Order (MCO) 5090.2, *Environmental Compliance and Protection Program* (2018), and other relevant laws and policies discussed herein. In response to current and emerging requirements (Marine Corps Force Design 2030 initiative), MAGTFTC evaluates and proposes – (1) ongoing and future actions; (2) changes to ongoing actions; (3) increased mitigation; and (4) efforts to improve and streamline regulatory compliance. MAGTFTC seeks public input to ensure an informed agency decision (40 CFR §1501.5(b)). While this SEA relies on best available data, minor inconsistencies may exist due to the limitations of the datasets and reliance on multiples sources of data (40 CFR §1500.3(d)).

1.2 PROJECT AREA

The Combat Center is in the Mojave Desert of San Bernardino County, California, and bounded by Twentynine Palms (south), Interstate 40 (north), Amboy Road (east), and BLM public land (north, east and west). The project area primairly includes the Combat Center (761,000 acres), desert tortoise translocation sites and Recovery and Sustainment Partnership (RASP) Initiative focal areas within the Western Mojave Recovery Unit. See Figure 1.

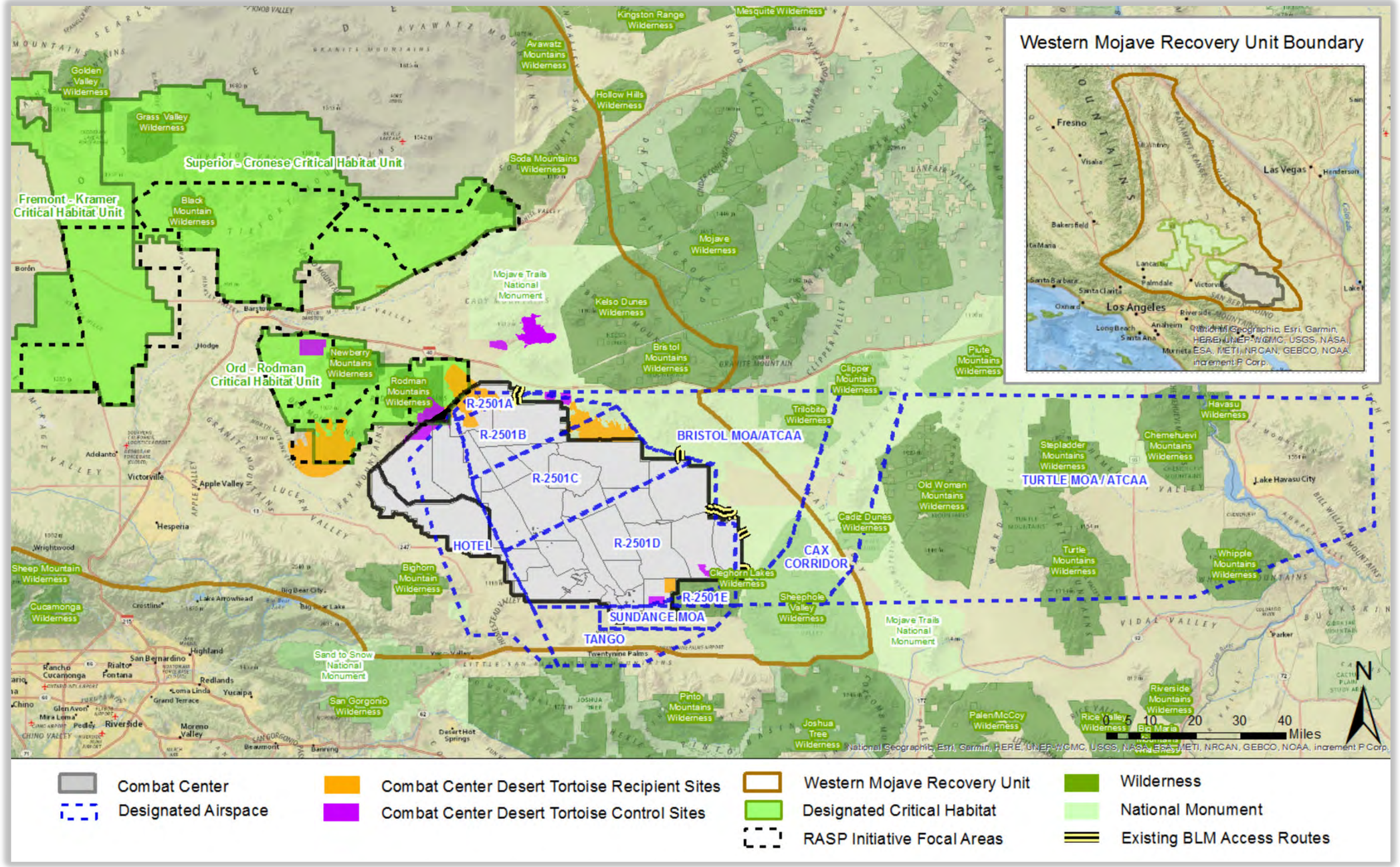
1.3 BACKGROUND

The Combat Center is primarily a training area. Training began under the Army in the 1940s, intensifying under the Marine Corps in the 1950s, and with its combined arms training program formalized in the 1970s (see e.g., Photos 1 to 3). Training began prior to the enactment of many environmental laws, namely: 21 years before the Bald and Golden Eagle Protection Act included golden eagles; 25 years before the National Historic Preservation Act; 29 years before NEPA; 31 years before the Clean Water Act; and 49 years before the desert tortoise was listed and 53 years before its critical habitat was designated under the Endangered Species Act.

Photo 1 – Bombing Practice (1940s)

Photo 2 – Desert Fire Exercise (1956)

Photo 3 – Operation CAX Tanks (1981)



Source: Combat Center Geospatial Data (November 6, 2022).

Figure 1 – Project Area[1]

[1] Notes: MAGTFTC coordinates with Yuma for use of Hotel, Tango and Turtle airspace. Hotel and Tango are used for transit only. Training occurs in Turtle.

(DON 2012, MCAGCC 2020, JRP 1999, and Ludwig 1989). As of 1969, over 95% of the Combat Center (then 596,647 acres) was used for targeting and bombing and 275 acres had been developed (e.g., housing, golf course, etc.) (NAVFAC 1969). Overtime, the Marine Corps brought ongoing actions into compliance with current laws and policies, including remedying the effects of past actions (e.g., invasive plants) (USDA 1962 and NAVFAC 1969). Under NEPA, this typically occurs when there is a new action or change to an ongoing action (see Section 1.4.1). MAGTFTC complies with current NEPA law and policy, including recent changes to regulations in 2019, 2020 and 2022. Regulatory compliance is challenging when laws become stricter and when past requirements allowed for less extensive analyses and resulted in a less comprehensive administrative record. For example, from 1981 to 1990, broader NEPA categorical exclusions existed for training. Depsite challenges, MAGTFTC ensures legal compliance for all actions (see Section 1.7).

From a broader perspective, the Combat Center is the only Marine Corps installation capable of supporting large-scale, combined arms training and exercises for Marine Corps units, sister-services, and foreign nations. The Combat Center's remote location and dry climate make it well-suited for supporting this training into the future due to fewer resources affected (e.g., one ESA-listed species and low densities of cultural resources by area), fewer applicable environmental regulations than other installations (e.g., Marine Mammal Protection Act), and lesser community concerns (e.g., encroachment) than would exist in more developed areas of the state or country.

In addition to military training activities, support operations and resource management activities are conducted at the Combat Center to facilitate training. Details are provided in Sections 1.3.1 to 1.3.4.

1.3.1 Military Training

1.3.1.1 Ongoing Military Training Activities

The Combat Center affords units the opportunity to practice combined-arms tactics in a realistic and challenging live-fire environment, on a scale unlike any other Marine Corps installation. Marine Corps warfighting doctrine centers on maneuver warfare, where combinations of task-organized units seek to exploit enemy gaps through combined-arms operations. This concept is based on rapid, flexible, and opportunistic decision-making. The Combat Center supports the scalable Marine Air Ground Task Force (MAGTF), which incorporates the command element, ground combat element, aviation combat element, and logistics combat element (see DON 2012 for a diagram of this construct). Consequently, training evolutions adapt in size and scope based on mission requirements.

Cyclical and intermittent training exercises authorized at the Combat Center vary in volume from small teams to the Marine Expeditionary Brigade (MEB) level. Exercises are scalable in size, involving many specific military training activities and simultaneous use of multiple training areas. Exercises are the culmination of individual and unit-level training and represent the greatest use of personnel, resources, and land at the Combat Center. When reoccurring major and large-scale exercises are not in progress, intermittent unit-level, joint (e.g., Army, Air Force, Navy), and foreign military training events can be supported at the Combat Center.

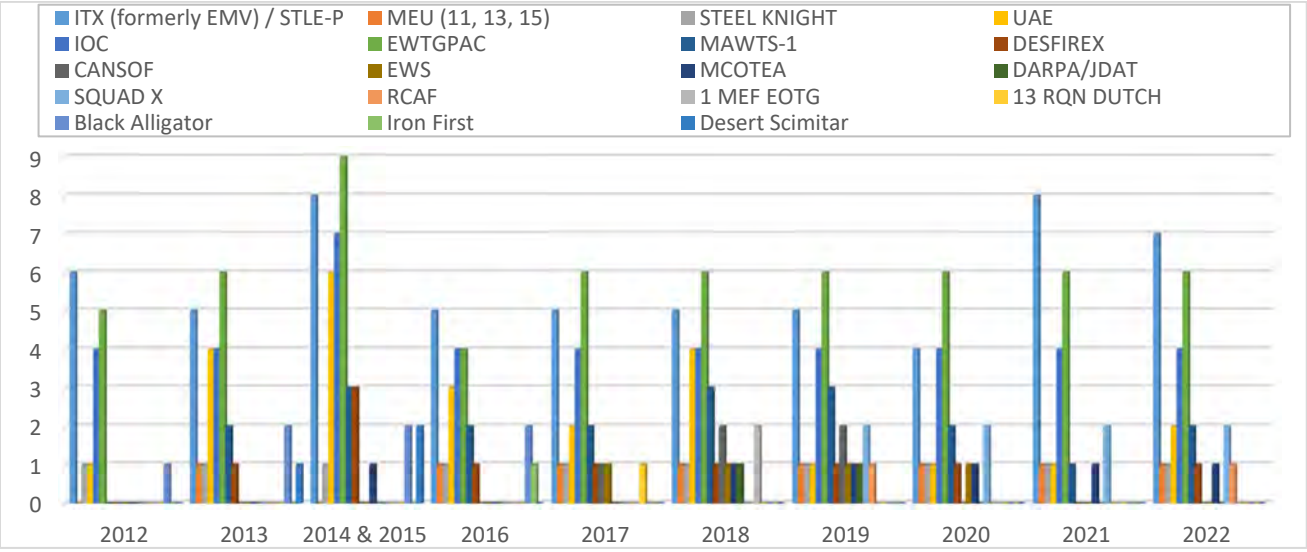
- The combined arms program exercises have incrementally evolved from the Combined Arms Exercise in 1978 to Mojave Viper and Enhanced Mojave Viper in the early to mid-2000s, to the current Integrated Training Exercise (ITX) and Adversary Force Exercise (AFX).
- Combat Center exercises have previously been classified as major or minor and now include elements of MEB-level training authorized in 2013 and the large-scale exercises authorized under the Service Level Training Exercise Program (SLTE-P) in 2019. The specific MEB exercise described in the 2012 EIS has not yet occurred due to lack of expanded airspace (See Chapter 4), but the MEB construct has been integrated into other exercises such as those carried out under the SLTE-P. For instance, ground based exercises, from basic convoy

training to portions of the SLTE-P have occurred in the expansion area since desert tortoises were translocated in April 2017.

- Current large-scale exercises executed under the SLTE-P generally follow a progressive, building block approach where units participate in realistic, stressful training that culminates with various live-fire and unscripted force-on-force (FoF) events. This approach renews focus on great power, peer adversary conflict. Under SLTE-P, the MAGTF Warfighting Exercise (MWX) is an added component to the Combat Center's ITX and AFX. Instead of units converging on an objective employing live-fire munitions, units train as opposing forces and converge on specified or intermittent and impromptu objectives (dependent on scope of action) in a "free play" scenario. The changed emphasis was determined to be within the scope of ongoing training due to similar training methodology and equipment used in historical exercises, along with non-live fire scenarios; thus, reducing environmental effects.

(DON 2003c, DON 2012, DON-USMC 2018a, MAGTFTC 2019, MAGTFTC 2020a, and USMC 2021b). For easier comprehension, Combat Center exercises can be viewed as scripted (pre-designed), unscripted (partially pre-designed), or a combination. From an environmental perspective, scripted exercises generally involve greater concentrated effects due to large, consolidated movements across the landscape (e.g., combined arms maneuver and live-fire), while unscripted often involves more dispersed movement with a lighter footprint (e.g., less, or no live-fire).

Despite the variety of exercises and changed training emphases, the nature of military training at the Combat Center has not changed. It remains expeditionary and focused on combined arms, live-fire and maneuver training that integrates the MAGTF elements. This remains true despite fluctuations and incremental changes influenced by evolving threats, methods of combat training, and deployment schedules. Diagram 1 shows the fluctuations over the past 10 years for major exercises. Combat Center exercises and training emphases would continue to evolve into the future and in support of the Marine Corps Force Design 2030 process (discussed below).



Source: Range Facility Management Support Systems (accessed August 2020, March - April 2023).

Diagram 1 – Trends in Total Number of Major Exercises (2012 – 2022)

Exercises involve any combination of training activities authorized at the Combat Center, to include:

- Sustainment training (e.g., engineering operations and logistical resupply involving convoys).
- Infantry training (e.g., vehicle use, foot traffic, bivouac sites and digging fighting holes).

- Maneuver training (e.g., combined arms training and vehicle use).
- Aircraft training using designated airspace, airfields, and landing areas and zones.
- Use of authorized equipment, ordnance, weapons, vehicles, and aircraft.
- On-route transit (paved and un-paved) through training areas.
- Off-route training within the training areas during training activities and exercises.
- Fueling and re-fueling operations in designated areas and within the training areas.

(DON 2003c, DON 2012, and DON-USMC 2018a). Training is conducted anywhere in the Combat Center and its designated airspace (Figures 1 and 2), subject to limitations shown on Figure 3 imposed for safety and resource protection. No area shown on Figure 3 completely prohibits all types of training. Additional details are provided below.

- Restricted Areas cover 45,865 acres (6% Combat Center) and are off-limits to training that involves ground disturbing activities (e.g., excavation) and off-route travel (DON 2012, DON 2003c, USFWS 2017, and DON-USMC 2017a), protecting resources from the most damaging types of training (e.g., maneuvers, ordnance delivery, and engineering operations).

- Steep terrain (22% or more) may limit some maneuver training using tracked vehicles (DON 2012), but this is a small portion of the Combat Center (29,904 acres or 4%).

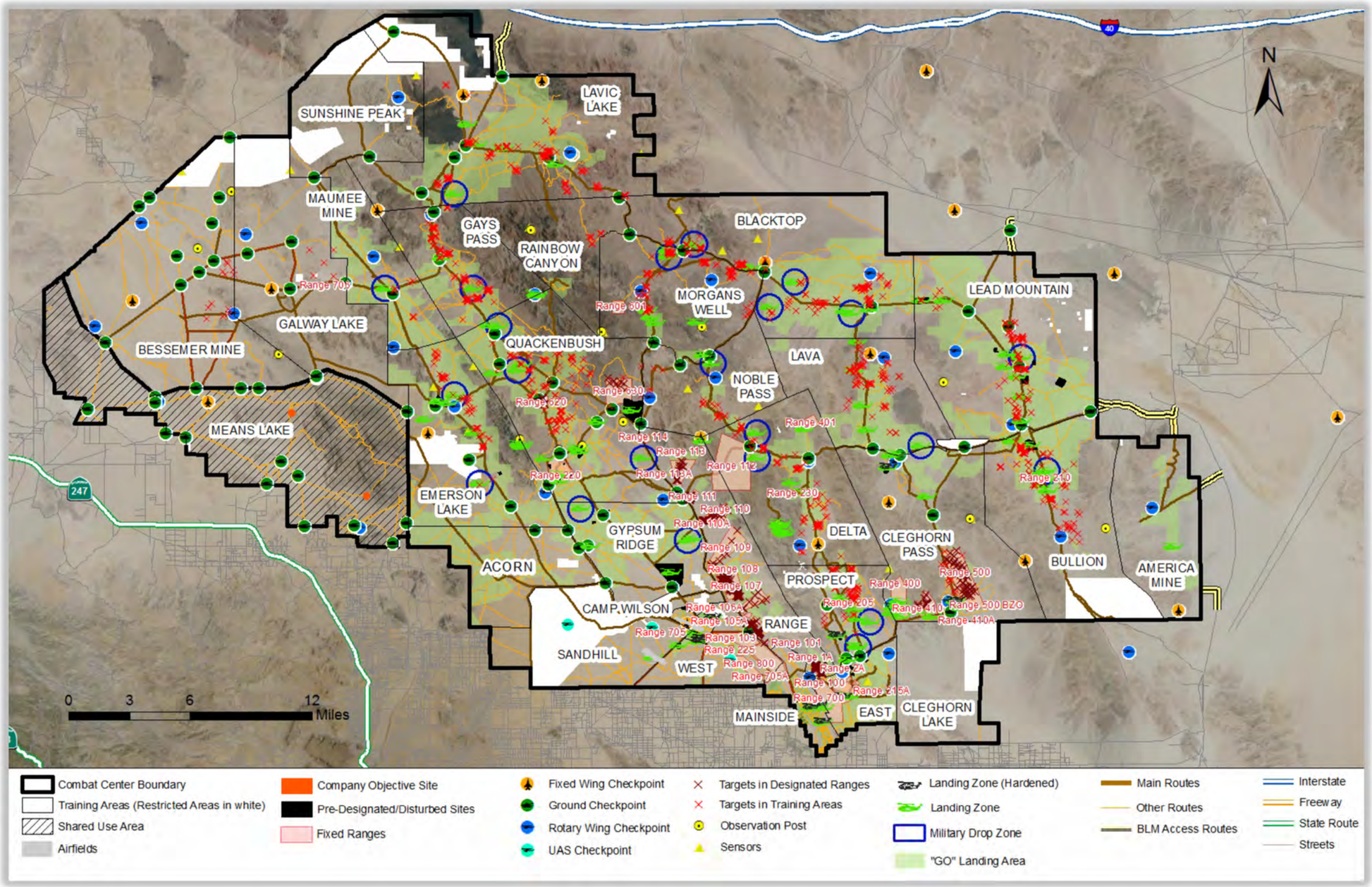
- The Shared Use Area (Means Lake Training Area) includes 56,410 acres (7% Combat Center) and is co-managed with BLM to allow military training and public access during certain times of the year. Public access occurs for 10 months and military training is authorized for up to 2 months. Use of dud-producing ordnance is not allowed for public safety, but explosives are authorized for us in the Company Objective Areas (44 acres total).[2]

- Past mapping efforts attempted to show training intensity (see e.g., MCAGCC 1999a, DON 2003c, MCAGCC 2003 and DON 2012), but it is not precise and oversimplifies the nature and location of training; training is not static. For example, Figure 4 shows the locations of main training activities with ground effects overlaid on past intensity estimates for artillery and maneuver training (DON 2012). While it is correct that the entire installation is used for training and ground disturbance generally occurs in low lying areas (Figure 4), it is not possible to show the exact location of all training activities and their effects, such as infantry training (e.g., digging fighting holes), craters from ordnance use, and off-route use. This is because training activities and effects are too dispersed across the landscape to be visible on maps and NEPA analyses are focused on activities with potential significant effects, not all activities with any potential effects.

- Figure 4 shows Bessemer Mine and Galway Lake training areas as moderate use areas due to the lack of designated air space, but a separate NEPA effort for airspace is underway (see Chapter 4) to facilitate increased use of these areas as previously anticipated (DON 2012).

Moving forward, the Combat Center would continue to support the full range of military training activities that has historically occurred, in addition to current and future training activities. Although training activities could occur anywhere in the training areas, it is anticipated that training would continue to occur in areas of existing disturbance, such as the low-lying navigable areas between passes (Figure 4). Future NEPA documents would focus on new training activities and substantial changes to ongoing training or significant new information relevant to ongoing training or its effects.

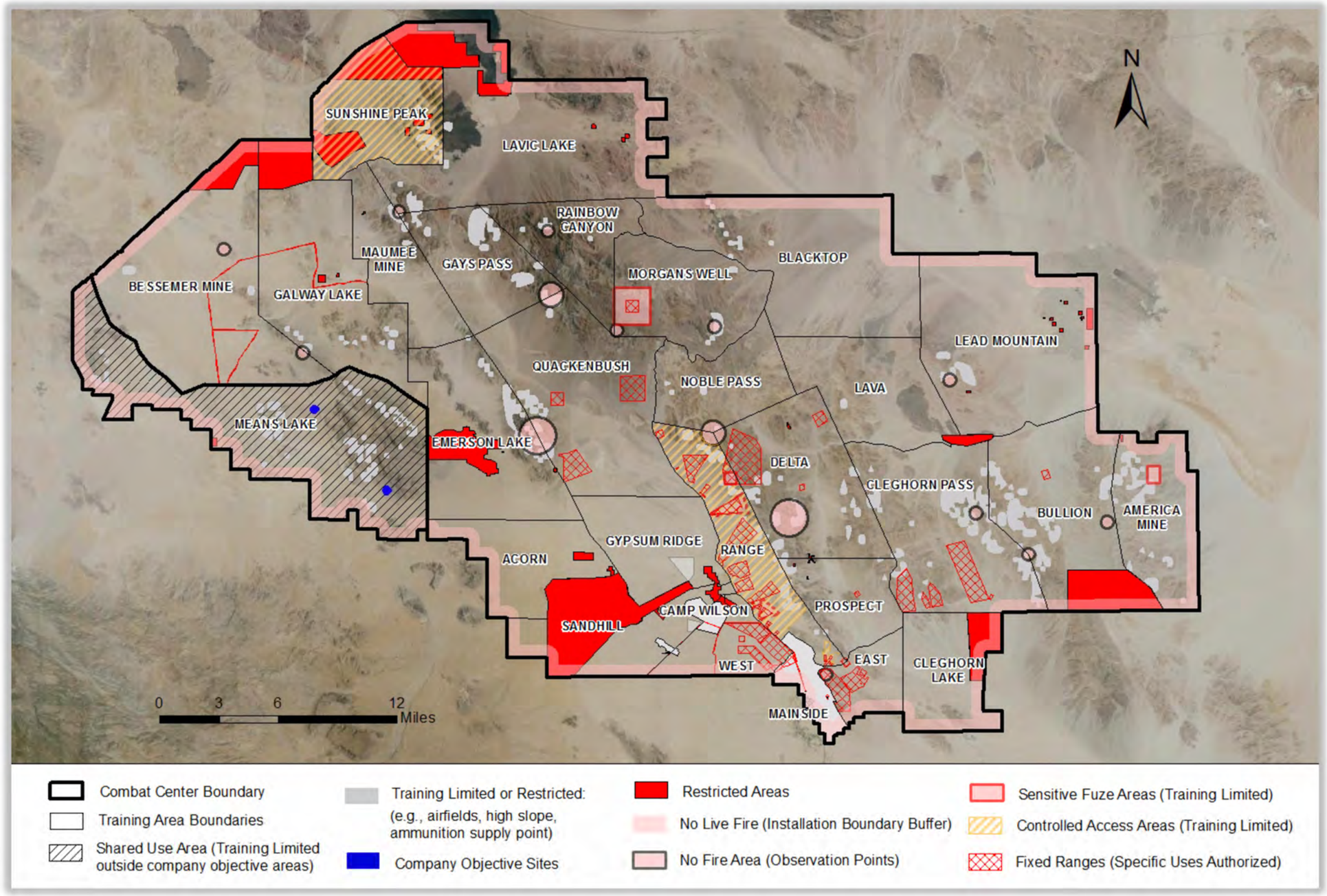
[2] Subtitle C, Section 2942, at: https://www.congress.gov/bill/113th-congress/house-bill/3304. The National Defense Authorization Act of 2014 designated the Shared Use Area at 53,231 acres, but the actual size is 56,410 acres if subsequently acquired parcels are included.



Source: Combat Center Geospatial Data (April 14, 2023).

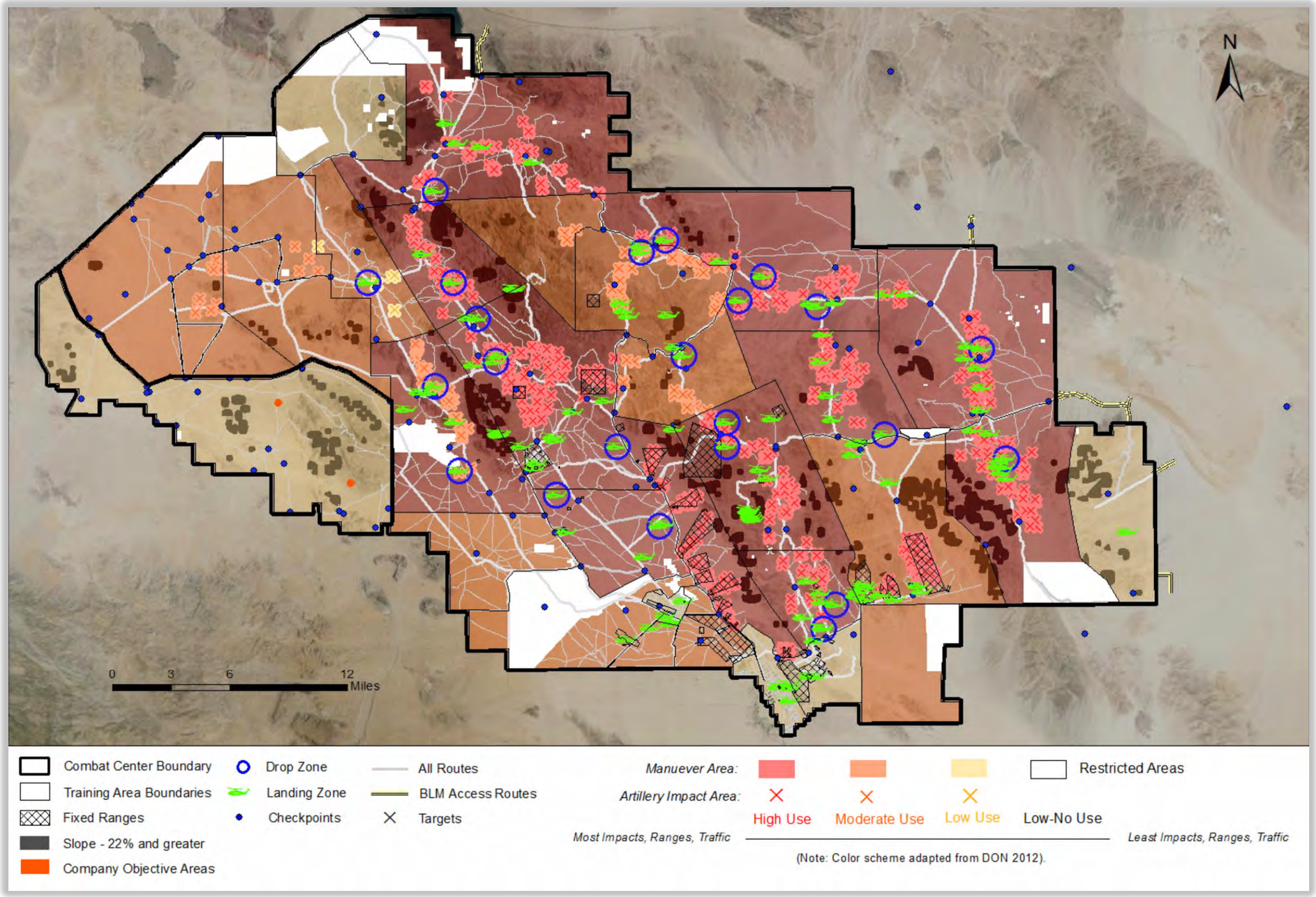
Figure 2 – Military Training Operational Setting[3]

[3] Note: (1) Off-installation checkpoints are references for navigation, with some occurring in the Mojave Trails National Monument. No aircraft landings or ground training occurs outside the Combat Center. (2) Rotary-wing and tilt-rotor aircraft can land anywhere in the "landing areas" (DON-USMC 2018a), but this map also includes previously designated "landing zones" (USMC 2010a and USMC 2014a). (3) Only the largest training support sites are visible on this map.



Source: Combat Center Geospatial Data (April 14, 2023).

Figure 3 – Training Limitations



Source: Combat Center Geospatial Data (April 14, 2023), MCAGCC 1999a, DON 2003c, MCAGCC 2003, and DON 2012.

Figure 4 – Main Locations of Ground Disturbing Activities & Prior Intensity Mapping[4]

[4] Note: This map only shows the previously designated "landing zones" (USMC 2010a and USMC 2014a). The purpose of this map is to show areas of concentrated impacts at the time of the past intensity mapping (DON 2012).

1.3.1.2 Marine Corps' Force Design 2030 Initiative

The Marine Corps' Force Design 2030 initiative may result in changes to ongoing military training activities at the Combat Center. Force Design 2030 shifts the focus from non-state actors to primarily peer competitors, with iterative adjustments to how the Marine Corps organizes, trains, and equips the future force while integrating with naval forces. The initiative seeks to execute within existing budgets, largely involving divestment of facilities and equipment no longer aligned with future conflicts, relocation of personnel, and improvements to existing training strategies, weapon systems, vehicles, and equipment. (CRS 2021; USMC 2019; USMC 2020; USMC 2021a). A recent Combat Center-approved action in support of Force Design 2030 included divesting 80 tanks in 2021 and hosting newly organized units (e.g., Marine Littoral Regiment) in 2023. Future actions in support of Force Design 2023 would likely remain within scope of Combat Center existing training activities and effects. For example, the Combat Center already supports conventional cannon and rocket artillery, so increases in future rocket capabilities may simply result in the increased maintenance of existing infrastructure, such as targets. Due to the uncertainty of scope and timing of future actions, MAGTFTC is advancing efforts to streamline regulatory compliance (see Section 1.7). More advanced forecasting would better position MAGTFTC to meet regulatory requirements and avoid training delay.

1.3.2 Support Operations

Support operations critical to facilitating military training include construction, operations, and maintenance of facilities and infrastructure; primarily occurring in Mainside and Camp Wilson. Consistent with the expeditionary nature of training (simulating austere combat conditions), these areas have not greatly expanded (see e.g., Photos 4 to 6). Support operations typically involve repair and maintenance of existing facilities or infrastructure, minor construction in disturbed areas, with new construction in undeveloped areas infrequent (see Sections 1.7 and 1.4.1). A recent Combat Center-approved action in support of Force Design 2030 was the construction of the MAGTF Warfighting Center, previously analyzed under NEPA (DON-USMC, 2009c). This action has minimal-to-no environmental effects. Any streamlined methods of regulatory compliance may minimize planning timelines and avoid project delay for support operations that may affect training.

1.3.3 Resource Management

Resource management is critical to facilitating military training and support operations at the Combat Center and includes programs and plans governing natural and physical resources. While Marine Corps Orders (MCO) provide overarching applicable direction, some Combat Center plans have been developed (e.g., Integrated Natural Resource Management Plan (INRMP)). These plans direct action and/or are a source of project requirements. Some MAGTFTC programs operate with no plan (e.g., Refrigeration Management Program). For these programs, requirements may be in MCOs, Combat Center Orders (CCO), and/or Environmental Standard Operating Procedures. Combat Center plan and program direction also incorporates regulatory requirements (see Section 1.7).

1.3.4 Incidental Uses

Incidental uses at the Combat Center include employees, residents, and contractors working, living and recreating in the training areas and designated areas. Limited organized off-road highway (OHV) races occur in the western training areas (BLM 2022a). Most incidental uses are within the scope of military training and support operations because personnel are using the same facilities and infrastructure (e.g., unpaved routes, golf course, etc.) and subject to the same constraints (e.g., Restricted Areas). As the Combat Center population changes, the level of services required and resulting environmental effects fluctuates. The resident population has ranged from 8,326 to 27,407, with an average of 20,945 individuals supported annually, and with 18,339 individuals in 2021.

(URS 2011 to URS 2015, CDM-AECOM 2016, CDM-AECOM 2017; MMECG 2018; Multi-MAC JV 2019 to Multi-MAC JV 2022). MAGTFTC would continue to address the needs of the entire installation, including its transient and residential populations, and occasional public use. Proposals exceeding existing uses would require additional NEPA review.

Source: Combat Center Gov't and External Affairs.

Photo 4 –Mainside (1965)

Source: Ludwig 1989.

Photo 5 –Mainside (1974)

Source: Combat Center Gov't and External Affairs. Photo Credit: Cpl Therese Edwards, USMC (Jan 12, 2022).

Photo 6 –Mainside (2022)

1.4 PROCEDURAL HISTORY

Relevant Combat Center documents are listed below, with some documents incorporated by reference into this SEA (40 CFR §1501.12), with full citations and access information in Appendix A.

1.4.1 NEPA Documents

Since the mid-1980s, NEPA documents show that most Combat Center actions do not have significant effects, with 50 environmental assessments (EA) supporting Findings of No Significant Effect (FONSI), and only 3 environmental impact statements (EIS).

1.4.2 ESA Documents

The main documents that have influenced desert tortoise management are listed below. Some of these documents were the source of requirements for past NEPA documents.

- Desert Tortoise Management Plan (UCR Herbarium 1996);
- INRMP for Fiscal Years 2002 to 2006 (MCAGCC 2001);
- INRMP for Fiscal Years 2007 to 2011 (MCAGCC 2007);
- Desert Tortoise Management Plan (Kiva Biological Consulting 2004);
- INRMP for Fiscal Years 2012 to 2016 (MCAGCC 2013);
- INRMP for Fiscal Years 2018 to 2024 (MCAGCC 2019) (update underway); and
- Biological Opinion for Basewide Training and Routine Maintenance (USFWS 2002); and
- Biological Opinions for Land Acquisition and Airspace Establishment to Support Large-scale Marine Air Ground Task Force Live-fire and Maneuver Training (USFWS 2012 and 2017).

1.4.3 NHPA Documents

The main documents that have influenced cultural resource management are listed below. Some of these documents were the source of requirements for past NEPA documents.

- Historic Preservation Plan (USACE 1994a);
- ICRMP for Fiscal Years 2002 to 2006 (MCAGCC 2002);
- ICRMP for Fiscal Years 2007 to 2011 (MCAGCC 2007);
- ICRMP for Fiscal Years 2012 to 2016 (MCAGCC 2011a);
- ICRMP for Fiscal Years 2015 to 2019 (MCAGCC 2018);
- ICRMP for Fiscal Years 2021 to 2025 (MCAGCC 2020);
- Programmatic Agreements among the United States Marine Corps, the California State Historic Preservation Officer, and the Advisory Council on Historic Preservation Regarding operation, Maintenance, Training, and Construction at the Combat Center (USMC *et al.* 2001 and USMC *et al.* 2007 (expired in 2014)).

1.5 PURPOSE AND NEED

MAGTFTC continually evaluates Combat Center operations to ensure Marines obtain realistic training. MAGTFTC anticipates the following needs to support existing and emergent requirements:

- Increased off-route, dispersed movement throughout the training areas (excluding Restricted Areas), with lighter vehicles, during exercises and maneuver training.
- Increased live-fire (e.g., rocket artillery) and target use throughout the training areas.
- Increased sustainment training (e.g., dispersed resupply operations).
- Resolving limitations on rotary-wing and tilt-rotor operations throughout the training areas.
- Resolving airfield congestion consistent with the Expeditionary Advanced Base Operation (EABO) and stand-in forces focus of Force Design 2030.

To facilitate these changes and address the effects of ongoing training, MAGTFTC would address the following Support Operation and Resource Management needs:

- Improving the Combat Center route network.
- Modernizing fixed ranges to increase training capacity.
- Improving Range Control's ability to track movement in the training areas.
- Improving desert tortoise management to offset the effects from training.
- Addressing invasive plant populations to offset the effects from training.
- Resolving potential land use conflicts (actual and apparent).

MAGTFC would address these issues and opportunities under the Proposed Action (Section 2.2). This is based on NEPA considerations of scope, connected actions, and some management changes that require NEPA analysis prior to implementation. Additional details are provided below.

1.5.1 Military Training

Increased Dispersed Movement. Maneuever training emphases shift based on the real-time threat so Marines are provided realisic training scenarios, currently integrating more dispersed movement across the landscape using various (often lighter) vehicles.

Increased Ordnance and Target Use. Live-fire training continues to involve ground and air-delivered ordnance, with increased rocket artillery use projected under Force Design 2030.

Increased Logistical and Engineering Operations. Sustainment training (e.g., resupply convoys, distribution points, refueling operations) and engineering operations (e.g., construction of Forward Operating Bases, creation of trenches and berms, etc.) by the Logistics Combat Element, in support of other MAGTF elements, would continue to be conducted as part of expeditionary training.

Resolving Limitations on Rotary-Wing and Tilt-Rotor Operations. These aircraft must be able to take-off, land, and deliver equipment and supplies throughout the Combat Center. Historically, landing areas were analyzed on a case-by-case basis (see e.g., USMC 2010a). The 2018 EA's GO, SLOW-GO, NO-GO framework (Figure 5) attempted to gain efficiencies but did not consider other training activities. The framework only allows operations in the GO areas, with use of SLOW-GO areas dependent on future surveys showing no resources. The unintended consequence is that any training with ground disturbance is not allowed in 64% of the Combat Center. This is not realistic given the Combat Center mission,[5] Department of Defense policy,[6] and the nature/effects of training.

Resolving Airfield Congestion Consistent with the EABO Focus of Force Design 2030. The location of existing airfields cannot achieve flexibilities necessitated by the EABO focus of Force Design 2030, which calls for prepositioned, mobile forces operating in austere, temporary locations within (potentially) contested maritime areas, thus enabling freedom of action for naval forces (see e.g., USMC 2021a). For example, the existing airfields cannot adequately support the Fire Support Coordination Exercise (FSCEX), which integrates all elements of combat. Assault Landing Zone Sandhill is used to support FSCEX but due to its proximity to the Strategic Expeditionary Landing Field, interference with landing of KC-130s occurs. Due to congestion and location, EABO-type actions can only be increased in a limited capacity.

1.5.2 Support Operations

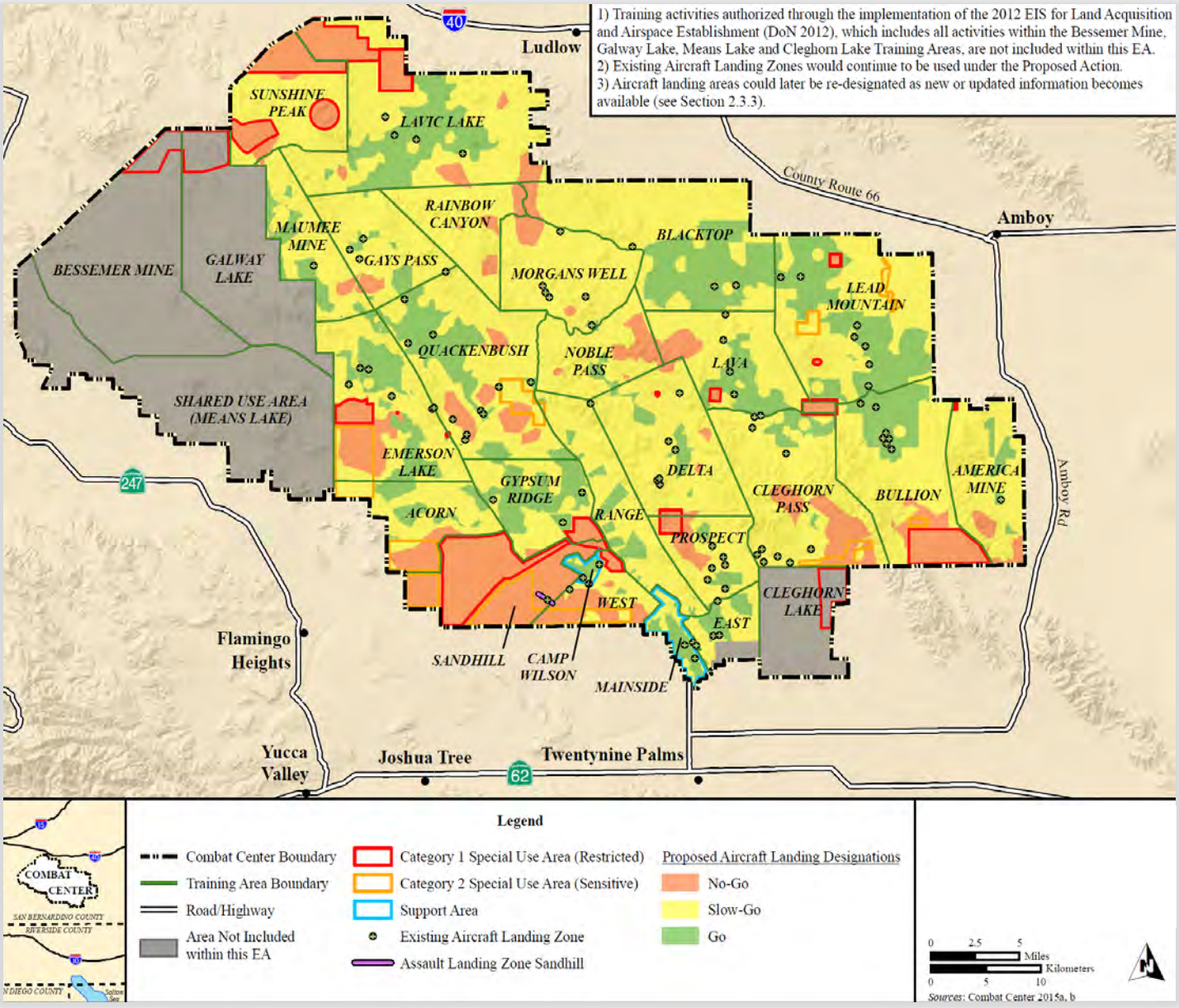
Improving the Combat Center Route Network. Improving existing routes would minimize the need for new routes, provide units more direct access to remote portions of training areas (e.g., minimizing safety risk from traveling on state highways and re-entering via BLM access roads), and facilitate other critical actions (e.g., vehicle recovery and medical evacuations).

Modernizing Fixed Ranges. For efficiency of scoring and target control, additional workspace is needed for contractors and unit staff managing Range 500. To facilitate concurrent types of training, additional acreage is needed. Range 500 is the only Marine Corps range supporting West Coast units in crew gunnery for assault amphibious vehicle (AAV) and light armored vehicle (LAV) training. When in use for gunnery qualifications, it cannot simultaneously support other training events.

Improving Range Control Operations. To ensure safe use of the training areas and airspace, MAGTFTC needs the ability to control aircraft and personnel movement (real time). Currently, personnel movement and ground locations are monitored by radio communication.

[5] The mission of the Combat Center is linked to that of the MAGTFTC and involves managing facilities, services, and support to forces conducting service-level, combined arms training to enhance the combat readiness of operating forces.

[6] "[T]he principal purpose of DoD lands ... [i]s to support mission-related activities..." (DoD 2011).



Source: DON-USMC 2018a.

Figure 5 – Landing Areas

1.5.3 Resource Management

Improving Desert Tortoise Management. The desert tortoise population is in continued decline in the Western Mojave Recovery Unit (see e.g., Allison and McLuckie 2018). While the USFWS has already concluded tortoise populations and habitat at the Combat Center are not critical to the survival and recovery of the species (USFWS 2017), MAGTFTC seeks an innovative approach to sustain military training at the Combat Center while also supporting desert tortoise recovery per ESA (Section 7(a)(1) and 7(a)(2)) and NEPA (mitigate for future effects) requirements.

Addressing Invasive Species. While the infestations are still of manageable size, MAGTFTC seeks to manage non-native invasive plant species to promote ecosystem and community integrity, to sustain the training mission and to prevent displacement of ESA-listed or sensitive species.

Resolving Potential Land Use Conflict: Organized OHV Race Events. MAGTFTC seeks to clarify the extent to which organized OHV races may be allowed at the Combat Center. Until restricted airspace is designated over the Exclusive Military Use Area (EMUA) (see Chapter 4), MAGTFTC would continue to consider requests per past adopted mitigation (DON 2013 and 2014 NDAA, Subtitle C, Section 2943(a)) due to the importance of these events to the public and economy.

Resolving Apparent Land Use Conflict: Environmental Constraints. In the 1990s, MAGTFTC designated Category 1 and Category 2 Special Use Areas for resource conservation (USFWS 2002 and DON 2003c) (Figure 6). In 2018, these categories were renamed Restricted Areas and Limited Use Areas, respectively, with Limited Use Areas covering 26,431 acres (3.5% Combat Center). Despite identified as sensitive areas, ground disturbing activities have never been limited (see e.g., DON 2003c, DON 2012, DON 2013, DON-USMC, 2018a, USFWS 2002, USFWS 2012, and USFWS 2017). This confusion may have played a role in the development of the 2018 EA framework above (NO-GO areas incorporate some Limited Use Areas).

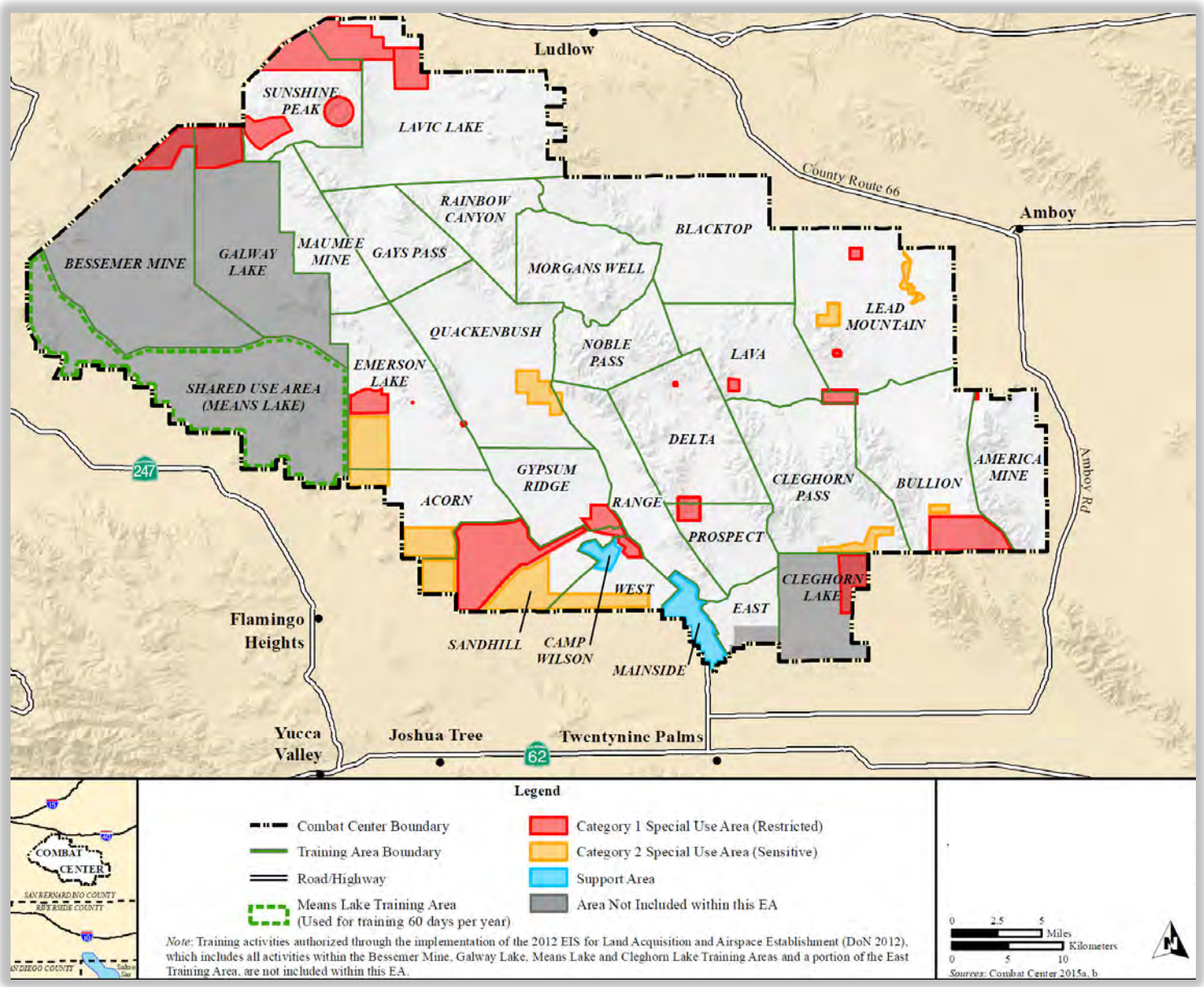
1.6 MANAGEMENT DIRECTION AND LEGAL REQUIREMENTS

- **Statutes, Regulations, and Executive Orders (EO)**. Requirements applicable to this SEA are primarily discussed in Section 1.7 and Chapter 3 (Environmental Consequences).
- **Main Policy Documents**: MCO 5090.2, *United States Marine Corps Environmental Compliance and Protection Program*, Volumes 1-21; Combat Center Order (CCO) 5090.1, *Environmental Protection*; and CCO 3500.4, *MAGTFTC, MCAGCC Range, Training Area, and Airspace Program* & Standard Operation Procedures (updated per MCOs and CCOs).
- **Plans**. Combat Center plans that would be updated for this SEA's Proposed Action include the INRMP, ICRMP, and Integrated Pest Management Plan.

1.7 AUTHORIZATIONS, PERMITS AND PROCESSES

The main authorizations, permits, and processes relevant to ongoing and future actions at the Combat Center are summarized below.

- **Clean Air Act (CAA) & Greenhouse Gases**. MAGTFTC complies with CAA requirements via applicable rules, permits, and federal and state programs. MAGTFTC complies with all applicable Mojave Desert Air Quality Management District (MDAQMD) rules for the protection of air quality; permit requirements for the 119 permitted equipment and processes at the Combat Center (e.g., gas stations); and applicable programs and reporting requirements as administered by the U.S. Environmental Protection Agency (USEPA) (e.g., greenhouse gas inventory) and State of California (e.g., Comprehensive Emissions Inventory Reporting**).**



Source: DON-USMC 2018a.

Figure 6 – Former Special Use Areas

- **Clean Water Act (CWA).** No navigable waters (Waters of the U.S.) occur at the Combat Center (USACE 2018), thus, CWA Sections 401, 402 and 404 do not apply. However, MAGTFTC still implements its own programs to manage stormwater and spills, ensuring Combat Center actions do not affect off-site and downstream navigable or state waters. In addition, California can still enforce its laws for the protection of drinking water and state waters. Thus, MAGTFTC manages permits for domestic and industrial facilities (e.g., Combat Center's wastewater treatment plant) with specific operations and maintenance requirements determined by the State Water Resources Control Board (SRWQCB) Region 9.
- **ESA.** MAGTFTC complies with ESA by adhering to its current biological opinion for base-wide training, operations, and routine maintenance. In summary, incidental take is limited to 15 large desert tortoises per year, disturbance of tortoise suitable habitat is limited to 150 acres per year, and actions must comply with effect avoidance and minimization measures (Appendix B) (USFWS 2017). Over the past 20 years (reporting started in 2002), 48 desert tortoises have been taken and 1,187 acres of suitable tortoise habitat have been disturbed at the Combat Center. The current biological opinion offers some flexibility, but it is not sufficient to facilitate training in the future and iteratively reinitiating consultation is infeasible for training that evolves incrementally, with uncertain timing, and often at critically high demand. Concurrent with this SEA, MAGTFTC reinitiated consultation on a mixed programmatic action (50 CFR §402.02(d)) to obtain coverage for ongoing and future actions, including revised conservation measures (Appendix C).
- **Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)**. Combat Center pest management has been limited to common pests that exist within the built environment (e.g., ants, rats, cockroaches) using minimal quantities of USEPA-registered pesticides and pesticide devices (NOPRS 2022). MAGTFTC complies with FIFRA by ensuring pesticides and pesticide devices (7 U.S.C. §136(t) and (u)) used at the Combat Center are pre-approved by the USEPA. This requirement applies to proposed invasive plant species management.
- **Natural Resource Management**. Per the Sikes Act (16 USC §670-670f), MAGTFTC implements its INRMP to manage and conserve natural resources. MAGTFTC's current INRMP emphasizes – optimizing mission readiness (e.g., reducing conservation conflicts and enhancing long-term ecosystem management); conserving federally protected species (e.g., ESA, Bald and Golden Eagle Protection Act, and Migratory Bird Treaty Act); monitoring and managing sensitive or at-risk species (e.g., Joshua trees (*Yucca brevifolia*) and monarch butterflies (*Danaus plexippus*); monitoring and managing landscape and ecosystem condition; and providing for other uses such as recreation. While Agassiz's Desert Tortoise is the Combat Center's sole ESA-listed species, monarch butterflies are a candidate species for ESA listing (USFWS 2022e). Identifying, avoiding, minimizing, and mitigating the risks to such species enhances species conservation, ecosystem condition, and mission sustainment.
- **Migratory Bird Treaty Act (MBTA)**. Migratory birds may occur at the Combat Center, but no ESA-listed birds are resident species. MAGTFTC manages migratory birds under two permits. The Special Purpose MBTA Permit (#MB053740-3) allows removal of up to ten nests of common birds per year when in conflict with training. MAGTFTC obtained a raven depredation permit (#MBPER0051897) authorizing take of 1,167 ravens and 130 raven nests from September 2022 to August 2023.
- **NEPA**. MAGTFTC is required to comply with NEPA for major federal actions with potential effects to the human environment, to include substantial changes to ongoing actions (see 40 CFR §§1500.1 and 1508.1(q); and 32 CFR §775.6(c)). The majority of proposed actions at the Combat Center are within the scope of categorical exclusions (CATEX). In Fiscal Year 2022,

59 projects were authorized under CATEXs and 1 EA was completed (MAGTFTC 2023). For the reasons explained in Section 1.3, MAGTFTC seeks to improve its NEPA practice (e.g., focused EAs) and explain the path forward for evaluating military training (see Chapter 5).

- **NHPA.** MAGTFTC follows the standard Section 106 process for new non-training undertakings (36 CFR §§800.3 to 800.13). For training operations, MAGTFTC operated under programmatic agreements (PA) from 2001 to 2014 (36 CFR §800.14(b)) and has since been working to enact a new PA, with the public comment period on the draft PA completed in 2022. Native American tribes have been consulted on the mitigation proposed for the effects of training, and the agreement is pending the approval of the California State Historic Preservation Officer (SHPO) and Advisory Council on Historic Preservation (ACHP). This new agreement is needed to avoid, minimize, or mitigate for effects to historic properties from ongoing and future training because the nature of military training and general inaccessibility of the training areas. Additionally, it is needed to develop a more efficient and effective consultation process for some routine training-related undertakings. Moving forward, MAGTFTC would continue to manage historic properties per the ICRMP (MCAGCC 2020) and follow the standard Section 106 process for new non-training undertakings. Once signed, the PA would provide mitigation for training activities and for the use and maintenance of training area infrastructure and facilities.
- **Hazardous Materials, Waste Management, and Pollution Prevention**. MAGTFTC complies with a variety of applicable federal and state requirements, namely: Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Resource Conservation and Recovery Act (RCRA), Pollution Prevention Act, and Emergency Planning and Community Right-to-Know Act (EPCRA). In summary, MAGTFTC minimizes waste streams and the potential for air, soil and water contamination by source reduction, waste diversion, and recycling. The Combat Center's Class III Landfill accepts non-hazardous waste. From Fiscal Year 2016 to 2020, an annual average of 7,500 tons of solid waste was disposed at the landfill, with a 30 to 50% waste diversion rate (Battelle 2021). The Combat Center is a Large Quantity Generator of hazardous waste (EPA # CA0170090013; DTSC # 36970007), with most of the waste transported off-site classified as California hazardous waste (459 tons in 2022), not RCRA-hazardous waste (USEPA 2023a and DTSC 2023a). The Combat Center is unique in its practice of diverting various hazardous wastes from accumulation areas for reuse or recycling. While munitions used during training are not regulated as hazardous waste (40 CFR Parts 260 to 266 and 270), units are required to retrieve some items from the training areas (e.g., brass casings) for recycling or reuse. Intermittently, berm mining at small arms ranges removes copper and lead compounds potentially released to the soil. In the future, if any range or training area ceases to be used for training, disposition and cleanup would be evaluated under the Environmental Restoration Program per CERCLA. Known contaminants of concern at the Combat Center include explosives, metals, organochlorine pesticides, petroleum, and polynuclear aromatic hydrocarbons (DTSC 2023b). Based on the most recent Range Environmental Vulnerability Assessment (REVA), there is no off-site release of munition constituents into the environment at levels of concern (ARCADIS 2016). Primary air emissions for the Combat Center are carbon monoxide, oxides of nitrogen, and particulate matter, which are generated from sources such as internal combustion engines, tactical support equipment, and mobile sources (Multi-MAC JV 2022). Primary chemical releases reported under EPCRA are lead compounds (including lead), copper, naphthalene, nitroglycerin, and phosphorus (USEPA 2023b). The Department of the Navy and MAGTFTC are investigating potential per- and polyfluoroalkyl substances contamination (PFAS). Findings would be made public.

- **Safe Drinking Water Act (SDWA).** MAGTFTC complies with the SDWA per federal (USEPA National Primary Drinking Water Regulations) and state requirements (must be at least as stringent as USEPA). MAGTFTC adheres to the California drinking water permit issued by the SRWQCB Region 9, Division of Drinking Water for the Combat Center's drinking water treatment plant (Water System # CA3610703). MAGTFTC's Consumer Confidence Report shows no violation of applicable standards (MAGTFTC 2022c).

1.8 SCOPE OF ENVIRONMENTAL ANALYSIS

MAGTFTC determined the scope of the SEA effects analyses should be focused on: *Air Quality; Biological Resources (Desert Tortoise); Climate Change; Cultural Resources; Environmental Justice (Noise);* and *Human Health and Safety (Herbicides)*. This is consistent with the scope of prior NEPA documents, and the desert tortoise is a focus of MAGTFTC mitigation efforts (see Section 1.4). Lastly, removing the *Limited Use Area* designation (Section 1.5.3) is an administrative action with no environmental effects to warrant detailed analysis.

1.9 DECISIONS TO BE MADE

Based upon the information in this SEA, the decision maker would determine: (1) whether to implement the Proposed Action, in whole or part; (2) whether new or revised mitigation and monitoring is required for aspects of the Proposed Action or Ongoing Action; and (3) whether the SEA analysis supports a FONSI, Mitigated FONSI, or requires further analysis in an EIS.

1.10 TRIBAL AND AGENCY COORDINATION

This Draft SEA was developed in support of ongoing ESA and NHPA efforts discussed in Section 1.7 (involved USFWS, SHPO, ACHP, and consulting Native American tribes), with additional input solicited from BLM and USEPA. Comments from USEPA regarding use of herbicides is incorporated into this SEA. MAGTFTC would consult under ESA Section 7 for use of herbicides and ensure compliance with all appropriate instructions and limitations when developing treatment plans.

1.11 PUBLIC PARTICIPATION

MAGTFTC published this Draft SEA and proposed Mitigated FONSI for a 30-day public comment period, which would end as stated in the Notice of Availability.

- Electronic copies are available on the Combat Center website (under "Environmental Assessments"): https://www.29palms.marines.mil/Staff-offices/Environmental-Affairs/
- If distribution is approved by the San Bernardino County Library Administration, hardcopies would be available for public review at the following library branches: Twentynine Palms, Joshua Tree, Yucca Valley, and Barstow.

Comments may be submitted by any of the following methods:

- Email: smb-plms-isdea@usmc.mil
- Phone: (760) 830-8190
- Mail. Combat Center mailroom procedures require letters to be addressed as follows:

CAPTAIN SEARCY
ATTN NEPA/SERRET
ENVIRONMENTAL AFFAIRS
BOX 788110
TWENTYNINE PALMS CA 92278-8110

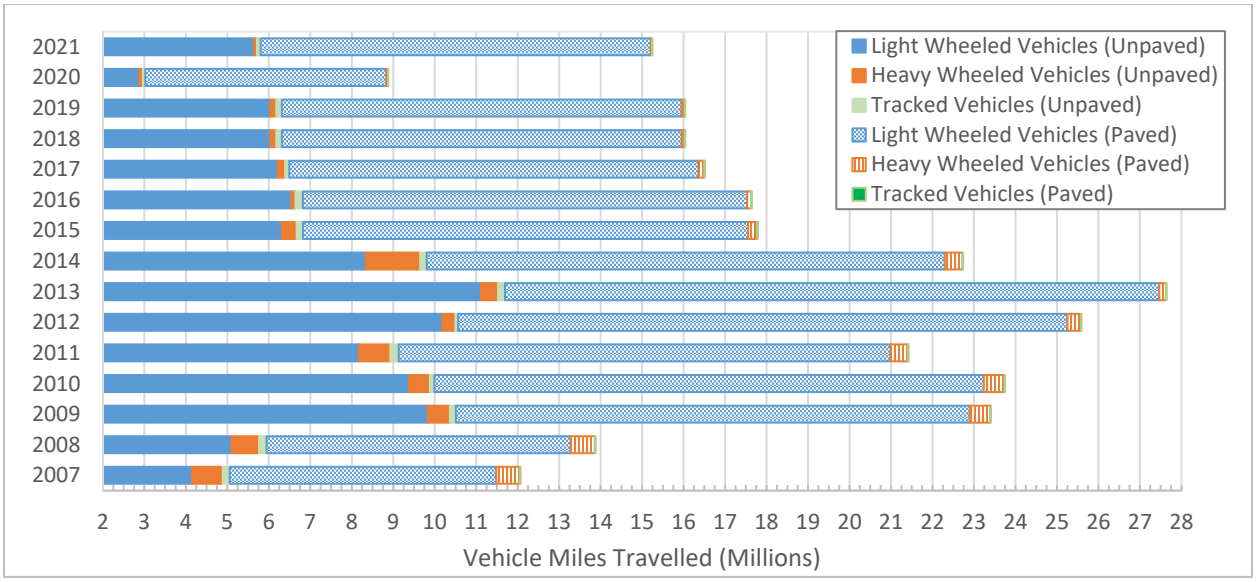
CHAPTER 2 – ALTERNATIVES

The *No Action Alternative* (40 CFR § 1502.14(c)) is the continuation of the status quo, which includes ongoing military training, support operations and resource management. It also provides a baseline against which to evaluate the effects of the Proposed Action. To avoid confusion, the No Action Alternative is called *Ongoing Action*. The *Proposed Action* includes the continuation of ongoing actions, changes to ongoing actions, and future actions. No other "action alternatives" are considered because this SEA is analyzing changes to ongoing actions, action alternatives were considered in prior NEPA documents, and the Purpose and Need is issue and site-specific. Alternatives in this SEA would be limited to methods, timing, or mitigation.

2.1 ONGOING ACTION

2.1.1 Maneuver Training & Military Vehicle Use

The Combat Center has 1,752 miles of existing routes, the majority unpaved (Figure 2). Paved routes are limited to Camp Wilson and Mainside (78 miles). The 413 miles of "main routes" are used for general transit and the remainder ("other routes") are the result of off-route training (mapped to encourage use/minimize new trails). The 131 miles of unpaved routes in Restricted Area are no longer authorized for use (some exceptions exist; not shown on most SEA maps). Standard widths are 32 feet (main routes) and 16-feet (other routes) (DON 2012). Annually, MAGTFTC maintains (e.g., grades) about 500 miles of main routes. Based on total route mileage and standard widths, existing routes encompass 4,200 acres (1,603 acres for main routes and 2,597 acres for other routes). Over the past 20 years,[7] up to 21 miles of main routes and 67 miles of off-route trails may have been created per year (211 acres per year). Past NEPA documents disclosed average vehicle mileage as a measure of intensity of use (e.g., DON 2012 and DON-USMC 2018a), but the status quo is better represented by actual data shown on Diagram 2 (8,800,611 to 27,645,479 million miles per year).



Source: URS 2008 to URS 2015, CDM-AECOM 2016, CDM-AECOM 2017; MMECG 2018; Multi-MAC JV 2019 to Multi-MAC JV 2022

Diagram 2 – Tactical Vehicle and Equipment Usage

[7] As of 2003, 354 miles of main routes and 665 miles of other routes existed (DON 2003c). This is a high-end estimate as some routes preceded the Marine Corps (prior to 1950s and former OHV trails).

2.1.2 Live-Fire Training

Over the past 20 years or more,[8] a total of 2,248 targets[9] have been installed and used for live-fire training (e.g., ordnance use) in the training areas, with up to 112 installed per year and 757 located outside of fixed ranges. Acorn, American Mine, Camp Wilson, Cleghorn Lake, East, Gypsum Ridge, Mainside, Means Lake, Sandhill, Sunshine Peak and West do not currently contain targets. Past NEPA documents provided average ordnance used as a measure of intensity of use (e.g., DON 2012 and DON-USMC 2018a), but the status quo is better represented by actual usage data shown on Diagram 3 (11,655,808 to 23,583,706 pieces of ordnance used per year). Small arms ordnance is used most frequently. The size of ground craters depends on the ordnance type and method of employment (e.g., small arms training using an old vehicle versus an aircraft-delivered bomb). Use of explosive ordnance (e.g., demolitions and artillery) can create large craters but demolition training often occurs in Range 114 and many employments involve breeching structures (e.g., doors), leaving no craters. Aircraft delivered ordnance (e.g., bombs) causes most disturbance, with up to 49 acres potentially disturbed (directly and indirectly) around each target (DON 2012).

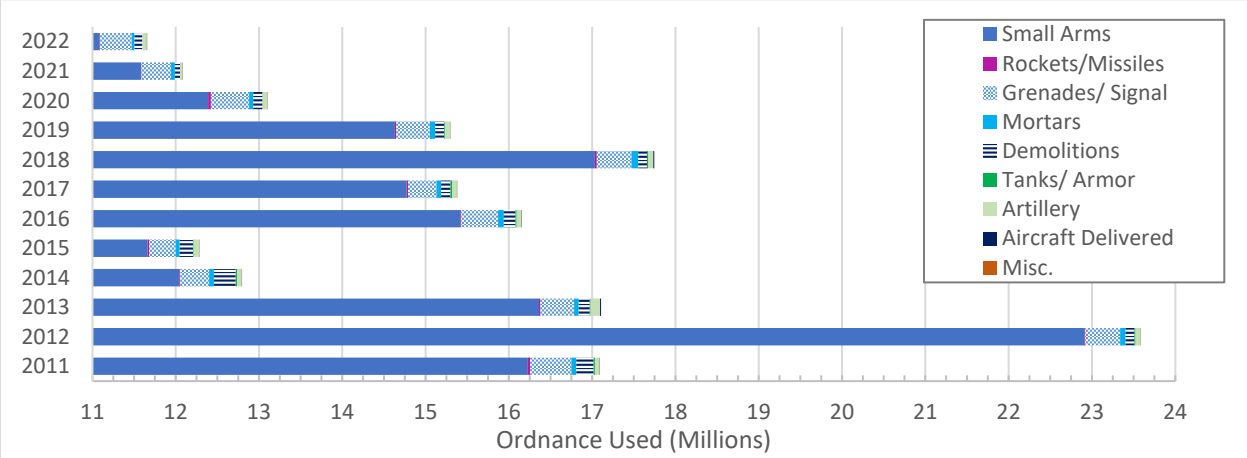


Diagram 3 – Total Ordnance Used by Munition Type[10]

2.1.3 Sustainment Training

A MAGTF's Logistics Combat Element conducts sustainment training, including transportation of personnel and materials, maintenance and repair of equipment, supply and distribution, general engineering, and various logistical services (e.g., medical, food service). General engineering (e.g.,

[8] Target use has been documented in early documents (DON 2003c and USFWS 2002), but the total number of targets used or installed has not been clearly documented. Although targets have likely been in use prior to 2002, this SEA limits the time frame of effects to 20-years to align with the date of these early documents.

[9] Range Training Area = 34% (757 targets) (most fixed ranges, some with ordnance limitations (e.g., small arms)). Blacktop, Gays Pass, Lavic Lake, Morgan's Well and Quackenbush Training Areas = 33% (742 targets). Bessemer Mine, Bullion, Cleghorn Pass, Delta, Emerson Lake, Galway Lake, Lava, Lead Mountain, Maumee Mine, Noble Pass, Prospect and Rainbow Canyon Training Areas = 33% (749 targets).

[10] Data extracted from Combat Center's EPCRA Section 313 TRI Reports for Reporting Years 2011 to 2022, specifically the Munitions Use Reports. Compiled and verified by the Combat Center EPCRA Program Manager on January 31, 2023 (limited to available electronic reports). Small Arms includes small arms ordnance fired from aircraft and other vehicles. Rockets and Missiles are listed in parts, not whole ordnance. Aircraft Delivered includes bombs, practice bombs, inert bombs, countermeasures, etc. Demolitions includes dynamite, pounds of explosives, feet of detonation chord, fuses, blasting caps, ignitors, charges, demo kits, etc. Miscellaneous category includes land mines and practice or training munitions that do not fit into the other category names.

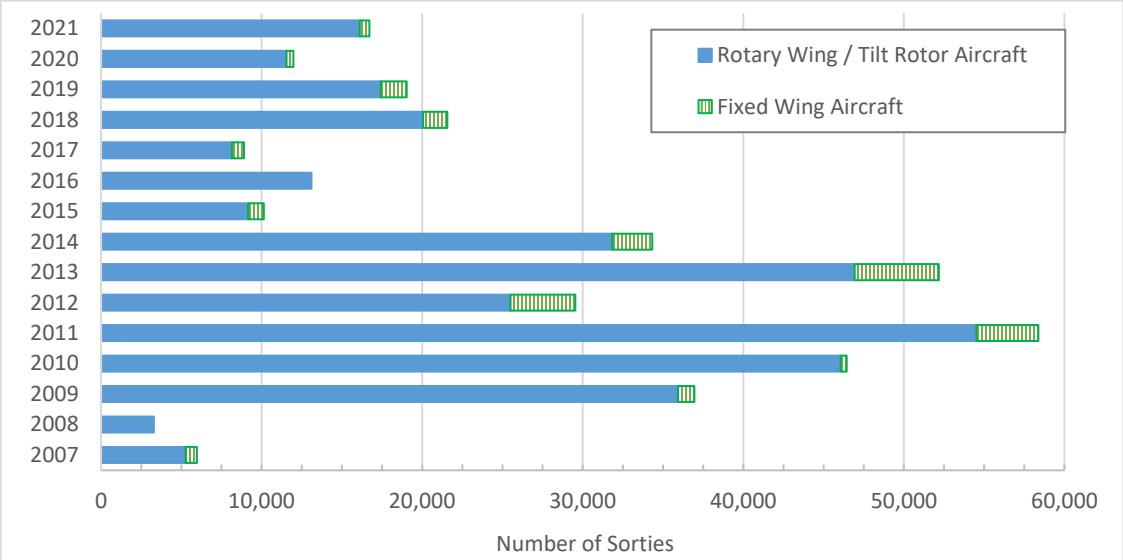
excavation or temporary construction) may also be executed during training. In support of this, and to concentrate effects, pre-designated and disturbed sites have been developed and mapped (e.g., Command Outposts, Forward Operating Bases, Forward Ammunition Supply Points, and Objective Areas). Use of these sites commonly require berm creation along the perimeter, using soil at or adjacent to the site, and other site preparation activities (e.g., installing temporary fencing or wire). A total of 39 sites encompass 1,944 acres, with an average size of 50 acres (Figure 2). Over the past 26 years,[11] up to 2 sites may have been developed each year, disturbing up to 75 acres per year.

2.1.4 Expeditionary Airfields, Landing Areas, and Landing Zones

The airfields and landing strips supporting all aircraft include the Strategic Expeditionary Landing Field (SELF), ALZ Sand Hill, Outlying Landing Field Seagle, and Helicopter Landing Zones White Rhino, Wilson, Red and Gunfighter. These areas occupy 553 acres at and near Camp Wilson (Figure 2). Although expeditionary in nature, these areas are functionally permanent for training purposes. In the training areas, rotary-wing and tilt-rotor aircraft operations include take-offs, landings, and dropping payloads (e.g., personnel and equipment) with and without landing.

- Areas open for operations: 110 landing zones (2,973 acres total/ 27-acre average size) (DON-USMC 2018a); 182,599 acres of "GO" landing areas; and 23 drop zones (Figure 2). Over the past 20 years,[12] 150 acres may have been disturbed annually by landing zones, with only 10 hardened.
- Areas closed to operations: 84,862 acres (NO-GO) and 331,673 acres (SLOW-GO) (Figure 5).

The status quo for rotary-wing and tilt-rotor aircraft operations is shown in Diagram 4 (3,294 to 54,525 sorties per year). Any changes would be resolved in the airspace NEPA process (Chapter 4).



Source: URS 2008 to URS 2015, CDM-AECOM 2016, CDM-AECOM 2017; MMECG 2018; Multi-MAC JV 2019 to Multi-MAC JV 2022.

Diagram 4 – Total Aircraft Sorties

[11] The initial development and designation of several training support sites was evaluated in a 1997 NEPA document (MCAGCC 1997b). Although the creation and use of support sites likely occurred prior to 1997, this SEA limits the time frame of effects to 26-years to align with this early NEPA document.

[12] Landing zones documented as early as 2003 (DON 2003c). Although creation of landing zones likely was occurring prior to 2003, this SEA assumes a 20-year period for the effects analyses.

2.1.5 Fixed Ranges

There are 48 fixed ranges at the Combat Center, encompassing 17,327 acres (Figure 2). Over the past 68 years, up to 255 acres may have been disturbed each year.[13] Relevant to this SEA is Range 500, with 1,820 acres minimally developed for live-fire and maneuver training, including: 120 targets, 15 miles of existing unpaved routes, a control tower, a generator, an ammunition loading area, and solar panels that power the range by underground utility conduit (see Section 2.2.6).

2.1.6 Range Control Operations

A total of 38 aircraft sensors exists at high points throughout the training areas and are typically co-located with existing disturbed areas (e.g., observation points), encompassing up to 8 acres (Figure 2). Each sensor has an 0.2-acre footprint, with a smaller area of ground disturbed, 0.01-acre, due to use of minimally intrusive ground anchors (see Section 2.2.6).

2.1.7 Desert Tortoise Management

Desert tortoise management is largely governed by the requirements of the Combat Center biological opinion (Section 1.7), with ongoing monitoring of desert tortoise translocation sites, continued operation of the Combat Center's head starting[14] facility, Tortoise Research and Captive Rearing Site (TRACRS) in support of ongoing research and translocation monitoring, and participation (funding) in the RASP Initiative to implement desert tortoise recovery actions in the Western Mojave Recovery Unit (DON-USMC 2017a, MAGTFTC 2022a, USFWS 2017).

2.1.8 Invasive Species Management

MAGTFTC conducts limited eradication of non-native invasive plant species and weeds in the built environment but not in the training areas. Surveys conducted in the training areas show that between 2015 to 2021, known infestations increased from 6,561 to 8,446 acres (GSRC 2022).

2.1.9 OHV Race Events

The only authorized OHV race event is King of the Hammers (BLM 2022a and MAGTFTC 2022b), with use limited to existing Combat Center routes in the western training areas (Figure 2).

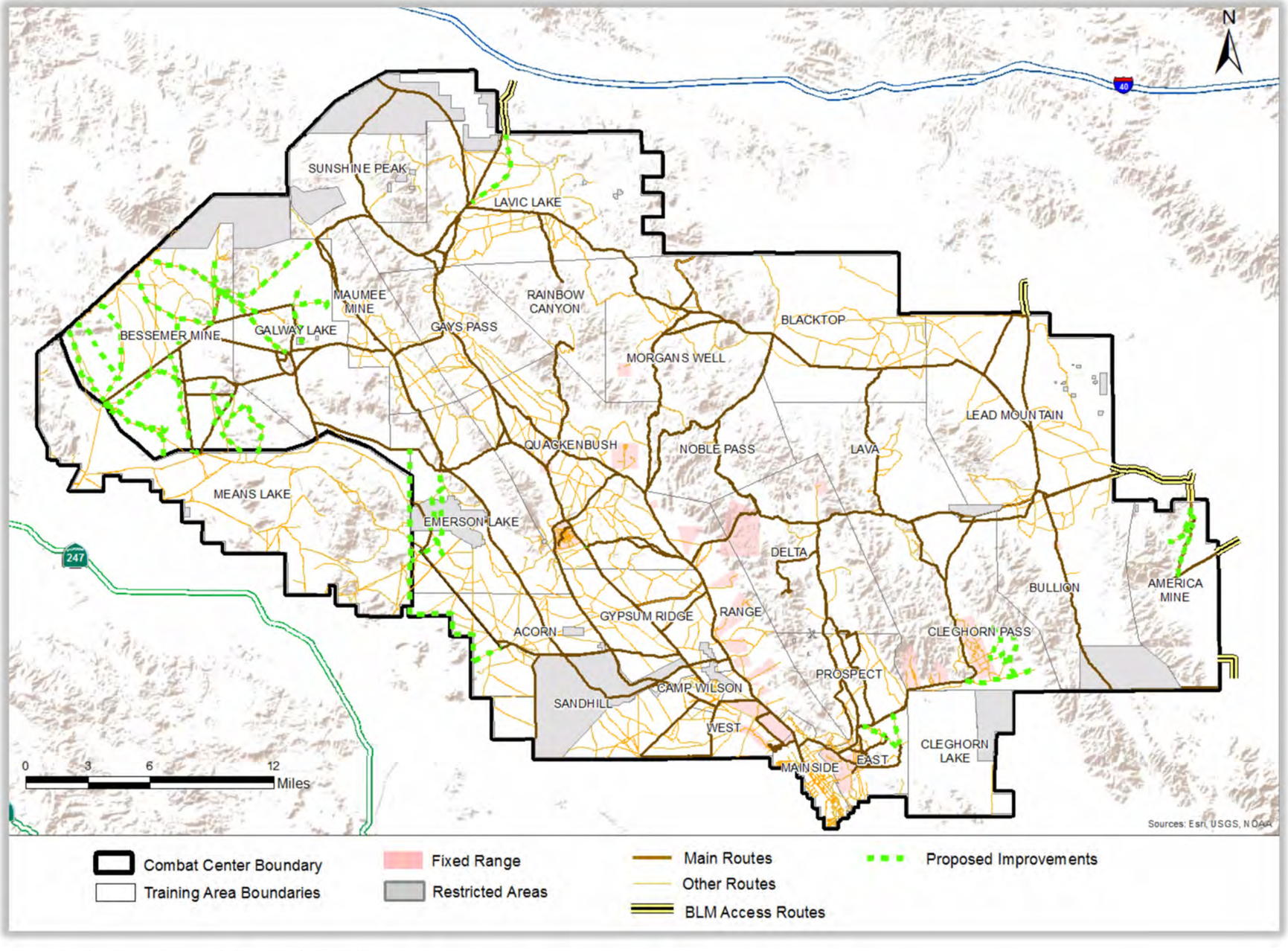
2.2 PROPOSED ACTION

2.2.1 Maneuver Training & Military Vehicle Use

Over the next 5 years, MAGTFTC proposes priority route improvements (e.g., widening from 8 to 16 feet, re-grading, and better connections) along approximately 120 miles of existing routes in the following training areas: America Mine (7 miles), Bessemer Mine & Galway Lake (72 miles), Cleghorn Pass (10 miles for Range 500 and 501), East (4 miles), Emerson Lake & Acorn (24 miles; 4 miles in the Emerson Lake Restricted Area), and Lavic Lake (4 miles) (Figure 7). MAGTFTC would also continue standard maintenance (up to 500 miles of existing routes per year, including the service route along installation boundary) and conduct future improvements as per future training requirements. An average of 25 miles of existing routes could be improved (e.g., widened to 16 or 32 feet) annually, with some routes re-designated as main routes depending on frequency of use and training needs. All routes would be graded and compacted, but no gravel or concrete would be used.

[13] A 68-year timeframe is based on 1955 as the earliest documented date of ranges existing and being used at the Combat Center (JRP 1999).

[14] Head starting involves – allowing wild tortoises to nest at TRACRS, where nests, hatchlings and juveniles grow protected from predators and then releasing the juveniles to the wild once they are larger and their shells have hardened to better withstand predation and endure the harsh desert climate.



Source: Combat Center Geospatial Data (March 17, 2023).

Figure 7 – Proposed Route Improvements[15]

[15] Note: the GIS data is best available. Some deviation exits. For example, not all existing routes (e.g., former OHV routes) may be mapped.

2.2.2 Live-Fire Training

Up to 35 new targets (1,715 acres disturbed) would be installed in Bullion and Lead Mountain training areas this year. Thereafter, up to 5 new targets (245 acres disturbed) (low end) or up to 50 new targets (2,450 acres disturbed) (high end) may be installed annually in any training area(s). New targets in Range 500 and Range 501 are discussed in Section 2.2.5. Target installation would not require construction (preconstructed and positioned in place), but ground disturbance would occur from use. The existing 2,248 targets would continue to be used and replaced when destroyed.

2.2.3 Sustainment Training

Annually, up to 10 training support sites could be developed, disturbing up to 365 acres per year into the future on an as needed basis. Initial development may be limited to grading, with units thereafter conducting soil disturbing activities (e.g., berm creation).

2.2.4 Expeditionary Airfields, Landing Areas, and Landing Zones

MAGTFTC proposes a three-pronged approach to better support existing aircraft operations and implement EABO elements of Force Design 2030.

First, MAGTFTC proposes to remove constraints on rotary-wing and tilt-rotor operations, resulting in 331,673 acres (formerly SLOW GO) and 43,673 acres (formerly NO-GO areas) opened for use. Some former NO-GO areas (41,189 acres) remain off-limits due to overlap with Restricted Areas. This results in a total of 557,945 acres that could be used for operations (per current geospatial data). When compared to the acreage analyzed in the 2018 EA, there may be only a 1,763-acre increase.[16]

Second, MAGTFTC proposes to allow development of temporary austere expeditionary airfields, on an as needed basis, when the specific tactics and methods being employed require development as part of the training or exercise. This would involve the unit finding a suitable location that can support the aircraft operation that involves minimal-to-no vegetation removal or grading. Photo 7 is an example request for use of a 12-acre area. This use is similar in scope to past designated landing zones. Based on historic rates (150 acres per year / 27 acres per site), up to 6 new sites may be used per year, disturbing up to 162 additional acres per year, with up to 16 acres hardened (e.g., gravel or soil binder) for safety. Each temporary airfield could take several hours to one day to complete.

Photo 7 – Potential Temporary Austere Expeditionary Airfield

[16] This increase is not substantial because the 2018 EA overestimated the acreage that could be used for take-offs and landings (included areas unsuitable for operations, such as rocky outcrops), although it excluded the Combat Center expansion areas acquired in 2014 after the 2012 EIS was completed. The 2018 EA shows a total of 597,371 acres of GO, SLOW-GO and NO-GO areas whereas current geospatial data shows a total of 599,134 acres (excluding unsuitable acreage and including the expansion areas).

Third, MAGTFTC proposes to construct two minimally developed expeditionary airfields or landing strips, disturbing up to 60 acres at each location in the Lead Mountain and Bessemer Mine training areas (see Figure 8; actual location vary slightly). MAGTFTC would also investigate using pre-disturbed airfield sites in Bessemer Mine as alternatives to new sites. These would be functionally permanent for training purposes.

The airfields would be either a graded dirt airstrip for the runway and taxiway, or a minimally developed expeditionary airfield like ALZ Sandhill (Photo 8). Dirt airstrips would primarily support rotary-wing and tilt-rotor wing aircraft operations while expeditionary airfields could be capable of supporting fixed wing (e.g., C130s, C123s, C17s and A400). Subject to availability of funds, minimally developed expeditionary airfields are preferred.

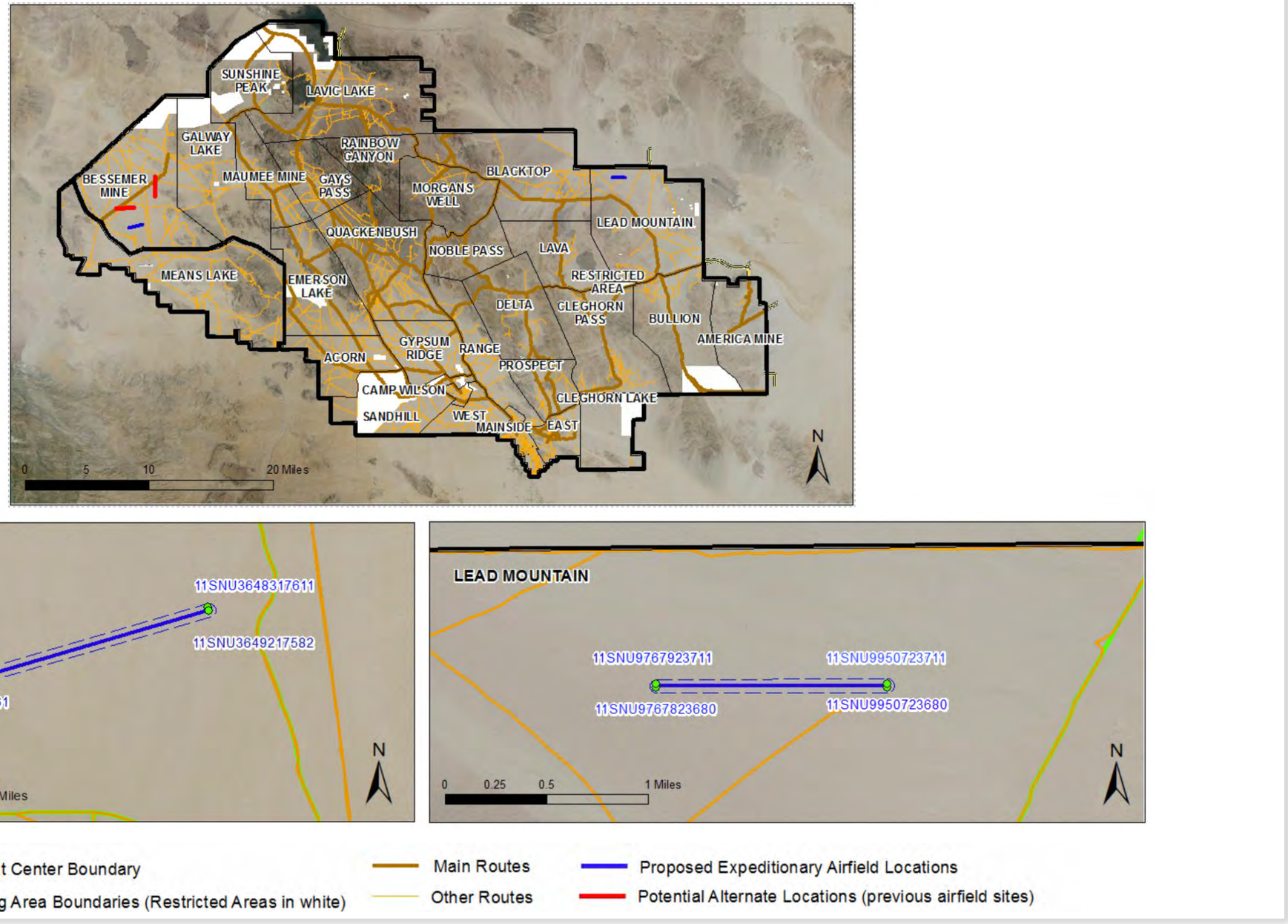
For an expeditionary airfield, construction would involve development of approximately 15 acres for the runway (4,600 feet by 120 feet; 13 acres) and taxiway (400 feet by 200 feet; 2 acres) using heavy equipment (e.g., grader, excavator, etc.) to remove native vegetation, grading and scraping the soil level, adding road base (soil mixed with ½ inch gravel, 6 inches thick; approximately 40,000 tons), compacting the soil and road base, and applying a solution like OPSDIRT® to harden the soil and road base (see Appendix D). OPSDIRT® stabilizes and hardens soil, has fugitive dust prevention properties. Approximately 65-70 gallons of the solution could be applied to the runway and taxiways, using heavy duty trucks capable of spraying the product directly to the ground (e.g., truck with tank). Approximately 320,000 gallons of water would also be used during the application process. A 160-foot perimeter along the runway and taxiway, directly disturbing an additional 40 acres, would be cleared of vegetation, and graded with a slight downward slope. This is to ensure aircraft and personnel safety by minimizing the potential for standing water and increasing visibility of any hazards that may be present adjacent to the runway and taxiway. Construction of each expeditionary airfield could take up to 8 weeks to complete. A staging area approximately 300 feet by 300 feet (2 acres) would be cleared at each location.

If construction of expeditionary airfields is not possible, the scope of the proposed action would be reduced to clearing, grubbing, and preparing the road base to support limited aircraft operations.

Implementation may begin within the year, in phases, due to potential funding constraints that may influence the desired end state of the airfields – e.g., graded dirt airstrip or minimally developed expeditionary airfield. It is possible that grading of the locations could occur within the year, with follow-on actions implemented until the desired end state is achieved.

Source: Combat Center MAGTF Training Directorate (July 27, 2022).

Photo 8 – ALZ Sandhill (For Illustrative Purposes)



Source: Combat Center Geospatial Data (March 17, 2023).

Figure 8 – Proposed Expeditionary Airfield Locations [17]

[17] Note: (1) size of airfields on upper map is enlarged for visibility (not to scale). (2) Estimates discussed in text control. (3) Endpoints in lower maps are presented in MGRS coordinates within the 11S datum.

2.2.5 Fixed Ranges

MAGTFTC proposes to modernize Range 500 (Multi-Purpose Range Complex) and expand the range to the east for a new permanent, fixed range described below and shown on Figure 9.

Range 500

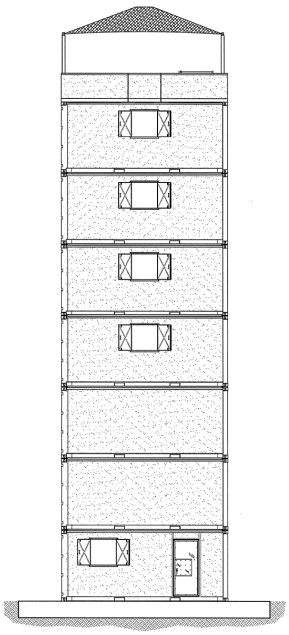
A new 70-foot control tower would be placed next to the existing control tower (see Diagram 5). The existing tower would remain and be repurposed.

Constructing a new tower would involve ground disturbance to install a concrete pad and to connect the tower to existing underground electrical conduit. The total area of disturbance would be less than 1 acre. For the tower and concrete pad, the area disturbed would be approximately 22-feet by 28-feet, with anchors installed to a depth of approximately 4 feet. For electrical connections, a two-foot-wide trench would run approximately 0.55 miles from the solar panels to the new tower location, at a depth of 3 to 6 feet.

Approximately 50 additional targets would be added to Range 500 as new locations or to replace existing targets as they are destroyed.

Because Range 500 has been in use for at least 20 years (DON-USMC 2003) and is highly disturbed, no new acreage for be affected by the upgrades.

Implementation would begin within the year.



Source: Parsons 2010.

FRONT VIEW

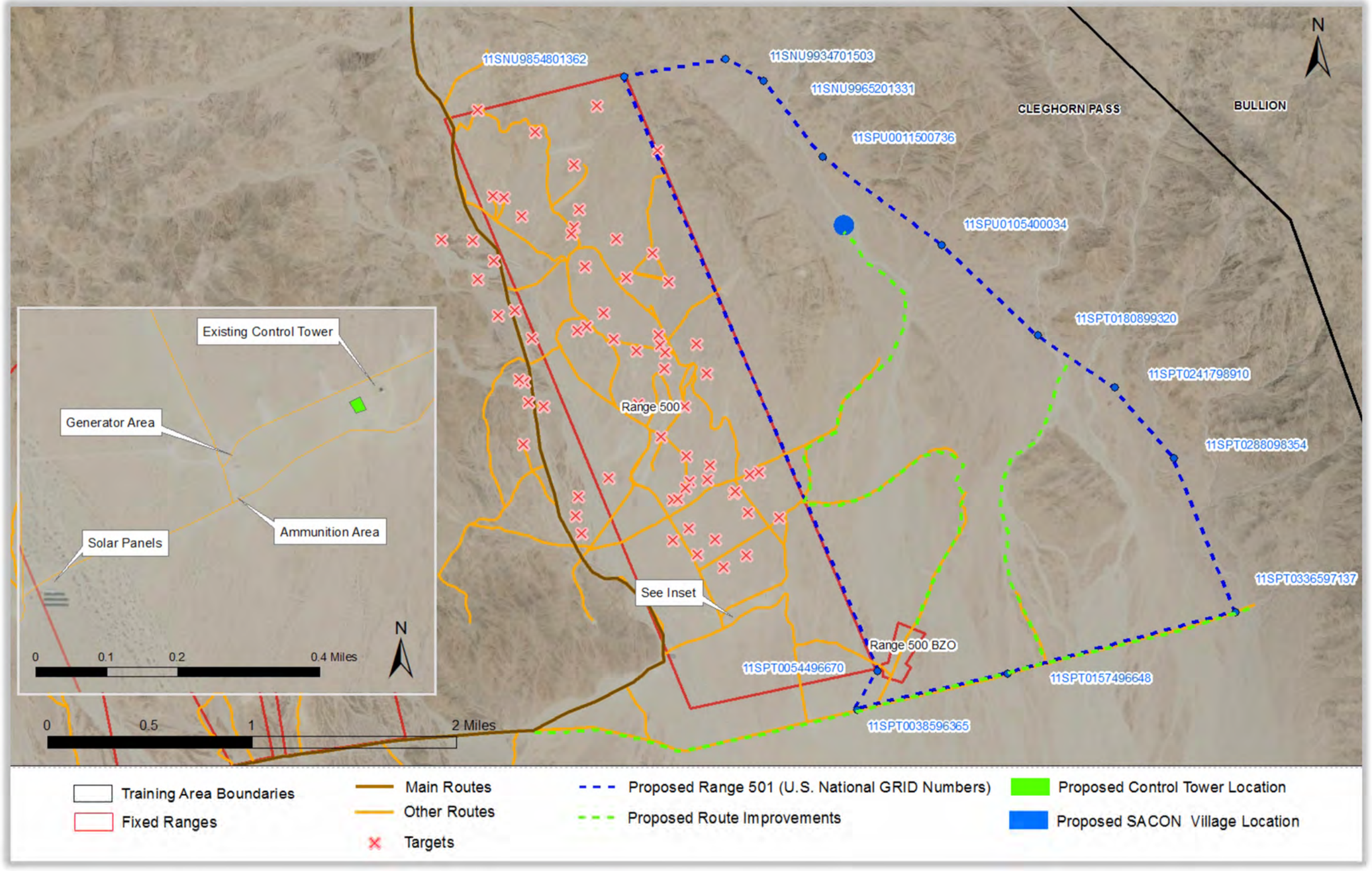
Diagram 5 – Typical Control Tower

Range 501

Range 500 would be expanded to the east and designated as Range 501, covering approximately 2,700 acres. Range 501 would support training that involves vehicle maneuvers and indirect fires (e.g., mortars). Units could train on and off-route.

Range 501 would be minimally set up with an initial 30 targets along dirt route(s) that would extend into the back (north) portion of the range and end at an approximate 2-acre SACON® village (shock absorbing concrete blocks). Figure 9 shows the potential locations of the routes, but the exact configuration may differ slightly to ensure maximum use of the area. Approximately 4 to 6 miles of new routes up to 16 feet wide may be needed within Range 501. This includes extending and widening the existing 1-mile route from 8 to 16 feet. Targets would generally be located within 1 kilometer (3,280 feet or 0.6 mile) of the route(s), but units could place additional targets anywhere in the new range in the future. Ordnance used would range from small arms to larger dud-producing munitions, with the larger ordnance used in the back portion of the range. Finally, the existing 4-mile route on the south side of Range 501 would be widened from 8 feet to 16 feet.

Implementation is planned between 2025 and 2027.



Source: Combat Center Geospatial Data (March 20, 2023).

Figure 9 – Proposed Range 500 Improvements and Expansion for Range 501

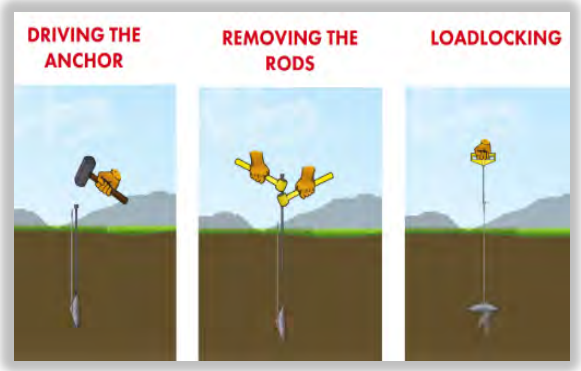
2.2.6 Range Control Operations

MAGTFTC proposes the installation of new ground and air location sensors throughout the training areas to improve real time coverage of ground and air movement into and within the Combat Center.

Initially, ground sensor equipment (e.g., global positioning system transmitters, radios, and/or antennas) would be installed on some of the 38 existing aircraft sensors (Figure 2). These areas are previously disturbed, with some co-located with observation points and communication tower locations. No new construction or ground disturbance would occur to attach additional equipment to the existing sensor's structure (e.g., rack under the solar panels or tower). It is anticipated that a helicopter (single trip) would be used to transport the equipment and personnel to each existing site for installation of the equipment. Once installed, MAGTFTC Range Control vehicles would be able to receive information from the sensors via a device or antenna installed in the vehicles.

To improve existing coverage, up to 5 new sensors may be installed at high points (e.g., ridges, mesas, and mountains) in the following training areas: America Mine, Bullion, Cleghorn Pass, Delta, Lava, Lead Mountain, Means Lake, Prospect, or Range. The project area at each new site would be 0.2-acre (100 feet by 100 feet). This would facilitate staging and installation. If vehicle access is not possible, it is anticipated that a helicopter would transport personnel and equipment from a staging area (e.g., SELF, existing checkpoint, etc.) to each new location for installation. As shown in Diagram 6, the sensors would stand 30 to 40 feet high, with a footprint of 0.01-acre (25 feet by 25 feet). Sensors would be installed using minimally intrusive Platipus® ground anchors (Diagram 7), or an equivalent type. Depending on soil characteristics, the anchors would be driven 5 to 10 feet below ground surface. Implementation could begin within the year.

Diagram 6 – Sensor Configuration (Front and Back View)



Source: Platipus (https://platipus-anchors.com/).

Diagram 7 – Conceptual Platipus® Earth Anchoring Systems

2.2.7 Desert Tortoise Management

MAGTFTC proposes to replace the 50 existing general minimization measures (Appendix B) with 11 concise conservation measures (Appendix C). This would result in a new biological opinion that – (1) consolidates existing direction and focus on the main requirement rather than step-by-step guidance (e.g., how to handle a desert tortoise); (2) removes measures that constrain military training and offer uncertain protection to the tortoise (e.g., staking netting 18 inches above ground); (3) removes measures that cannot be enforced due to the nature of military training (e.g., neutral steer turns); (4) removes inefficient measures (e.g., tortoise surveys in developed areas) and prioritizes funds for the RASP Initiative; and (5) increases participation in the RASP Initiative beyond funding.

Most new proposed conservation measures are a consolidation of existing requirements, but the implementation of some may have effects, namely:

- CM-1. RASP Initiative. *** (B) MAGTFTC would increase involvement including continued operations of Tortoise Research and Captive Rearing Site (TRACRS) and additional translocation and population augmentation to off-site locations per CM-10. ***
- CM-4. Desert Tortoise Encounters & Reporting: *** (B) When personnel or workers encounter a tortoise that could be harmed by project activities or an existing use, they shall immediately contact Range Control (if in a training area) or Environmental Affairs (if in Mainside) for instructions on how to secure and move a tortoise from harm's way. In some scenarios, MAGTFTC's Environmental Affairs Office may decide to temporarily relocate tortoises to TRACRS until a permanent relocation site is determined (see CM-10). ***
- CM-10. Translocation & Population Augmentation. *** (C) Tortoises temporarily relocated to TRACRS under CM-4 may be relocated off-base in support of the RASP Initiative. (D) Under the RASP Initiative, MAGTFTC would coordinate with the USFWS and off-site land managers if the proposed relocation site is not within the Combat Center (e.g., existing recipient sites or Restricted Areas). ***

Measures CM-1, CM-4 and CM-10 would support population augmentation and additional translocation and tie MAGTFTC management to recovery actions occurring outside of the Combat Center. This would better mitigate for effects to the desert tortoise from ongoing and future actions.

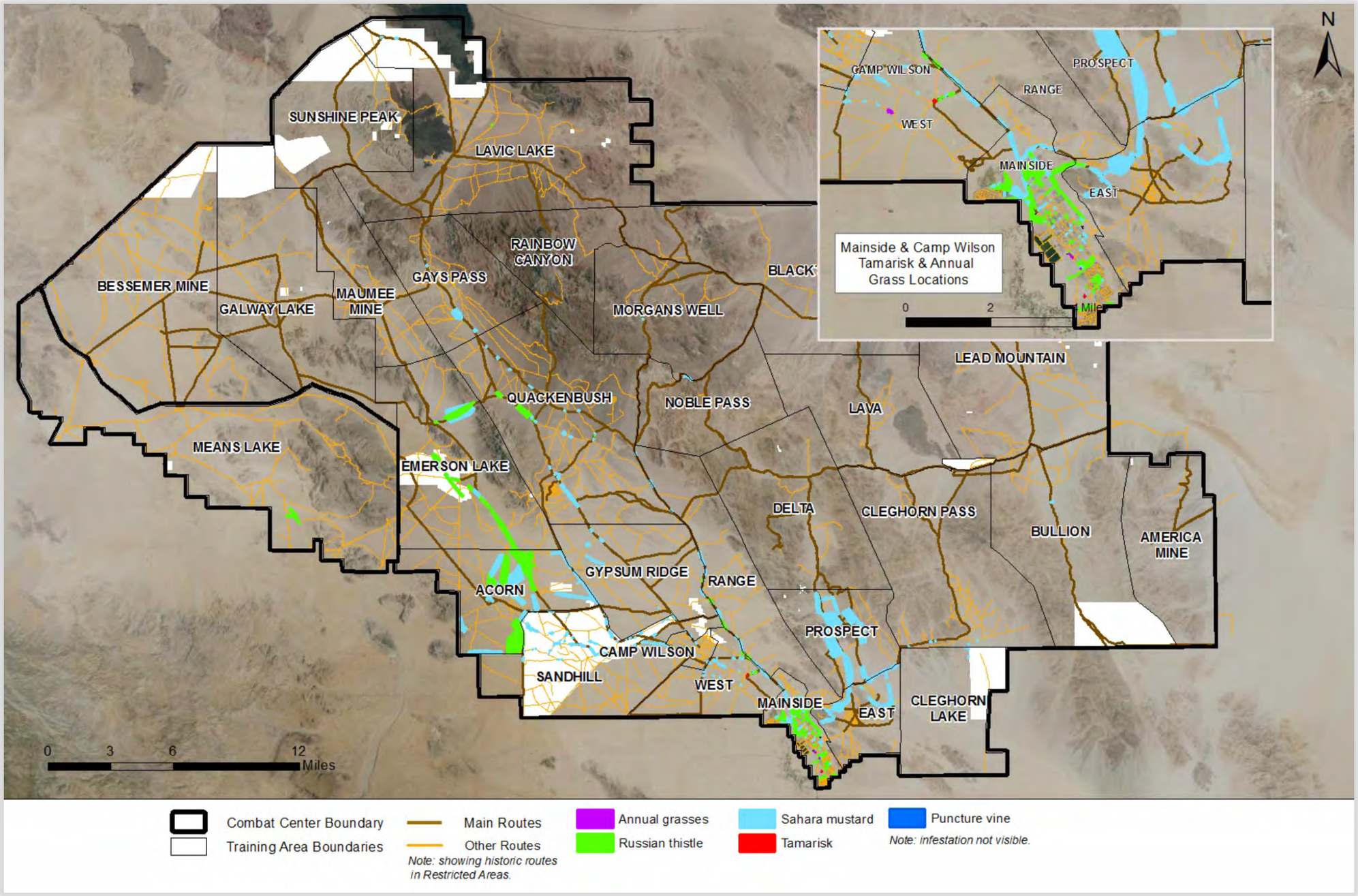
Moving forward, MAGTFTC would not re-initiate consultation under ESA for effects to the desert tortoise within the Combat Center but may seek USFWS technical advice and would still be limited by its incidental take statement. While MAGTFTC has already initiated ESA Section 7 consultation on these proposed changes, the aspects of the biological opinion that have environmental effects (beneficial or adverse) would not be implemented until after this NEPA process is completed and conservation measures suggesting future actions (e.g., CM-1 (D), CM-3(C), CM-7, CM-8, and CM-9) would be evaluated in the future for NEPA and ESA compliance.

2.2.8 Invasive Plant Species Management

MAGTFTC proposes to control and treat current and future infestations of non-native invasive plant species throughout the training areas, currently encompassing 8,446 acres. This acreage includes sensitive areas (e.g., cultural resources sites) and transmission vector sites (e.g., routes) (Figure 10).

Treatment of most of the current infestation, 8,441 acres (>99%), would involve hand-pulling and foliar spray methods using herbicides containing the active ingredient glyphosate. Herbicides containing the active ingredient fluazifop-P-butyl may be applied to treat 4 acres of cheatgrass (*Bromus tectorum*) if glyphosate provides inadequate control. The remaining infestation, 5 acres (<1%) (tamarisk), would involve cutting the vegetation and applying herbicides containing the active ingredients triclopyr and imazypyr to the stump. After the initial treatment, control measures would include monitoring and subsequent treatment to reduce and eliminate the soil seed bank. For additional details of the proposed treatments, see Appendix E (E-1).

MAGTFTC would treat priority species, emerging high priority species (as part of early response efforts) and focus on the 350 acres of infestations in Restricted Areas to minimize displacement of native vegetation in these areas.



Source: Combat Center Geospatial Data (March 30, 2023).

Figure 10 – Known Invasive Species Populations

2.2.9 OHV Race Events

MAGTFTC would continue to review requests for use of the Combat Center's EMUA (Bessemer Mine and Galway Lake) for organized OHV race events, but not all requests may be granted. MAGTFTC would adopt the BLM EA for King of the Hammers (BLM 2022a) in support of future authorizations that are substantially the same (40 CFR §1506.3(c)). This is because – King of the Hammers is the largest event in the area, with no significant effects, and future events would likely be smaller; and similar effect avoidance measures would be adopted (Section 2.3.3). Additional requirements may be imposed by the Department of the Navy in any issued license (e.g., insurance). The race organizer and participating public assume the risk of harm by choosing to recreate in an active military training area (NDAA for FY2014, Subtitle A, Section 2923) and the race organizer would be responsible for the costs of the agency review and approval processes.

2.3 MITIGATION MEASURES AND MONITORING

This section provides main requirements that apply to the Ongoing Action and Proposed Action. MAGTFTC continues to adhere to mitigation for past-disclosed significant effects (DON 2013 and DON-USMC 2017a), as modified by regulatory consultations. While subject to the availability of funds, funding of ongoing commitments is planned in advance.

2.3.1 General Requirements, Limitations

A. Environmental Review Process. The proponents of major federal actions (40 CFR §1508.1(q)) requiring MAGTFTC approval are responsible for completing the MAGTFTC environmental review process to ensure compliance with applicable laws and policies. See Chapter 5.

2.3.2 Ongoing Action

A. Air Quality. Per CAA Section 176(c) and MDAQMD Rule 2002 General Federal Actions Conformity, ongoing federal activities do not require periodic redeterminations if the emissions are within the scope of the final conformity determination. To ensure compliance, actual emissions associated with ongoing military training activities are estimated on an annual basis and compared to the emissions analyzed in the 2012 conformity determination.

B. Land Condition Trend Analysis. MAGTFTC has planned for an updated Land Condition Trend Analysis (Tierra Data Systems 2000) to inform resource management in the training areas.

C. Noise. In accordance with NEPA and other relevant laws and policies (e.g., DoDI 4715.13, DoDI 4165.57, OPNAVINST 3550.1A/MCO 3550.11, and MCO 11011.23), MAGTFTC would conduct and updated noise analysis to confirm whether effects from ongoing training activities remain within the scope of prior analyses and acceptable levels.

D. Military Training Activities. The requirements and best management practices listed below are intended to minimize effects on resources and ensure safety during training:

- Complete the Combat Center's general environmental awareness training and maintain a current training map showing the location of Restricted Areas.
- AVOID – Restricted Areas and groundwater monitoring wells.
- NO – fires; unnecessary removal or trampling of vegetation; graffiti, removal or defacing cultural resources; hunting, touching, feeding, or disturbing wildlife.
- Remove all trash and dunnage from the training areas after use.
- Remove all netting, wire, and items having similar wildlife entanglement risks from the training areas after use.

- Conduct a desert tortoise check before moving vehicles and backfilling temporary excavations after use (e.g., fighting holes, trenches, etc.).
- To move a desert tortoise out of harm's way or to report an injured or dead tortoise, contact Range Control (call sign "BEARMAT") for instructions.
- TO THE EXTENT POSSIBLE – avoid playas; fill-in temporary excavations after use; use existing routes and disturbed sites; and ensure vehicles, equipment, and gear is cleaned to minimize the spread of invasive plant species in the training areas.

2.3.3 Proposed Action

To avoid and minimize effects, the requirements below apply to specific activities.

A. Route Improvements.

1. Comply with MDAQMD Rule 403 (Fugitive Dust) when constructing/widening dirt routes.

B. Invasive Plant Species Herbicide Application. (I) Use EPA-approved herbicides, follow label instructions, and adhere to uses approved in registrations.[18] (II) Equipment would be checked before use to ensure in good working condition. (III) Applicators would use the lowest pressure possible to avoid overspray and oversaturation. (IV) Backpack sprayers would be used for precision applications. (V) To reduce effects to sensitive species/archaeological sites, hand-pulling may occur. (VI) Application would not occur when rain or wind is in the forecast. (VII) Comply with requirements in Sections 3.2 (Biological Resources), 3.4 (Cultural Resources), and 3.6 (Human Health/Safety). (VIII) Integrate Integrated Pest Management into treatment plans.[19]

USEPA Comments: Recommend use of minimial risk chemicals; adhere to the registrations; and minimize potential for effects to sensitive areas/species. In specific, do not apply glyphosate & imazapyr if high or gusty winds, high temperatures, low humidity, or temperature inversions. Do not apply triclopyr if high or gusty winds. Due to ongoing evaluation of fluazifop-p-butyl its use cannot be recommended in tortoise habitat & cannot be used on the following species in California: downy brome, littleseed canarygrass, large and smooth crabgrass, junglerice, fall panicums, rabbitfootgrass and volunteer corn. If used, refer to uses approved in registration, with attention to drift risk and cultivation requirements prior to application.

C. New Targets, Permanent Airfields, Training Support Sites, Range 500, and Range 501. The following requirements apply to planned projects executed outside of the training regimen. Otherwise, Section 2.3.2(D) lists requirements applicable to Marines engaged in similar types of activities during training exercises.

1. Avoid Restricted Areas.
2. Either 1) avoid active bird nests by choosing areas with no vegetation, 2) constructing outside the migratory bird nesting season (February to September), or 3) conducting a

[18] Imazapyr - *https://www3.epa.gov/pesticides/chem_search/ppls/000228-00570-20100104.pdf; https://www3.epa.gov/pesticides/chem_search/ppls/083529-00139-20210316.pdf;*
Glyphosate - *https://www3.epa.gov/pesticides/chem_search/ppls/091543-00001-20160621.pdf);*
Triclopyr - *https://www3.epa.gov/pesticides/chem_search/ppls/042750-00126-20151109.pdf; https://www3.epa.gov/pesticides/chem_search/ppls/000228-00520-20200224.pdf);*
Fluazifop-p-butyl - *https://www3.epa.gov/pesticides/chem_search/ppls/083529-00173-20210922.pdf;* and *https://www3.epa.gov/pesticides/chem_search/ppls/083529-00121-20200122.pdf)*

[19] USEPA guidance on IPM - https://www.epa.gov/safepestcontrol/integrated-pest-management-ipm-principles

nest survey prior to construction that would occur between 1 February through 30 September.

3. For permanent new developments that would result in substantial tortoise take, conduct a desert tortoise clearance survey to relocate tortoises prior to construction and increased training. An authorized biologist would perform clearance surveys per current USFWS protocols (see e.g., USFWS 2020). MAGTFTC would coordinate with the USFWS per CM-10 (Section 2.2.7).
4. Comply with Section 3.4 (Cultural Resource) requirements, conditions of future NHPA Section 106 consultation, and avoid effects to unevaluated or eligible historic properties.

D. New and Existing Sensors:

1. To avoid and minimize adverse effects to human health, the requirements listed below apply to site workers installing, operating and maintaining the sensors:
    - If personnel less than 3.1 meters (10.17 feet) from a sensor for prolonged exposure, set power OFF. Dangerous non-ionizing radiation less than 0.41 meter (1.35 feet) from the attached antenna when power to the transmitter is ON.
    - For the first frequency Directional Antenna and parameters, a Minimum Safe Distance of 1 to 2 feet (controlled Environment) or 1.5 to 3.3 feet (uncontrolled Environment).
    - For the second frequency Omni Antenna and parameters, a Minimum Safe Distance of 4.6 to 6.5 feet (controlled Environment) or 7.9 to 11.2 feet (uncontrolled Environment).
2. Comply with conditions of future NHPA Section 106 consultations for new sensors.

E. OHV Races. To avoid and minimize effects, the following apply:

1. Use would be limited to existing routes, not occur in a Restricted Area or other sensitive areas (determined by MAGTFTC); and adhere to ESA & NHPA limitations for King of the Hammers, or separate consultations would be required.

CHAPTER 3 – AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

Potential effects of the Ongoing Action and Proposed Action are presented in Sections 3.1 to 3.6 and summarized in Table 1. All effects are considered direct unless expressly indicated as indirect. The effects of past actions are part of the Affected Environment (CEQ 2005). For other resources/issues considered and cumulative effects, see Section 3.7 and Chapter 4, respectively.

Table 1 – Summary of Environmental Consequences

Resource	Ongoing Action	Proposed Action
Air Quality	Ongoing adverse impacts. Emissions reduction anticipated from MAGTFTC and agency efforts.	Incremental increase in adverse impacts. Emissions reduction anticipated from MAGTFTC and agency efforts.
Biological Resources (Desert Tortoise)	Ongoing adverse effects. Ongoing mitigation per the BO and RASP Initiative.	Incremental increase in adverse effects, with increased mitigation (RASP and for use of herbicides; short-term adverse /long-term beneficial effects).
Climate Change	Ongoing adverse effects. Emissions reduction from MAGTFTC/agency efforts.	Incremental increase in adverse impacts. Emissions reduction anticipated from

Resource	Ongoing Action	Proposed Action
		MAGTFTC and agency efforts.
Cultural Resources	Ongoing adverse effects to known and unknown resources. Mitigation per ICRMP.	Incremental increase in adverse effects, with increased mitigation per the draft PA.
Environmental Justice (Noise)	No disproportionate adverse effect.	Same as Ongoing Action
Health & Safety	Adverse effects to applicators.	Increased risk of exposure to herbicides, with mitigation required.

3.1 AIR QUALITY

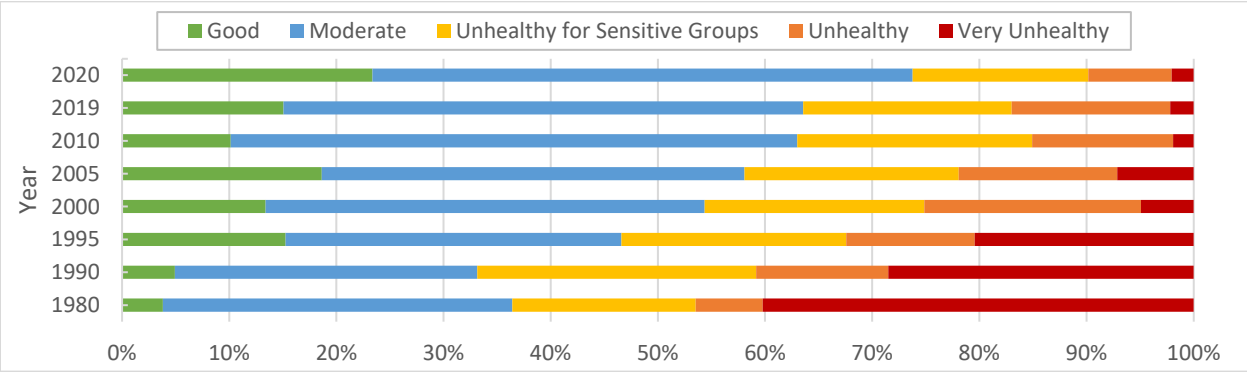
3.1.1 Guidance and Thresholds

The guidance and thresholds listed below are relevant in developing this section and determining whether, based on the totality of the circumstances, there may be significant effects under NEPA.

- Clean Air Act (CAA) §176(c), as implemented by MDAQMD Rule 2002 (Conformity).
- National Ambient Air Quality Standards (NAAQS) (40 CFR Part 50).
- California Ambient Air Quality Standards (CAAQS) (17 CCR §70200).
- MDAQMD Rule Book.

3.1.2 Affected Environment

The Combat Center is located approximately 140 miles east of Los Angeles and 5 miles north of Joshua Tree National Park (Figure 1). This region is within the Mojave Desert Air Basin (MDAB), therefore, it falls under the jurisdiction of the MDAQMD. The air quality in California is evaluated via air monitoring stations that are located throughout the state. The state compares the air monitoring data to the NAAQS and CAAQS to determine the nature and severity of the air quality problems in each air basin. The entire MDAB is currently classified as nonattainment for both the NAAQS and CAAQS for ozone (O_3) and particulate matter less than 10 microns in diameter (PM_{10}) (CARB 2016, CARB 2022a, and USEPA 2022a). The basin is in Severe-15 nonattainment for O_3 and Moderate nonattainment for PM_{10}. The Combat Center is in an attainment zone for all other federal and state standards: carbon monoxide (CO), nitrogen oxides (NO_x), sulfur oxides (SO_x), lead (Pb), and particulate matter less than 2.5 microns in diameter ($PM_{2.5}$). San Bernardino County ambient air quality trends are shown in Diagram 8. Air quality has improved substantially since 1980 and is currently classified as good to moderate a majority of the year (USEPA 2020a). Locally, air quality in the Joshua Tree National Park is considered fair for visibility, good for particulate matter, and poor for ozone (NPS 2022). High ozone is consistent with air pollution trends of the entire air basin.



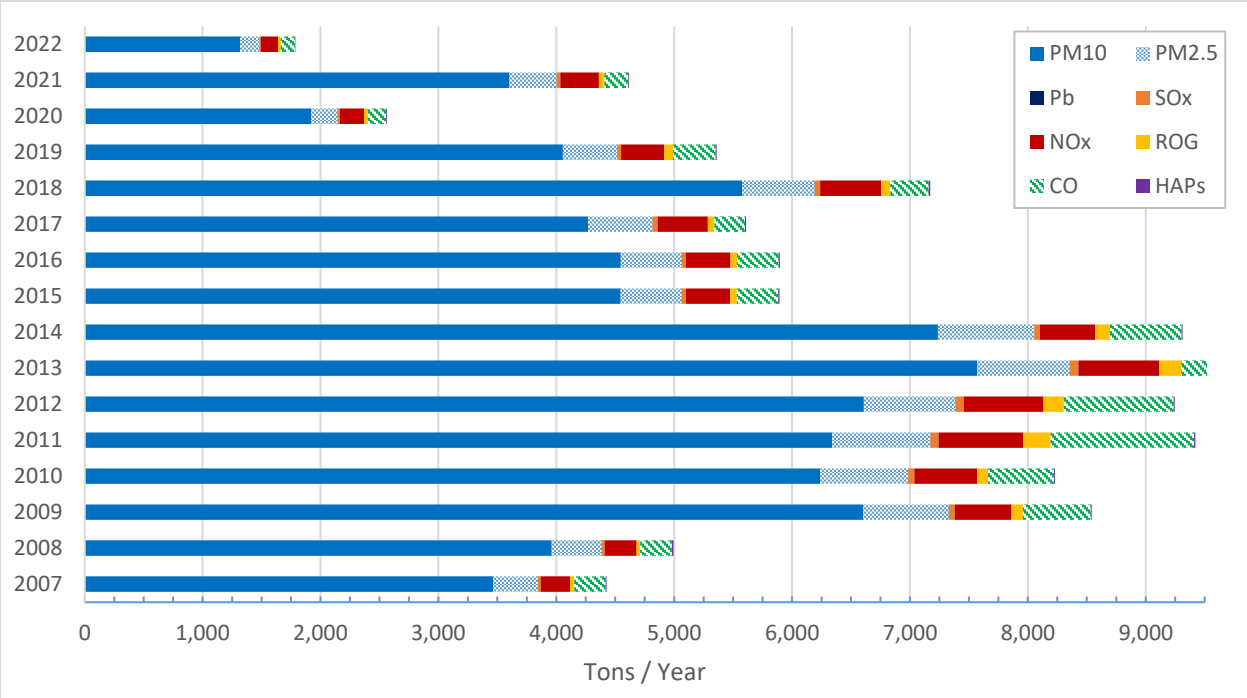
Source: USEPA 2020a.

Diagram 8 – San Bernardino County Air Pollution Trends (Percentage of Days/Year)

Diagram 9 summarizes the estimated annual air emissions for all operations conducted at the Combat Center from 2007 to 2022. Diagram 10 provides a breakdown of emissions by source category: stationary, area, and mobile. Stationary sources include non-moving, permitted equipment or processes such as emergency generators; mobile sources include moving equipment such as vehicles and aircraft; and area sources are low or ground level sources of emissions that cannot be represented by a single stack (e.g, aircraft exhaust, wind erosion, munitions, explosives, and travel on paved and unpaved roads).

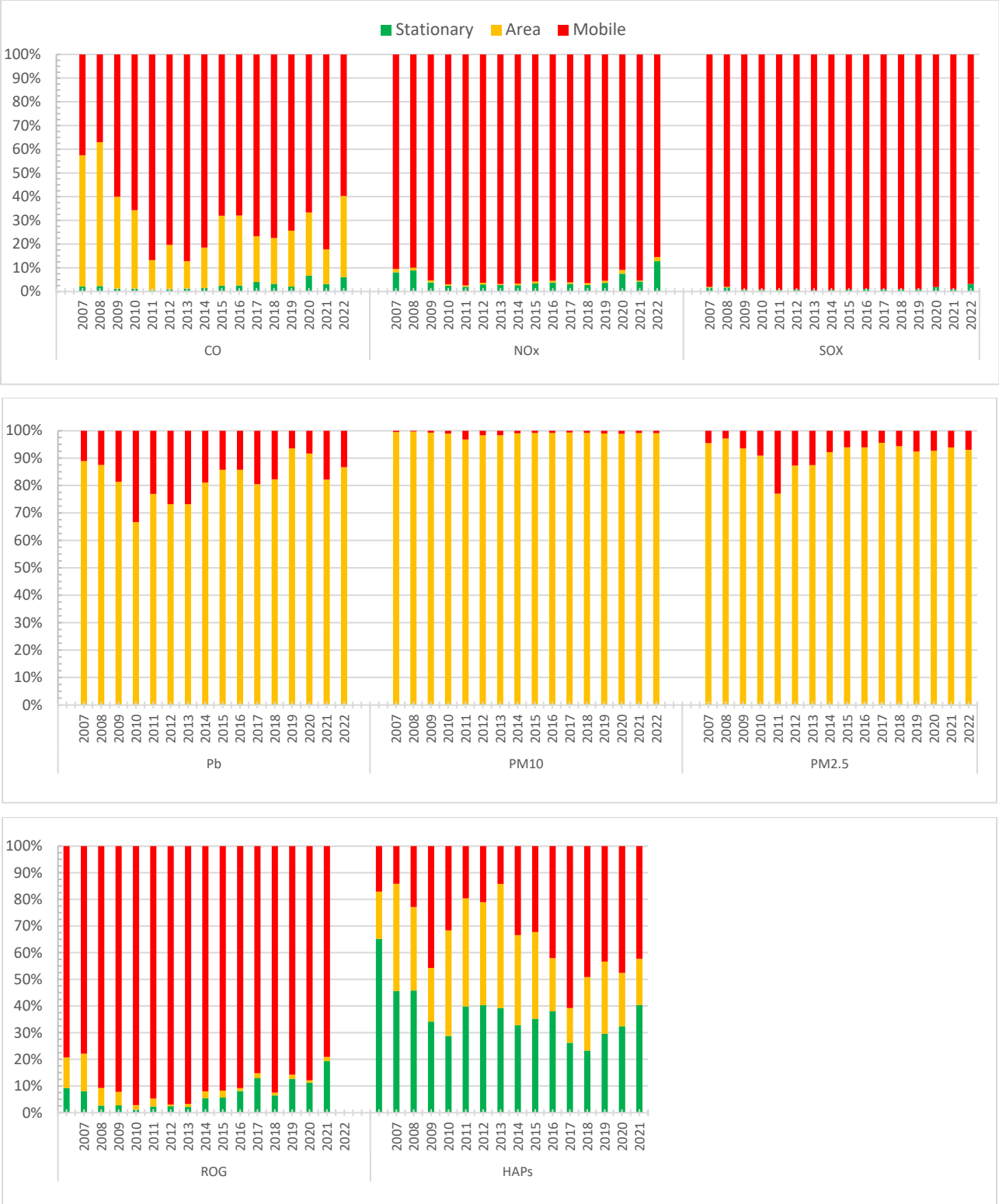
Combat Center air pollutant emission trends can be summarized as follows:

- Stationary sources (e.g., Cogeneration Facility equipment) primarily generate NO_x, CO, hazardous air pollutants (HAPs), and reactive organic gas (ROG) emissions (synonymous with volatile organic compounds). Mobile sources (e.g., military vehicle exhaust) contribute heavily to NO_x, SO_x, and ROG emissions. Area sources (e.g., live-fire training or vehicle travel on roads) contribute heavily to PM_{10}, $PM_{2.5}$, and lead emissions.
- Emissions fluctuate annually, but there has been an overall decrease over the last 15 years.
- Annual average emissions from all sources are: 463 tons CO, 427 tons NO_x, 0.37 tons lead, 4,807 tons PM_{10}, 558 tons $PM_{2.5}$, 87 tons ROG, 42 tons SO_x, and 9 tons of HAPs.
- Approximately 151 tons of HAPs have been emitted over the past 15 years; approximately 56 tons from stationary sources, 50 tons from mobile sources, and 45 tons from area sources.



Source: URS 2008 to URS 2015, CDM-AECOM 2016, CDM-AECOM 2017; MMECG 2018; Multi-MAC JV 2019 to Multi-MAC JV 2022

Diagram 9 – Combat Center Criteria Air Pollutant Emissions (All Sources)



Source: URS 2008 to URS 2015, CDM-AECOM 2016, CDM-AECOM 2017; MMECG 2018; Multi-MAC JV 2019 to Multi-MAC JV 2022

Diagram 10 – Combat Center Emissions by Source Category

3.1.3 Environmental Consequences

ONGOING ACTION

Military Training. Air quality effects from the Ongoing Action that were previously analyzed were a result of operational activities (use of military vehicles, equipment, ordnance, and aircraft). Air quality effects associated with ongoing operational activites are attributed to – (1) use of fossil-fuel fired mobile sources, (2) ordnance activities, and (3) disturbance of soils. The Ongoing Action was determined to generate emissions that would exceed the *de minimis* threshold for PM_{10}, volatile organic compounds (VOC), and NO_x. Therefore, a conformity determination was completed, and the State Implementation Plan (SIP) was modified to comply with the CAA for PM_{10} and ozone. Overall, it was determined that the action would not result in an exceedence of the NAAQS. (DON 2012).

Military training largely attributes to mobile and area source emissions, resulting in a variety of criteria air pollutants, with some relevant information summarized below.

- Continued use of disturbed areas, existing routes, and off-route travel during training contributes to combustive emissions as well as particulate matter emissions from military vehicles driving on unpaved surfaces. Prior NEPA and CAA analyses were prepared for the development of several training support sites throughout the Combat Center and for the development of Range 500, both with *de minimis* determinations (MCAGCC 1997b, DON-USMC 2003 and MCAGCC 2004). Other developed and disturbed areas exist as a result of ongoing training activities (e.g., infantry training and target use) (DON 2003c, DON 2012, DON-USMC 2018a). Vehicle and ordnance use was captured in the CAA conformity determination for ongoing training activities (DON 2012).
- Continued use of existing expeditionary airfields, landing areas, landing zones, and drop zones would not generate new or increased emissions because operations would continue to occur at current levels (see e.g., NAVFAC 1986, MCAGCC 1997a, DON-USMC 2005, USAF 2009, USMC 2010, DON 2012, USMC 2013, USMC 2014a, DON-USMC 2018a).
- The following activities occurring to support continued uses would generate minimal emissions and are considered *de minimis* and presumed to conform to the SIP: routine operation of sensor equipment, routine transportation of material and personnel to the remote sites, and repair and maintenance to existing routes, airfields, and areas (MDAQMD Rule 2002, Section D(1)(b)(iv), (vii), and (xiii)).

The 2012 EIS used Calendar Year (CY) 2009 as the baseline for the operational emissions and estimated the anticipated increase in emissions for training operations (Table 2). The current operational emissions are consistent with the emissions analyzed in the 2012 EIS. Therefore, no additional increase in operational emissions is analyzed in this SEA. In accordance with MDAQMD Rule 2002, the 2012 conformity determination was based on actions that were reasonably foreseeable[20] at the time. Actual emissions from 2009 were used as the baseline and the anticipated maximum net increase was estimated based on incremental and evolutionary changes in the Marine Corps' force structure and mission assignments. Emissions were estimated for scenarios that were expected to occur (e.g., amount of vehicle usage per exercise); however, due to the somewhat unpredictable nature of training it was impossible to analyze future operations with 100% accuracy.

[20] Reasonably foreseeable emissions are projected future direct and indirect emissions that are identified at the time the conformity determination is made; the location of such emissions is known, and the emissions are quantifiable as described and documented by the Federal agency based on its own information and after reviewing any information presented to the Federal agency (see 40 CFR 93, Subpart B, Definitions).

Table 2 – 2012 EIS Estimated Operational Emissions

Activity/ Source	Annual Emissions (Tons per Year)					
	VOC	**CO**	**NO_X**	**SO_X**	**PM_{10}**	**$PM_{2.5}$**
Baseline Operations (CY2009)						
Tactical Vehicles and TSE	34.36	155.23	413.39	45.62	16.49	16.33
Paved and Unpaved Routes	--	--	--	--	6,591.79	660.83
Aircraft	52.46	189.83	45.80	3.69	30.91	30.62
Wind Erosion	--	--	--	--	0.67	0.27
Live Fire (Explosives and Smoke Ordnance)	3.33	165.16	2.25	--	22.89	22.05
Baseline Emissions	90.15	510.22	461.44	49.31	6,662.75	730.10
Projected Increase in Emissions	32.31	220.94	121.78	11.31	488.81	107.78
TOTAL	**122.46**	**731.16**	**583.22**	**60.62**	**7,151.56**	**837.88**

For this SEA, training operational data from the past 12 years was reviewed to evaluate the validity of the prior conformity determination and determine if current operations warrant a new conformity determination. Training operational trends, as shown in Diagram 11, demonstrate that although aircraft, tactical vehicle and equipment, and ordnance usage vary from year to year, there has been an overall decline in training operations at the Combat Center since the 2012 analysis was performed. During 2011 through 2014, certain training operations were higher than what was anticipated in the 2012 analysis. Specific instances include increased overall vehicle mileage in 2012 and 2013 – with substantially higher use of heavy wheeled vehicles in 2014, anomalously high ordnance usage in 2012, and increased aircraft operations in 2010, 2011, and 2013. Despite these unforeseeable increases during these specific years, the operational emissions in the subsequent years remained well below the 2012 analysis. The overall trend is that the Ongoing Action is within the scope of the conformity determination and would likely continue to follow the trend. Therefore, the Ongoing Action does does not require further CAA or NEPA analysis at this time due to the activities being a continuation of actions previously evaluated, currently within the scope of the status quo, and for which the available data does not indicate a notable change that may suggest additional analysis is warranted. MAGTFTC should periodically evaluate emissions associated with the Ongoing Action to ensure that it continues to remain within the scope of the conformity determination. If training operations substantially change the conformity determination would be updated.

In addition to criteria pollutants, the Ongoing Action generates HAPs via combustion of fuels. For these source types, HAP emissions are typically one or more orders of magnitude smaller than concurrent emissions of criteria air pollutants and only become a concern when large amounts of fuel or other materials are consumed during a single activity or in one location. For the Ongoing Action, emissions of HAPs are intermittent and dispersed over a vast area. Only small quantities of HAPs are expected to be emitted with very low potential exposure and health risk. A quantitative evaluation of HAPs was, therefore, not warranted and not conducted.

Although continued use of unpaved areas results in fugitive dust, MAGTFTC enforces training area speed limits (30 miles per hour), maps existing disturbed sites and routes (encourages re-use and minimizes the proliferation of new off-route trails during training), and occasionally applies soil binders (e.g., OPS Dirt, Rhino Snot, Gorilla-Snot®, ElimiDust; see Appendix D) in high use areas for safety reasons (e.g., ALZ Sandhill and OLF Seagle). These efforts minimize fugitive dust and particualte matter and new soil disturbance (soil crust and vegetation binding lose soil remains intact).

Vehicle and aircraft emissions cannot be further mitigated at the MAGTFTC level, however, the Department of Defense and Department of the Navy efforts to address climate change (e.g., reduce emissions from military vehicles by utilizing alternative fuels, exploring hybridization/electrification,

and replacing vehicles with more fuel-efficient variants) would eventually result in decreased operational emissions and improve air quality at the Combat Center (see Section 3.3).

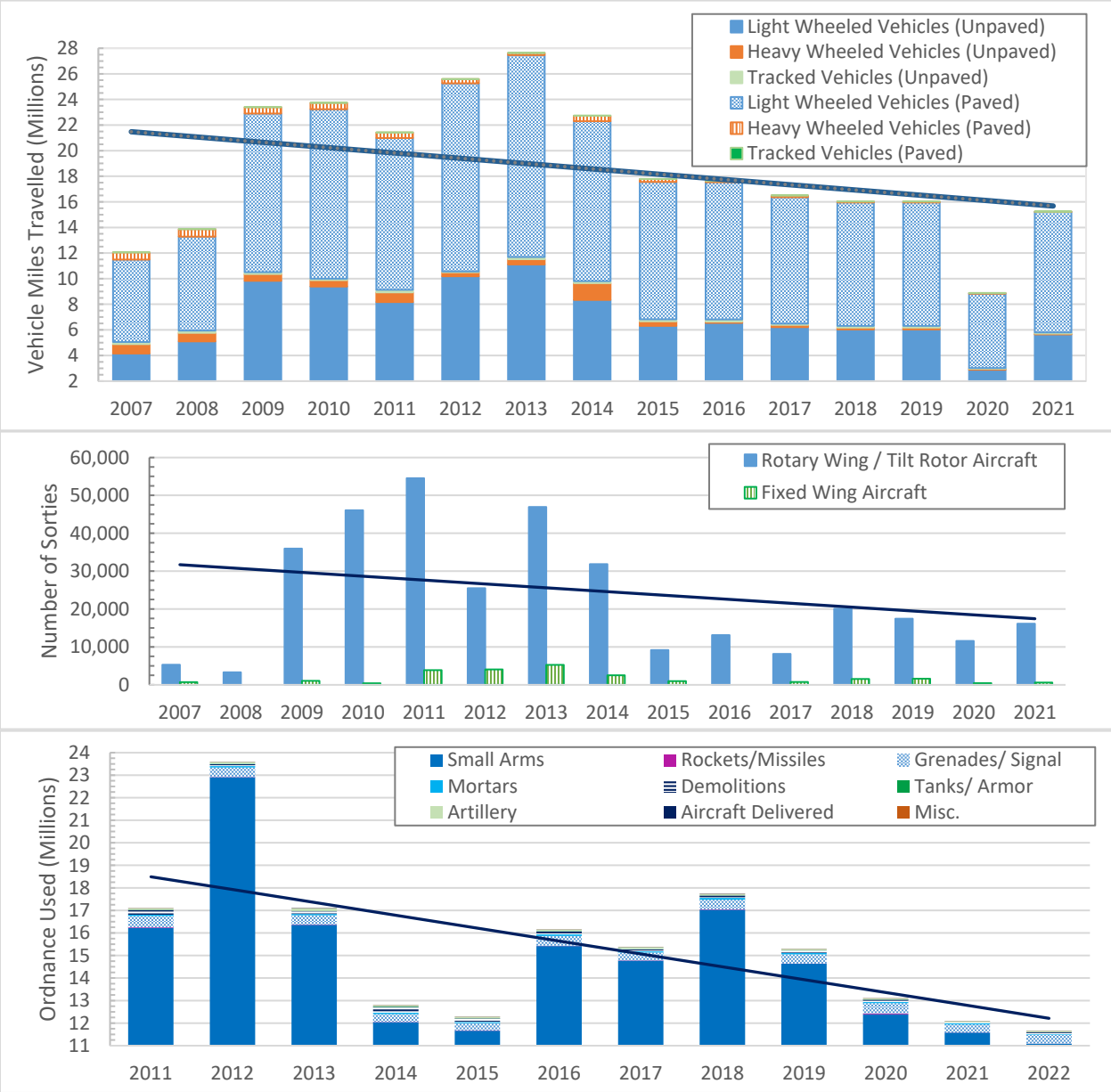


Diagram 11 – Military Training Operations Trends

Desert Tortoise Management. Continued desert tortoise management (e.g., ongoing research, population monitoring, and translocation monitoring) does not generally present effects to air quality and is within the scope of prior NEPA analyses, including the construction and operation of TRACRS, implementation of the INRMP, and implementation of desert tortoise translocation activities in the Mojave Desert, using vehicles and helicopters; all supported by *de minimis* air quality effect determinations. (USMC 2005a, DON-USMC 2017a, and DON-USMC 2019b).

Invasive Species Management. Pest and invasive species management is currently limited to the built environment, using existing staff and contract personnel and vehicles to drive to specific locations to deploy pest management (e.g., rat traps in housing areas, spot application of herbicides in landscaped

areas, etc.). The routine, recurring transportation of material and personnel to conduct limited pest and invasive species management, is exempted and presumed to conform to the SIP per MDAQMD Rule 2002, Section D(1)(b)(vii).

OHV Race Events. Potential emissions from the King of the Hammers race events were determined *de minimis* for the 2023 event. Future events would need to remain *de minimis* or additional CAA and NEPA would be required. MAGTFTC would work with BLM and Hammerking Productions to ensure the use remains compliant with the CAA. (BLM 2022a).

PROPOSED ACTION

Military Training. Air emissions analyzed in the Proposed Action mainly occur from construction and transportation activities. Table 3 presents a summary of activities and emissions sources that were analyzed in this SEA, along with the calculation methodologies and assumptions used to estimate the emissions. Emissions from site preparation and construction activities were estimated using the California Emissions Estimator Model® (CalEEMod). Aircraft emissions were estimated based on the operational data and emission factors developed by the Navy Aircraft Environmental Support Office (AESO). Emissions from vehicle use during activities were estimated using California's emissions inventories of on-road and off-road mobile sources, EMFAC2021 (v1.0.2).

Table 3 – Summary of Activities and Emission Sources

Activity	Size	Emission Sources	Emission Calculation Methodology
Route Development (Maneuver Training & Military Vehicle Use/ Fixed Ranges)	Widen up to 160 miles of routes (from 8 to 16 feet) per year. Develop up to 6 miles of new routes per year (16-feet wide).	Dust, off road vehicle/equipment combustion emissions	CalEEMod; Land use: Parking Lot; other non-asphalt surfaces Total: 166.79 acres
Live-Fire Training	Install up to 50 new targets per year in the training areas.	Dust, on-road vehicle combustion emissions	EMFAC2021 (v1.0.2) Emission Rates for T6 Utility Class 7 to model Medium Tactical Vehicle Replacement (MTVR)
Sustainment Training	Develop up to 10 new sustainment support sites annually, directly disturbing up to 365 acres per year	Dust, off road vehicle/equipment combustion emissions	CalEEMod; Land use: Parking Lot; other non-asphalt surfaces
Expeditionary Airfields, Landing Areas, and Landing Zones	Develop temporary airfields by scraping the top layer of soil/vegetation, of up to 194 acres per year. Develop semi-permanent airfields by removing vegetation, grading, and scaping the soil, up to 270 acres per year (includes importing 23,500 cubic yards of road base materials).	Dust, off road vehicle/equipment combustion emissions	CalEEMod; Land use: Parking Lot; other non-asphalt surfaces
Range Control Operations	Install/replace up to 43 new or existing sensors; Trip distance = 45 miles one way.	Aircraft emissions (all analyzed aircraft activities occur below 3,000 feet)	Helicopter modeled: H-60

Activity	Size	Emission Sources	Emission Calculation Methodology
Fixed Ranges	Construct a 70-foot tall, 616-square foot control tower at Range 500. Install up to 80 new targets per year at Range 500/501.	Dust, off road vehicle/equipment combustion emissions	CalEEMod; Land use: Industrial, General Light Industry; Parking, Other Non-Asphalt Surfaces EMFAC2021 Emission Rates for T6 Utility Class 7 to MTVR

Criteria pollutants and greenhouse gas emissions were estimated for each of the above activities. Criteria pollutants emissions are reported in tons, while greenhouse gases are reported in metric tons. The results of these analyses were then compared to *de minimis* levels to ensure that the project meets the CAA General Conformity requirements. For the Proposed Action, only small quantities of HAPs are expected to be emitted with very low potential exposure and health risk. A quantitative evaluation of HAP emissions is, therefore, not warranted and was not conducted. Appendix F contains a summary of the air quality calculations.

Table 4 summarizes the total annual emissions for the proposed activities. The analysis conservatively assumes that the activities could occur each year, although some activities would be spread out over several years, not all activities would be executed at the same time, and some activities (e.g., control tower construction at Range 500 or sensor installation) would likely occur one time. As shown in Table 4, even with the conservative assumption (all activities could occur during the same year), the estimated emissions are below the applicable General Conformity *de minimis* levels. Thus, a General Conformity Determination is not required, and a record of non-applicability is included in Appendix F.

Table 4 – Estimated Total Annual Air Emissions

Activity	Total Annual Emissions (Tons/year)						
	CO	**NOx**	**VOC**	**SO_x**	**PM_{10}**	**$PM_{2.5}$**	**CO_2 (MT/year)**
Route Development (Maneuver Training & Military Vehicle Use/ Fixed Ranges)	0.64	0.80	0.08	1.5E-03	0.09	0.09	136.44
Live-Fire Training	1.3E-04	1.4E-03	1.2E-05	2.8E-05	2.95	0.29	2.70
Sustainment Training	0.17	0.22	0.02	4.3E-04	0.10	0.10	38.51
Expeditionary Airfields, Landing Areas, and Landing Zones	1.03	2.81	0.13	0.01	0.68	0.68	1,233.61
Fixed Ranges	0.26	0.26	0.02	7.1E-04	3.80	0.41	65.54
Range Control Operations	0.35	0.16	0.04	0.01	0.11	0.11	80.15
TOTAL	**2.44**	**4.25**	**0.29**	**0.03**	**7.72**	**1.67**	**1,556.94**
General Conformity Applicability Thresholds	N/A	25	25	N/A	100	N/A	N/A
Exceeds threshold?	N/A	No	No	N/A	No	N/A	N/A

Desert Tortoise Management. Improved desert management strategies would include additional translocation efforts (e.g., removing desert tortoises out of harm's way and relocating to safer areas) on a situational basis, using existing personnel and vehicles to implement. Additional translocation efforts would not rise to the level of effort analyzed in the past NEPA analysis for desert tortoise translocation, which was supported by a *de minimis* determination. This prior concentrated effort occurred within a short expanse of time (up to 12 days), involved the transport of tortoises by helicopter, with 40 to 50 helicopter trips between the Combat Center and off-site areas. (DON-USMC 2017a). Further, the routine, recurring transportation of material and personnel that would be used to implement additional translocation would be exempted and presumed to conform to the SIP per MDAQMD Rule 2002, Section D(1)(b)(vii).

Invasive Species Management. The Combat Center's Integrated Pest Management Plan would be modified to include invasive species management due to the use of herbicides in the training areas. MAGTFTC would use existing personnel and vehicles to drive to specific locations in the training areas to treat invasive plant populations. The routine, recurring transportation of material and personnel, to implement increased invasive species management, is exempted and presumed to conform to the SIP per MDAQMD Rule 2002, Section D(1)(b)(vii).

OHV Race Events. Future race events would be evaluated to ensure compliance with the CAA per MDAQMD Rule 2002. Although details are not available for analysis in this SEA, it is unlikely that future events would exceed the scope of effects discussed under the Ongoing Action. This is because the King of the Hammers races are the largest in the area, with a *de minimis* effect determination for 2023 (BLM 2022a). Also, MAGTFTC would impose similar environmental requirements to avoid and minimize adverse effects to resources (see Section 2.3.3). Finally, MAGTFTC may impose contraints on the scope of future OHV race events to ensure CAA compliance.

3.2 BIOLOGICAL RESOURCES (DESERT TORTOISE)

3.2.1 Guidance & Thresholds

The guidance and thresholds listed below are relevant in developing this section and determining whether, based on the totality of the circumstances, there may be significant effects under NEPA.

- Population of species affected versus total population;
- Proportion of habitat that exists versus habitat affected; and
- Combat Center incidental take limit: 15 large desert tortoises and 150 acres of habitat affected per year (see Section 1.7).

3.2.2 Affected Environment

Desert Tortoise Habitat. Desert tortoises occupy a variety of habitats from flats and slopes dominated by creosote bush scrub at lower elevations to rocky slopes in blackbrush and juniper woodland ecotones at higher elevations. Tortoises occur most commonly on gently sloping terrain with sandy-gravel soils and where there is sparse cover of low-growing shrubs, which allows establishment of herbaceous plants. Soils must be friable enough for digging of burrows, but firm enough so that burrows do not collapse. Typical habitat for the desert tortoise in the Mojave Desert has been characterized as creosote bush scrub below 5,500 feet, where precipitation ranges from 2 to 8 inches, the diversity of perennial plants is relatively high, and production of ephemerals is high. Intact soils are important given that desert tortoises spend most of the year underground to avoid extreme summer and winter temperatures, with most above ground activity occurring in spring, summer, and autumn when daytime air temperatures are below 90° Fahrenheit. Designated critical habitat encompasses 6 million acres outside of the Combat Center. Although critical habitat is not

located in the Combat Center, suitable habitat (based on the same essential features of critical habitat) may exist, including sufficient habitat, sufficient quality and quantity of forage species, suitable substrates, shelter sites, sufficient vegetation, and habitat protected from disturbance and human-caused mortality. Estimates of potential habitat (vegetation and soils) discussed below exclude 194,690 acres (26% Combat Center) not considered suitable. This includes areas with high slopes (more than 30%), dry lakes or playas, bedrock outcrops, and wastewater treatment ponds (shown as a white underlay in Figure 11).[21] (DON 2012, MCAGCC 2019, Nagy and Medica 1986, USFWS 1994, USFWS 2011, and USFWS 2022c).

Desert Tortoise Population. Desert tortoise population estimates are based on surveys that estimate area densities of tortoises (e.g., adults per km^2). The population density for the Western Mojave Recovery Unit has declined: 5.6 adult tortoises per square kilometer (km^2) in 2001; 4.7 adult tortoises per km^2 in 2007; and 2.9 adult tortoises per km^2 in 2014. USFWS estimated that the species' minimum viable density is 3.9 adult tortoises per km^2. Across all desert tortoise recovery units, the total number of adult tortoises declined by an estimated 124,050 (37%) between 2004 to 2014, with the mean density of adult tortoises below 3.9 adult tortoises per km^2 in most areas. Adult desert tortoise densities in the Western Mojave Recovery Unit are: 3.6 per km^2 (Ord-Rodman), 2.6 per km^2 (Fremont-Kramer), and 2.4 per km^2 (Superior-Cronese). Because the species' intrinsic rate of population growth is low, these numbers may not substantially change based on the data obtained from future surveys. (Allison and McLuckie 2018, Turner *et al.* 1987, USFWS 2011, and USFWS 2022c). In addition to human activities, regional population decline appears influenced by ecosystem level stressors, including drought, disease, temperature extremes, ravens, fire, coyotes, invasive plants, and shifting vegetation and habitat [climate change] (USFWS 2022c).

Prior NEPA and ESA analyses determined that the majority of the Combat Center contained low populations of desert tortoise (Figure 12). As of 2008, 11,992 to 12,554 adult tortoises occurred at the Combat Center, with an average density of 3.7 to 4.1 adult tortoises per km^2. The current population should be lower due to the translocation effort that occurred between 2017 and 2021, relocating 1,014 adult tortoises to recipient sites outside the Combat Center. This results in a revised density of 3.56 to 3.8 adult tortoise per km^2 at the Combat Center. (DON 2003c, DON 2012, DON-USMC 2018a, Karl 2010, MCAGCC 2011b, MCAGCC 2019, USFWS 2002, USFWS 2012, USFWS 2017, and Vernadero-TetraTech 2022).

Combat Center population data suggest density declines were similar to the regional population decline (about 50% declines per decade, or 7% per year; Allison & McLuckie 2018). This suggests the 2022 and 2032 Combat Center estimates would range, as low as 5,223 to 5,770 in 2022, and 2,610 to 2,890 in 2032. These represent densities of 1.7 to 1.9 adults per km^2 and 0.85 to 0.94 per km^2 in 2022 and 2032, respectively. The average annual decline for the first decade (ending in 2022) would be about 520 to 580 adults.

Preferred Vegetation. Creosote bush (*Larrea tridentata spp.*) and desert annuals are the predominant vegetative species at the Combat Center. The prior estimate of creosote bush at the Combat Center was 531,140 acres (70% Combat Center) (MCAGCC 2019). Based on current geospatial data, creosote bush vegetation covers 587,290 acres (77 % Combat Center) (see Figure 11).

[21] Note: most of the large-scale surveys supporting the 2012 EIS avoided bedrock outcrops and high slopes because the areas (1) are likely to provide low density estimates, (2) likely to provide highly variable estimates for the categories (e.g., bedrock), and (3) are very difficult to survey quantitatively in comparison to most methods applied at large scale (e.g., USFWS Range-wide monitoring and prior large Combat Center surveys (e.g., Woodman *et al.* 2001 and Karl 2010)).

Riparian Areas. The majority of the Combat Center is located with the Southern Mojave watershed, with its smaller watersheds occurring at the Combat Center. A variety of features may hold and transport water, including desert washes, playas, seeps and springs (see Figure 11). Playas cover the most acreage, 15,165 acres (2% Combat Center). The prevalence of riparian areas is low, but they are important for wildlife because they hold water and supporting riparian vegetation that can be used for forage or shelter. While most of the Combat Center's natural aquatic habitats are ephemeral and contain water because of precipitation events, desert washes are prevalent and may provide some, although limited, benefits to wildlife. (MCAGCC 2019 and USFWS 2022b).

Suitable Soils. Combat Center soils are generally suitable to support desert tortoise burrowing activities due to the widespread occurrence of creosote bush scrub vegetation (Figure 11) and observations of tortoises (see e.g., Woodman *et al*. 2001, Karl 2010 and LaRue 2013, MCAGCC 2019). Due to military training activities, some soils may be too compacted or disturbed (e.g., vehicle or ordnance effects) as tortoises can only tolerate low disturbance (Henen 2012). Based on a review of Combat Center geospatial data, intact soils may cover 532,319 acres (70% Combat Center).[22]

Protected Areas. Desert tortoises are largely protected from effects in the Combat Center's Restricted Areas, which cover 45,865 acres (6% Combat Center), with other areas having some training limitations that may provide additional partial protection for tortoises occurring within those boundaries, for a total of 185,294 acres (24%) (see Figure 3).[23]

3.2.3 Environmental Consequences

ONGOING ACTION

Overview. The effects to the desert tortoise from Combat Center operations have been previously analyzed under NEPA and ESA (see e.g., DON 2003c, DON 2012, DON-USMC 2017a, DON-USMC 2018a, USFWS 2002, USFWS 2012, USFWS 2017, and USFWS 2018).

In summary, Combat Center *Military Training* has the potential to affect the tortoise to a greater degree than *Support Operations* or *Resource Management*. This is due to the nature of military training activities and that they occur in the training areas where tortoises and habitat are present.

Over the past 20 years, *Military Training* and *Support Operations* have resulted in a combined reported take of 48 tortoises. The biological opinion's incidental take limit (15) has not been exceeded in any year. Non-training activities (*Support Operations* and *Resource Management*) have affected 1,187 acres of tortoise habitat. Adverse effects to the tortoise and its habitat are typically avoided or minimized during project planning, most projects occur in previously developed or disturbed areas (see Section 1.3.2), and resource management activities tends to benefit the tortoise, with some exceptions (e.g., drinking water plant in a Restricted Area) (DON-USMC 2018b).

In the most recent change to ongoing military training activities, the biological opinion estimated that increased maneuver training and live-fire training across the installation could affect – an additional 125,282 acres of habitat, 2,838 large tortoises, and 9,564 small tortoises. It was estimated that 682 large and 4,802 small tortoises would be killed or injured (upper estimate).

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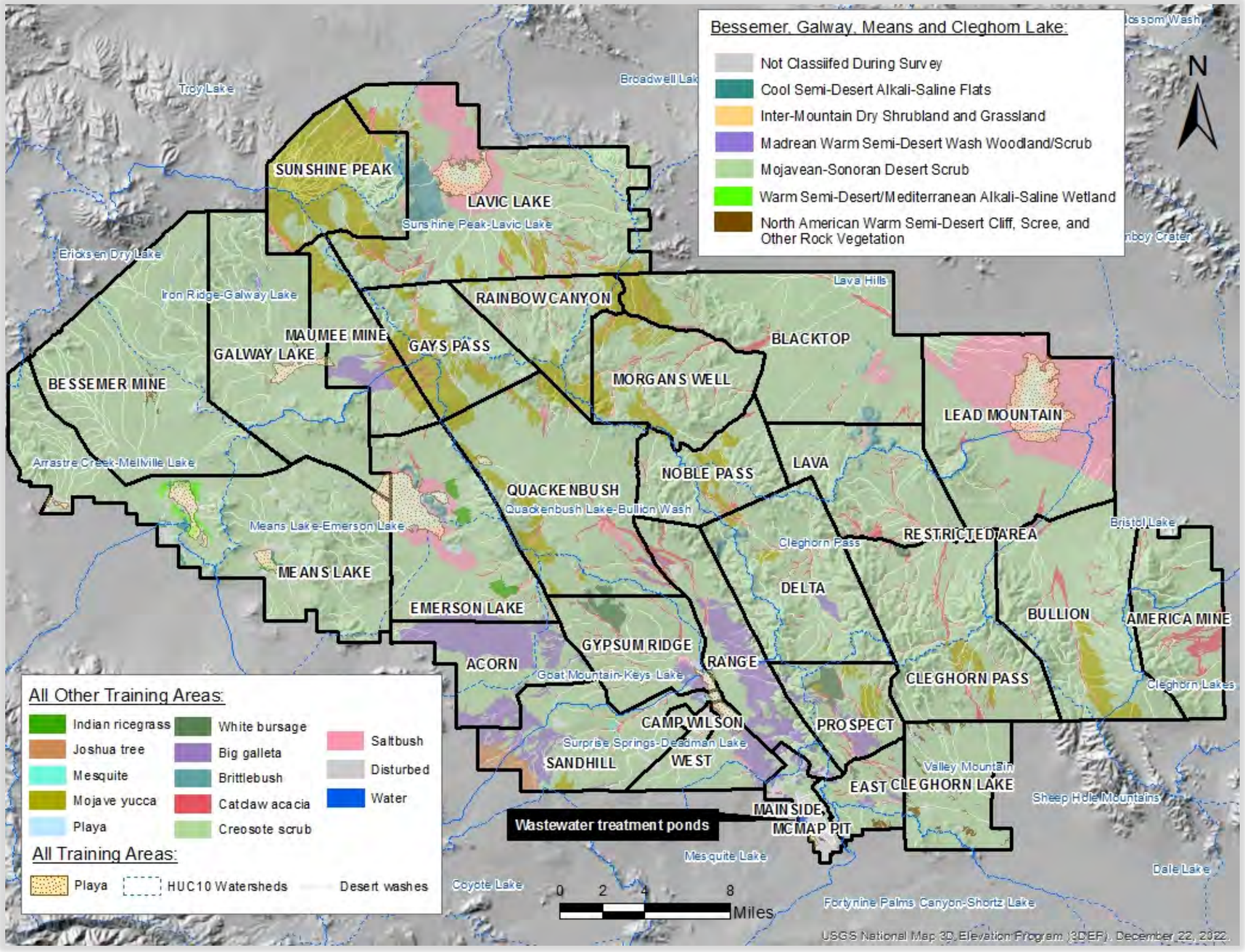
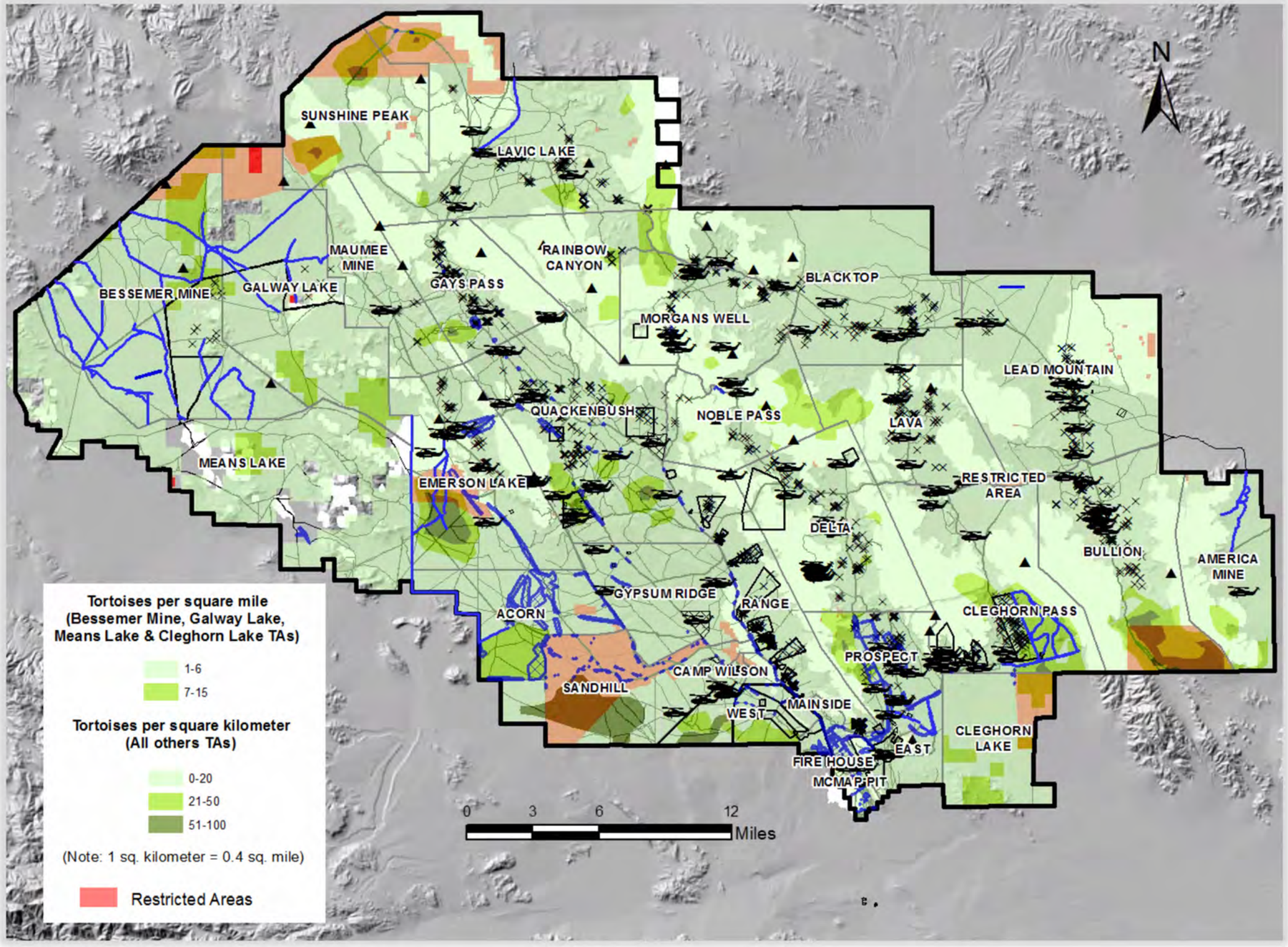
[22] Combat Center acreage (761,000 acres) minus the acreage directly affected by routes (4,200 acres), fixed ranges (17,327 acres), designated landing zones (2,973 acres),[22] Company Objective Sites (44 acres), targets in the training areas (up to 37,093 acres directly and indirectly affected),[22] and areas of bedrock outcrops and lava flows (167,044 acres). See Sections 2.1 and 3.2.3

[23] Estimate includes the acreage of the following areas: no fire, no live-fire buffer, sensitive fuze areas, controlled access areas, and areas where slope is 22% or more (general limitation on use of tracked vehicles) (DON 2012).



Source: Combat Center Geospatial Data (January 27, 2023) and USFWS 2022b.

Figure 11 – Vegetation Communities & Water Resources at the Combat Center



Source: Combat Center Geospatial Data (April 18, 2023).

Figure 12 – Desert Tortoise Density Data and Areas Affected by Ongoing Action (Black/Grey) & Proposed Action (Blue)

Due to the uncertainty regarding the exact number of tortoises that could be taken (e.g., crushed in burrows), the biological opinion's incidental take limit of 15 large desert tortoises per year is a surrogate number and applies to all Combat Center actions, including training. Because MAGTFTC's mitigation for these increased effects was focused on the new areas of increased training, the tortoises remaining in other portions of the Combat Center may still be affected over the next 50 years (estimated life of the training program). (USFWS 2017).

Actual take would likely be lower than past estimates if tortoise densities across the installation declined 7% per year, due to non-training forces, as for the region (see Section 3.2.2).

Despite the Combat Center's no jeopardy biological opinions (USFWS 2002, USFWS 2012, and USFWS 2017) and USWFS's prior determination that the Combat Center's tortoise population and habitat are not critical to the survival and recovery of the species (Section 1.5.3), MAGTFTC continues to evaluate effects of its operations and mitigate for its effects. MAGTFTC recently developed new Restricted Areas, translocated tortoises, and is working with partners to implement the RASP Initiative (DON 2012, USFWS 2017, and MAGTFTC 2022a).

In the subsections below, MAGTFTC has included supplemental analyses (when able) to better quantify effects that may have occurred to the desert tortoise under the Ongoing Action. This would inform the potential effects that may continue to accrue under the Proposed Action.

Maneuver Training & Military Vehicle Use. Based on available data, existing routes have directly affected 4,200 acres (0.6 % Combat Center), with potential indirect effects totaling 257,596 acres considering a 400-meter buffer (34% Combat Center).[24] When compared against the 587,290 acres of creosote bush vegetation and 532,319 acres of potential intact soils, maneuver training and military vehicle use has affected, to some extent, 44% to 48% of potential desert tortoise habitat over the past 20 years, respectively. Despite fluctuations in vehicle miles traveled and current emphasis on lighter weight vehicles, it is assumed all vehicles traversing the training areas are equally capable of affecting the tortoise and their habitat (e.g., crushed burrow). Based on supplemental analysis,[25] ongoing maneuver training and military vehicle use could have affected up to 26 tortoises per year (potentially killed, injured, or subject to other behavioral or physiological effects). Therefore, effects from maneuver training and military vehicle use under the Ongoing Action represents the status quo for at least 20 years, with no major changes in activities in the past 15 years (on- and off-route travel continue at varying rates), continued use of existing routes would not result in new effects, and MAGTFTC minimizes creation of new routes by providing units maps with existing routes for use and with the identification of Restricted Area (no off-route travel).

Live Fire Training. Based on total number of targets, up to 37,093 acres in the training areas outside of fixed ranges (5% Combat Center) may have been directly and indirectly[26] affected over the past 20

[24] To determine indirect effects, a radius of 100 meters (328 feet) from the edge of main routes was previously indicated as an appropriate buffer (DON 2012). However, a study in the Mojave Desert indicates that depressed desert tortoise populations were documented within 400 meters (1,312 feet) of a highway in the Mojave Desert (Boarman and Sazaki 2006). While this study may overestimate impacts (2 to 4 lane, 8,500 vehicles per day, speed limit of 65 miles per hour, in an area with different tortoise densities) at the Combat Center, it is best available science for this SEA. For comparison, Combat Center training area routes: unpaved, single lane; not all used daily with high rates of traffic; and units drive at lower speeds (30 mile per hour).

[25] This analysis showed that up to 255 adult tortoises (about 26 per year, 8% per decade, or 0.8% per year) were estimated at risk by the increase route length and roadside effects (in the buffered areas). Increased route length was based on a comparison of 2011 and 2022 geospatial datasets for the legacy installation (best available data) and applying both a 400 and 800 meter buffer to existing routes (as measured in Boarman and Sazaki 2006).

[26] To determine indirect effects, MAGTFTC used the 49-acre area of impacts assumed for used for aviation-delivered ordnance (greatest general impacts). Assuming all targets used (including those in fixed ranges), up to

years. Despite the fluctuations with ordnance used (most small arms with lesser risk), the area affected remains around existing targets (49-acre effect area). When compared against the 587,290 acres of creosote bush vegetation and 532,319 acres of potential intact soils, live-fire training has affected, to some extent, 6% to 7% of potential desert tortoise habitat over the past 20 years, respectively. Based on supplemental analysis[27] of a sample year (2008) and acreage assumed affected by average number of targets that may have been installed per year (112 affecting 5,488 acres), live-fire training could have affected 80 desert tortoises due to mortality, injury, behavioral or physiological effects (number decreases to about 40 tortoises in 2022 if considering regional population decline trends). These numbers provide some indication of actual take that could have initially occurred with target placement and use; however, risks and effects from continued use of existing targets would likely be much lower because: many targets are placed within 800 meters of existing routes (vehicles reduce tortoise density as explained above) and past ordnance effects would have likely suppressed tortoise density near existing targets. The potential take that could have occurred per year was not attempted to be estimated because the effects of live-fire training present a lesser risk than maneuver training and vehicle use, with overlap in potential effects. Therefore, effects of live-fire training under the Ongoing Action represent the status quo for at least 20 years, with no major changes in activities in the past 12 years (ordnance use continues at varying rates), and continued use of existing targets would not result in new effects.

Sustainment Training & Fixed Ranges. A total of 19,271 acres (2.5% Combat Center) has been disturbed over the past 26 years from the development of fixed ranges and training support sites. This includes areas disturbed during military training activities and subsequently designated as sites. When compared against the 587,290 acres of creosote bush vegetation and 532,319 acres potential intact soils, the development and use of these sites has affected up to 3% to 4% of potential desert tortoise habitat, to-date, respectively. Based on supplemental analysis,[28] this may have resulted in up to 280 tortoises potentially killed, injured, or subject to other physiological effects from initial development, with up to 11 adult tortoises taken per year. Therefore, effects from sustainment training under the Ongoing Action represents the status quo for at least 26 years, with prior planned developments previously analyzed (Section 1.4.1), continued use of existing sites and ranges would not result in new effects, and MAGTFTC minimizes new disturbance by providing units maps with existing sites for use.

110,152 acres could be indirectly affected. Because not all targets would be used for aviation-delivered ordnance (e.g., fixed ranges have limitations), the acreage affected outside of fixed ranges (757 total targets) is a more reasonable estimate; up to 37,093 acres indirectly affected and sufficient to account for missed targets.

[27] If adult densities were 3.6 adults per km^2 and 1.7 adults per km^2 in 2008 and 2022, respectively (Section 3.2.2), and considering the average 5,488 acres (22.2 km^2) affected, there would be less than 80 (40) adults at risk from ordnance impacts at target areas in 2008 (2022).

[28] Based on 2008 and 2022 density estimates (3.6 and 1.7 adults per km^2) (Section 3.2.2) and total acreage affected to-date (19,271 acres / 77.9 km^2), development may have affected as many as 280 adult tortoises (at the 2008 density), and as few as 132 adults (at the 2022 tortoise density; accounts for regional population decline). Similarly, the 1,187 acres (4.8 km^2) affected by projects approved since 2022 may have affected 5 to 8 adult tortoises. However, at least one project (MCAGCC 2006) translocated 17 adults and 4 juveniles before construction began. Assuming an upper take of 280 adult tortoise over 26 years, up to 11 adult tortoises may have been taken per year. However, this would be an overestimate since some development and potential take would have occurred more than 26 years ago and some planned projects may have avoided actual take (e.g., see e.g., Battelle 1998, DON 2003b, DON-USMC 2003, MCAGCC 1997b, MCAGCC, 2004, MCAGCC 2006, DON-USMC 2007b).

Expeditionary Airfields, Landing Areas, and Landing Zones. Up to 4,426 acres have been affected by airfields and landing zones within the "GO" to-date (0.5% Combat Center).[29] Comparing total acreage affected against the 587,290 acres of creosote bush vegetation and 532,319 acres potential intact soils, operations in the "GO" areas may have affected, to some extent, 1% of potential desert tortoise habitat, respectively, over the past 20 to 37 years. Based on supplemental analysis, this development and use may have resulted in between 64 to 68 tortoises killed, injured, or subject to other physiological effects.[30] Ongoing rotary-wing and tilt-rotor aircraft operations alone generally pose little risk to desert tortoises, with less than 1 adult injured or killed per year and between 16 to 51 indirectly affected by downwash or downdraft (downward wind gusts causing dust and soil erosion). These estimates remain consistent with past effect analyses (DON-USMC 2017). Therefore, rotary-wing and tilt-rotor aircraft operations under the Ongoing Action represents the status quo for 20 to 37 years, with no major new developments or changes in activities in the past 15 years (operations continue at varying rates), continued use of existing airfield, landing zones and "GO" acreage would result in low effects.

Range Control Operations. The potential effects to the desert tortoise are low-to-negligible due to the location of the existing sensors being within areas where tortoise density is assumed zero (e.g., slopes above 30%) (DON 2012). Operation and maintenance of these sensors occurs by vehicle or helicopter access (sites with no route access). While the risk of being run over by a vehicle or crushed by a helicopter exists, there is no record of this having occurred in the past and these effects are within scope of those discussed under *Maneuver Training & Military Vehicle Use* and *Expeditionary Airfields, Landing Areas, and Landing Zones.*

Desert Tortoise Management. MAGTFTC continues to manage desert tortoise per existing legal requirements, ongoing commitments, and recent approved actions (e.g., reduce predation via raven management) (DON 2013, DON-USMC 2017a, MAGTFTC 2022a, USFWS 2012, USFWS 2017, and USFWS 2022a). These requirements have been developed over the decades, to address the effects from ongoing military training activities and basewide non-training operations.

Invasive Species Management. Since 2015, MAGTFTC has not routinely controlled invasive species. Limited treatment of tamarisk occurred in some training areas in the 1990s and 2000s; 100 acres was treated with herbicides containing the active ingredients glyphosate and triclopyr. The residues from these past treatments have long-since dissipated based on the biodegradation rate of these ingredients (see Appendix E, E-2). Adverse effects to the desert tortoise may be occuring from lack of invasive species management as the quality and quantity of habitat and forage is impaired (e.g., desert scrub landscapes converted to monocultures of invasive species). In one experiment,

[29] In the 2018 EA, 182,599 acres ("GO" areas) for rotary wind and tilt-rotor aircraft operations was intended to allow units flexibility, but the entire area has not been affected. Based on past rates of landing zone development (up to 150 acres per year), it can be assumed that between 2018 to 2023, up to 900 additional acres could have been affected in the "GO" areas, in addition to the prior developed landing zones within in the "GO" areas (2,973 acres) and airfields (553 acres).

There are a total of 110 designated landing zones. The 2012 EIS assumed 7.4 acres could be affected around each zone from the effects of wind and downwash (DON 2012), which would result in a 814-acre area directly affected by landings and takeoffs. However, the 2018 EA reported a larger 2,973-acre area affected, which was based on the actual size of the landing zones within which operations would occur (DON-USMC 2018a and USFWS 2018). This number is consistent with prior estimates (USMC 2010a and USMC 2014a).

[30] If adult densities were 3.6 adults per km^2 and 1.7 adults per km^2 in 2008 and 2022, respectively (Section 3.2.2), and considering the average 4,426 acres (17.9 km^2) affected, there would 64 (30) adults at risk from ordnance impacts in 2008 (2022). However, this may be an overestimate since projects are typically planned to avoid and minimize impacts to the desert tortoise (e.g., exclusion fencing) (see e.g., NAVFAC 1986, USMC 2010a, USMC *et al.,* 2013, and USMC 2010a).

desert tortoises fed multiple diets ranging from native forbs or grasses to invasive grasses and combinations thereof, influenced tortoise body condition and immune functions. Tortoises fed only native forbs had better body condition and immune functions, grew more, and had higher survival rates (>95%) than tortoises fed any other diet. (Abella *et al.* 2010, Abella and Berry 2016, Brooks *et al.* 2004, Drake *et al.* 2016).

OHV Race Events. The potential effects to the desert tortoise from the King of the Hammers OHV race events occuring on the Combat Center over the next 4 years have been previously analyzed, with no significant effects. To minmize the potential for incidental take, the event is limited to the time of year when tortoises are typically underground (January to February), is limited to existing routes, and requires a pre- and post-monitoring survey to minimize and document effects. (BLM 2022a). For the recent 2023 event, all conditions were implemented and no effects to the desert tortoise occurred.

PROPOSED ACTION

Overview. The risks from activities conducted under the Proposed Action would be the same as the Ongoing Action, to include crushing tortoises and collapsing burrows via vehicles and equipment, striking tortoises with ordnance, and downwash or downdraft (downward wind gusts causing dust and soil erosion) from rotary-wing and tilt-rotor landings and takeoffs, and continued effects at existing sites (some areas may continue to be suitable habitat when not in active use for training). Overall, effects would incrementally increase, as summarized below, even considering the largest proposed developments (Range 501 and permanent expeditionary airfields). While the potential effects from planned projects can likely be avoided or minimized, the same is not true of training. Thus, MAGTFTC would implement avoidance and minimization measures as part of the Proposed Action (Section 2.3.3) and offer increased mitigation under the RASP Initiative (Section 2.2.7) to better mitigate for the ongoing and future effects that would result from military training activities. The only requirements that would apply to Marines engaged in training would be the general avoidance and minimization requirements listed in Section 2.3.2(D).

Maneuver Training & Military Vehicle Use. Under the Proposed Action, up to 212 miles of route work may be completed (120 miles widened by 8 feet / 116 acres), with 19,083 acres indirectly affected (400-meter buffer), and 25 miles per year into the future (widened by 8 or 16 feet) (24 to 45 acres), with 3,975 acres indirectly affected. If ongoing annual maintenance is considered, the total is 712 miles per year (although no widening for annual maintenance). Indirect effects (400-meter buffer) from existing routes are already part of the Ongoing Action (not additional acreage affected). Given that off-route training would continue, the past rate of off-route trail creation (67 miles per year) (65 acres assuming 8 feet width) may be a valid estimate of future effects from maneuver training and off-route travel during exercises due to dispersed movement, with indirect effects up to 10,655 acres affected each year into the future. Up to 33,713 additional acres could be indirectly affected from all proposed work, although it would decrease to 14,630 acres thereafter. When compared against the 587,290 acres of creosote bush vegetation and 532,319 acres potential intact soils, the Proposed Action could affect up to 6% more of potential desert tortoise habitat at the high end, respectively, and then decreasing to 2.5% to 3% each year, respectively.

Live-Fire Training. Under the Proposed Action, a total of 1,715 acres would be affected this year (35 new targets) and thereafter ranging from 245 acres (5 new targets) to 2,450 acres (50 new targets) each year (based on 49-acre area directly and indirectly affected). When compared against the 587,290 acres of creosote bush vegetation and 532,319 acres potential intact soils, the Proposed Action could initially affect up to 0.3% more of potential desert tortoise habitat, respectively, and then ranging annually from 0.04% (low end), respectively, to 0.4% and 0.5% (high end), respectively. Replacing the existing 2,248 targets would not result in new effects.

Sustainment Training & Fixed ranges. Under the Proposed Action, up to 365 additional acres may be affected per year (if 10 new sites are developed each year). When compared against the 587,290 acres of creosote bush vegetation and 532,319 acres potential intact soils, the Proposed Action would affect 0.06% more of potential desert tortoise habitat per year, respectively. Continued use of existing sites, including soil movement (e.g., berm creation), would not result in new effects and Marines are required to avoid and minimize effects (see Section 2.3.2(D)) since tortoises may still occur in these areas. The creation of Range 501 would affect an additional 2,700 acres of tortoise habitat. When compared against the 587,290 acres of creosote bush vegetation and 532,319 acres potential intact soils, the Proposed Action would affect 0.5% more of potential desert tortoise habitat, respectively, for this specific project. Effects from Range 500 upgrades (new targets and tower construction) would remain within scope of prior analyses (DON-USMC 2003 and MCAGCC 2004).

Expeditionary Airfields, Landing Areas, and Landing Zones. Under the Proposed Action, up to 162 additional acres could be affected each year (temporary airfields) and up to 120 additional acres for the specific project (permanent airfields). When compared against the 587,290 acres of creosote bush vegetation and 532,319 acres potential intact soils, the Proposed Action would affect up to 0.05% more of potential desert tortoise habitat at the high end, respectively, and then decreasing to 0.03% per year, respectively. In addition, the entire installation would be able to support rotary-wing and tilt-rotor aircraft operations. Due to the overestimate of acreage in the 2018 EA, the additional acreage that could be affected is 1,763 acres. The risk from these operations was previously determined not significant (USMC 2010a and USMC 2014a). When compared against the 587,290 acres of creosote bush vegetation and 532,319 acres potential intact soils, the Proposed Action would affect up to 0.3% more of potential desert tortoise habitat, respectively. Increased dispersed landings and takeoffs throughout the Combat Center would not result in increased risk compared to the Ongoing Action (within range) despite the slight increase in area open for operations.

Range Control Operations. Same as the Ongoing Action. Up to 5 new sensors (up to 1 acre) would be installed in areas where desert tortoise and habitat is not typically present, avoidance measures incorporated into the Proposed Action (Section 2.3.3) would ensure no actual effects, and transit and travel to install and maintain both existing and new sensors would remain within the scope of effects discussed under *Maneuver Training & Military Vehicle Use* and *Expeditionary Airfields, Landing Areas, and Landing Zones.*

Desert Tortoise Management. Same as the Ongoing Action except that MAGTFTC proposes improved desert tortoise conservation measures at the Combat Center to ensure management is focused on effective and enforceable measures. This includes increased desert tortoise mitigation under the RASP Initiative (CM-1 and CM-10) to offset the effects from ongoing and future actions. Specifically, MAGTFTC proposes population augmentation via head starting and additional translocation (CM-4 and CM-10). As explained under CM-10, MAGTFTC would coordinate with the USFWS to relocate tortoises to areas currently designated for tortoise conservation (e.g., area with low populations) and may include authorized areas on BLM-managed land. The intent is to increase the tortoise population in areas outside the Combat Center that have been designated critical for the survival and recovery of the species (e.g., critical habitat). However, benefits may only result if the tortoises are relocated to areas that are managed for conservation. For example, some portions of designated critical habitat have existing or proposed uses that are inconsistent with tortoise conservation (e.g., utility development or OHV use) and may result in direct and/or indirect effects to tortoises. Thus, MAGTFTC would focus its efforts on areas that are actively managed for conservation or in areas passively managed but where uses are consistent with desert tortoise conservation. The Proposed Action would involve the same types of activities analyzed in the 2017 SEIS for desert tortoise translocation (no significant effect from translocating 1,000 to 1,200 tortoises) (DON-USMC 2017a), although long-term monitoring was required to confirm the success

of the mitigation. MAGTFTC is in year 6 of its 30-year monitoring commitment. Based on recent reporting, MAGTFTC's translocation effort has been successful, with a 95% survival rate. In contrast, MAGTFTC would only translocate tortoises as needed (e.g., relocation of tortoises out of harm's way at the Combat Center) under the Proposed Action.

Invasive Species Management. Introducing herbicides into the environment at the Combat Center would have the potential to adversely affect the desert tortoise and its habitat in the short-term but is intended to minimize conversion of vegetation (e.g., loss of tortoise habitat) in the long-term. Based on available data and the uncertainties, tortoises may be directly and/or indirectly affected by herbicides containing the active ingredients glyphosate, imazypyr, triclopyr and fluazifop-P-butyl. Each herbicide has a different risk depending on its properties and the application method, rate – pounds of acid equivalent per acre (lb a.e./acre), and location. For detailed information, see Section 3.6 and Appendix E (E-2 to E-7). Notable characteristics are summarized below.

- All active ingredients can persist in the environment and risk assessments lack supporting reptiles/terrestrial amphibian data.
- For glyphosate and imazapyr, non-target plants can be killed via downwind spray drift.
- At low application rates, glyphosate (1 lb a.e./acre) and triclopyr (1.5 to 3 lbs a.e./acre) can adversely affect sensitive aquatic species.
- At higher application rates, glyphosate can adversely affect mammals (2.5 lb a.e./acre) and birds and insects (3.3 lb a.e./acre).
- Glyphosate toxicity varies with the formulation and surfactant used.
- Triclopyr toxicity is low at typical application rate (1 lb a.e./acre), but its metabolite TCP is more toxic.
- Imazapyr toxicity is limited to the Arsenal® formulation.
- Fluazifop-P-butyl toxicity shows reproductive toxicity in mammals and birds after 3 successive treatments (bioaccumulation).

(SERA 2011a, SERA 2011b, SERA 2011c, and SERA 2014). The standard avoidance and minimization measures incorporated into the Proposed Action (Section 2.3.3) should minimize adverse effects from overspray and wind drift. However, due the general presence of the desert tortoise throughout the training areas (Section 3.2.2), herbicide application over large areas could adversely affect the tortoise and its habitat, if an individual tortoise is accidentally sprayed (e.g., tortoise burrow under vegetation), native vegetation is intermixed with infestations is treated and killed, or a tortoise eats contaminated vegetation (e.g., herbicide residue on galleta grass).

The risk assessments for all active ingredients lack reptile data (sometimes birds are a suitable proxy), although the active ingredient glyphosate would largely be used. MAGTFTC is proposing to use glyphosate formulations with high toxicity but not state or federally restricted (DPR 2021 and USEPA 2022g). Available literature shows glyphosate has generally low animal toxicity (Henderson *et al.* 2010, Martin and Murray 2013, Griem *et al.* 2015), with one study showing no effect on reptiles from spraying an herbicide containing glyphosate (Martin and Murray 2013). However, more recent studies that have indicated potential chronic effects of glyphosate as it accumulates in the environment and across the food chain (Jarrel *et al.* 2020 and Van Bruggen *et al.* 2021).

Based on potential risks that would not be resolved by the standard avoidance and minimization measures, the following precautions would be incorporated into the Proposed Action:

- Use the least amount of active ingredient as possible to minimize effects to non-target vegetation, plants, and the desert tortoise, consistent with the risk assessment thresholds (see

Section 3.6.1 and Appendix E, E-2), as modified by the above information regarding potential risk to desert tortoise at low application rates.

- Use less toxic glyphosate formulations, if still effective to treat the infestation, and use non-toxic surfactants (see Appendix E, E-3).
- Avoid the use of active ingredient fluazifop-P-butyl, if other methods or herbicides exist to treat the small 4-acre infestation of cheatgrass.
- Avoid application methods that would be the equivalent to broadcast application (e.g., backpack sprayers in sweepline formation), if other effective methods are available.
- Due to the lack of comprehensive data regarding species that could occur in the areas to be treated, a field survey is required prior to implementation to ensure that sensitive species are considered when developing the implementation strategy.
- Herbicide applicators would be required to use existing routes to access infestations and walk to treatment sites to minimize off-route vehicle traffic. Some infestations are in Restricted Areas where desert tortoise may be present at high densities.
- Adhere to additional limitations recommend by the USFWS.

Therefore, the Proposed Action would ensure MAGTFTC strikes the right balance of complying with its invasive species management responsibilities (e.g., Sikes Act, Executive Order 13112, and Executive Order 13751) in a way that does not adversely affect ESA-listed or at-risk species.

OHV Race Events. Effects are anticipated to be the same as the Ongoing Action. This assumes future events would not exceed the size of the King of Hammers events, occur when tortoises are typically underground, and incorporate avoidance and minimization for use of the Combat Center (Section 2.3.3). Non-conforming OHV events would require additional NEPA and ESA analysis.

3.3 CLIMATE CHANGE

3.3.1 Guidance & Thresholds

The guidance and thresholds listed below are relevant in developing this section and determining whether, based on the totality of the circumstances, there may be significant effects under NEPA.

- Exeutive Order (E.O.) 13653, Preparing the United States for the Effects of Climate Change;
- E.O. 13990, Protecting Public Health and the Environment and Restoring Science To Tackle the Climate Crisis;
- E.O. 14008, Tackling the Climate Crisis at Home and Abroad;
- CEQ's Interim Guidance on Consideration of Greenhouse Gas Emissions and Climate Change pursuant to Executive Order 13990, Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis (CEQ 2023).
- Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates under Executive Order 13990 (IWG 2021).

3.3.2 Affected Environment

Climate is the average weather or long-term pattern in an area. The Combat Center is in the Mojave Desert, within the Desert Province, which has a climate that varies from cooler and wetter in the north to hotter and drier in the south. Climate change is a natural phenomenon that has been expedited by the effects of human activities since the Industrial Revolution. It is evaluated by greenhouse gas (GHG) emissions, namely: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and several fluorine-containing halogenated substances (HFCs, PFCs, SF_6 and NF_3). Each GHG has a different

potential to contribute to climate change. Because the majority of GHG emissions are CO_2, the global warming potential of each GHG has been calculated in reference to CO_2 and is usually expressed in terms of million metric tons of CO_2 equivalent (MMT CO_2e). (CARB 2022c, CDFW 2015, CEQ 2023, IPCC 2018, OEHHA 2022a, and USEPA 2022c, and USEPA 2022f).

In 2020, Combat Center stationary and area source operations generated 72,063 metric tons of CO_2e (Multi-MAC JV 2021), which represents 3.3% of California's military GHG emissions. The main contributors of reported GHG emissions at the Combat Center are stationary sources, with the Cogeneration Plant generating the majority of emissions. While the Combat Center reports all criteria pollutant emissions for mobile sources, GHG emissions are excluded per MDAQMD guidance (MDAQMD 2021). This does not negate the fact that ongoing training operations contribute to GHG emissions – they are just not quantified on an annual basis.

In addition to GHG emissions, military training operations also contribute to black carbon (soot) in the atmosphere. Black carbon is the carbon component of particulate matter that is generated by combustion sources; the majority (36%) is attributed to off-road mobile sources in California. While it has a much shorter lifespan than carbon dioxide (e.g., it's removed from atmosphere by rain and deposition after a few days or weeks), it contributes heavily to global warming because it absorbs sunlight and releases heat into the atmosphere. One ton of black carbon has a warming effect equal to 900 tons of CO_2 over a 100-year period. (OEHHA 2022a). Black carbon is excluded from GHG emission inventories because the fraction of black carbon in particulate matter for specific sources has not yet been quantified.

3.3.3 Environmental Consequences

This section includes an analysis of GHG emissions from the Ongoing Action and Proposed Action and discusses general and resource-specific consequences relevant to the Mojave Desert and the Combat Center. Climate change is a "threat multiplier" (OEHHA 2022), with wide ranging consequences that may modify the affected environment and exacerbate potential effects discussed in this SEA.

ONGOING ACTION

Climate change effects associated with the Ongoing Action occur from ordnance and combustive emissions due to fossil-fuel powered mobile sources. Combustive emissions sources include tactical vehicle and equipment operations as well as aircraft operations. The GHG emissions associated with the Ongoing Action, as analyzed in the 2012 EIS, are presented in Table 5.

Table 5 – Maximum Anticipated GHG Emissions from Ongoing Action

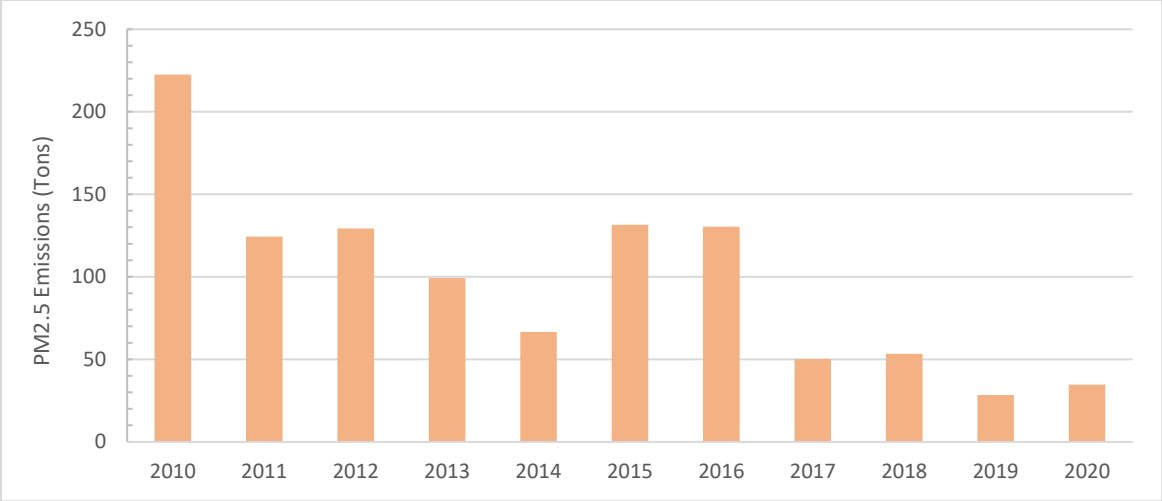
Scenario/Activity	Metric Tons Per Year			
	CO_2	CH_4	N_2O	CO_2e
Combat Center 2009 Baseline Emissions[1]	112,576.00	64.40	1.40	114,620.00
Proposed Action (Ongoing Action)				
Aircraft Operations	35,106.00	1.10	1.00	35,443.50
Tactical Vehicles	3,558.00	0.40	0.00	3,568.00
Tactical Support Equipment	778.00	0.20	0.10	814.00
Net Increase from Ongoing Action	39,442.00	1.70	1.10	39,825.50
2012 EIS Emissions	**152,018.00**	**66.10**	**2.50**	**154,445.50**

(1) The emissions from the Cogeneration Facility were not included in the Baseline Emissions estimate.

Emissions associated with the Ongoing Action are proportional to the training operation tempo; that is, if the number of sorties, tactical vehicle and equipment usage, or ordnance usage increases, the GHG emissions would increase. As shown in Diagram 11 (Section 3.1.3), training operations fluctuate year-to-year, but there has been an overall decline in training operations over the last decade. It is anticipated that the GHG emissions associated with the Ongoing Action would be consistent with the

presented trend, thereby, below what was analyzed in the 2012 EIS. For the sake of the discussion, the emissions from the 2012 analysis were used to quantify effects.

Although there is no data to quantify black carbon from the Ongoing Action, $PM_{2.5}$ emissions from combustive sources may be viewed as a proxy (OEHAA 2022a). Diagram 12 displays the annual $PM_{2.5}$ emissions from ongoing training operations that utilize combustive sources (e.g., aircraft, tactical vehicles, and tactical equipment). The annual $PM_{2.5}$ emissions range from 34 to 222 tons per year. Over the past 11 years, combustive source $PM_{2.5}$ emissions from ongoing training operations have declined, with an average of 97 tons emitted per year. Considering that 1 ton of black carbon has the same warming effect as 900 tons of CO_2, average annual $PM_{2.5}$ emissions may be equated to 78,831 tons of CO_2 per year. However, this is a conservatively high estimate since black carbon is only one component of $PM_{2.5}$.



Source: URS 2011 to URS 2015, CDM-AECOM 2016, CDM-AECOM 2017; MMECG 2018; Multi-MAC JV 2018 to Multi-MAC JV 2022.

Diagram 12 – Particulate Matter Emissions from Ongoing Training Combustion Sources

The greenhouse gas emissions from the Ongoing Action can be related to the social cost of carbon. The social cost of carbon is the monetary estimate of the long-term damages of greenhouse gas emissions. The estimated social cost (USD/metric ton) for each GHG is as follows: $52 for carbon dioxide, $1,532 for methane, and $18,842 for nitrous oxide (Cost of Carbon 2023). Based on these estimates and the emissions analyzed in the 2012 EIS as well as the observed $PM_{2.5}$ combustive emissions, one year of the Ongoing Action has a social cost of carbon that ranges from $9,256,364 to $17,500,668, with the average cost being $12,152,538. While this may seem high, the average annual social cost of carbon for operating a typical passenger vehicle is $840 (USEPA 2021). Therefore, the average annual effect from ongoing training operations can be equated to 14,467 passenger vehicles.

Tactical vehicles, equipment, and aircraft are widely recognized as being difficult to decarbonize due to the mission they must perform and the long service life of the assets. As part of the Climate Action 2030, the Department of the Navy strives to reduce greenhouse gas emissions in order to meet the nation's net-zero goal by 2050 by exploring alternative fuels, hybridization, and electrification to reduce the footprint of its tactical forces (DON 2022). In addition to optimizing the fleet, MAGTFTC continues to make efforts to improve the efficiency of all Combat Center operations and reduce GHG emissions. Some of the efforts include: using photovoltaic systems; installing electric charging stations to promote electric vehicle use; prioritizing energy efficiency and promoting conservation; utilizing alternative fuels; diverting solid and organic waste to reduce methane emission in the landfill; and

upgrading vehicle fleets to more fuel-efficient versions. MAGTFTC intends to make continued efforts to minmize its contribution to climate change while maintaining military readiness and facilitating training at the Combat Center. The majority of reductions would likely be seen in support operations, such as utilities and resource management (e.g., landfill). However, the climate change reduction efforts being planned at the DoD, Department of the Navy, and Headquarters Marine Corps levels (e.g., procurement, master planning, modification of military vehicles and equipment, etc.) (DoD 2021, DoD 2022 and DON 2022) would benefit the Combat Center and surrounding environment as these initiatives are implemented.

Based on the foregoing, the Ongoing Action would continue to contribute to climate change, but MAGTFTC efforts are aligned with federal policies regarding climate change resiliency, adaptation and reduction (DOS-EOP 2021 and DoD 2014) per applicable executive orders.

PROPOSED ACTION

Short-term GHG emissions would be generated during various transportation and construction activites associated with certain portions of the Proposed Action. Table 6 displays the estimated GHG emissions as well as the social cost of carbon for each activity. The Proposed Action may generate an additional 1,556.94 metric tons CO_2e. In addition to GHG, the Proposed Action could result in 1.52 metric tons of $PM_{2.5}$ emitted into the atmosphere from combustive sources. Based on the global warming effect of black carbon presented in the previous section, this equates to 1,368 tons of CO_2. The social cost of carbon for all activities within the proposed action is estimated to be $153,345. This equates to the same effect as 183 passenger vehicles being operated for one year. The Proposed Action would not result in any substantial or long-term increases in existing GHG emission levels. Considering ongoing MAGTFTC and agency climate reduction efforts, MAGTFTC would remain compliant with climate change policies and executive orders.

Table 6 – Estimated GHG Emissions and Social Cost for the Proposed Action

Activity	Metric Tons		Social Cost
	CO_2	$PM_{2.5}$	
Route Development (Maneuver Training & Military Vehicle Use/ Fixed ranges)	136.44	0.08	$10,733.37
Live-Fire Training	2.70	0.29	$13,930.04
Sustainment Training	38.51	0.09	$6,358.78
Expeditionary Airfields, Landing Areas, and Landing Zones	1,233.61	0.62	$93,013.51
Fixed ranges	65.54	0.37	$20,626.47
Range Control Operations	80.15	0.10	$8,683.18
TOTAL	**1,556.94**	**1.52**	**$153,345.35**

GENERAL CONSEQUENCES OF CLIMATE CHANGE

GHG emissions generated from the Ongoing Action and Proposed Action would occur against a backdrop of high GHG emissions and incrementally contribute to total global emission levels, with different consequences at the local level. In California, climate change is causing increased temperatures, aridification of deserts, increased lightning with warming air, more intense and variable precipitation (e.g., more intense storms within a shorter wet season), and an increased wildfire risk (e.g., larger fires with increased acreage burned). In the Desert Region of San Bernardino County, climate change would increase average temperature and aridification of deserts (Combat Center is in the southern portion of the Western Mojave Desert), rainfall would remain variable in the eastern desert region of the county, and areas could have the same or slightly increased likelihood of wildfire risk (low-to-moderate risk at Combat Center). In the Inland Deserts region, winter precipitation is projected to increase and summer precipitation may decrease by up to 40%. There may be an

increase in extreme weather events like heat waves, droughts, and flash floods (dry soils absorb water poorly). The variability of precipitation can promote the growth of invasive grasses, a fuel source. (Barrows *et al*. 2016, Cal-Adapt 2022, CalFire 2022, Hopkins 2018, IPCC 2018, OEHHA 2022a, SBC 2017, USGCRP 2016, and Westerling 2018).

RESOURCE-SPECIFIC CONSEQUENCES OF CLIMATE CHANGE

Air Quality. As discussed in the previous section, climate change can influence temperature and precipitation as well as other factors such as wind patterns, humidity, and cloudiness. Meteorological changes can positively or negatively effect the region's air quality. For example, an increase in precipitation can decrease particulate matter by knocking it out of the air, while a decrease in precipitation can have the opposite effect. (USGCRP 2016).

Considering that higher temperatures are projected in the Mojave Desert, climate change may result in increased formation of ground-level ozone and particulate matter, which may make it more difficult to attain the national ambient air quality standards for both pollutants. In addition, the increased temperatures contribute and exacerbate naturally occurring drought. Climate scientists suggest we may be in a "megadrought" era, with 2000 to 2021 being the driest 22-year period over the past 1,000 years in California and the southwestern United States. Increasing temperatures, continued variable precipitation and increased wind speed in desert areas may result in drier conditions, more intense drought conditions, increase risk for more extreme wildfires or more acres burned compared to historic rates, and increased dust storms. This means that fugitive dust and other hazardous air pollutants (e.g., wildfire smoke) may be present at increased levels, resulting in adverse effects to human health and the environment. (OEHHA 2022a and USGCRP 2016).

Based on the foregoing, GHG emissions generated under the Ongoing Action and the Proposed Action would contribute to adverse regional air quality. It is possible that persons residing and working at the Combat Center may be affected to a greater extent than the general public because a large portion of the Combat Center population (e.g., Marines, construction crews, and field personnnel) are routinely in the field and exposed to the elements. However, the downward trend in overall Combat Center emissions in conjunction with the MAGTFTC and agency level climate reduction efforts may combat the effects of climate change and eventually lead to improved regional air quality.

Biological Resources (Desert Tortoise). The influence that climate change has on metoerological conditions can alter habitats and change ecosystems (e.g., the type and amount of vegetation, competition for resources, and biodiversity). Although species in the Mojave Desert are suited to survive in arid environments with high temperatures, not all species may be able to adapt to the anticipated temperature increases associated with climate change. Indirect impacts to the desert tortoise may result from the adverse effects of temperature increases and how invasive plants may influence and change ecosystem processes. For instance, as the temperature increases it is projected that there would be habitat loss from vegetative communities shifting upslope. As vegetation moves upslope, lower areas may open and invasive plant species colonize, resulting in less native food plants for the tortoise. Despite the temperature increases, a recent study indicated that approximately 40% of tortoise habitat at the Combat Center would remain climate refugia, meaning that area persists as habitat despite climate warming. While wildfire risk is not expected to greatly increase in the Mojave Desert, fires are generally becoming larger and affecting more acres in California. (Barrows et al. 2016, CalFire 2022, CDFW 2015, Henen et al. 2022, Hopkins 2018, Nagy et al. 2016, USGCRP 2016, NatureServe-CEMML 2021, NPS 2023, OEHHA 2022a).

In addition, non-native invasive plant species use strategies to out-compete native plants and affect ecosystems. The tamarisk leaves (*Tamarisk spp.*) shed salts that degrade soil conditions for native plants, and tamarisk roots extend deeper than can many native species, out-competing native plants

for the limited soil moisture. These effects may be compounded by groundwater use by human's and the effects of drought (e.g., drier soils) that may intensify as temperatures increase. Given that increased precipitation is not projected, these compounding stressors may adversely affect the desert tortoise. (USGCRP 2016, CDFW 2015, Hopkins 2018, OEHHA 2022a).

Based on the foregoing, it is prudent for MAGTFTC to continue monitoring weather and land condition (see Section 2.3.2) and actively prevent the spread of non-native invasive plants (Section 2.2.8) and degradation of soils that would synergize GHG effects and alter ecosystem processes essential to the desert tortoise and its community

Cultural Resources. Increased xeric conditions (lack of water supply) due to anthropogenic climate change exacerbate summer weather, including increased severity, duration, and unpredictability of storms, heat, and soil erosion and deposition (Hughson *et al*. 2011), increasing risk to the long-term conditions of the Combat Center's archaeological sites (NPS 2016). Exacerbated summer monsoons may increase erosion, re-deposition and acute damage to archaeological sites located near drainages throughout the Combat Center (Miller *et al.* 2010). Exacerbated temperatures may cause heat-related damage to rock art and historic sites (NPS 2016). Increased temperature can trigger the upslope shift of vegetation and vegetation die off at the southern extent of its range (Barrows et al. 2016), potentially affecting traditional plant gathering, a potential adverse effect to a traditional use, or cultural resource. Although some Native American cultures and peoples could be affected by climate change (e.g., exposure of cultural resources from drying of water features), documented effects are not specific to the desert areas (OEHHA 2022). Limited information indicates that the Combat Center was used for hunting and habitatation by pre-historic inhabitants (DON 2012 and MCAGCC 2020). While the Combat Center may include ancestral or traditional lands of Native American cultures, Native American use does not occur. Due to the low access to the Combat Center since the 1940s, the professional or tribal information on important cultural resources has been limited. Adverse effects would need to be addressed by the MAGTFTC to promote conservation and preservation of historic properties. Proposed mitigation (Section 3.4.4) may help inform management of important cultural resources remaining at the Combat Center.

Human Health. Because people in the Mojave Desert are already exposed to high temperatures, future increases may not represent a drastic change from existing conditions. However, vulnerable population segments may experience a higher degree of effects if they are unable to cope or adapt, including: the immunocompromised; low-income households; and people in outdoor and high-risk occupations (e.g., construction crews and active military). In 2009, 9% of San Bernardino County households lacked air conditioning, a strategy to counter adverse effects of heat (statewide average was 36%). In 2010, San Bernardino County had 60,807 outdoor workers and 5% of households did not own a vehicle that could be used for evacuation for situations like critical infrastructure failing during extreme weather events (statewide average was 8%). (CalFire 2022, Hopkins 2018, IPCC 2018, OEHHA 2022a, SBC 2017, SBC 2020, SBC 2022, and USGCRP 2016).

In San Bernardino County, climate change is anticipated to lead to an increase of heat related illness and death (e.g., personnel working outside in extreme conditions), respiratory infections (e.g., *Coccidioidomycosis*, or "valley fever") due to increased ground level ozone and particulate matter, and proliferation of vectors that transmit diseases and viruses (e.g., ticks and lyme disease, and mosquitos and the West Nile virus), and exposure to wildfire smoke. This may result in increased risk to personnel working outside at the Combat Center, including Marines, civilians, and contractors. Marines may be at higher risk of exposure because the occupation requires exposure to harsh conditions. For example, the incidence of heat illness among active duty U.S. military is several-fold higher than the summertime incidence in the general U.S. population and valley fever is a known occupational hazard when training in the southwestern United States. (USGRP 2016).

Based on the foregoing, Combat Center activities under the Ongoing Action and Proposed Action would contribute to climate change and the general adverse effects to human health (see Air Quality), with a disproportionate effect to Marines and outdoor workers at the Combat Center (occupational safety precautions apply). Due to the potential for more extreme weather events, MAGTFTC is constantly upgrading older infrastructure (e.g., wastewater treatment plant, electrical lines, waterlines, etc.) to sustain its resident and transient populations (see Chapter 4).

3.4 CULTURAL RESOURCES

3.4.1 Thresholds

A variety of direction pertains to cultural resources and consultation with Native American tribes and government, as tribal resources often overlap with the consideration of cultural resources. Main sources of direction include:

- Archaeological and Historic Preservation Act of 1974;
- Archaeological Resources Protection Act of 1979;
- National Historic Preservation Act;
- Native American Graves Protection and Repatriation Act;
- Executive Order 13007, Indian Sacred Sites; and
- Executive Order 13175, Consultation and Coordination with Indian Tribal Governments.

The undertaking location and resource type is most relvant to ensuring compliance with the various laws and policies. The thresholds listed below are relevant in developing this section and determining whether, based on the totality of the circumstances, there may be significant effects under NEPA.

- Adverse effects to historic properties eligible for the National Register of Historic Places.
- Adverse effects to unique cultural resources.
- Adverse effects to tribal resources, access, or rights.

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

3.4.2 Regulatory Considerations

Cultural resources may generally include resources important to a culture or community for scientific, traditional, religious, or other reasons. Because cultural resources are not defined under NEPA, MAGTFTC relies on the Department of Defense (DoDI 4715.16) and Department Navy definitions (SECNAVINST 4000.35B), which is consistent with NHPA and tied to its definition of historic properties (e.g., buildings, archaeological sites, traditional cultural properties, etc.). Worth noting is that some cultural resources important to Native American cultures may be outside the scope of these definitions (see e.g., OEHHA 2022), but inclusion of traditional cultural properties within the scope of NHPA was aimed at closing this gap in perspective (see e.g., King 2012).

Under NHPA, an agency must determine if there are adverse effects to historic properties from its undertakings. A historic property is one that is listed or is eligible for listing in the National Register of Historic Places (NRHP). If a cultural resource is eligible for listing, the agency must manage the resource as a historic property, including resolving adverse effects. If a cultural resource is not eligible, the agency has no further management responsibility. (36 CFR Part 800).

To be eligible for the NRHP, a property must meet one criteria of significance: *(A) Associated with events that have made a significant contribution to the broad patterns of American history; (B) Associated with the lives of persons significant in our past; (C) Embody the distinctive characteristic*

of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic value, or that represent a significant or distinguishable entity whose components may lack individual distinction; or (D) Have yielded, or may likely yield, information important in prehistory or history. Archaeological resource eligibility is typically evaluated based on criterion D. In addition, a historic property must also retain integrity, which is the ability to convey said significance. This is based on seven aspects of integrity: location, design, setting, materials, workmanship, feeling, and association. A resource must retain several, if not all these aspects, to be considered eligible for listing in the NRHP. (36 CFR Parts 60 and 63). An agency may also assume eligibility and manage sites. This approach allows agencies to focus its efforts on management rather than debating eligibility (see e.g., King 2012).

3.4.3 Affected Environment

The affected environment for cultural resources is the area of potential effect (APE) because it is the relevant area for evaluating potential effects to cultural resources and historic properties under NHPA and agency policies – *"[t]he geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist."* (36 CFR §800.16(d)). The APE for the Ongoing Action is the Combat Center (Figure 2). The APE for the Proposed Action is the areas within the Combat Center that would be affected by proposed changes to ongoing actions and specific projects as shown in Figures 7 to 10.

The history of the Combat Center, past cultural resource investigations, and general cultural resource context have been previously described in detail (see e.g., DON 2012 and MCAGCC 2020). The majority of the Combat Center (62%) has been surveyed for cultural resources (Figure 13), including most areas subject to high use for ongoing training and support operations. Archaeological studies begin in the 1930s (Campbell 1931), but no intensive study of the archaeology of the Combat Center begins until the 1970s. Most early Combat Center surveys in the 1970s were not stratified samples, but strategic sampling, focusing on specific areas throughout the Combat Center (Fenenga and Murray 1977). As of 2022, surveys have identified 2,704 archeological sites. Approximately 88% of these sites are prehistoric and may be associated with four different ethnohistoric tribes: Serrano, Chemehuevi, Mojave, and Cahuilla.

The Combat Center contains several different types of cultural resources including both prehistoric and historic archaeological sites. A notable prehistoric pattern is that the major dry lake basins (e.g., Lead Mountain, Lavic, Emerson, and Deadman) were used extensively as habitation and resource procurement areas during Middle to Late Holocene times during the Pinto cultural period (7,500-4,000 years before present [YBP]) and Shoshonean cultural period (700-150 YBP) (Byerly *et al.* 2022). The other notable prehistoric pattern is the exploitation of desert pavement quarries of jasper, chalcedonies and felsite on bajadas and upland areas in the Combat Center (Blacktop, Emerson Lake, Gays Pass, Lavic Lake, Morgan's Well, Noble Pass, Quackenbush and Rainbow Canyon Training Areas). Over 1,050 sites are pavement quarries that may have been exploited for perhaps thousands of years. The Combat Center contains 15 prehistoric rock art sites including Foxtrot Petroglyphs, a very large and complex rock art site that is listed on NRHP.

Historic resources are mining related (over 200 sites), early twentieth century homesteads, historic roads, and historic recreational activities in the southwestern and western areas of the Combat Center. Historic resources date from 1870's to the 1960's. MAGTFTC's 983 archeological sites have been formally evaluated for listing on the NRHP, with 205 determined eligible. Only 17 sites have been determined eligible for the NRHP (concurred by the SHPO). Only one site is currently listed (Foxtrot Petroglyphs, CA-SBR-161). MAGTFTC completed two historic architecture surveys. None of the Cold War-era buildings and structures are eligible for listing in the NRHP. (Gregory and

Thompson 2018 and JRP 1999). There are no traditional cultural properties (TCP's) or sacred sites aboard the Combat Center. Consultations completed for an ethnographic report in 2005 (Baksh and Hilliard 2005) did not document any sacred sites from consultations with regional tribes and recent consultations and research conducted by MAGTFTC have not determined any TCP's or sacred sites exist at the Combat Center.

MAGTFTC consults with 11 federally recognized Native American tribes. Many have commented that military training causes detrimental effects to resources perceived as heritage to these tribes. Since 1979, MAGTFTC has gone to great lengths to preserve some of the most unique and important archaeological resources by establishing Restricted Areas from training activities.

The USMC has trained in this area since 1953. Facilities, infrastructure, and buildings dating from the early Cold War era are present aboard the Combat Center and the installation and its associated land use patterns are historic. MAGTFTC has conducted historic architectural surveys of Mainside, Camp Wilson, and the Sand Hill well field. To date, MAGTFTC has not documented any historic properties relating to the USMC-era in the region or at the Combat Center. The land use pattern and training elements of the USMC may constitute consideration for the NRHP under criteria A and C. No evaluation of the Combat Center has ever been completed on this scale.

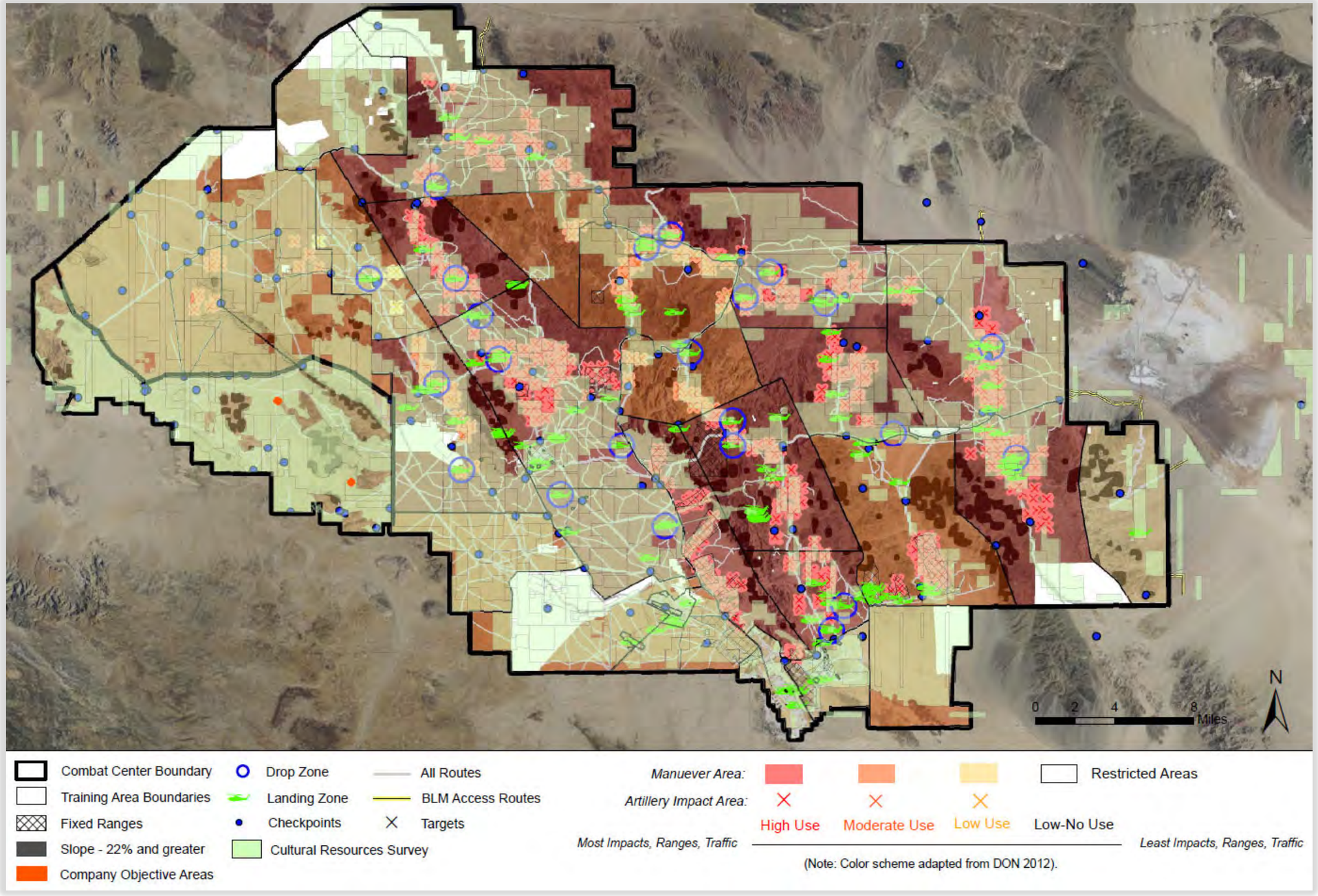
3.4.4 Environmental Consequences

ONGOING ACTION

Overview. Combat Center activities resulting in ground disturbance have been occurring since at least the 1950s. Prior to this, prehistoric and historic activities contributed to a legacy of sparse occupation of the region for the last 12,000 years (e.g., rock art, abandoned mines, WWII aerial targets, etc.). Military training activities have been ongoing for decades and have likely affected the more obvious cultural resources (e.g., mines, rock art). There is a lack of records explaining what existed and what happened in the past by the Marine Corps for training and development.

Cultural resource surveys at the Combat Center began in the 1970s. Inventory is ongoing today and occurs in a phased effort concurrent with the present action. Over 62% of the installation has been surveyed for cultural resources. In support of this effort, MAGTFTC conducts site evaluations of potentially eligible properties. Site evaluations occur in a phased effort concurrent with the present action. MAGTFTC has received 118 concurrences for determinations of eligibility from the SHPO. Site condition assessments have occurred within the last five years.

Generally, Native American cultures were subject to various destructive colonial policies, including Spanish missionization practices and U.S. Federal pacification policies in California. These events have likely affected the remembrance and transmission of cultural and traditional histories relating to areas within and around the Combat Center. Today, the Combat Center actively consults with 11 federally recognized tribes located in the Mojave Desert region. These tribes have not identified any sacred sites or traditional cultural properties. However, there are locations in the Mojave Desert that hold meaningful cultural importance to contemporary tribes such as Spirit Mountain (*Avi Kwa Ame*) north of Laughlin, Nevada and part of a national monument.



Source: Combat Center Geospatial Data (September 23, 2022)

Figure 13 – Cultural Resource Survey Overlay

NEPA documents do not generally help bridge the knowledge gaps due to the lack of comprehensive baseline information and past NHPA practice was often deferred, resolved by the prior programmatic alternatives (PA) that were valid at that time, or focused on known NHPA-eligible sites.

The lack of comprehensive information has likely affected or made difficult NEPA and NHPA effect determinations. Combat Center NEPA documents (Section 1.4.1) have not concluded that a significant effect has occurred due to a past or ongoing actions. In the 2012 EIS, it was determined that there would be significant cumulative effects based on a rationale that, although broad and speculative, could be accurate (e.g., cumulative net loss of cultural resources) (DON 2012).

MAGTFTC has assessed site conditions for adverse effects to historic properties in 2018-2021. To date, over 1,000 sites have received at least one visit or attempt to relocate the resource. A review of available site condition assessment data indicates moderate to severe military training effects to 31.3% of all sites assessed (data from 2018 to 2021) and 21% of all eligible sites (2018 data).

Despite this situation, MAGTFTC has protected some of the most important cultural resources by marking Restricted Areas that limit training within its boundaries (Figure 3). MAGTFTC has designated 39 different Restricted Areas for cultural resources, encompassing 7,975 acres and protecting 393 archaeological sites. While other Restricted Areas were developed for desert tortoise and water resource conservation and protection, they also provide protection for cultural resources.

As explained in Section 1.7, MAGTFTC renewed its efforts to obtain a current PA under NHPA to develop NHPA compliance protocols and develop mitigation to resolve adverse effects to historic properties from past and ongoing training operations.

Based on the site condition assessment data, MAGTFTC is not knowingly affecting known historic properties listed, eligible or assumed eligible for the NRHP. Furthermore, MAGTFTC currently protects known sites that are listed or determined eligible for the NRHPs (e.g., enforcing Restricted Areas boundaries). The stipulations proposed in the draft PA would help manage for effect for training operations and range maintenance.

Military Training. Much of the effects to cultural resources from military training activities (e.g., maneuver, live-fire, sustainment training, and aircraft operations) and range management (e.g., UXO clearance, route maintenance, etc.). is part of the status quo with recent NEPA analyses in 2003, 2012, and 2018 (DON 2003c, DON 2012, DON-USMC 2018a). MAGTFTC either consulted on individual actions under NHPA or determined actions to be within the scope of prior programmatic agreement terms and conditions in effect between 2002 to 2014 (see Section 1.4.3). The mitigation in those agreements were for the development and implementation of an Integrated Cultural Resources Management Plan (ICRMP). Additional information and efforts are discussed below.

Maneuver Training & Military Vehicle Use. Continued use of existing routes presents a low to high potential to affect cultural resources at the Combat Center. Existing historic routes appropriated by the MAGTFTC for training and management operations have a low potential to further affect cultural resources. However, improvements to those routes, either by widening them or by installing water control features can create additional effects if these routes bisect cultural resources. Constructing new routes can have a moderate to high effect to known or unknown cultural resources. Not only does blading a new route through a site destroy the surface or subsurface of a site, but it increases the likelihood that dismounted and mounted access to the area and over the site would occur. Possible damage includes: *effects to archeological sites from off-route travel; bisecting or more truncation to the surface of an archaeological resource; and increased likelihood of direct effects from training, provided by route accesses.* Established route maintenance and improvements have been addressed on a case-by-case basis. For example, Section 106 consultation was completed for re-routing a main route in Emerson in 2021 (to alleviate effects to the Restricted Area) (no adverse effects to historic

properties). Additionally, Section 106 consultation was conducted for all existing routes in 2021. The ACHP responded to the invitation to consult and mentioned that using established routes is not an undertaking requiring Section 106 consultation (ACHP 2022). Often, "new routes" at the Combat Center are re-designations of existing incised, improvised routes that have been used for decades, including some historic routes. New construction is usually focused on improving existing routes or widening into main routes. Potential damage to a cultural resource may occur without any oversight or knowledge by MAGTFTC and as a function of decades of consistent, diffuse, overland vehicular travel. That being stated, current knowledge of cultural resources directly adjacent (within 10 meters) of existing designated routes at the Combat Center is well known. MAGTFTC has inventoried over 85% of all lands with designated routes and recorded 195 archaeological sites or linear resources that intersect these routes. Some of the designated routes are historic dating to the period prior to World War II, and some routes dating from the Cold War are historic elements of the Combat Center and Marine Corps history of the region. MAGTFTC has determined 36 of these resources are eligible for or listed on the NRHP, 70 are not eligible for the NRHP, and 89 remain unevaluated for the NRHP. MAGTFTC continues to protect cultural resources that may exist within the alignment of designated routes. For instance, routes in Restricted Areas are clearly marked and sometimes fenced to prevent off-route access. In addition, new planned route improvements are reviewed internally before execution with avoidance measures incorporated into the actions.

Live-Fire Training. MAGTFTC has conducted several cultural resources studies to support target infrastructure aboard the Combat Center, including: Tank Targets and Obstacles in Emerson Lake in 2001; Target Arrays in Quackenbush and Lavic Lake in 2002; Boresight and Zero Target Array in Cleghorn Pass in 2003; Survey of 12,624 acres for Target Array locations in 2007; Target Elements for the Enhanced Mojave Viper Air Combat Training Event in 2009; Target Location Surveys in Bullion and Lava training areas in 2012; and Three Targets in Delta training area in 2014. Live-fire training can occur in several training areas and in fixed ranges at the Combat Center. Two major effects from live-fire training are: *the establishment and maintenance of fixed or mobile targets; and shrapnel "splash" or cratering from heavy explosive or air dropped munitions.* Currently, MAGTFTC has many targets throughout the Combat Center. These targets range in size from stacked tires to military vehicle "hulks" to large trenches or mobile targets set on a rail system. For the purposes of this section, only the targets outside of fixed ranges would be addressed. Those targets are small, stationary objects such as vehicle hulks or stacked tires. There are 798 of those types of targets dispersed in training areas such as Quackenbush, Noble Pass, and Lavic Lake. For assesing cultural resource impacts, a 15 meter buffer (diameter) is used as the area diretly affected (based on field observations), with up to 133 acres affected across the Combat Center. MAGTFTC has surveyed the majority of these fixed, dispersed targets, resulting in 85.3% of all target acreage surveyed for cultural resources. MAGTFTC has recorded four cultural resources that overlap with fixed targets. MAGTFTC determined two of these resources are eligible for the NRHP, and two are not eligible for the NRHP. Continued use of existing targets presents a low-to-moderate effect to cultural resources. Potential effects from fixed, dispersed targets includes: *damage to resource surface from building/ maintaining a target; and "splash" damage or cratering from heavy explosive ordnance on targets affecting nearby resources.* Similar to roads and overland travel, some of this training may predate current cultural resources laws and rules and have been largely continued under current management practices. New targets undergo review under Section 106 on an as needed basis. For example, Section 106 consultation was completed for an array of different target infrastructure in Bullion, Delta, and Lava Training Areas in 2012, 2014 and 2017. MAGTFTC has, where it can, conducted Section 106 to avoid placing targets on sites. MAGTFTC has little control over use and errant landing of ordnance apart from designating approval of types of munitions in a training area. Those

effects from munitions would be covered under a post-review analysis such as a site condition assessment program.

Sustainment Training. MAGTFTC has surveyed most training support sites (e.g., PRTSSs, FOBs, etc.) at the Combat Center. A total of 1,999 acres have been surveyed,[31] with only two sites discovered within or adjacent to these areas. MAGTFTC determined one site eligible for the NRHP and one site remains undetermined. Due to the nature of training, MAGTFTC cannot observe unplanned sustainment training actions such as units creating obstacle courses or tank ditches. Therefore, post-review analyses of site condition after training actions are critical to understanding the effects of sustainment training to cultural resources. MAGTFTC observed grading, bulldozing, or mass earth movement associated with sustainment training at few sites (less than 5%) during site condition assessments between 2018-2020 (See Table 7). These types of training activities have a moderate to severe effect to cultural resources. Mass excavation, whether tank ditches, survivability positions, or FOBs, can easily affect archaeological sites. Furthermore, some sustainment training facilities such as FOBs or COP's can be addressed prior to training events, but other sustainment activities are germane to the training event and subjective in location and execution. Potential effects from sustainment training include: *disturbance of surface and subsurface of an archaeological site, especially prehistoric resources, from large earth-moving vehicles; can result in near-total or destruction of cultural resources; and create conditions that exacerbate local, natural environments and cause damage from natural elements during flood or erosion events.* In recent years, specific projects in support of sustainment training have been addressed individually on a case-by-case basis. For example, Section 106 consultation was completed for the Forward Ammunition Supply Point upgrade in 2020 (no adverse effect to historic properties).

Table 7 – Site Condition Assessment Data from 2018 – 2020

Military Impacts	2018	2019	2020
Troop Movement	78	16	1
Off-road travel/ tracks	56	30	91
Dirt Road	22	25	3
Vandalism/ Looting	3	9	0
Dumping/ Trash	14	7	58
Grading/ Bulldozer/ Foxholes	5	6	10
Erosion - Human Caused	2	19	0
Shrapnel/ Bomb Crater	N/A	26	100
Sites Monitored	**93**	**84**	**255**

Expeditionary Airfields, Landing Areas, and Landing Zones. MAGTFTC has conducted several cultural resources studies to support development of airfields, landing areas, and landing zones, including: studies for the SELF in 1985, 1993, and 2002 (MCAGCC 1997a, Padon 1985, Pigniolo *et al.* 1993, and Robbins-Wade and Gross 2002). These types of infrastructure have low to moderate effects to cultural resources, with previosuly documented lack of significant effects (USMC 2010a, USMC 2013, and USMC 2014a). Austere, temporary landing areas without any development would not cause effects to cultural resources, but heavier development such as permanent airfields can have serious effects to cultural resources, including severe damage and destruction. Possible damage includes: *crushing/ damage from landing actions; downwash/downdraft, heat scarring/ wind disturbance from turbines; damage/ destruction from infrastructure development; and damage from maintenance activities.* In recent years, specific projects in support of aircraft operations have been

[31] This information is based on previous studies of sustainment training facilities and may not align exactly with current Combat Center geospatial data.

addressed individually on a case-by-case basis. For example, Section 106 consultation was completed for 65 temporary rotary aircraft landing areas in 2017 (no historic properties affected).

Fixed Ranges. Initial development of most fixed ranges preceded NEPA and NHPA practice at the Combat Center (Section 1.4). MAGTFTC has made efforts to close the data gap by completing additional surveys, studies, and Section 106 consultations for planned improvements or projects. Current survey coverage shows that most ranges had some cultural resource inventory (see Appendix E, E-8). To date, there are no eligible or listed properties within fixed ranges. MAGTFTC has recorded 44 archaeological sites within these ranges: 21 sites have been evaluated for the NRHP and 17 sites have been determined not eligible for the NRHP in 2017 (SHPO concurred). For areas not previously surveyed, inventory to identify cultural resources is based on accessibilty to the range for safety from unexploded ordnance. Ultimately, some areas may not be accessible for inventory in the future. Use of fixed ranges have a moderate effect to cultural resources depending on the type of munition and types of training occuring at the range. Ranges that allow use of explosive munitions can produce large ground disturbances. Possible damage to cultural resources could occur from: *driving over sites within fixed ranges; damage from heavy explosive ordnance; and damage from range infrastructure development and maintenance.* In 2021, MAGTFTC initiated a Section 106 consultation to address use, maintenance, and improvements to all existing fixed ranges, seeking to address known eligible and not eligible properties located within fixed ranges. MAGTFTC has not received any comment on the determinations of eligibility from the SHPO.

Range Control Operations. Aside from routine range manangement discussed above (e.g., UXO clearance, etc.), specific projects have been addressed individually on a case-by-case basis. For example, in 2005, 41 aircraft sensors were proposed for installation (not all installed). In the past, MAGTFTC determined that Section 106 was not applicable for installing sensors. That understanding has evolved. In 2022, 6 additional aircraft sensors were proposed for installation. Consistent with current NHPA practice, cultural resources surveys were completed in support of Section 106 consultation (no adverse effects to historic properties). Overall, sensor installation and use are a low effect to cultural resources at the Combat Center. These sensors do not need a graded pad for installation and some are moved by helicopter to high points around the installation. Once installed, these sensors do not have any further potential effect to cultural resources. A possible effect is to the viewshed but because the sensors are relatively small, this is not a major concern.

Desert Tortoise Management. Desert tortoise management strategies are not generally considered undertakings that could affect historic properties. Section 106 consultation was not required to implement the Combat Center's 2017 biological opinion, but Section 106 consultation was completed for specific projects to implement aspects of the conservation program pertaining to desert tortoises, including: installing desert tortoise exclusion fencing in 2016 and expanding TRACRS in 2019 (no adverse effect to historic properties). During consultation for the INRMP, the desert tortoise was identified as a significant animal to the Twenty-Nine Palms Band of Mission Indians. However, per agency policies (Section 3.4.1) and the definition of historic properties, potential effects to animals are not analyzed as cultural resources under NEPA or as historic properties under NHPA.

Invasive Plant Species Management. Invasive plant management projects for tamarisk removal occurred in Deadman Lake north of Camp Wilson in 1997, 1998 and 2006. The Deadman Lake area is very sensitive because of its cultural resources. In the past, MAGTFTC determined that Section 106 was not applicable for invasive plant species management projects.

OHV Race Events. Same as *Biological Resources* for Ongoing Action (Section 3.2.3), but effect avoidance and minimization measures were specific to cultural resource (e.g., avoid new effects to the existing site already bisected by an existing route that could be used).

PROPOSED ACTION

Overview. Same as the Ongoing Action for *Military Training*, but the current NHPA practice for *Support Operations* and *Resource Management* would tend to ensure adverse effects to cultural resources are avoided, to the extent possible, during project planning. The NHPA compliance strategy for the Proposed Action is summarized in Table 8. The draft programmatic agreement (PA) discussed in Section 1.7 would provide NHPA regulatory coverage for the effects from training activities, including some training related aspects of the Proposed Action (e.g., training support sites developed during an exercise), with Marines just required to comply with the standard requirements listed in Section 2.3.2(D). Planned projects in support of training (e.g., permanent training support sites) would largely remain subject to the Section 106 process, with additional avoidance, minimization, or mitigation possible. If the draft PA is approved by the SHPO, MAGTFTC would be able to request funding for implementing the PA mitigation discussed below.

Military Training Activities. Although incremental increases in acreage affected would result, as discussed under *Biological Resources* (Section 3.2), the potential effects to cultural resources would be the same as the Ongoing Action. Both known and unknown cultural resources may be affected from ground disturbing activities, with avoidance and mitigation more feasible for planned projects that ongoing and future training. For the larger proposed construction, supporting information is provided below.

- Permanent Expeditionary Airfields. The proposed locations have been inventoried for cultural resources and would not affect any historic properties. The proposed expeditionary airfield in Bessemer Mine training area may re-use a historic landing strip that dates to the mid-twentieth century. This site, CA-SBR-16092, has been determined not eligible for the NRHP and the SHPO concurred with this determination in 2015.
- Range 500 & 501. Range 500 has been previously assessed for effects and there are no historic properties that could be affected. MAGTFTC has recorded only three archaeological sites; none of these sites are eligible for the NRHP. Based on current inventory information in the immediate vicinity of Range 501, there is a low potential for encountering historic properties, however, additional information is required to inform this assessment. The following requirements are incorporated into the Proposed Action for Range 501:
    - Inventory the proposed range area prior to construction.
    - If new archaeological sites are found, those resources would be treated as if eligible until a determination of eligibility to the NRHP is made by MAGTFTC.
    - Eligible properties would be protected by a buffer or until Section 106 consultation for the undertaking is completed to address possible adverse effects.

Under the draft PA, to resolve adverse effects to cultural resources from training, MAGTFTC proposes a *Phased Identification and Evaluation of Historic Properties*, a *Site Condition Assessment Program, a Site Stabilization Program and an Education and Outreach Program*. Specific activities intended to manage for adverse effects to historic properties includes:

- Continue a phased identification of historic properties including:
    1. Completing 3,500 acres of inventory annually
    2. Evaluate up to 10 historic properties annually
    3. Seek review and concurrence of at least 50 determinations of eligibility annually
- Continue to identify effects to historic properties

1. Establishing a site condition assessment program.
2. Monitor 50 eligible historic properties annually.
3. Site condition assessments would prioritize areas of greatest risk from ongoing training activities

- The site condition assessments inform management decisions to avoid, minimize or mitigate for adverse effect.
    1. Establish a site stabilization program
    2. Stabilization efforts include establishing additional restricted areas, capping sites, moving training infrastructure, closing roads, and/or establishing obstacles/signage.
- Establishing additional education and outreach programming for training units.
    1. Developing products (e.g., video, weatherproof informational cards) for cultural resource awareness with the intent to incorporate regional Native American perspectives and contributions.

These proposals are more substantial than what has been offered in the past and under the Ongoing Action and they would contribute to preservation of historic properties at the Combat Center.

Range Control Operations. Effects are the same as the Ongoing Action. New sensors would have a negligible effect to cultural resources since they have a small footprint and potential effects could be avoided. While viewshed is not a major concern, MAGTFTC would consult under Section 106 and may relocate sensors to less senstive locations, if any location presents a concern to consulting tribes.

Desert Tortoise Management. Effects are the same as the Ongoing Action. Future actions (e.g., fencing) under CM-1, CM-3, CM-7, CM-8, and CM-9 would be addressed under future Section 106 by by MAGTFTC or partners (e.g., RASP actions off-installation).

Invasive Plant Species Management. Negligible to low potential effects. Plant removal would have a negligible effect in developed areas such as Mainside. The built environment has been surveyed and evaluated for eligibility to the NRHP in 1999 and 2018 (no historic properties). Plant removal may have an acute adverse effect to certain historic homestead sites in Sand Hill and West Training Areas. As a means of creating windrows and windbreaks, homesteaders planted tamarisk trees. These tamarisk trees persist today and form part of the historic legacy of the homesteaders. In other areas aboard the Combat Center identified for plant removal, consultation for areas near prehistoric sites may need to occur where wide swath effects or spraying with pesticides. While effects to cultural resources is considered low, contemporary tribes may view widespread removal or use of herbicides as an effect to prehistoric resources. Section 106 consultation would be required to address potential effects to prehistoric sites and historic sites with old-growth tamarisk trees.

OHV Race Events. Same as *Biological Resources* for Proposed Action (Section 3.2.3), but with concerns and assumptions focused on cultural resource (e.g., avoid new effects to cultural resources). Future OHV events that do not conform would require additional NEPA and NHPA analysis.

Table 8 – Summary of Cultural Resource Analysis and NHPA Compliance Strategy

Specific Aspect of Proposed Action	Potential to Adversely Affect Historic Properties?	NHPA Compliance Strategy
Maneuver Training & Military Vehicle Use		
Continued use and maintenance of existing routes	Potential	PA Mitigation
Continued off-route travel (training related)	Yes	
New, planned permanent route improvements	Yes	Section 106 prior to implementation.
Live-Fire Training		
Continued use and maintenance of existing targets	No new effects	PA Mitigation
New, temporary targets (training related)	Potential	
New, permanent target locations	Potential	Section 106 prior to implementation
Sustainment Training		
Continued use of existing support sites	No new effects	PA Mitigation
New, planned permanent support sites	Potential	Section 106 prior to implementation
Expeditionary Airfields, Landing Areas, and Landing Zones		
Continued rotary-wing/tilt-rotor operations and constraint removal	No new effects	PA Mitigation
New, temporary expeditionary airfields (training related)	Potential	
New, permanent expeditionary airfields	Potential	Section 106 prior to implementation
Fixed Ranges		
Continued use and maintenance of existing fixed ranges	Potential	PA Mitigation
Existing Range 500 Modernization	No new effects	Section 106 prior to implementation
Development and use of Range 501	Potential	Section 106 for initial development. PA Mitigation for future training effects.
Range Control Operations		
Continued use and maintenance of existing sensors	No new effects	No Section 106 / no new undertaking
New, permanent sensors	Potential	Section 106 process prior to implementation
Desert Tortoise Management		
Update and implementation of biological opinion	No effects	No Section 106
Implementation of future actions	Potential (undefined future actions)	Federal decision maker authorizing action responsible for Section 106.
Off-site population augmentation	No	
Invasive Species Management		
Application of herbicides in the training areas	Potential	Section 106 prior to implementation
OHV Races		
Use of existing routes	Potential	Section 106 consultation if nonconforming to King of the Hammers limitations.

3.5 ENVIRONMENTAL JUSTICE (NOISE)

3.5.1 Thresholds

The guidance and thresholds listed below are relevant in developing this section and determining whether, based on the totality of the circumstances, there may be significant effects under NEPA.

- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (February 11, 1994).
- Executive Order 14008, Tackling the Climate Crisis at Home and Abroad (January 27, 2021) (re-iterates federal agency obligation to address environmental justice).
- CEQ Environmental Justice Guidance under the National Environmental Policy Act (December 10, 1997) (contains definitions of minority and low-income populations).
- Federal Interagency Working Group on Environmental Justice & NEPA Committee: Promosing Practices for EJ Methodologies in NEPA Reviews (March 2016):
    - General threshold for identifying environmental justice populations is 50% or more.
    - "No Threhold Analysis," or the "Fifty Percent Analysis" coupled with the "Meaningfully Greater Analysis."

3.5.2 Affected Environment

Note: this section was prepared concurrent with USEPA's updates to EJ Screen. Thus, two versions of EJ Screen were used, with slight variation in data reported (possibly due to a different methods of averaging U.S. Census data across larger land areas in the current version).

In San Bernardino County, the main cities and towns located in close proximity to the Combat Center include: Landers, Yucca Valley, Joshua Tree, Twentynine Palms, and Cadiz. Landers is located within the Lucerne Valley Census Designated Place (CDP). Cadiz is not within any larger CDP.

In San Bernardino County (reference population), 76% of the population is minority and 13% is low income. This is higher than the state average (64.8% minority / 12.3% low income).

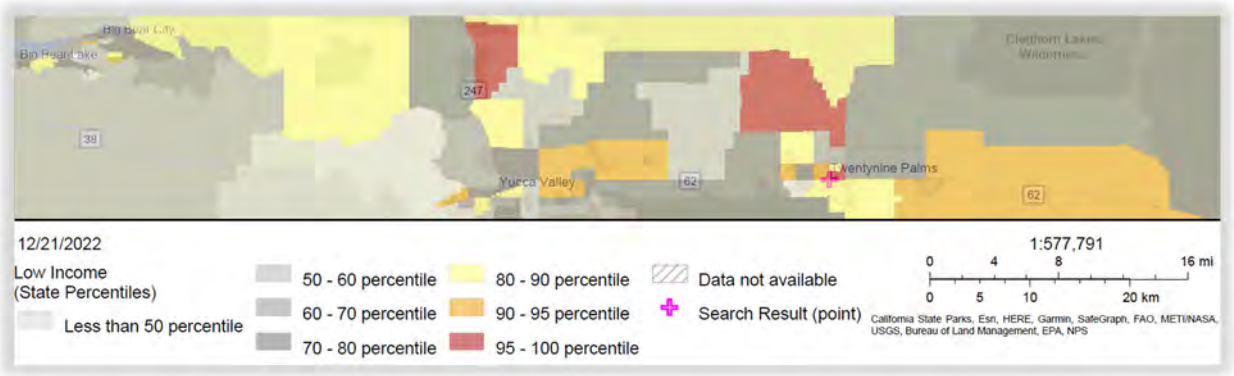
- For the cities and towns listed above, the total population did not exceed the 50 percent threshold for minority or low-income sub-populations, but the low-income populations slightly exceed the reference population by 1.4 to 2.8 times. (US Census 2020).
- Using EPA's EJ Screen Version 2021, the total population did not exceed the 50 percent threshold for minority sub-populations, but low-income sub-populations slightly exceeded 50% and exceed the reference population by 3.7 to 4 times. (USEPA 2022d).

Using USEPA's EJ Screen Version 2.1, pockets of minority and low-income populations exist (exceed the reference population by 4 to 7 times) near the Combat Center and under its airspace:

- Cadiz has a low-income population of 71% (averaged across larger area / no pocket)
- Landers has a low-income population of 54% (averaged across larger area / no pocket)
- An area in Lake Havasu has minority and low-income populations of 69% and 85%
- An area in Twentynine Palms has minority and low-income populations of 73% and 91%
- An area in Yucca Valley has minority and low-income populations of 58% and 57%

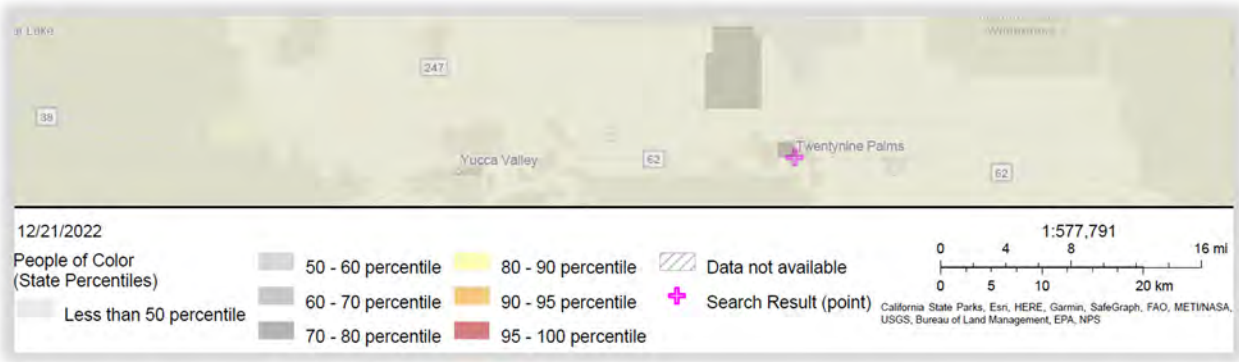
(USEPA 2022e). For supporting details, see Appendix E (E-9). MAGTFTC views the U.S. Census data as authoritative (no environmental justice populations per the 50% threshold and slight exceedances compared to the reference population), but due to the subjectivity in determining what is a "meaningfully greater" exceedance and the different data generated by the two versions of EJ

Screen, including the identification of pockets of environmental justice populations (Figure 14 and Figure 15), further analysis is provided in this SEA. The pocket populations that may exist in the Lake Havasu area would be addressed in a separate NEPA process for airspace (see Chapter 4).



Source: USEPA 2022e

Figure 14 – Pockets of Low Income Communities (South of Combat Center)



Source: USEPA 2022e

Figure 15 – Pockets of Minority Communities (South of the Combat Center)

3.5.3 Environmental Consequences

ONGOING ACTION

Past Combat Center NEPA documents (Section 1.4.1) have not identified any disproportionate environmental justice effect resulting from past or ongoing military training, support operations, or resource management actions at the Combat Center. Rather, there may be beneficial effects to the local communities, including low-income populations (main environmental justice population of concern), from the revenue streams generated by the operation of the Combat Center (DON 2012).

In the most recent analysis of military training activities (DON 2012), noise levels from aircraft operations and live-fire training above 65 dB Community Noise Equivalent Level (CNEL)[32] are contained within the installation (see Figures 16 and 17). Based on the updated environmental justice information (Section 3.5.2), no environmental justice populations would be affected, or

[32] For military installations in California, the CNEL noise metric is used instead of the standard A-weighted (frequencies humans can hear) day-night average sound level (DNL) to evaluate long-term noise exposure. Both metrics includes a 10-dB penalty for activities occurring between 10 p.m. and 7 a.m., but only CNEL includes an additional 5-dB penalty for activities occurring between 7 p.m. and 10 p.m. (DoD 2018).

disproportionately affected because noise levels up to 65 dB are considered compatible with residential land use (see e.g., FICON 1992, FAA 2021, City of Twentynine Palms Municipal Code Chapter 19.8, Noise Standards, and Town of Yucca Valley Code of Ordinances, Chapter 9.34 Performance Standards, Section 9.34.080, Noise).

Despite this, MAGTFTC determined that the public could be disturbed by noise levels ranging from 115 to 130 peak dB (see Figure 18). Peak noise considers the highest instantaneous sound of an event and the characteristics of impulse noise, with noise noticeable between 115 to 130 peak dB and very loud above 130 peak dB (DoD 2018). However, the public and pockets of environmental justice populations occurring within the 115-30 peak dB contour would be affected to the same degree. Since the 2012 EIS analysis was prepared (DON 2012), additional people have likely moved into the area surrounding the Combat Center, potentially increasing noise exposure to people recreating or living in the noise complaint zones (Figure 18), but available data indicates noise levels may not be a major issue. MAGTFTC has received an average of 13 noise complaints per year since 2012. This is not particularly high considering unit level exercises and training occurs year-round.

In addition to locating military training with high noise effects within the central areas of the Combat Center (Figures 16 and 17), other factors may minimize actual noise exposure and disturbance. For instance, the area along the Combat Center boundary is not zoned for high density residential use in the San Bernardino General Plan (see Section 3.7). MAGTFTC imposes a no-live fire buffer (1,000 meter / 3,280 feet / 0.6-mile wide) along the installation boundary (see Figure 3). And large portions of the areas surrounding the Combat Center are undeveloped.

Based on the foregoing information, continuation of the Ongoing Action would not result in environmental justice effects because the average noise levels outside the installation boundaries do not exceed 65 dB CNEL, all people residing or recreating within the noise disturbance area would be affected to a similar extent, and the mitigating properties of existing training and land use limitations may help minimize actual noise effects. Therefore, the Ongoing Action complies with Executive Orders 12898 and 14008 and no further analysis or evaulation of mitigation is required at this time.

PROPOSED ACTION

Same as Ongoing Action. However, due to the ongoing incremental changes in training activities (Section 1.3.1) and changes to the operating environment that could result under the Proposed Action (e.g., new expeditionary airfields, new targets, etc.), MAGTFTC should conduct a comprehensive noise analysis to ensure continued compliance with NEPA and other relevant laws and policies intended to minimize noise to acceptable levels. This requirement is incorporated in Section 2.3.3.

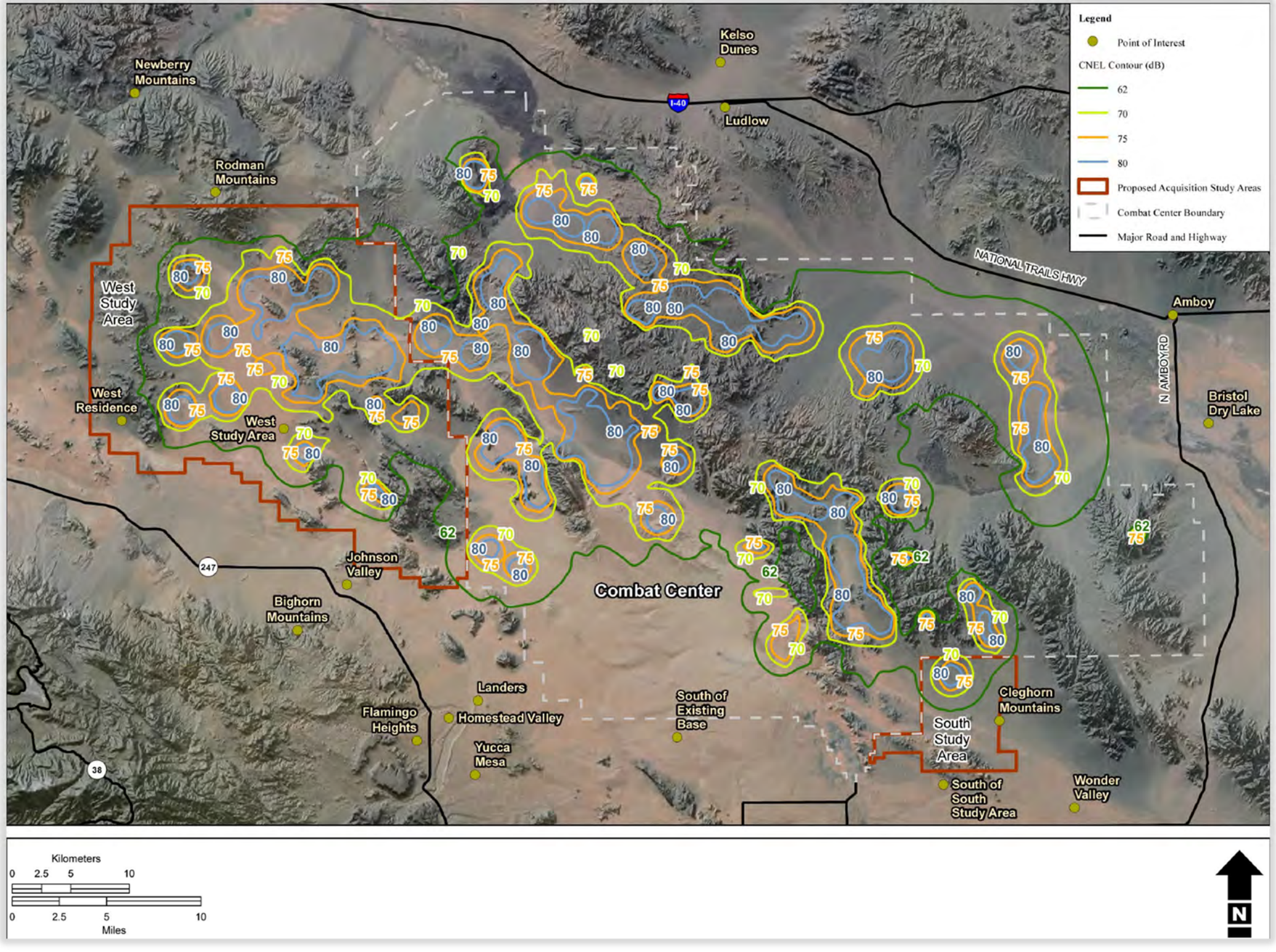
3.6 HUMAN HEALTH AND SAFETY (HERBICIDES)

3.6.1 Thresholds

Human health and safety related requirements applicable to the Marine Corps are discussed in MCO 5100.8 (Occupational Health and Safety).[33] The guidance and thresholds listed below are relevant in developing this section and determining whether, based on the totality of the circumstances, there may be significant effects under NEPA.

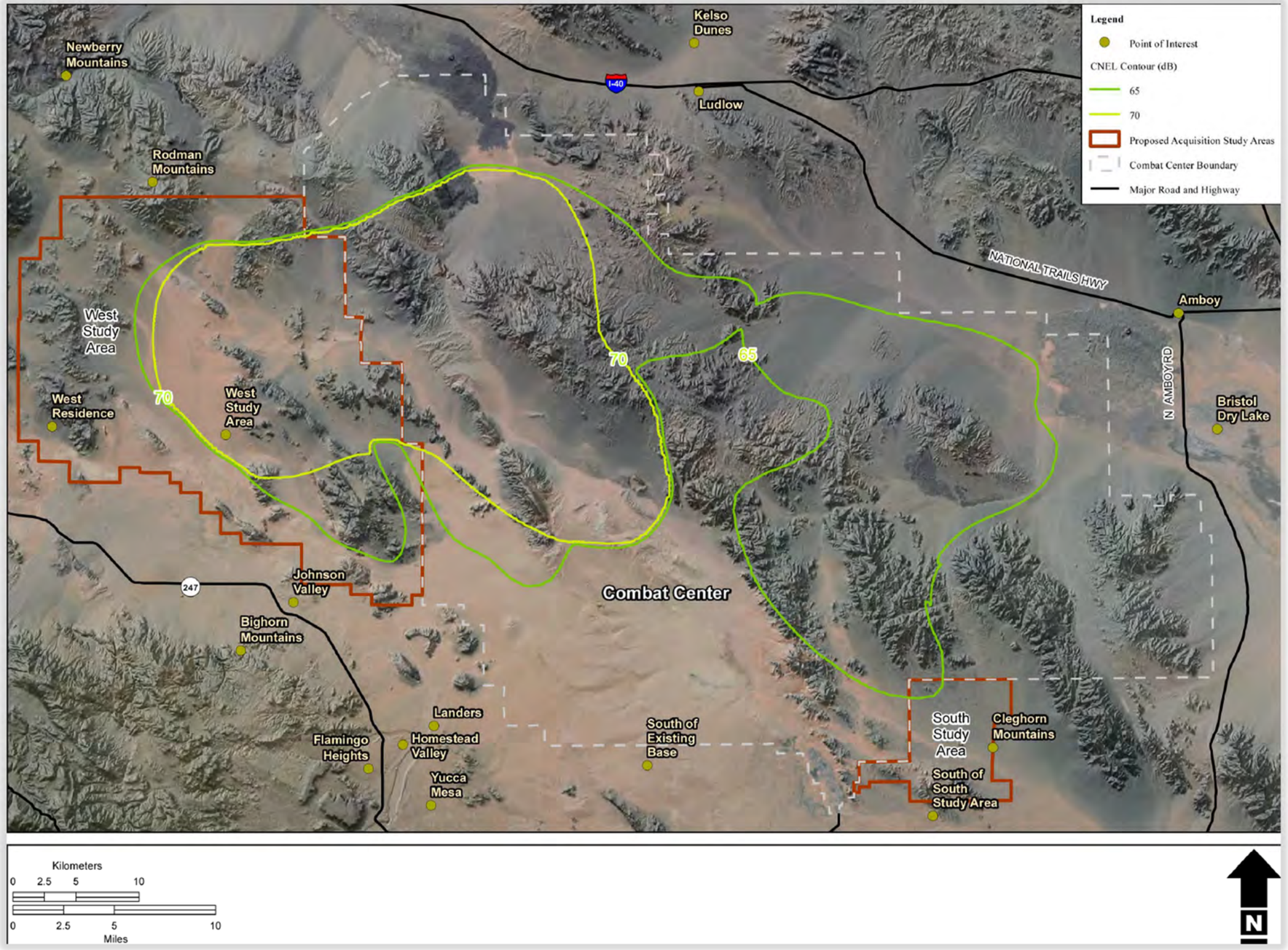
- California and/or USEPA classification of herbicides as causing cancer or reproductive harm.
- Risk Assessment hazard quotients (HQ) at 1 or greater indicates that the herbicide exceeds a level of concern for species, vegetation, or human health. HQ depends on applicate rate, method of application, exposure pathway and/or rate of biodegradation.

[33] Available at: https://www.marines.mil/portals/1/Publications/MCO%205100.8.pdf?ver=2012-10-11-163640-943.



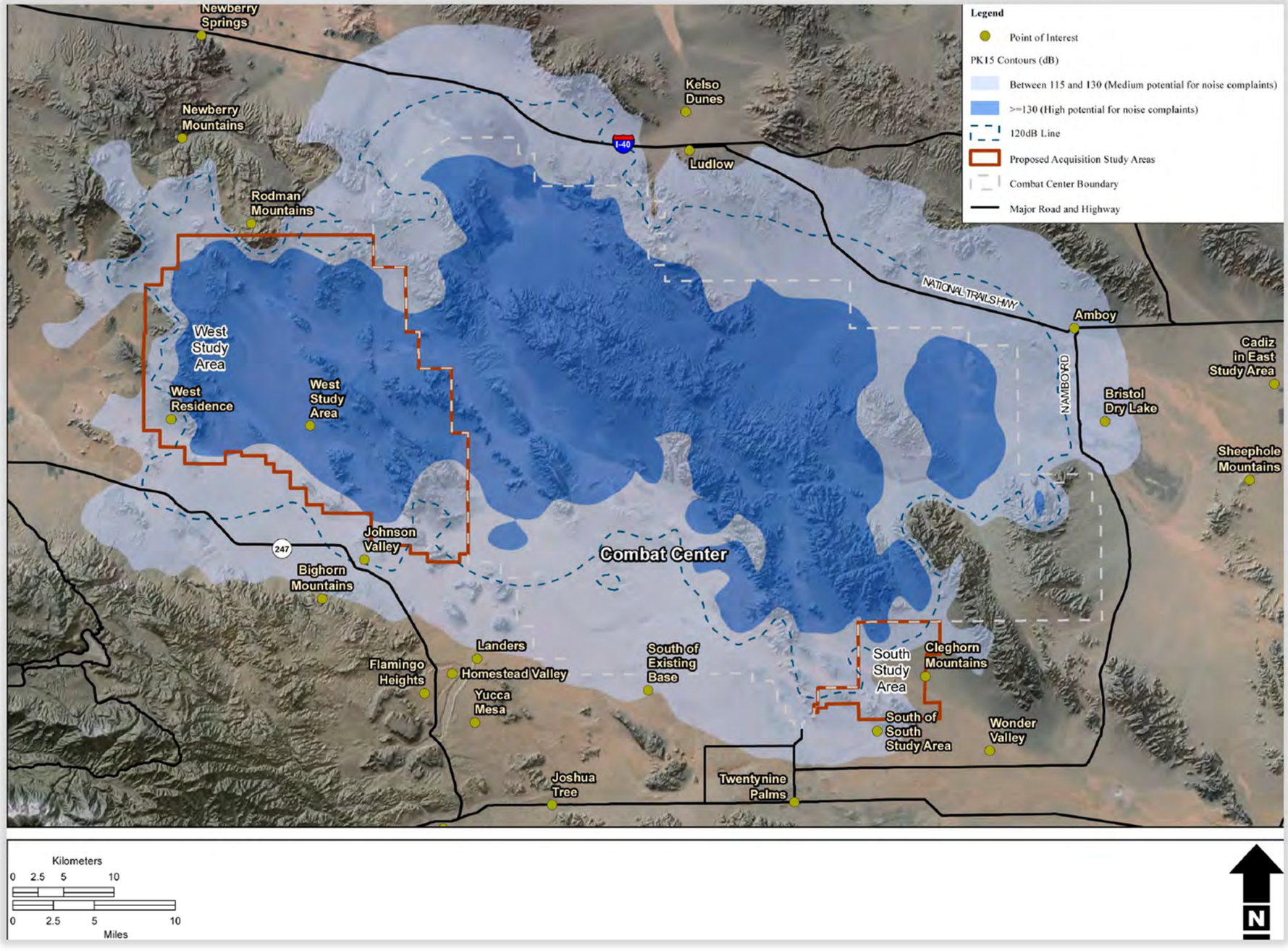
Source: DON 2012.

Figure 16 – Noise from Live-Fire Training (Ordnance)



Source: DON 2012.

Figure 17 – Noise from Airspace Operations



Source: DON 2012.

Figure 18 – Potential for Noise Complaints from Live-Fire Training (Ordnance)

3.6.2 Affected Environment

The relevant affected environment is the Combat Center, with the initial focus areas of herbicide use shown on Figure 10. Additional areas would be treated within the Combat Center in the future.

3.6.3 Environmental Consequences

The risk assessments prepared for the U.S. Department of Agriculture were used to develop the section. They evaluate effects on the environment based on typical application rates (listed below) of commonly used herbicide formulations and integrate data from published scientific literature and data submitted to USEPA in support of FIFRA product registration. (SERA 2011a, SERA 2011b, SERA 2011c, and SERA 2014).

- HQs for *glyphosate, imazapyr and triclopyr* are based on a unit application rate of 1 lb a.e./acre, but higher rates are discussed in the risk assessments.
- HQs for *Fluazifop-P-butyl* are based on a single application rate of 0.375 lb active ingredient (a.i.) per acre (equals 0.32 lb a.e./acre). The maximum seasonal application rate is 1.125 lb a.i./acre (0.96075 lb 27 a.e./acre) as three single applications of 0.375 lb a.i./acre with a minimum application interval of 14 days.

The information below is focused on the terrestrial environment, site workers, and notable limitations or hazardous properties. Information on accidental spill and aquatic scenarios and public exposure is excluded because the public would not be affected (no public access, far distance to boundary and lack connected water bodies) (see Figure 11) and the proposed action would not be implemented in or near standing water or when rain is in the forecast (minimizing risk of transport) (Section 2.3.3).

ONGOING ACTION

The Ongoing Action would not result in any increased or new environmental or human health and safety effects. Pest management occurs as a routine matter at the Combat Center per the Pest Management Plan and is currently limited to the built environment and landscaped areas.

MAGTFTC has a certified pest applicator on staff that conducts the treatments, ensuring compliance with applicable laws, policies, and label instructions, and to ensure exposure is minimized. For example, when spraying an office for ants, this work is normally conducted on the weekend when the offices are vacant. Most pest management actions deal with common pests (e.g., rodents and cockroaches) and using common over the counter pesticides. Pesticide use in landscaped areas (e.g., housing greens and golf course) is limited. In the 2000s, a total of 494 gallons of glyphosate, 3 gallons of imazapyr, and 0.4 gallons of triclopry have been applied to a collective 785 acres of landscaped area in the built environment (NOPRS 2022).

The residue from these past treatments have long-since dissipated based on the biodegradation rates of the active ingredients, glyphosate, imazapyr, and triclopry (see Appendix E, E-2).

Overall, potential environmental and human health and safety effects are minimized by limiting treatments to the built environmental landscaped areas and MAGTFTC employing a certified pesticide applicator to respond to pest management requests throughout the Combat Center.

PROPOSED ACTION

Overview. The proposed action would introduce herbicides into the environment to address existing and future non-native invasive plant infestations. Chemical treatment has environmental trade-offs. While controlling and eradicating non-native invasive plant species may reduce some environmental issues (e.g., minimize displacement of endangered species and reduce fuel loading by invasive grasses), it would result in new issues from introducing chemicals with adverse consequences into the environment. Chemical treatment may also be as a losing battle if treatments are not consistent.

Due to the nature of military training at the Combat Center (e.g., on-route and off-route vehicle use throughout the training areas), MAGTFTC needs to implement some chemical control in order to minimize the spread of existing infestations per Executive Orders 13122, *Invasive Species*, and 13751, *Safeguarding the Nation from the Effects of Invasive Species*, and the Sikes Act. Although prevention is generally known to be the most effective and least costly aspect of invasive species management strategy, in the long-term, it is difficult to implement at the Combat Center due to the native of military training and the need to balance competing resource use. In specific, MAGTFTC is not able to ensure that all units wash vehicles as they enter and exit the installation or move between training areas. There are a limited number of wash racks and time between training activities for Marines to be able to continually wash vehicles. This would also not be a wise use of limited water resources, which MAGTFTC relies on to provide drinking water to persons living and working at the Combat Center. Finally, natural forces contribute to the spread of invasive species (e.g., wind) and may negate MAGTFTC efforts. To ensure future chemical treatments are effective, MAGTFTC would initially focus on treating important areas throughout the Combat Center, like Restricted Areas and desert washes or other depressions that contain or support riparian vegetation (when water is present).

Each active ingredient that may be contained in the proposed herbicide formulations have a different degree of risk to human health depending on its properties, application method, application rate, and application location. However, glyphosate would be the active ingredient primarily used to treat infestations. Summaries of notable, potential human health effects are provided below.

Glyphosate:

- Toxicity varies with the formulation used and the type of surfactant use.
- Human health risk if ingested (HQ=1).
- In California, glyphosate is a carcinogen (no major risk at exposure of 100 micrograms/day).

Imazapyr:

- Minimal risk to site workers (HQs<1 for typical application rates, mildly irritating to eyes, but risk increases if gloves worn for more than 1 hour).
- Toxicity data limited to the Arsenal® formulation.

Fluazifop-P-butyl:

- Human health risk if ingested (HQ=1 / HQ>1).
- Very high / hazardous HQs for site workers using a backpack sprayer.
- Potential inhalation hazard (can volatize in heat).
- The State of California classified as causing developmental/reproductive toxicity in humans.
- Limited data in support of risk assessment overall.

Triclopyr:

- Hazardous to women that eat contaminated vegetation (HQ=27 at 1 lb a.e./acre) and high risk to women site workers (HQ>1 wearing contaminated gloves for 2 ½ hours).
- Potential inhalation hazard (can volatize in heat).

For more information, see Appendix E (E-2 to E-7). Overall, there would be an increased risk of exposure to site workers applying the herbicides and Marines that may enter the training areas shortly after treatment (e.g., herbicide residue as most active ingredients have lengthy biodegradation rates). Standard avoidance and minimizations measures (Section 2.3.3) and those under *Biological Resources* (Section 3.2.3) would reduce most exposure risk, but notable issues remain:

- MAGTFTC is proposing use of glyphosate formulations with high toxicity, although none of the formulations are state or federally restricted (DPR 2021 and USEPA2022g).
- All site workers could be adversely affected from exposure to fluazifop-P-butyl.
- Triclopyr could adversely affect women site workers more than male site workers.
- Marines could be exposed to herbicide residue in the training areas.

Based on the above, the following additional requirements are incorporated into the Proposed Action:

- MAGTFTC would consult with the MAGTFTC's Base Safety Office and Industrial Hygienist to ensure appropriate worker protection measures are in place for use of formulations containing fluazifop-P-butyl and triclopyr.
- Vegetation would not be sprayed close in time to when Marines would enter those areas.

Therefore, the Proposed Action would ensure MAGTFTC strikes the right balance of complying with its invasive species management responsibilities in a way that does not result in high exposure risk.

3.7 OTHER RESOURCES & ISSUES CONSIDERED

The resources discussed in Table 9 were not carried forward for detailed analysis because the resources were not relevant for this SEA (Section 1.8), potential effects were negated by measures incorporated into the Ongoing Action and Proposed Action (Section 2.3), and/or the potential effects being non-existent, negligible, or not capable of meaningful analysis.

Table 9 – Other Resources & Issues Considered

Resource / Issue	Rationale
Farmland	The Ongoing Action or Proposed Action would not affect prime or unique farmlands at or near the Combat Center because none are present (CDC 2023).
Geology and Soils	The Ongoing Action or Proposed Action would result in effects to soils and geology due to the nature of military training. Although MAGTFTC does not have management direction pertaining to soils and geology, relevant information is integrated into *Biological Resources* (Section 3.2).
Grazing	The Ongoing Action or Proposed Action would not affect grazing or grazing rights and grazing does not occur at the Combat Center. MAGTFTC works with Preservation Ranch to implement desert tortoise monitoring (per the Combat Center's biological opinion) on an active grazing allotment on BLM-managed land (USFWS 2017), but there is no interference with grazing.
Groundwater	The Ongoing Action or Proposed Action would not result in any changes to groundwater use and avoidance measures incorporated in the Proposed Action (e.g., avoid herbicides from entering soil or standing water, avoid oversaturation, etc.) would avoid direct and indirect effects to groundwater. No known adverse effects are associated with the soil binders that are proposed for use (see Appendix D) and reapplication is typically required as it biodegrades overtime. Relevant information pertaining to groundwater effects from use overtime is included in *Cumulative Effects* (Chapter 4).
Hazardous Materials, Waste Management, and Pollution Prevention	Under the Ongoing Action and the Proposed Action, MAGTFTC would continue to comply with relevant laws, reduce and manage waste, and prevent off-site contamination. Based on the summaries provided in Section 1.7, there are no effects from ongoing management that require further analysis in this SEA.

Resource / Issue	Rationale
Land Use	The main plans and projects that guide land use in the region and integrate conservation, include – the San Bernardino County General Plan and local elements; BLM's California Desert Conservation Area Plan, West Mojave Plan, West Mojave Route Network Project, and Desert Renewable Energy Conservation Plan (BLM 1980, BLM 2004, BLM 2018, BLM 2019). Per the county general plan, the desert area is generally zoned for rural living with larger lot sizes that prevent high density of residents (SBC 2014), including areas along the installation boundary (see e.g., Twentynine Palms 2022a). The Ongoing Action or Proposed Action would not result in any incompatible use per relevant noise ordinances (see Section 3.5). MAGTFTC actively coordinates with and implements an encroachment program to prevent incompatible development (e.g., land acquisition, BLM's Mojave Trails National Monument Plan, etc.). See also *Visual Resources* and Chapter 4. Future actions occurring in the desert tortoise translocation sites and RASP focal areas (Figure 1) would not result in land use change.
Mining	The Ongoing Action or Proposed Action would not affect mining rights that may be present at the Combat Center despite the land withdrawal (77 Fed. Reg. 58864 to 58867) (September 24, 2012) and 2014 NDAA §2946).
Plants	At the Combat Center plant density and diversity increase in higher elevations and within desert wash systems, with 39 special-status plant species detected during past surveys, although none are listed under the ESA (MCAGCC 2019). While no specific management direction exists for the protection for plants at the Combat Center, MAGTFTC attempts to minimize effects (if possible, considering the pervasiveness of training activities) when unique plant population are observed (e.g., crucifixion thorn) (DON 2012). MAGTFTC is currently evaluating new survey data. Any new species discovered, or management direction that could be developed would be part of the next INRMP update (underway). However, like the desert tortoise, plants located within Restricted Areas would be protected from the most impactful type of training and invasive species management would benefit native vegetation and plants over invasive plant species.
Public Recreation	Under the Ongoing Action and Proposed Action, MAGTFTC would continue to allow limited access for organized OHV race events (Sections 1.5.3 and 2.2.9). This OHV-specific accommodation was mitigation for the expansion of the Combat Center that resulted in the reduction of the Johnson Valley OHV area (DON 2012 and DON 2013).
Visual Resources	The Ongoing Action and Proposed Action would not result in visual effects to important resources beyond what was disclosed and analyzed in the 2012 EIS. Per MDAQMD Rule 403, fugitive dust minimization occurs under the Ongoing Action and Proposed Action. MAGTFTC prepared an evaluation of night sky brightness (Dark Sky Partners LLC 2017) and takes steps to ensure Combat Center operations do not adversely affect important aspects of visual quality that may be important to resources outside the installation. For example, in a recent planning process, MAGTFTC decided not to install a communication tower with lighting at a peak in the Lead Mountain Training Area because potential effects of light to Amboy Crater, located in the Mojave Trails National Monument, although Presidential Proclamation 9395 allows this use. This would allow BLM to develop its monument plan and determine the level of visual quality standards

Resource / Issue	Rationale
	needed to manage the monument without having to deal with a development at the Combat Center that could have directly or indirectly affected visual quality.
Water Resources	The Ongoing Action or Proposed Action would not affect water resources due to the limited permanent water resources at the Combat Center (MCAGCC 2019), lack of navigable waters (Waters of the U.S.) (USACE 2018), and avoidance measures incorporated in Section 2.3.3 (e.g., no herbicide application in standing water). No known adverse effects are associated with the soil binders that are proposed for use (see Appendix D) and reapplication is typically required as it biodegrades overtime. Combat Center playas, dry washes, and seeps and springs were previously identified as navigable waters (Waters of the U.S.) (USACE 1994), but these areas are no longer regulated under the CWA per a recent USACE jurisdictional determination (USACE 2018). Despite the lack of permanent or regulated water bodies, all desert washes occurring throughout the Combat Center may function as a floodplain during flood events (see Figure 11). MATFTC does not proposed any construction or development within desert washes or floodplains that would warrant further analysis per Executive Order 13690 (Floodplain Management) or Executive Order 11990 (Protection of Wetlands). In addition, measures incorporated into proposed actions (e.g., stormwater management) and the ongoing monitoring of off-site transport of munition constituents under the REVA Program (see Section 1.7) ensure that navigable waters and state waters that may occur downstream of the Combat Center are not adversely affected. Based on current data (Section 1.7), there is no off-site migration of munitions constituents from the Combat Center's training areas.
Wildlife	At the Combat Center, 5 amphibian species, 6 invertebrate species, more than 40 reptile species, more than 215 species of birds, 60 mammal species (bighorn sheep introduced) have been detected. The desert tortoise is the only ESA-listed species. Migratory birds that may occur at the Combat Center are not resident species and golden eagles have been observed typically near steep ridges (DON-USMC 2018a, MCAGCC 2019 and MAGTFTC 2022a). The tortoise may have the potential to be affected by training to a greater degree than most other species (resident and slow-moving). However, MAGTFTC is currently evaluating new survey data. Any new species discovered, or management direction that could be developed would be part of the next INRMP update (underway). Like the tortoise, species occurring in Restricted Areas would be protected from the most impactful types of training and invasive species management would benefit native vegetation and plants important to other species.

CHAPTER 4 – CUMULATIVE EFFECTS

The scope of the main SEA analysis was focused on relevant resources as explained in Section 1.8. This cumulative effect analysis is similarly focused and includes relevant past, present, and/or reasonably foreseeable future actions (RFFAs) that in combination with the Ongoing Action and Proposed Action could result in potential significant effects to the relevant resources.

4.1 CUMULATIVE EFFECT PROJECTS

Based on available information, the relevant federal and non-federal projects considered in the cumulative effect analysis are listed in Table 10. These projects were selected based on proximity to

the Combat Center, potential effects to relevant resources evaluated in this SEA, and ongoing actions at the Combat Center. MAGTFTC aimed to properly classify the status of the projects. Multiple designations are included for projects that appear ongoing, recurring, not fully implemented, and/or if environmental review is underway. For supporting details, see Appendix E (E-11).

Table 10 – Summary of Cumulative Effect Projects

Project #	Relevant Projects	Status
Projects in the Vicinity of Combat Center		
Project 1	Southern California Edison (SCE) Abengoa Mojave Solar Power Plant	Past
Project 2	Soda Mountain Solar Project	Past
Project 3	2022 Rebelle Rally	Past / RFFA
Project 4	Army Military Training & Public Land Withdrawal Extension	Past / Present / RFFA
Project 5	CalTrans District 8 Road Projects	Present
Project 6	Cadiz Oil & Gas Pipeline to Transport Water Project	Present / RFFA
Project 7	SCE Lugo-Victorville/Eldorado Lugo 500kV Remedial Action Scheme	Present / RFFA
Project 8	SCE Eldorado Lugo Mohave Pesticide Use Permit	Present / RFFA
Project 9	Twentynine Palms Downtown Specific Plan	Present / RFFA
Project 10	Twentynine Palms Wastewater Reclamation Project Phase 1	RFFA
Project 11	SCE Ivanpah Control Transmission Line Project	RFFA
Project 12	Cady Solar Energy Project	RFFA
Projects Including the Combat Center		
Project 13	King of the Hammers OHV Race Event (2023 to 2027)	Past / RFFA
Project 14	AT&T Desert Winds Wireless Tower	Present / RFFA
Project 15	USMC Off-Installation Transit and Corridor	RFFA
MAGTFTC Proposed Actions		
Project 16	Combat Center Land Expansion and Airspace Establishment	Past / Present
Project 17	Combat Center Desert Tortoise Translocation	Past / Present
Project 18	Ongoing Training Activities	Past / Present
Project 19	Common Raven Management	Past / Present
Project 20	Notable Combat Center Projects –Existing Electrical Pole Repair & Wastewater Treatment Plant Upgrades	Present / RFFA
Project 21	Permanent Special Use Airspace	Present / RFFA
Project 22	Combat Center Master Plan	RFFA
Project 23	BLM Right of Way Access	Past / Present / RFFA

4.2 CUMULATIVE EFFECT ANALYSIS

Potential cumulative effects of the Ongoing Action and Proposed Action, in combination with other projects (Table 11), would not result in significant effects as discussed in Sections 4.2.1 to 4.2.5.

Table 11 – Summary of Cumulative Effects

Resource	Ongoing Action	Proposed Action	Cumulative Effects
Air Quality	Adverse	Adverse	Not contributing to significant effect in region or state. Project-specific mitigation and MAGTFTC/agency efforts to reduce GHG emissions would result in reductions to some criteria air pollutant emissions.

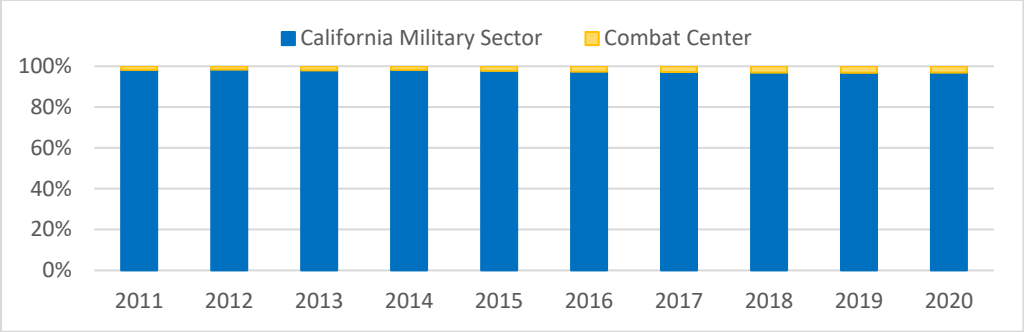
Resource	Ongoing Action	Proposed Action	Cumulative Effects
Biological Resources (Desert Tortoise)	Adverse & Beneficial	Adverse & Beneficial	Not contributing to a significant effect on desert tortoise, considering project-specific mitigation and mitigation occurring across the species range under the RASP Initiative
Climate Change	Adverse & Beneficial	Adverse & Beneficial	Not contributing to significant effect in region or state. Project-specific mitigation and MAGTFTC/agency efforts to reduce GHG emissions would contribute to reductions at regional/state levels.
Cultural Resources	Adverse & Beneficial	Adverse & Beneficial	Not contributing to a significant effect on cultural resources, considering project-specific mitigation and MAGTFTC increased mitigation proposed under the Draft PA.
Environmental Justice	No disproportionate effect	No disproportionate effect	Not contributing to a significant effect considering lack of project effects.
Health & Safety	Adverse	Adverse	Not contributing to a significant effect in region considering project-specific mitigation and overall low use of herbicides and pesticides in the region.

4.2.1 Air Quality & Climate Change

Combat Center air pollutant emissions under the Ongoing Action and Proposed Action occur against a backdrop of high regional ozone and PM_{10} emissions (Section 3.1). While the data in Section 3.1.2 shows moderate ambient air quality in San Bernardino County, air quality in the region has generally improved since the 1980s (USEPA 2020b). Past (2002), present (2022), and projected emissions (2042) for the Mojave Desert Air Basin show no major increase from current levels (CARB 2023).

In combination with the Ongoing Action and Proposed Action, Projects 1 to 23 would not result in substantial adverse effects to air quality or adverse contribution to climate change. This is because – most projects either have (or are expected to have) a *de minimis* impact determination (Projects 1, 3, 7, 10, 13, 14, 17, 18, 19, 20 and 23) or have ensured compliance with the SIP via mitigation or amending the SIP (Projects 2, 4, and 16); the effects of past actions (Projects 1 – 4, 13, and 16-19) are already captured in existing air quality data; and some projects would help offset existing and future regional and state GHG emissions (Projects 1, 2 and 9). Any changes to aircraft operations under Project 21 would be supported by a conformity determination to ensure CAA compliance.

While project-related efforts to reduce GHGs are beneficial, reductions by higher emitting sectors would make a noticeable difference at the state, national, and global level. The U.S. is a top GHG emitter, generating 5,222 MMT CO_2e in 2020 (7.3% decline since 1990). As of 2020, reported military mobile sources emitted 5.2 MMT CO_2e (0.01% U.S. emissions), with a 70% reduction in military aircraft emissions since 1990. In 2020, California GHG emissions totaled 369.2 MMT CO_2e, (7% total U.S. emissions) and of which 2.19 MMT CO_2e was from military activities (0.6% total state emissions). Combat Center emissions represent a small fraction (3.3%) of California military emissions (Diagram 13). The top three GHG sources in California are transportation (on-road vehicles), electricity generation, and industrial activities, with on-road use of passenger vehicles accounting for 40% of emissions. (CARB 2022b, CARB 2022c, OEHHA 2022a, USEPA 2022c and USEPA 2022f).



Source: CARB 2022b, USEPA 2022b, URS 2012 to URS 2015, CDM-AECOM 2016, CDM-AECOM 2017; MMECG 2018; Multi-MAC JV 2019 to Multi-MAC JV 2022.

Diagram 13 – Comparison of California Military GHG Emissions (CO_2e)

4.2.2 Biological Resources (Desert Tortoise)

The desert tortoise remains on a downward population trajectory in the Mojave Desert, with the potential to be listed as state endangered if effort is made in the region to halt its decline (about 50% declines per decade, or 7% per year) and reverse this trend (Allison & McLuckie 2018, USFWS 2022c, and CFGC 2023). The issues facing the tortoise today are not new (e.g., energy development, OHV, military, groundwater use, urban growth, etc.) (CDFW 2015 and USFWS 2011). Most projects listed in Table 10 involve relevant uses directly (Projects 1-4, 6-16, 18, 20, and 23) or indirectly (e.g., Projects 9, 10 and 22 facilitate urban growth).

The USFWS has confirmed that solar projects (e.g., Projects 1, 2 and 12) are a threat to desert tortoise and their habitat, with 74,491 acres known to have been affected from 2010 to 2021, and with a lower acreage affected in the Western Mojave Recovery Unit (2,773 acres; includes Project 2) (USFWS 2022c). While the climate change benefits of these projects are important, balance is needed at the ecosystem, community, and species level. For example, Project 2 would result in a reduction of 280,470 metric tons of CO2e per year but affect 4,179 acres (BLM 2015). Because solar panels can exist in other locations (e.g., top of parking structure, etc.) and there are other methods to reduce GHG emissions (e.g., electric vehicles), alternatives to the unconstrained development and loss of tortoise habitat in the Mojave Desert should be considered (see e.g., Vandergast et al., 2013).

The desert tortoise translocation (Project 17) was mitigation for effects to the tortoise from land expansion and increased training at the Combat Center (Project 16). To date, the Marine Corps has spent nearly $60 million on the translocation effort, with multiple commitments to ongoing research that would inform how future translocations are managed on BLM land. The translocation commitment extends for another 24 years, at an estimated $20 million more in cost. Project 12 would conflict with Project 16, Project 17, and this SEA because some solar panels would overlap a translocation site (Rodman-Sunshine Peak North Recipient Site). MAGTFTC and BLM are discussing alternatives with the applicant. MAGTFTC does not intend to develop new mitigation or incur increased costs to support a conflicting land use.

Groundwater usage adversely affects species and habitat in the Mojave Desert and this resource may become more depleted with projected increases in users and temperature due to climate change (see e.g., Hopkins 2018, Parker *et al.*, 2020, and OEHHA 2022a). Projects 1, 2, 6, and 12 may require use of groundwater for construction, operations and/or maintenance. The potential effects of Project 6 on groundwater are not readily available. While this project has been delayed, it may still move forward after the appropriate environmental review is completed (CDB 2022 and Cadiz Inc. 2023).

MAGTFTC has historically relied on groundwater for all potable water needs. The Surprise Springs sub-basin was the sole source for the Combat Center. This reliance on a single source created significant drawdown of the sub-basin. To increase water security and quality MAGTFTC installed a reverse osmosis treatment plant, including two groundwater production wells located in the Deadman sub-basin (DON-USMC 2018b and DON-USMC 2019c). To ensure resource availability, MAGTFTC developed various demand management measures (e.g., installation of water efficient fixtures). MAGTFTC also developed several water supply enhancement projects to better manage and utilize water resources, including plans to replace/upgrade the wastewater treatment plant to produce tertiary quality water expanding water reuse capabilities (Project 20). Because MAGTFTC relies on groundwater, projects proposed in the vicinity of the Combat Center should ensure that groundwater use does not interfere with federally reserved rights that may exist.[34]

Over the past 5 years, 49 recreation and OHV-related permits have been approved by BLM, including Projects 3 and 13 (BLM 2023d). Aside from the direct effects of vehicles on desert tortoise (e.g., vehicle strikes), the more concerning issue is when individuals knowingly disregard the laws and protections agencies put in place (e.g., recreating in designated critical habitat and removing BLM signs) (CDFW 2015). While state and federal agencies typically provide regulatory coverage for authorized public recreation on state and federal land, the "take" prohibitions of CESA and ESA apply to any person, especially those engaged in unauthorized use.

MAGTFTC has acknowledged that its actions (e.g., maneuver training) effect the tortoise at the Combat Center and has continued to implement research, mitigation, and monitoring (e.g., translocation, raven management, etc.) to off-set effects (e.g., USFWS 2012, USFWS 2017, USFWS 2022a, USMC 2005a, and MAGTFTC 2022a), including operating TRACRS for nealy 20 years (USMC 2005a) and the increased mitigation under the RASP Initiative per this SEA. The Army and other installations are engaged in similar activities and mitigation (Projects 4 and 19).

For the RASP Initiative to be successful, more participation is needed. The Initiative would benefit all players in the Mojave Desert by eventually reducing the cost of desert tortoise management and mitigation. In 2002, the Governmental Accounting Office estimated that expenditures on desert tortoise recovery exceeded $100 million since its listing in 1990 (GAO 2002). In 2011, the USFWS estimated that desert tortoise recovery would cost $159 million and could be achieved by 2025 if recovery actions were implemented promptly (USFWS 2011). In 2022, the USFWS concluded that there is a low potential for recovery based on current uncertainties about various threats and our ability to manage them, and the potential conflict with development or other forms of economic activity (USFWS 2022c). While scientific certainty may be needed before a regulator requires mitigation, agencies and entities can work together to better mitigate for the effects of their actions. However, as time continues to pass, the opportunity to reverse the species decline may be lost while the management and permitting costs continue to increase, and with project approvals becoming less certain as the species moves toward extinction. In support, most ESA de-listing actions occurred between the 1970s and 1990s (USFWS 2023).

Based on the foregoing, the potential for significant cumulative effects would be mitigated because – the Ongoing Action and Proposed Action would continue to mitigate for the effects of past, present and future actions (no new habitat affected); MAGTFTC would increase its contributions under the RASP Initiative to offset future effects from training and mitigate the effects of other actions in the Western Mojave Recovery Unit; other projects incorporated mitigation; and non-project factors may contribute to the continued decline of the species (e.g., unlawful OHV activities and predation).

[34] For more information, see: https://www.justice.gov/enrd/federal-reserved-water-rights-and-state-law-claims

4.2.3 Cultural Resources

The potential cumulative effects to cultural resources from the Ongoing Action and Proposed Action, in addition to Projects 1 to 23, cannot be fully ascertained as explained in Section 3.4.

Ongoing military training (Projects 4 and 16) could effect known and known cultural resources due the size of the area affected (753,537 acres at the National Training Center and 761,000 acres at Combat Center) and nature the of actions (e.g., maneuver, landings, ordnance, etc.), but both MAGTFTC and the Army implement mitigation to minimize and resolve adverse effects.

Adverse effects to cultural resources at the Combat Center were recently disclosed under Project 16, with mitigation commitments tied to the implementation of the ICRMP and the 2007 PA (since expired). As part of its site condition assessment program, MAGTFTC has confirmed that while most resources show effects from training (historic or recent), most effects are negligible to the integrity of the resource to demonstrate its relevance to the criteria to the NRHP (average 72.8% of all sites monitored from 2018 to 2021 were stable or had minor effects to condition) (see Table 12). Furthermore, the monitoring program has documented that MAGTFTC protective restrictions improved condition for some of the most important cultural resources aboard the Combat Center (e.g., resources within Restricted Areas such as Fox Trot Petroglyphs). As explained in Sections 1.7 and 3.4, MAGTFTC has consulted Native American tribes and SHPO to develop a draft PA with additional mitigation to addresses potential effects from ongoing training activities. Once approved, MAGTFTC could request associated funding to improve the pace and scale of its mitigation.

In addition, direct effects to known cultural resources were anticipated under Projects 2, 7, 9 and 10, but mitigation was offered to avoid actual effects and none of the resources were listed or determined eligble for listing on the NRHPs. Under Project 10, most cultural resources (5 sites and 2 historic roadways) would not be affected or are not eligible for listing in the NRHP, but substantial mitigation is proposed to avoid and minimize effects to 3 sites that are eligible (Oasis of Mara) and important (Chemehuevi Cemetery and an area of lithic scatters). Project 15 would likey use existing routes and sites to support specific types of training activities and transit between the various installations in Southern California and would likely be planned to avoid any significant effect to cultural resources.

Based on the foregoing, the potential for significant cumulative effects would be mitigated by – MAGTFTC actively monitoring and protecting known cultural resources eligible for listing on the NRHP (e.g., Fox Trot petroglyphs), implementing mitigation under the ICRMP, and increasing mitigation under the draft PA (if approved); and project-specific mitigation discussed above.

Table 12 - Site Stability Data from Site Condition Assessment Program 2018-2020

Stability - All Sites	2018	2019	2020
Stable/ Improved	77 (82.8%)	79 (94%)	129 (51.8%)
Minor	--	--	3
Moderate/ More Degraded	16 (17.2%)	5 (6%)	76 (29.8%)
Severe	--	--	44 (14.3%)
Destroyed	--	--	2
Sites Monitored	**93**	**84**	**255**

4.2.4 Environmental Justice (Noise, Waste, Air Quality)

No disproportionate effects were discovered under the Ongoing Action and Proposed Action (Section 3.5) and Projects 1 to 23, but future projects would be required to evaluate for potential effects (e.g., Project 19 should consider the pockets environmental justice populations that may exist in the Lake Havasu area). Projects 20 and 22 would not result in effects as they would not influence the noise

environment outside the Combat Center. While Project 14 is intended to serve the Combat Center population, frequencies extend slightly outside of the installation (Figure 19; green area). This would not adversely affect any population occurring or moving into this area as discussed in Section 4.2.5. Based on further review of environmental justice information for the areas surrounding the Combat Center, categories flagged for potential high cumulative effect burden include: *Social Vulnerability Rank, Potentially Hazardous & Toxic Sites, Built Environment, Socioeconomic Status, Household Characteristics, and Housing Type* (CDC-ATSDR 2022) (see Appendix E, E-10). Except for *Hazardous & Toxic Sites*, these categories do not overlap with the types of actions or potential effects from Combat Center actions. As explained in Section 1.7, MAGTFTC manages its hazardous waste and air emissions to ensure exposure is within regulatory limits. Some of these issues would be better addressed by local land use planning and development efforts (e.g., Project 9).

4.2.5 Human Health and Safety (Herbicides, Pesticides, Radiation)

Herbicides & Pesticides. While the Proposed Action and Project 8 and 19 could contribute to increased use of herbicides or pesticides in the County but it is likely that overall pesticide use in San Bernardino County would remain low and generally occuring in the less populated areas of the County. Based on available data, no major increase or decrease has occurred in the vicinity of the Combat Center between 1991 and 2018 (Tracking California 2023). In addition, as invasive plant infestations are reduced at the Combat Center, MAGTFTC may reduce the amount of herbicides used and transition to other management methods such as prevention, manual, or mechanical methods.

Radiation. Due to the variety of infrastructure installed, operated, and maintained at the Combat Center, site workers are at risk of exposure to radiation under the Ongoing Action and Proposed Action (hazardous emissions from sensors; Section 2.3.3). Because sensors are in remote locations, the public is not at risk of exposure. The same is true of Project 14. Hazardous levels of radiation would only be emitted within 94 feet of the antenna panels, located 72-feet above the ground (Figure 20; red dot within Combat Center). Only site workers could be exposed and would have to take safety precautions. Signs would be posted to notify site workers of the risks and occupational safety precautions should be taken (likely employer specific).

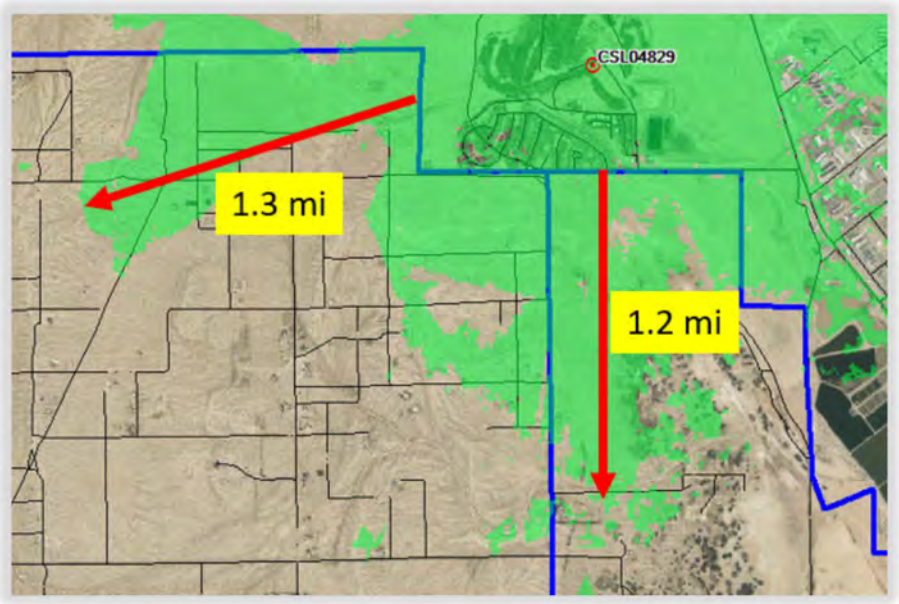


Figure 19 – Proposed Location of AT&T Monopole & Off-Installation Frequencies (Green)

CHAPTER 5 – MITIGATION AND MONITORING

5.1 MITIGATION AND MONITORING

The Ongoing Action and Proposed Action would comply with the following requirements:

- General management direction and requirements (Sections 1.6).
- Regulatory requirements (Section 1.7), as modified.
- Requirements pertaining the Ongoing Action and Proposed Action (Section 2.3).
- Ongoing mitigation monitoring for the desert tortoise translocation.

MAGTFTC would keep track of actions being implemented under this SEA, with reevaluation recommended in 5 years to determine the need for supplementation (40 CFR §1502.9(d) and 32 CFR §775.6(c)). Because new data would be needed to inform a determination, this SEA would be reevalauted when new data listed in Section 2.3 is available. This could take more than 5 years.

5.2 FUTURE NEPA PROCESSES

5.2.1 Military Training Activities

Combat Center military training activities supporting resident and external units are considered ongoing actions. These activities are subject to additional NEPA process for substantial changes or new circumstances (see e.g., 32 CFR §775.6(c)). MAGTFTC would evaluate ongoing training activities to ensure they remain within the scope of the status quo. Depending on the scope of any future change and potential effects, MAGTFTC may prepare a focused EA (discussed below) or obtain contractor support for more complex actions (EA or EIS). MAGTFTC would likely be the NEPA lead to support resident training requirements, but external entities could be responsible for NEPA costs.

When training activities involve multiple installations, activities would typically be limited by the scope of existing authorizations for each installation. No new NEPA review is ordinarily needed because – units are engaged in ongoing training activites (e.g., no new major federal action) and have freedom to plan specific training events (e.g., no new agency decision required). Where training activities are new, or part of a larger plan or program capable of NEPA analysis, the same options above apply but MAGTFTC may not necessarily be the NEPA lead.

5.2.2 Support Operations, Resource Management, and Incidental Uses

Consistent with past trends, new proposed actions would not be anticipated to have significant effects and/or fit into one of 49 categorical exclusions (CATEX). If a proposed action does not within with the text of a CATEX or there are extraordinary circumstances suggesting that CATEX use is inappropriate, the same options above apply; the project proponent is typically responsible for NEPA costs.

5.2.3 Focused Environmental Assessments

- Template. Modeled after the CEQA Environmental Checklist.[35]
- Anticipated Scope. Proposed actions that do not fit within a CATEX but potential effects are not significant and/or actions where notable effects are contained within the Combat Center.
- Public Notice. MAGTFTC webpage & social media accounts.
- Public Comment. 30-day comment period on Draft EAs and unsigned FONSIs.
- Distribution List. To be notified of future NEPA processes (EA or EIS), please submit a request by any method listed in Section 1.11 and specify your topic of interest.

[35] CEQA Guidelines are available at: https://www.opr.ca.gov/ceqa/#guidelines-updates

APPENDIX A

References

Note: This SEA relies on the citations listed below. Internal citations are generally omitted except where the author of an SEA section wanted specific additional citations included along with the main citation. The website location to access each reference is included when available. For access to sources with no website please contact MAGTFTC (see SEA Section 1.11).

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APPENDIX B

Existing Conservation Measures

For ESA compliance, MAGTFTC's Existing Conservation Measures (listed below) currently apply to ongoing and future actions at the Combat Center.

1. The Marine Corps will appoint an official representative to oversee compliance with all protective measures for the desert tortoise. This person will receive and investigate reports of non-compliance and will have the authority to stop all activities that may violate these measures.

2. The Marine Corps will continue to implement a desert tortoise education program for military and civilian personnel that train or work on MCAGCC. All personnel will receive this program prior to proceeding with training exercises, construction projects, or other activities that may affect desert tortoises. This program will also be required of SUA users through the permitting system that the Bureau will manage. The program will include the following: a) information on the biology and distribution of the species, b) its sensitivity to human activities, c) legal protection for the species and penalties for violation of Federal laws intended to protect it, d) its general activity patterns, e) the required measures for minimizing effects during training and construction-related activities, f) reporting requirements and measures to take if a desert tortoise is encountered, and g) measures that personnel can take to promote the conservation of desert tortoises.

3. The Marine Corps will inform all personnel of their responsibility to report any form of injury or mortality of desert tortoises to the official responsible for overseeing compliance with the protective measures.

4. The Marine Corps will place signs promoting awareness of desert tortoises in key locations to encourage personnel not to stray off established main and secondary routes.

5. The Marine Corps will require all personnel on MCAGCC to remove or contain foodstuffs, trash, or other wastes that may attract predators. The Marine Corps will require the use of latching or locking lids on all trash receptacles used for extended stays.

6. The Marine Corps will concentrate training activities that cause increased surface disturbance to pre-designated hardened sites, or within 200 meters of main supply routes, once these sites and routes are established. The Marine Corps will limit off-road activity to that which is necessary to support the mission directly and will plan maneuvers to emphasize use of already disturbed sites.

7. During training maneuvers, the Marine Corps will limit "neutral steer" turns of tracked vehicles (i.e., running tracks in the opposite directions from each other, so that the vehicle pivots in place) to emergency situations. The Marine Corps will identify authorized areas for practicing "neutral steer" turns that are away from special use areas and other biologically sensitive areas.

8. The Marine Corps will require that temporary fighting positions and other types of temporary excavations are filled to original grade and excess material leveled after each training exercise.

9. Contractor and maintenance personnel will remain on main or secondary main supply routes whenever possible. Personnel will only travel off the supply routes when no other route exists to the objective.

10. The Marine Corps will post and enforce a 32.2 kilometer-per-hour (20-mile-per-hour) speed limit for contractor, construction, and maintenance personnel on all roads within desert tortoise habitat.

11. The Marine Corps will require personnel to obtain approval of the G-3 Directorate and the Natural Resources and Environmental Affairs (NREA) Division prior to clearing land (grading) or conducting any other vegetation removal action in the training areas.

12. The Marine Corps will ensure that all personnel immediately report to a MCAGCC-authorized desert tortoise biologist (i.e., a biologist authorized by the Service) any desert tortoises if they are within or immediately adjacent to training exercises or construction projects that may kill or injure them.

13. The Marine Corps will ensure that only authorized biologists handle desert tortoises or their eggs except in circumstances where the desert tortoise is in immediate danger of injury and mortality or is impeding an active training exercise. Use of authorized biologists and biological monitors will be in accordance with the most recent Service guidance (Service 2008a). The Marine Corps will ensure that biologists do not perform specialized handling activities (e.g., transmitter placement, health assessments, or blood collection) for which they are not specifically authorized by the Service.

14. If a desert tortoise is in immediate danger, the Marine Corps will ensure that it is moved into adjacent undisturbed habitat and placed in a shaded area, out of direct sunlight. If a desert tortoise is not in danger but is impeding military training, Marine units will notify Range Control and request instructions. Only appropriately briefed Marines, with direct radio or telephone communication with Range Control and authorization from NREA authorized biologists, will move desert tortoises. In these instances, the Marine Corps will move desert tortoises only the minimum distance to ensure their safety.

15. The Marine Corps will ensure that personnel inspect beneath and around all parked vehicles, located in desert tortoise habitat, prior to moving the vehicle. If a desert tortoise is located beneath a vehicle and is not in immediate danger or impeding training, the Marines will allow the tortoise to move on its own or they will contact Range Control for instructions. Only appropriately briefed Marines, with direct radio or telephone communication with and authorization from Range Control, will move desert tortoises. In these instances, the Marine Corps will move desert tortoises only the minimum distance to ensure their safety.

16. When requesting authorization of biologists to handle desert tortoises, the Marine Corps will submit the credentials to the Service for review and approval at least 30 days prior to the need for the biologist to perform those activities in the field. For authorization of specialized handling activities (e.g., transmitter placement or health assessments), the Marine Corps will clearly define activities for which it is requesting authorization and provide credentials that are specific to those activities.

17. All handling of desert tortoises and their eggs will comply with the protocols outlined in the Desert Tortoise Field Manual (Service 2009a) unless specifically modified by this biological opinion. When performing tasks where tools and equipment may contact desert tortoises, the Marine Corps will ensure that biologists disinfect all tools via the Service's disease prevention protocols (Service 2016c) or most recent Service guidance.

18. The Marine Corps will ensure that desert tortoises are handled only when air temperature, measured at two inches above the ground (shaded bulb) is not expected to exceed 35 degrees Celsius (95 degrees Fahrenheit) during the handling session. If air temperature exceeds 35 degrees Celsius during handling or processing, desert tortoises will be shaded in an environment where the ambient air temperatures do not exceed 32.8 degrees Celsius (91 degrees Fahrenheit). The Marine Corps will not release desert tortoises until the air temperature at the release site has declined to below 35 degrees Celsius and is expected to remain below 35 degrees Celsius for the remainder of that day.

19. The Marine Corps will ensure that authorized biologists follow the protocols outlined in Service (2016c) or the most current Service guidance when performing health assessments on the desert tortoise.

20. The Marine Corps will ensure that authorized biologists re-hydrate desert tortoises that void their bladder using epicoelomic injections of sterile saline or by nasal or oral administration of drinking water. If a desert tortoise smaller than four inches in carapace length voids its bladder, the Marine Corps will offer fluids nasally or orally.

21. The Marine Corps will not translocate or otherwise move wild desert tortoises that show clinical signs of disease. If the Marine Corps locates a desert tortoise that must be moved, and it has clinical signs of upper respiratory tract disease, they will quarantine this individual and contact the Service to determine appropriate disposition of the animal.

22. The Marine Corps will ensure that authorized biologists mark desert tortoises in accordance with the Desert Tortoise Field Manual (Service 2009a) or other Service-authorized method.

23. The Marine Corps will ensure that authorized biologists attach only transmitters of appropriate size to desert tortoises. Transmitter mass will not exceed 10 percent of the desert tortoise's mass.

24. The Marine Corps will ensure that authorized biologists attach transmitters to the fifth vertebral scute of large[5] male and small desert tortoises. For female desert tortoises, the

[5] For the purposes of this biological opinion, we will generally reference size class as "large" (i.e., equal to or larger than 160 millimeters) and "small" (i.e., smaller than 160 millimeters) desert tortoises. In certain contexts we will also use "adult" (i.e., equal to or larger than 180 millimeters) and "juvenile" (i.e., smaller than 180 millimeters) when the terminology is relevant to the data presented.

Marine Corps will attach transmitters to the anterior carapace in the most appropriate place to preclude interference with righting. The Marine Corps will attach an antenna sheath just above the marginal scutes of each desert tortoise's shell. The antenna sheath will be slightly larger diameter than the antenna and will be split at each scute seam to prevent interference with natural shell growth.

25. The Marine Corps will ensure that authorized biologists replace transmitters earlier than the recommended battery life of the transmitter to reduce the potential of losing desert tortoises.

26. The Marine Corps will ensure that desert tortoise exclusionary fencing complies with the Desert Tortoise Field Manual (Service 2009a). Fence material will be galvanized, one inch by two-inch vertical wire mesh and will incorporate tortoise-proof gates or cattle guards at all entry points. In instances where temporary exclusion of desert tortoises is required, the Marine Corps may use a temporary exclusion fence design after receiving approval by the NREA Division.

27. The Marine Corps will inspect all permanent desert tortoise exclusion fencing monthly and after rainfall events (i.e., the same day or the morning after an evening rain). The Marine Corps will inspect all temporary desert tortoise exclusion fencing monthly and after rainfall events. Repairs will occur on all damaged exclusion fencing within two days; temporary fencing will be used to close gaps until the permanent fencing is repaired. If monitoring identifies gaps in exclusion fencing that cannot be adequately closed by temporary fencing, the Marine Corps will post a biological monitor at the gap until fence repairs are made.

28. During fence installations, the Marine Corps will employ at least one biological monitor for each construction team, such that no driving, trenching, fence-pulling, or surface disturbance occurs without the presence of a biological monitor. The Marine Corps will supply these biological monitors with maps of burrows located during pre-project surveys to assist them in minimizing effects on desert tortoises. Biological monitors will have the authority to halt activities if a desert tortoise enters work areas, and they will contact an authorized biologist to move the animal out of harm's way prior to commencement of activities.

29. Following installation of any desert tortoise exclusion fence, the Marine Corps will ensure that an authorized biologist checks the fence alignment for desert tortoises that are exhibiting fence-pacing behavior. From April 1 to October 15 and during other unseasonably warm periods of the year, fence checks will occur two times daily for 2 weeks following completion of fence construction. If midday temperatures are likely to be above 40.6 degrees Celsius, one of these checks will occur one hour prior to the forecasted temperature high. If a given fence alignment is installed in the winter, inspections will occur three times per day for the first 3 weeks of the next active season.

30. Desert tortoises exhibiting fence-pacing behavior on construction and maintenance projects will be moved to a safe location away from the fence and monitored. If temperatures are above 35 degrees Celsius, an authorized biologist will construct an artificial burrow for the desert tortoise or hold it in a climate-controlled location until temperatures fall below 32.8 degrees Celsius and are expected to remain below 35 degrees Celsius for the remainder of that day.

31. When marking and flagging burrows, the Marine Corps will follow the guidance in the Desert Tortoise Field Manual (Service 2009a).

32. The Marine Corps will conduct surveys for desert tortoises in the earliest possible planning stages for construction and maintenance projects that require clearing of land within training areas. The Marine Corps will use the information gained from these surveys to reduce adverse effects to desert tortoises to the greatest extent practicable in the project plan.

33. For maintenance or construction projects outside of the Mainside Cantonment Area and in areas known to support desert tortoises, the Marine Corps will install temporary desert tortoise exclusion fencing around work sites and/or use biological monitors.

34. Prior to ground disturbance on maintenance and construction projects, an authorized biologist will perform pre-construction clearance surveys for desert tortoises. The authorized biologist will mark all desert tortoises moved from the construction site.

35. If a construction or maintenance project does not use desert tortoise exclusion fencing, the Marine Corps will ensure that clearance survey timing reduces the likelihood that a desert tortoise could enter a work area between the time of surveys and the onset of work. If desert tortoises are unlikely to be active, clearance surveys may occur within 48 hours prior to ground disturbance. The Marine Corps will determine whether desert tortoises are likely to be active based on the biology of the species, time of year, and weather conditions.

36. During pre-construction clearance surveys for construction and maintenance projects, the Marine Corps will inspect all desert tortoise burrows for small and large desert tortoises and all mammal burrows that may host large desert tortoises. The Marine Corps will flag and avoid all active burrows wherever feasible.

37. If construction activities cannot avoid an active burrow, an authorized biologist will excavate the burrow according to the protocols in the Desert Tortoise Field Manual (Service 2009a). Authorized biologists will move all desert tortoises excavated from active burrows to the nearest unoccupied natural burrow, an artificially constructed burrow, or place it under a shrub if it can be released within specified temperature limits. The Marine Corps will ensure that further construction activities do not disrupt the release location.

38. If an inactive burrow is near a construction or maintenance activity but in no danger of disturbance, the Marine Corps will block it and flag it for avoidance. The Marine Corps will follow the guidance provided in the Desert Tortoise Field Manual (Service 2009a) when blocking and marking the burrow. After completion of construction activities, the Marine Corps will remove materials used to block and flag the burrow. The Marine Corps will collapse all inactive burrows that construction activities are likely to disturb.

39. The Marine Corps will only confirm a burrow as inactive if close inspection can locate all interior edges of the burrow, such that hidden chambers are not missed.

40. On construction and maintenance projects that require biological monitoring, the biological monitors will work with the construction supervisor to minimize disturbance. The Marine Corps will ensure that an adequate number of biological monitors are present to monitor all aspects of the activities that have the potential to injure or kill desert tortoises. Biological monitors will have the authority to halt construction activities if they locate a desert tortoise in the construction area. The Marine Corps will cease all construction activity if they identify a desert tortoise within a construction area following initial clearance surveys. Construction activities will not resume until an authorized biologist has marked the desert tortoise and moved it to a safe location. The Marine Corps may forego the use of biological monitors in fenced construction areas where clearance surveys have occurred. MCAGCC biological staff will make this determination based on site-specific circumstances.

41. During construction in areas that are not fenced with desert tortoise exclusion fencing, biological monitors will check open trenches at least two times a day, in the morning and evening, throughout the duration of construction. If midday temperatures are likely to be above 35 degrees Celsius, one of these checks will occur one hour prior to the forecasted high temperature. The Marine Corps will leave open excavations only if they are temporarily fenced or covered to exclude desert tortoises. The Marine Corps will inspect all excavations for desert tortoises prior to filling.

42. The Marine Corps will require that personnel stake all camouflage netting 45.8 centimeters (18 inches) off the ground to prevent entanglement of desert tortoises.

43. The Marine Corps will prohibit accessing or departing the southeastern ranges of MCAGCC through the Cleghorn Lakes Wilderness Area. The Marine Corps will also prohibit access to Bullion or America Mine Training Ranges from a southerly direction. The Marine Corps will prohibit personnel from entering the Ord-Rodman Area of Critical Environmental Concern (ACEC) as part of training activities described in the proposed action, except for the purposes of implementing the translocation program.

44. The Marine Corps will take necessary steps to reduce effects to the desert tortoises caused by feral or free-roaming dogs at MCAGCC. These steps may include increased public awareness, cooperation with other agencies, and other methods of control.

45. The Marine Corps will prohibit pets within the MCAGCC training areas, with the exception of pets in the Mainside Cantonment Area and military working dogs that are under the control of their handler.

46. The Marine Corps will prohibit the possession of otherwise legal captive desert tortoises on any portion of MCAGCC, with the exception of animals used for desert tortoise awareness and education programs. The Marine Corps will prohibit the release of legal captive or wild desert tortoises from off base into the MCAGCC population.

47. The Marine Corps will prohibit the feeding of wildlife on MCAGCC.

48. The Marine Corps will prohibit recreational OHV use of the MCAGCC training areas, with the exception of those specifically identified above in the SUA or those on main or secondary supply routes.

49. The Marine Corps will prohibit the introduction of invasive plant species on MCAGCC.

50. The Marine Corps will prohibit unpermitted open fires and the harvesting or cutting of native vegetation, with limited exceptions within the SUA or as allowed for in MCAGCC's Integrated Natural Resources Management Plan.

APPENDIX C

Proposed Conservation Measures

For ESA compliance, MAGTFTC's Proposed Conservation Measures (listed below) would apply to ongoing and future actions at the Combat Center.

CM-1. RASP Initiative. **(A)** Marine Air Ground Task Force Training Command (MAGTFTC) would fund off-site recovery actions outside the Combat Center to advance the recovery of the species. Recovery actions would be based on the 2011 *Revised Recovery Plan for the Mojave Population of the Desert Tortoise* (https://www.fws.gov/media/2011-revised-recovery-plan-mojave-desert-tortoise). **(B)** MAGTFTC would increase involvement that includes operations of Tortoise Research and Captive Rearing Site (TRACRS) and additional translocation and population augmentation to off-site locations per CM-10. **(C)** MAGTFTC efforts under the RASP Initiative is intended to offset the impacts to desert tortoises from military training within the Combat Center by focusing on off-site efforts that should more appreciably benefit the species. Consequently, MAGTFTC proposes the consolidation and replacement of existing conservation measures with CM-1 to CM-12. **(D)** CM-8 to CM-10 are requirements of the existing biological opinion that include off-installation efforts. Continued implementation may be separate or included in the RASP Initiative, and current efforts may expand beyond initial scope if necessary for successful implementation.

CM-2. Environmental Representative. MAGTFTC would appoint an official representative in the Combat Center's Environmental Affairs Office to oversee compliance with the conservation measures and the annual reporting for the biological opinion. This person would receive and investigate reports of non-compliance and have the authority to stop all activities that may violate the requirements of the biological opinion.

CM-3. Educational Program. **(A)** MAGTFTC would continue to support an educational program for Combat Center personnel prior to training exercises, construction projects, or other activities that may affect desert tortoises. The educational program would include: reporting and response requirements, if any desert tortoise is encountered, and general information on the species' biology; distribution; sensitivity to human activities; legal protection and penalties; and measures for minimizing effects on tortoises. **(B)** This requirement would also apply to users of the Shared Use Area (Means Lake Training Area), via Bureau of Land Management permitting process for OHV race events that enter the Combat Center's Exclusive Military Use Area. **(C)** MAGTFTC shall place signs in key locations along roads to promote tortoise awareness and reduce effects on tortoises.

CM-4. Desert Tortoise Encounters & Reporting. **(A)** Military training would not cease due to presence or injury of a tortoise. **(B)** When personnel or workers encounter a tortoise that could be harmed by project activities or an existing use, they shall immediately contact Range Control (if in a training area) or Environmental Affairs (if in Mainside) for instructions on how to secure and move a tortoise from harm's way. In some scenarios, MAGTFTC's Environmental Affairs Office may decide to temporarily relocate tortoises to TRACRS until a permanent relocation site is determined (see CM-10). The following information must be reported: location, date and time observed and released, and whether the tortoise voided its bladder (which requires care from a USFWS Authorized Biologist). **(C)** When Marines encounter a tortoise during training, they shall avoid the tortoise (if possible), and report the location of any injured or dead tortoise to Range Control. For dead or injured tortoises, the location, date and time observed, and whether the tortoise was injured or killed, must be reported

CM-5. U.S. Fish and Wildlife (USFWS) Guidance Documents. MAGTFTC would follow the most recent USFWS guidance for all handling, survey methods, construction monitoring, translocation, radio telemetry, blood sampling, health assessments, and disease management. Documents available at: https://www.fws.gov/program/desert-tortoise-recovery.

CM-6. Restricted Areas. (I) Avoid entry into Restricted Areas. Restricted Areas are off limits to entry that involves vehicles and any ground disturbance except for travel on current main routes. Off-route travel or use of unapproved routes is not allowed. (II) MAGTFTC's Range Management and Development Division and Environmental Affairs' may make exceptions for access if the use is consistent with or does not interfere with the conservation purpose of the Restricted Areas. (III) Safety Dangers Zones and weapon danger zones may overlap with Restricted Areas. (IV) In rare cases, new construction may be needed.

CM-7. Predator Control. MAGTFTC would use lethal and non-lethal means to reduce effects to the desert tortoises caused by feral or free-roaming dogs, coyotes and ravens at the Combat Center and at translocation sites. These steps may include: increased public awareness, cooperation with other agencies, reduction of subsidies, and trapping or other lethal means of control.

CM-8. Desert Tortoise Fencing. MAGTFTC would continue to prioritize and install up to 44 miles of fencing to protect tortoises from crossing Highway 247 and to minimize unauthorized off-road highway vehicle traffic in BLM's Ord-Rodman Desert Wildlife Management Area.

CM-9. Habitat Restoration. MAGTFTC would continue to cooperate with others, such as BLM and Preservation Ranch, LLC (PR, under an existing cooperative agreement), to install signs along authorized routes, and close and restore habitat of unauthorized routes in the Ord Mountain allotment, and monitor the success of the tortoise translocation within the PR allotment. Cooperation with BLM would include areas within and beyond the allotment.

CM-10. **Translocation & Population Augmentation**. **(A)** MAGTFTC would continue translocation and post-translocation monitoring via the 2016 Translocation Plan, and continue Line Distance Sampling for the associated stratum (Ord-Rodman ACEC). **(B)** MAGTFTC would continue to head-start tortoises at TRACRS under the current BO (USFWS 2017), with some headstart tortoises relocated off-base to support the RASP Initiative. **(C)** Tortoises temporarily relocated to TRACRS under CM-4 may be relocated off-base in support of the RASP Initiative. **(D)** Under the RASP Initiative, MAGTFTC would coordinate with the USFWS and off-site land managers if the proposed relocation site is not within the Combat Center (e.g., existing recipient sites or Restricted Areas).

CM-11. Enforcement. MAGTFTC Conservation Law Enforcement Officers (CLEO) would continue patrolling areas for protection of desert tortoise and enforce the boundaries and limitations within Restricted Areas (e.g., no ground disturbing activities unless authorized by EA). CLEO duties include: deterring trespassers (e.g., illegal OHV entry into Combat Center); issuing citations for trespass (e.g., damage to habitat) and theft (e.g., tortoise shells); and monitoring and controlling tortoise predators.

APPENDIX D

Soil Binder Information

OPSDIRT® Safety Data Sheets

https://www.landlocknaturalpaving.com/polymer-military-road-construction

Rhino Snot Information

https://www.geopaveco.com/en/products/soil-enviroment-products/envirotac-ii-rhino-snot?gdprAccept

Gorilla Snot Information

https://soilworks.com/gorilla-snot/

Elima Dust Information

https://www.elimadust.com/about

OPS25

MATERIAL SAFETY DATA SHEET

MSDS No: 25092613

Date: 2/27/18

Supersedes: 2/11/13

OPS.DIRT
operational ready dirt

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name:	OPS25
Synonyms & Chemical Family:	Vinyl-acrylic polymeric emulsion
Product Use:	Dust control agent and Soil Stabilizer for: expeditionary airfields, haul roads, hard stands, loading zones, Life Support Areas, shelter flooring, slope and stability control, dust control, FOD control

Emergency Phone No.: 1-800-360-2687

2. COMPOSITION/INFORMATION ON INGREDIENTS

COMPONENT	Percent	CAS NO.	ACGIH TLV		OSHA
			TWA	STEL	
Vinyl-Acrylic copolymer	54-56%	108-05-4	N/E	N/E	N/E
Vinyl acetate	Less than 0.5%	68784-69-0	N/A	N/A	N/A
Alkylated bisphenol A	Less than 4%	7756-94-7	N/A	N/A	N/A
Tri-isobutylene	Less than 1%	25167-70-8	N/A	N/A	N/A
Disobutylene	Less than 1%	Proprietary	N/A	N/A	N/A
Polyglycolesters poly(1-carbamoylethylene)	Less than 4%	9003-05-8	N/A	N/A	N/A
Poly(1-carbamoylethylene)	Less than .5%	64742-47-8	N/A	N/A	N/A
Hydrotreated light distillates	Less than .25%	7732-18-5	N/A	N/A	N/A
Water	44-46%		N/E	N/E	N/A

3. HAZARDS IDENFICATION

EMERGENCY OVERVIEW

Appearance and Odor: Milky white liquid, sweet odor.

Statement of Hazards: Vapors may cause eye irritation. Vapors are irritating to the respiratory tract. Contact may cause skin irritation.

POTENTIAL HEALTH EFFECTS

Likely routes of exposure: Eye contact, ingestion, inhalation and skin contact.
Eye contact: Direct contact with this material may cause eye irritation including tearing and redness.
Skin contact: Contact may cause skin irritation.
Ingestion: No hazard in normal industrial use.
Inhalation: Inhalation of vapor or aerosol causes irritation of the respiratory tract (nose, throat, and lungs).

CARCINOGENICITY

This material does not contain 0.1% or more of any unreacted chemical that is listed by the International Agency for Research on cancer (IARC).

4. FIRST AID MEASURES

Skin contact: Wash skin with soap and water. Remove contaminated clothing. Get medical attention if irritation persists. Wash contaminated clothing before reuse.
Eye contact: Immediately flush eyes with large quantities of clean water for at least 15 min. Get immediate medical attention.
Inhalation: If breathing is difficult, give oxygen by trained personnel. Get immediate medical attention.
Ingestion: Give the victim one or two glasses of water or milk to drink. Never give anything by mouth to an unconscious person.

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operational ready dirt

Immediately seek medical attention.

NOTE(S) TO PHYSICIAN: None.

5. FIRE FIGHTING MEASURES

Fire and Explosion Hazards: This material will not burn unless it is evaporated to dryness.
Extinguishing Media: Dry polymer, use alcohol resistant foam, carbon dioxide (CO2) or dry chemical
Fire-Fighting Equipment: Wear self-contained breathing apparatus (SCBA) and full fire-fighting protective clothing if necessary.
Other Information: This is a water-based product and presents no particular fire or explosion hazard.

6. ACCIDENTAL RELEASE MEASURES

Spill/Lead Procedure:
Wear suitable protective equipment. If recovery of the materials is not possible, absorb with dry soil, sand or non-reactive material and place in an appropriate chemical waste container. Prevent spilled material from entering sewers, drainage systems or bodies of waters. Transfer to container by suction, preparatory for later disposal and flush area with water. Wash contaminated property (i.e. cars) quickly before the material dries. For large spills, recover spilled material with a vacuum truck.

Other Notes: Spilled polymer emulsion is slippery. Use caution to avoid falling. When drying, this material will form a film. Remove contaminated clothing and thoroughly wash any contacted skin areas with soap and water.

7. STORAGE AND HANDLING PROCEDURES

Open containers in ventilated area. Keep from freezing. Store in a dry area.
No special restrictions on storage with other products.
Incompatible with oxidizing agents.

8. EXPOSURE CONTROL MEASURES / PERSONAL PROTECTION

Engineering Controls: Use general ventilation to maintain airborne concentrations to levels that are below regulatory and recommended occupational exposure limits.

Eye Protection: Wear safety glass with side shields and a face shield or goggles and a face shield.
Nitrile, neoprene or rubber gloves should provide protection against skin contact. If splashing is likely,
Skin Protection: Wear impervious clothing and boots to prevent repeated or prolonged skin contact. Consult your supplier of personal protective equipment for additional instructions on proper usage.

Other Protective Clothing/Equipment: None.

9. PHYSICAL AND CHEMICAL PROPERTIES

Color:	Milky white
Odor:	sweet
Physical State:	Liquid
Solubility in Water:	Dispersible
Specific Gravity:	1.08
Vapor Pressure:	Same as water
Bulk Density:	9.0 lbs/gal
Boiling Point:	> 212 F (> 100 C) = water
Freezing Point:	< 32 F (< 0 c) = water
Evaporation Rate:	< 1 (BuAc=1)
pH:	4.5

10. STABILITY AND REACTIVITY DATA

Stability:	Stable at normal temperatures and storage conditions.
Incompatibility:	Oxidizing agents.
Conditions to Avoid:	Freezing temperatures (less than 32 F or 0c).
Hazardous Polymerization:	Will not occur.

11. ECOLOGICAL INFORMATION

No information is available. Experience demonstrates the material has no harmful effect on the environment.

12. TOXICOLOGY DATA

No information is available. Standard methods for handling chemicals should be observed.

13. TRANSPORT INFORMATION

US DOT — Not regulated.

OPS25

MATERIAL SAFETY DATA SHEET

MSDS No: 25092613

Date: 2/27/18

Supersedes: 2/11/13

OPS.DIRT
operational ready dirt

TDG	Not regulated.	
CAO/IATA	Not restricted.	Not regulated.

14. DISPOSAL INFORMATION

This material is not a RCRA hazardous waste. Disposal of this material is not regulated under RCRA. Consult Federal, State, and Local regulations to ensure that this material and its containers if discarded is disposed of in compliance with all regulatory requirements.

15. REGULATORY INFORMATION

OSHA Status: This material is not classified as a hazardous chemical under the criteria of the U.S. Occupational Safety and Health Administration (OSHA) Hazard Communication Standard, 29 CFR 1910.1200.

TSCA Inventory: This product complies with U.S. Toxic Substance Control Act (TSCA)

WHMIS Classification: All components are listed on the Canadian Domestic Substance List (DSL) or below the reportable threshold for the Canadian Non-Domestic Substances List (NDSL)

US STATE REGULATIONS: Chemicals associated with the product which are subject to state right-to-know regulations are listed with applicable state.

Vinyl Acetate 108-05-4: Listed in the following: Pennsylvania, New York, New Jersey, Illinois, Louisiana, Massachusetts, RI

16. OTHER INFORMATION

NFPA HAZARD RATING (National Fire Protection Association)

0	**Fire:**	Materials that must be preheated before ignition car occur.
1	**Health:**	Materials which on intense or continued exposure could cause temporary incapacitation or possible residual injury unless prompt medical treatment is given.
0	**Reactivity:**	Materials which in themselves are normally stable, even under fire exposure conditions, and which are not reactive with water.
------	**Specific Hazard:**	None.

OPS25

MATERIAL SAFETY DATA SHEET

MSDS No: 25092613

Date: 2/27/18

Supersedes: 2/11/13

OPS.DIRT
operational ready dirt

Health Hazard	Fire Hazard	Reactivity	Specific Hazard
4 – Deadly	4 – Below 73° F	4 – May detonate	OX Oxidizer
3 – Extremely Hazardous	3 – Below 100° F	3 – Shock and heat may detonate	ACID Acid
2 – Hazardous	2 – Below 200° F	2 – Violent chemical change	ALK Alkali
1 – Slightly Hazardous	1 – Above 200° F	1 – Unstable if heated	COR Corrosive
0 – Non-hazardous	0 – Will not burn	0 – Stable	

OPS25

MATERIAL SAFETY DATA SHEET

MSDS No: 25092613

Date: 2/27/18

Supersedes: 2/11/13

OPS.DIRT
operational ready dirt

Rating	Health Hazard	Fire Hazard	Reactivity	Protective Equipment Guide
4	Extreme: Highly toxic. May be fatal on short term exposure. Special protective equipment required.	Extreme: Extremely flammable gas or liquid, Flash Point below 73° F		
3	Serious: Toxic. Avoid Inhalation or skin contact.	Serious: Flammable. Flash Point 73° F to 100° F.		
2	Moderate: Moderately toxic. May be harmful if inhaled or absorbed.	Moderate: Combustible. Requires moderate heating to ignite.		
1	Slight: Slightly toxic. May cause slight irritation.			
0	Minimal: All chemicals have some degree of toxicity.			

OPS30

MATERIAL SAFETY DATA SHEET

MSDS No: 3002114

Date: 2/27/18

Supersedes: 2/11/14

OPS.DIRT
operational ready dirt

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name:	OPS30
Synonyms & Chemical Family:	Vinyl-acrylic polymeric emulsion
Product Use:	Dust control agent and Soil Stabilizer for: expeditionary airfields, haul roads, hard stands, loading zones, Life Support Areas, shelter flooring, slope and stability control, dust control, FOD control

Emergency Phone No.: 1-800-360-2687

2. COMPOSITION/INFORMATION ON INGREDIENTS

COMPONENT	Percent	CAS NO.	ACGIH TLV		OSHA
			TWA	STEL	
Vinyl-Acrylic polymeric emulsion	54-56%	108-05-4	N/E	N/E	N/E
Vinyl acetate	Less than .5%	79-10-7	N/E	N/E	N/E
Acrylates	Less than .5%	N/A	N/A	N/A	N/A
Proprietary poly (1-carbamoylethlene)	Less than .5%	9003-05-8	N/A	N/A	N/A
Hydrotreated light distillates	Less than.25%	7732-18-5	N/A	N/A	N/A
Water	44-46%		N/E	N/E	N/A

3. HAZARDS IDENFICATION

EMERGENCY OVERVIEW

Appearance and Odor: Milky white liquid, sweet odor.

Statement of Hazards: Vapor may cause eye irritation. Vapors are irritating to the respiratory tract.

POTENTIAL HEALTH EFFECTS

Likely routes of exposure: Eye contact, ingestion, inhalation and skin contact.

Eye contact: Direct contact with this material may cause eye irritation including tearing and redness.

Skin contact: Contact may cause skin irritation.

Ingestion: No hazard in normal industrial use.

Inhalation: Inhalation of vapor or aerosol causes irritation of the respiratory tract (nose, throat, and lungs).

CARCINOGENICITY

This material does not contain 0.1% or more of any unreacted chemical that is listed by the International Agency for Research on cancer (IARC).

4. FIRST AID MEASURES

Skin contact: Wash skin with soap and water. Remove contaminated clothing. Get medical attention if irritation persists. Wash contaminated clothing before reuse.

Eye contact: Immediately flush eyes with large quantities of clean water for at least 15 min. Get immediate medical attention.

Inhalation: If breathing is difficult, give oxygen by trained personnel. Get immediate medical attention.

Ingestion: Give the victim one or two glasses of water or milk to drink. Never give anything by mouth to an unconscious person. Immediately seek medical attention.

NOTE(S) TO PHYSICIAN: None.

OPS30

MATERIAL SAFETY DATA SHEET

MSDS No: 3002114

Date: 2/27/18

Supersedes: 2/11/14

OPS.DIRT
operational ready dirt

5. FIRE FIGHTING MEASURES

Fire and Explosion Hazards: This material will not burn unless it is evaporated to dryness.
Extinguishing Media: Dry polymer, use alcohol resistant foam, carbon dioxide (CO2) or dry chemical
Fire-Fighting Equipment: Wear self-contained breathing apparatus (SCBA) and full fire-fighting protective clothing if necessary.
Other Information: This is a water-based product and presents no particular fire or explosion hazard.

6. ACCIDENTAL RELEASE MEASURES

Spill/Lead Procedure:
Wear suitable protective equipment. If recovery of the materials is not possible, absorb with dry soil, sand or non-reactive material and place in an appropriate chemical waste container. Prevent spilled material from entering sewers, drainage systems or bodies of waters. Transfer to container by suction, preparatory for later disposal and flush area with water. Wash contaminated property (i.e. cars) quickly before the material dries. For large spills, recover spilled material with a vacuum truck.

Other Notes:
Spilled polymer emulsion is slippery. Use caution to avoid falling. When drying, this material will form a film. Remove contaminated clothing and thoroughly wash any contacted skin areas with soap and water.

7. STORAGE AND HANDLING PROCEDURES

Open containers in ventilated area. Keep from freezing. Store in a dry area.
No special restrictions on storage with other products.
Incompatible with oxidizing agents.

8. EXPOSURE CONTROL MEASURES / PERSONAL PROTECTION

Engineering Controls: Use general ventilation to maintain airborne concentrations to levels that are below regulatory and recommended occupational exposure limits.

Eye Protection: Wear safety glass with side shields and a face shield or goggles and a face shield.
Skin Protection: Nitrile, neoprene or rubber gloves should provide protection against skin contact. If splashing is likely, Wear impervious clothing and boots to prevent repeated or prolonged skin contact. Consult your supplier of personal protective equipment for additional instructions on proper usage.

Other Protective Clothing/Equipment: None.

9. PHYSICAL AND CHEMICAL PROPERTIES

Color:	Milky white
Odor:	sweet
Physical State:	Liquid
Solubility in Water:	Dispersible
Specific Gravity:	1.08
Vapor Pressure:	Same as water
Bulk Density:	9.0 lbs/gal
Boiling Point:	> 212 F (> 100 C) = water
Freezing Point:	< 32 F (< 0 c) = water
Evaporation Rate:	< 1 (BuAc=1)
pH:	4.5

10. STABILITY AND REACTIVITY DATA

Stability:	Stable at normal temperatures and storage conditions.
Incompatibility:	Oxidizing agents.
Conditions to Avoid:	Freezing temperatures (less than 32 F or 0c).
Hazardous Polymerization:	Will not occur.

11. ECOLOGICAL INFORMATION

No information is available. Experience demonstrates the material has no harmful effect on the environment.

12. TOXICOLOGY DATA

No information is available. Standard methods for handling chemicals should be observed.

13. TRANSPORT INFORMATION

US DOT	Not regulated.
TDG	Not regulated.
CAO/IATA	Not restricted. Not regulated.

OPS30

MATERIAL SAFETY DATA SHEET

MSDS No: 3002114

Date: 2/27/18

Supersedes: 2/11/14

OPS.DIRT
operational ready dirt

14. DISPOSAL INFORMATION

This material is not a RCRA hazardous waste. Disposal of this material is not regulated under RCRA. Consult Federal, State, and Local regulations to ensure that this material and its containers if discarded is disposed of in compliance with all regulatory requirements.

15. REGULATORY INFORMATION

OSHA Status: This material is not classified as a hazardous chemical under the criteria of the U.S. Occupational Safety and Health Administration (OSHA) Hazard Communication Standard, 29 CFR 1910.1200.

TSCA Inventory: This product complies with U.S. Toxic Substance Control Act (TSCA)

WHMIS Classification: All components are listed on the Canadian Domestic Substance List (DSL) or below the reportable threshold for the Canadian Non-Domestic Substances List (NDSL)

US STATE REGULATIONS: Chemicals associated with the product which are subject to state right-to-know regulations are listed with applicable state.

Vinyl Acetate 108-05-4: Listed in the following: Pennsylvania, New York, New Jersey, Illinois, Louisiana, Massachusetts, RI

16. OTHER INFORMATION

NFPA HAZARD RATING (National Fire Protection Association)

0	**Fire:**	Materials that must be preheated before ignition car occur.
1	**Health:**	Materials which on intense or continued exposure could cause temporary incapacitation or possible residual injury unless prompt medical treatment is given.
0	**Reactivity:**	Materials which in themselves are normally stable, even under fire exposure conditions, and which are not reactive with water.
------	**Specific Hazard:**	None.

OPS30

MATERIAL SAFETY DATA SHEET

MSDS No: 3002114

Date: 2/27/18

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OPS.DIRT
operational ready dirt

Health Hazard	Fire Hazard	Reactivity	Specific Hazard
4 – Deadly	4 – Below 73° F	4 – May detonate	OX Oxidizer
3 – Extremely Hazardous	3 – Below 100° F	3 – Shock and heat may detonate	ACID Acid
2 – Hazardous	2 – Below 200° F	2 – Violent chemical change	ALK Alkali
1 – Slightly Hazardous	1 – Above 200° F	1 – Unstable if heated	COR Corrosive
0 – Non-hazardous	0 – Will not burn	0 – Stable	

Rating	Health Hazard	Fire Hazard	Reactivity	Protective Equipment Guide
4	Extreme: Highly toxic. May be fatal on short term exposure. Special protective equipment required.	Extreme: Extremely flammable gas or liquid, Flash Point below 73° F		
3	Serious: Toxic. Avoid Inhalation or skin contact.	Serious: Flammable. Flash Point 73° F to 100° F.		
2	Moderate: Moderately toxic. May be harmful if inhaled or absorbed.	Moderate: Combustible. Requires moderate heating to ignite.		
1	Slight: Slightly toxic. May cause slight irritation.			
0	Minimal: All chemicals have some degree of toxicity.			

GORILLA-SNOT® SAFETY DATA SHEET

SECTION 1 – IDENTIFICATION

PRODUCT NAME

GORILLA-SNOT®
Soil Stabilizer & Dust Control Agent

CHEMICAL FAMILY

Synthetic Copolymer Dispersion

MANUFACTURER

Soilworks®, LLC – Soil Stabilization & Dust Control
7150 E. Camelback Rd., #444
Scottsdale, Arizona 85251 USA
(800) 545-5420 USA
+1 (480) 545-5454 International
info@soilworks.com
www.soilworks.com

EMERGENCY PHONE NUMBERS

(800) 545-5420 USA
+1 (480) 545-5454 International

U.S. DATA UNIVERSAL NUMBERING SYSTEM (DUNS NUMBER)

Soilworks, LLC	131946159

U.S. DEPARTMENT OF DEFENSE COMMERCIAL AND GOVERNMENT ENTITY CODE (CAGE CODE)

Soilworks, LLC	3FTH5

U.S. DEPARTMENT OF DEFENSE NATIONAL STOCK NUMBERS (NSN)

275-gallon (1,041 Liter)	Intermediate Bulk Container (IBC) Tote	6850-01-542-5389
55-gallon (208 Liter)	Drum	6850-01-542-3712

U.S. GENERAL SERVICES ADMINISTRATION (GSA) CONTRACT

Soilworks, LLC	GS-07F-5364P	October 31, 2018

SYNONYMS/OTHER MEANS OF IDENTIFICATION

Gorilla-Snot is a formulated, high molecular weight, engineered, prime synthetic copolymer dispersion.

INTENDED USES

For industrial use only. Major industries include construction, mining, military, municipal, oil & gas, energy & renewable energy and transportation.

Abate dust, air quality control, control dust, controlling dust, desertification prevention, dune stabilization, dust abatement, dust control, dust control agent, dust control material, dust control product, dust elimination, dust inhibitor, dust mitigation, dust palliative, dust pollution control, dust pollution prevention, dust prevention, dust reduction, dust retardant, dust stabilization, dust stabilizer, dust suppressant, dust suppression, eliminate dust, erosion control, erosion control material, erosion control product, erosion prevention, fines preservation, fugitive dust control, hydromulch tackifier, hydroseed tackifier, inhibit dust, mitigate dust, pm10 control, pm2.5 control, prevent dust, reduce dust, retard dust, road stabilization, road stabilizer, sand stabilization, soil additive, soil amendment, soil binder, soil crusting agent, soil solidifier, soil stabilization, soil stabilizer, stabilize dust, stabilize soil, stockpile capping, stop dust, suppress dust, surface wear course, wind erosion control.

SECTION 2 – HAZARDS IDENTIFICATION

Emergency Overview

Appearance:	Milky white liquid (transparent once cured)
Odor:	Sweet and mild (no odor once cured)
Health Hazards:	Under normal conditions of industrial use, this material is NOT expected to be a primary route of exposure
Safety Hazards:	Nonflammable
Environmental Hazards:	NOT classified as dangerous for the environment

HEALTH HAZARDS

INHALATION	Under normal conditions of industrial use, this material is NOT expected to be a primary route of exposure
SKIN CONTACT	Under normal conditions of industrial use, this material is NOT expected to be a primary route of exposure
EYE CONTACT	Under normal conditions of industrial use, this material is NOT expected to be a primary route of exposure
INGESTION	Under normal conditions of industrial use, this material is NOT expected to be a primary route of exposure

GLOBALLY HARMONIZED SYSTEM OF CLASSIFICATION AND LABELLING OF CHEMICALS (GHS)

Not a hazardous substance or mixture

U.S. HAZARDOUS MATERIALS IDENTIFICATION SYSTEM (HMIS) RATING

Health	0	No significant risk to health
Flammability	0	Material will not burn
Physical Hazard	0	Stable, non-reactive and non-explosive
Personal Protection	-	No special hazard under normal use

SECTION 3 – COMPOSITION/ INFORMATION ON INGREDIENTS

This material does NOT contain hazardous ingredients and is NOT considered hazardous according to OSHA criteria.

#	COMPONENT	%	CAS Number
1.	Synthetic Vinyl Copolymer Dispersion	60-20%	Non-Hazardous
2.	Water	40-80%	7732-18-5

SECTION 4 – FIRST-AID MEASURES

Provide medical care provider with this Safety Data Sheet.

EYE CONTACT

If irritation or redness develops from exposure, flush eyes with clean water. If irritation persists, seek medical attention.

SKIN CONTACT

No treatment necessary under normal conditions of use. Remove contaminated clothing. Wash affected area with mild soap and water. If irritation or redness develops and persists, seek medical attention.

INHALATION

No treatment necessary under normal conditions of use. If breathing difficulties develop move victim away from source of exposure and into fresh air in a position comfortable for breathing. If symptoms persist, seek medical attention.

INGESTION

If swallowed do not induce vomiting. If symptoms persist, seek medical attention.

800.545.5420 USA
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SECTION 5 – FIRE-FIGHTING MEASURES

FLAMMABILITY

Nonflammable and NOT combustible
This material is an aqueous mixture that will not burn
Dried material will burn in a fire

FLASH POINT

Nonflammable

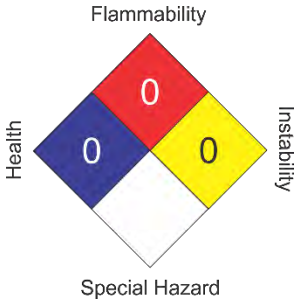
EXTINGUISHING MEDIA

Use water spray, foam, dry chemical or carbon dioxide

SPECIAL FIRE FIGHTING PROCEDURES & PROTECTIVE EQUIPMENT

Cool closed containers exposed to fire with water spray. Proper protective equipment including breathing apparatus must be worn when approaching a fire in a confined space.

U.S. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) 704 HAZARD CLASS



Legend
0 – Minimal
1 – Slight
2 – Moderate
3 – Serious
4 – Severe

SECTION 6 – ACCIDENTAL RELEASE MEASURES

For guidance on selection of personal protective equipment see Chapter 8 of this Safety Data Sheet. See Chapter 13 for information on disposal. Observe the relevant local and international regulations.

PROTECTIVE MEASURES

Stop the leak, if possible. Avoid contact with skin and eyes. Use appropriate containment to avoid environmental contamination. Prevent from spreading or entering drains, ditches, sewers, rivers or open bodies of water by using sand, earth or other appropriate barriers.

CLEAN-UP METHODS

Avoid accidents, clean up immediately. Slippery when spilled. Prevent from spreading by making a barrier with sand, earth or other containment material. Reclaim liquid directly or in an absorbent. Soak up residue with an absorbent such as clay, sand or other suitable material and dispose of properly.

ADDITIONAL ADVICE

Local authorities should be advised if significant spillages cannot be contained.

SECTION 7 - HANDLING AND STORAGE

GENERAL PRECAUTIONS

Use local exhaust ventilation if there is risk of inhalation of vapors, mists or aerosols. Use the information in this data sheet as input to a risk assessment of local circumstances to help determine appropriate controls for safe handling, storage and disposal of this material.

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STORAGE

Keep container tightly closed in a cool, well-ventilated place. Use properly labelled and closeable containers. Maintain storage temperature ≥40 °F (4 °C) to avoid freezing and destabilization. Ideal storage temperature is 72 °F (22 °C).

HANDLING

Avoid breathing vapors or mist. Avoid contact with eyes. Avoid prolonged or repeated contact with skin. Wash thoroughly after handling. When handling material in drums, safety footwear should be worn and proper handling equipment should be used.

RECOMMENDED MATERIALS

For containers or container linings, use mild steel or high density polyethylene.

ADDITIONAL INFORMATION

Do not freeze.

SECTION 8 – EXPOSURE CONTROLS / PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS

Contains no substances with occupational exposure limit values.

EXPOSURE CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances. Appropriate measures include: Adequate ventilation to control airborne concentrations. Where material is heated, sprayed or mist formed, there is greater potential for airborne concentrations to be generated.

PERSONAL PROTECTIVE EQUIPMENT

Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers.

RESPIRATORY PROTECTION

Respiratory protection is NOT required under normal conditions of use in a well-ventilated workplace. In accordance with good industrial hygiene practices, precautions should be taken to avoid breathing of material. If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, select respiratory protection equipment suitable for the specific conditions of use and meeting relevant legislation. Check with respiratory protective equipment suppliers. Where air-filtering respirators are suitable, select an appropriate combination of mask and filter. Select a filter suitable for combined particulate/organic gases and vapors.

HAND PROTECTION

Where hand contact with the material may occur the use of gloves approved to relevant standards (e.g. Europe: EN374, US: F739) made from the following materials may provide suitable chemical protection: PVC, neoprene or nitrile rubber gloves. Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material, glove thickness, dexterity. Always seek advice from glove suppliers. Contaminated gloves should be replaced. Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed with soap and water and dried thoroughly.

EYE PROTECTION

Eye protection is NOT required under normal conditions of use. If material is handled such that it could be splashed into eyes, wear splash-proof safety goggles or full face shield.

PROTECTIVE CLOTHING

Skin protection is NOT required under normal conditions of use or for single, short duration exposures. For prolonged or repeated exposures, use impervious chemical resistant boots, gloves and/or aprons over parts of the body subject to exposure.

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MONITORING METHODS

Monitoring of the concentration of substances in the breathing zone of workers or in the general workplace may be required to confirm compliance with an OEL and adequacy of exposure controls.

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

BOILING POINT	>212 °F (>100 °C)
COLOR	Milky white (transparent once cured)
EVAPORATION RATE	<1 (BuAc = 1)
FLASH POINT	Nonflammable
FREEZING POINT	<32 °F (<0 °C)
ODOR	Sweet and mild (no odor once cured)
PH	4-9
PHYSICAL FORM	Liquid
SPECIFIC GRAVITY	1.02-1.10
VAPOR DENSITY	>1 (Air = 1)
WATER SOLUBILITY	100% dispersible, completely (until cured)

SECTION 10- STABILITY AND REACTIVITY

CHEMICAL STABILITY

Stable. Coagulation may occur following freezing, thawing or boiling.

CONDITIONS TO AVOID

Freezing (until cured)

HAZARDOUS REACTIONS

Hazardous polymerization does not occur

HAZARDOUS DECOMPOSITION

Hazardous decomposition products are NOT expected to form during normal storage

CORROSIVITY

Non-corrosive

SECTION 11 - TOXICOLOGICAL INFORMATION

CARCINOGENICITY

Components ≥0.1% are NOT known to be associated with carcinogenic effects.

ACGIH	American Conference of Governmental Industrial Hygienists	Not listed as carcinogenic
IARC	World Health Organization International Agency for Research on Cancer	Not listed as carcinogenic
NTP	U.S. National Toxicology Program	Not listed as carcinogenic
OSHA	U.S. Occupational Safety and Health Administration	Not listed as carcinogenic
Prop 65	California Office of Environmental Health Hazard Assessment Proposition 65	Not listed as carcinogenic

REPRODUCTIVE AND DEVELOPMENTAL TOXICITY

NOT expected to be a hazard

SECTION 12 - ECOLOGICAL INFORMATION

Based on EPA guidelines, this material is classified as practically non-toxic to all species. When used and applied properly, this material is not known to pose any ecological problems.

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OTHER ADVERSE EFFECTS

The material contains non-volatile components, which are NOT expected to be released to air in any significant quantities. The material is NOT expected to have ozone depletion potential, photochemical ozone creation potential or global warming potential.

SECTION 13 - DISPOSAL CONSIDERATIONS

MATERIAL DISPOSAL

Recover or recycle if possible. Do NOT dispose into the environment, in drains or in water courses. To the best of our knowledge, this material does not meet the definition of hazardous waste under the U.S. EPA Hazardous Waste Regulations 40 CFR 261. Solidify and dispose of in an approved landfill. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste classification and disposal methods in compliance with applicable regulations.

CONTAINER DISPOSAL

Dispose in accordance with prevailing regulations, preferably to a recognized collector or contractor. The competence of the collector or contractor should be established beforehand.

LOCAL LEGISLATION

Dispose in accordance with applicable regional, national and local laws and regulations.

SECTION 14 - TRANSPORT INFORMATION

NOT dangerous goods.

U.S. DEPARTMENT OF TRANSPORTATION (DOT)

NOT regulated. This material is NOT subject to DOT regulations under 49 CFR Parts 171-180.

INTERNATIONAL MARITIME DANGEROUS GOODS (IMDG)

NOT regulated. This material is NOT classified as dangerous under IMDG regulations.

INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA)

NOT regulated. This material is either NOT classified as dangerous under IATA regulations or needs to follow country specific requirements.

SECTION 15 - REGULATORY INFORMATION

The regulatory information is not intended to be comprehensive. Other regulations may apply to this material.

U.S. FEDERAL REGULATIONS

EPA COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT (CERCLA)

This material does NOT contain any chemicals with U.S. EPA CERCLA reportable quantities.

EPA SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA)

This material does NOT contain any chemicals with SARA reportable quantities.

EPA TOXIC SUBSTANCES CONTROL ACT (TSCA)

All components listed or in compliance with the inventory.

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EPA CERCLA/SARA SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES AND TPQS

This material does NOT contain any chemicals subject to the reporting requirements of SARA 302 and 40 CFR 372.

EPA CERCLA/SARA SECTION 311/312 (TITLE III HAZARD CATEGORIES)

Acute Health:	No
Chronic Health:	No
Fire Hazard:	No
Pressure Hazard:	No
Reactive Hazard:	No

EPA CERCLA/SARA SECTION 313 AND 40 CFR 372

This material does NOT contain any chemicals subject to the reporting requirements of SARA 313 and 40 CFR 372.

CLEAN AIR ACT (CAA)

This material does NOT contain any hazardous air pollutants (HAP, as defined by the CAA Section 12 (40 CFR 61).

U.S. STATE REGULATIONS

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65)

This material does NOT contain any chemicals known to the State of California to cause cancer, birth defects or reproductive harm.

CANADIAN REGULATIONS

This material has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the SDS contains all the information required by the regulations.

CANADIAN DOMESTIC SUBSTANCES LIST (DSL)

All components listed or in compliance with the inventory.

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHIMIS)

None. This material is NOT a controlled material under the Canadian WHIMIS.

INVENTORY REGULATIONS

Australia	AICS	All components listed or in compliance with the inventory.
Canada	DSL/NDSL	All components listed or in compliance with the inventory.
China	IECSC	All components listed or in compliance with the inventory.
Japan	ENCS	All components listed or in compliance with the inventory.
Korea	KECI	All components listed or in compliance with the inventory.
Philippines	PICCS	All components listed or in compliance with the inventory.
United States	TSCA	All components listed or in compliance with the inventory.

INVENTORIES LEGEND

AICS	Australian Inventory of Chemical Substances
DSL	Canadian Domestic Substances List
ENCS	Japanese Existing and New Chemical Substances
IECSC	China Existing Chemical Inventory
KECI	Korea Existing Chemicals Inventory
NDSL	Canadian Non-Domestic Substances List
PICCS	Philippine Inventory of Chemicals and Chemical Substances
TSCA	Toxic Substances Control Act

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SECTION 16 – OTHER INFORMATION

SDS VERSION NUMBER 1.4

SDS EFFECTIVE DATE 7/15/2015

SDS REGULATIONS

The content and format of this SDS is in accordance with the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

SDS DISTRIBUTION

The information in this document should be made available to all who may handle the material.

DISCLAIMER

The information presented in this Safety Data Sheet is based on data believed to be accurate as of the date this Safety Data Sheet was prepared. HOWEVER, NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY OTHER WARRANTY IS EXPRESSED OR IS TO BE IMPLIED REGARDING THE ACCURACY OR COMPLETENESS OF THE INFORMATION PROVIDED ABOVE, THE RESULTS TO BE OBTAINED FROM THE USE OF THIS INFORMATION OR THE MATERIAL, THE SAFETY OF THIS MATERIAL, OR THE HAZARDS RELATED TO ITS USE. No responsibility is assumed for any damage or injury resulting from abnormal use or from any failure to adhere to recommended practices. The information provided above, and the material, are furnished on the condition that the person receiving them shall make their own determination as to the suitability of the material for their particular purpose and on the condition that they assume the risk of their use. In addition, no authorization is given nor implied to practice any patented invention without a license.

SAFETY DATA SHEET

Emergency Phone Numbers:

435-890-6060

Section 1: Product and Company Information

Manufacturer: ElimaDust, LLC – 656 Carriage LN North – Twin Falls, ID 83301

435-890-6060– info@ElimaDust.com

Trade Name: ElimaDust

Chemical Family: Mixture

Recommended Uses: Dust Control

Section 2: Hazard Identification

Signal Word: N/A

Physical Hazards: None

Acute Toxicity: None

Skin: Category

Eye: Category

Aquatic Toxicity: None

Health Hazards: Non-Toxic

Pictogram: **No** Health Hazard

Precautionary Statements: Wash hands after handling. Wear Protective equipment.

Prevention: Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Wear protective gloves/protective clothing/eye protection/face protection.

Response: **If exposed or concerned:** Get medical advice/attention

Storage: Store in approved container

Disposal: Dispose in Approved facility

Environmental Hazards: None

HNOC*: N/A

Supplemental Info: www.ElimaDust.com

*Hazard(s) not otherwise classified

Section 3: Composition/Information on Ingredients

Component	CAS Number	Percentage
Inverted sucrose/glucose blend	8013-17-0	1-50%
Proprietary Food Thickeners		

Section 4: First Aid Measures

General advice:

Inhalation: Remove to fresh air. If not breathing, give artificial respiration

Skin Contact: Rinse with water

Eye Contact: Wash eyes with plenty water for 15 minutes. Seek medical professional care.

Ingestion: Get medical attention. Do not induce vomiting unless directed by medical personnel.

Section 5: Firefighting Measures

Suitable Extinguishing Media: Use alcohol resistant foam, carbon dioxide, or dry chemical spray.

Specific hazards arising from the substance or mixture: No Data

Special protective equipment and precautions for fire-fighters: Use NIOSH approved gear (self containing breathing apparatus, and personal protection: boots, gloves goggles)

Advice for firefighters: Use NIOSH approved gear (self containing breathing apparatus, and personal protection: boots, gloves goggles)

Further information:

Section 6: Accidental Measures

Emergency Action:

Spill/Leak Procedure:Take steps to avoid release into environment,USDA BioPreferred/Non-Toxic.

Disposal: Transfer into approved container and dispose at approved facility.

Notification: Use NIOSH approved gear (self containing breathing apparatus, and personal protection: boots, gloves goggles)

Section 7: Handling and Storage

Handling: Avoid repeat exposure. Avoid fumes.

Storage: Keep container tightly closed.

Section 8: Exposure Control and Personal Protection

Component exposure limits:

Notes: No data

Engineering Controls: No data

Eye and Face Protection: Safety Glasses.

Skin Protection: Standard PPE

Respiratory Protection: NIOSH approved equipment.

Other Protective Equipment:

Section 9: Physical and Chemical Properties

Appearance/Physical State	Liquid	**Flash Point**	nd
Specific Gravity	nd	**Upper/lower Flammability Limits**	nd
pH	nd	**Auto-ignition Temperature**	nd
Solubility in Water	nd	**Decomposition Temperature**	nd
Odor	nd	**Vapor Pressure**	nd
Odor Threshold	nd	**Vapor Density**	nd
Melting Point (°F/°C)	nd	**Partition Coefficient**	nd
Boiling Range	nd	**Viscosity**	nd
Initial Boiling Point (°F/°C)	nd	**Critical Temperature**	nd
Note: Physical and chemical properties are provided for safety, health, and environmental considerations only and may not fully represent product specifications. Those should be requested separately.			

Section 10: Stability and Reactivity

Reactivity: nd

Chemical Stability: Stable

Incompatibility/Conditions to avoid: None

Hazardous Polymerization: None

Section 11: Toxicological Information

No adverse health effects expected if the product is handled in accordance with this Safety Data Sheet and the product label. Symptoms or effects that may arise if the product is mishandled and overexposure occurs are:

Acute Toxicity: The toxicology effects of this products have not been thoroughly studied.

Section 12: Ecological Information

Ecotoxicity: None

Persistence and Biodegradability: Not Available

Bioaccumulative Potential: Not Available

Mobility in Soil: Not Available

Section 13: Disposal Consideration

Treatment, storage, transportation, and disposal must be in accordance with applicable Federal, State/Provincial, and local regulations. Regulations may vary in different locations.

Section 14: Transportation Information

Section 15: Regulatory Information

Inventories:

Reportable quantities (RQ): no

SARA 302 Components: no

SARA 304 Components: no

SARA 313 Components: no

SARA311/3122 Hazards: no

Section 16: Other Information

Disclaimer: This SDS summarized to our best knowledge at the date of issue, the chemical health and safety hazards of the material and general guidance on how to safely handle the material in the workplace. ElimaDust LLC (EDP) cannot anticipate or control the conditions under which the product may be used, each user must, prior to usage, assess and control the risks arising from its use of the material. If clarification or further information is needed, the user should contact their ElimaDust LLC representative at the contact details in Section 1 of this SDS.

ElimaDust

Dust Abatement System

ElimaDust

ElimaDust is 100% USDA BioPreferred. No SALT!

How Happy would Residents and Land-Owners be if you could dust control the roads and not damage equipment, environment, plants, and animals?

The New Way Forward In Dust Control

A revolutionary new product line deserves a new way of service to win the war on fugitive dust.
*Non-Toxic & Non-Corrosive
*Environmentally friendly.
*USDA Certified BioPreferred.
*Cost effective.
*Immediate reduction of PM5 & PM10 dust particles.
*Long lasting.
*Simple application.
*Reduction of water usage.
Our program is a complete evaluation to capitalize on the most cost-effective way to solve the fugitive dust issues that may be present.
Three things will determine the amount of application, dilution, and duration of ElimaDust.
Soil * Traffic * Climate

ElimaDust absorbs the dust particles allowing the natural dust binder to bind larger aggregate stabilizing your material. It is an interval based solution that utilizes reduced maintenance applications, allowing you to perform road grading maintenance without hindering the performance of the product. Water treatment intervals will reinvigorate ElimaDust particles. When the water intervals start to lose their efficiency, a diluted application of ElimaDust will need to be applied to regenerate the binding strength of the product. This can be applied with a water truck or computer rate controlled distributor truck.

ElimaDust

Email: Info@ElimaDust.com

Salt Based Dust Control Products Vs Groundwater

Salt Inputs to Wappinger Creek

The Cary Institute of Ecosystems Studies
Road Salt: Moving toward the solution
SPECIAL REPORT

ElimaDust is SALT free!

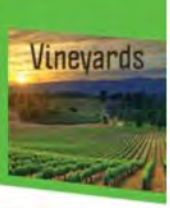
How Safe is ElimaDust?

Safe around food? YES
Vineyards, Orchards, and Crops are areas that can become bothersome during the growing season. ElimaDust is all natural and can not only be spread around the roadways but in the plant rows. ElimaDust acts to stimulate natural ground bacteria. It is biodegradable and completely safe for plants. ElimaDust will aid in Dust Mite control

Safe around Animals? YES
Equine facilities can generally become dusty and uncomfortable to train in. ElimaDust controls the dust in the area and is a perfect application in the arena to make riding more comfortable.

Safe around your home? YES
Driveways always become dusty. ElimaDust controls the dust, so less dust enters the residence and makes outdoor activities more enjoyable.

ElimaDust dust control product is 100% Environment, Plant, and Animal Friendly.



Contact Your ElimaDust Representative for more information.

Email: Info@ElimaDust.com

APPENDIX E

SEA Supporting Information

E-1 - Proposed Invasive Species Treatment (Sequenced by Timing)

Target Species	Treatment					Acres
	Trade Name	Active Ingredients	Solution	Method	Timing	
Sahara mustard *(Brassica tournefortii)*	Roundup ProMax	Glyphosate	2%	Foliar spray, Hand Pull	Jan-Apr	4,894
Cheat grass *(Bromus tectorum)*	Roundup Pro	Glyphosate	2%	Foliar spray, Hand Pull	Feb-Jun	4
	Fusilade II	Fluazifop-P-butly	0.5%	Foliar spray, Hand Pull		
Tumble mustard *(Sisymbrium altissimum)*	Roundup Pro	Glyphosate	2%	Foliar spray, Hand Pull	Feb-Jun	0
London Rocket *(Sisymbrium irio)*	Roundup Pro	Glyphosate	2%	Foliar spray, Hand Pull	Feb-Jun	0
Puncture Vine *(Tribulus terrestris)*	Roundup Pro	Glyphosate	2%	Foliar spray, Hand Pull	Apr-May	0.1
Russian thistle *(Salsola tragus)*	Roundup Pro	Glyphosate	2%	Foliar spray, Hand Pull	Apr-June	3,543
Salt Cedar *(Tamarix ramosissima)*	Garlon 4 Ultra, Polaris	Triclopyr/ Imazapyr	50% / 10%	Cut-stump	Oct-Nov	4.8
Smallflower tamarisk *(Tamarix parviflora)*	Garlon 4 Ultra, Polaris	Triclopyr/ Imazapyr	50% / 10%	Cut-stump	Oct- Nov	0

Source: GSRC 2022.

E-2 – Herbicide Toxicity Summary

(This information was summarized from USDS Risk Assessments. See Appendix A for full citation and website location.)

	Glyphosate	Fluazifop-P-butly	Imazapyr	Triclopyr
Degradation Rates	Foliar Half-Life = Up to 27 days Soil Half-Life = Up to 180 days Water Half-Life = 14 days (minimum); 42 to 70 days (typical) Sediment Half-Life = Up to 208 days Terrestrial/Field Dissipation = Up to 240 days Very soluble; long-term persistence if reaches groundwater. Unlikely to reach shallow groundwater in silty/loam soils; very unlikely in sandy soils. (NPIC 2022)	Foliar Half-Life = Up to 9 days Soil Half-Life = Up to 120 day. *Fluazifop-P*: Up to 168 days (aerobic conditions); 1 to 3 years (anaerobic conditions). Water Half-Life = 60 days. *Fluazifop-P*: 78 days Sediment Half-Life = Up to 6 years Terrestrial/Field Dissipation = Up to 7 days Fluazifop-P-butyl is rapidly converted to fluazifop-P, which is more persistent. No very soluble and very unlikely to reach groundwater (NPIC 2022).	Foliar Half-Life = 30 days Soil Half-Life = Up to 6 years (extrapolated; data varies) Water Half-Life = 20 to 200 days Sediment Half-Life = 17 months, 14 years, and some evidence of no degradation Terrestrial/Field Dissipation = Up to 180 days Very soluble; long-term persistence if reaches groundwater (NPIC 2022).	Foliar Half-Life = Up to 15 days. Up to 27 days on fruit. Soil Half-Life = Up to 130 days Water Half-Life = 6 to 10 days (pond); lower in larger water bodies. *Triclopyr TEA – up to 18 days (aerobic); and 2 years (anaerobic)* Sediment Half-Life = Up to 14 days Terrestrial/Field Dissipation = Up to 60 days. Moderately soluble. Long-term persistence if reaches groundwater. Triclopyr & Triclopyr Triethylamine salt (TEA) have a moderate potential to reach shallow groundwater. (NPIC 2022)
Humans Health Risk	• If contaminated vegetation is eaten shortly after glyphosate applied, HQ=1 at 1.4 lbs a.e./acre and HQ=5.6 at 8 lbs a.e./acre. • Worker risk minimal. At 8 lbs a.e./acre (HQ = 0.6); upper bound was for broadcast application.	• Eating contaminated vegetation (acute exposure), HQs = 1 to 1.4. For chronic exposure, HQs >1, with risk increasing with successive treatments. • Based on upper exposure estimates for backpack spray applications, HQs exceed level of concern by factors of up to 43. Worker protected necessary. • Potential inhalation hazard; volatilizes in heat. (NPIC 2022)	• Mildly irritating to eyes and skin. • HQs < 1 at 1 lb a.e./acre and no exposures substantially exceeded HQ of 1 at 1.5 lb a.e./acre. • HQs<1 for worker exposure, including wearing contaminated gloves for 1 hour, but risk increases if wear contaminated gloves for > 1 hour.	• HQs high for a young woman eating contaminated vegetation (HQ = 27 for acute exposure / HQ = 6 chronic) at 1 lb a.e./acre. • Triclopyr may cause adverse reproductive outcomes in humans. • HQs < 1 if wear contaminated gloves for 1 hour and 1-hour dermal contact, but higher risk for women wearing contaminated gloves for 2½ hours (HQ>1). • Potential inhalation hazard; volatilizes in heat. (NPIC 2022)
Plants and Animals	Terrestrial Environment: • HQ > 1 at rates above 3.3 lb a.e./acre for birds. • HQ up to 10 at 8 lb a.e./acre for insect dietary exposure. • At rates greater than 2.5 lb a.e./acre, potential risks to mammals. • Non-target plants can be killed from direct spray and drift. Risk depends on application rate, application method, and site-specific conditions that can influence drift. See highlighted scenarios in Table A-25. Aquatic Environment. At 1 lb a.e./acre, HQ = 2 for amphibians and other HQs = 1 to 1.7 for fish, invertebrates, and plants.	Terrestrial Environment: • After three applications, HQs reach up to 57 for a small bird and 146 for a small mammal. After one or two applications, HQs lower. • HQs for mammals of greater concern because of possible effects to reproductive capacity. • Potential risk to some sensitive species of terrestrial arthropods but may enhance the growth of wildflowers can benefit bees and butterflies. Aquatic Environment. Risks to plants and invertebrates.	Terrestrial Environment: • Practically non-toxic to mammals, birds, honeybees, fish, and aquatic invertebrates. HQ = 1.4 if eat contaminated grass. • Likely to alter vegetation within the treatment area, affecting terrestrial animals and non-target plants. See highlighted scenarios in Table A-26. Aquatic Environment. Practically non-toxic to fish and invertebrates (HQs<1).	Terrestrial Environment: • HQs <1 based on central estimates for all application methods at 1 lb a.e./acre. For broadcast application, HQ = 1.4 at 9 lbs a.e./acre. • HQs >1 for birds and mammals eating contaminated vegetation at 1 lb a.e./acre. Potential for developmental effects in large mammals. See highlighted scenarios in Tables A-27 and A-28. Aquatic Environment. Application of triclopyr BEE in excess of 1.5 to 3 lbs a.e./acre could result in acute adverse effects to sensitive species of fish or invertebrates, if substantial drift or off-site transport.
Data Gap	Lack of reptiles/terrestrial amphibian data; birds as surrogate. Toxicity of surfactants varies (see Table A-24).	Lack of field studies. Risk to mammals and birds limited to laboratory studies. Lack reptiles/terrestrial amphibian data and concern expressed regarding use of birds as surrogate.	Lack of reptiles/terrestrial amphibian data; birds as surrogate. Toxicity data only for Arsenal formulation.	Lack of reptiles/terrestrial amphibian data; birds as surrogate.
Hazardous or Restricted	Non-US study show potential for human chromosomal damage. MON-14420 formulation is hazardous. POEA (polyethoxylated tallow amines) surfactants are toxic to aquatic organisms. Glyphosate listed as cancer causing (California 2022), but no significant risk level at 1100 micrograms/day (OEHHA 2017). Federal Restricted Use Product = EXPERT HERBICIDE (USEPA 2022g).	Developmental and reproductive toxicity (California 2022 and OEHHA 2022b).	Federal Restricted Use P Product = Kifix 70 DG (USEPA 2022g).	Two forms of triclopyr are used commercially as herbicides: the triethylamine salt (TEA) and the butoxyethyl ester (BEE). Longer term toxicities exist with triclopyr as it degrades. TCP is the main metabolite. TCP is more toxic than triclopyr to mammals and aquatic animals. Federal Restricted Use Product = GF-1249; and INVORA VM (USEPA 2022g).

*Summaries based on chemical properties. If not specified or unclear, GLEAMS model assumptions underlying the risk assessment are presented. Upper range or limit presented when variation existed. (Mains sources: SERA 2011a, 2011b, 2011c and 2014).

E-3 - Toxicity Classifications for Glyphosate Formulations

Confidence	Low Toxicity		Medium Toxicity		High Toxicity	
High Confidence	**Accord**	Glyphosate VMF			Buccaneer	**Roundup Orig.**
	Accord Conc	Glypro			Cornerstone	Roundup Pro
	AquaMaster	**Rodeo**			Eliminator	Roundup Pro Conc.
	AquaNeat				Gly Star Plus	Roundup ProDry
	Foresters				**Honcho**	Roundup ProMax
	Glyfos Aquatic				Ranger Pro	Roundup UltraMax
Medium Confidence	Diamondback		Accord SP	Glyphomax Plus	Glyphogan	
			Buccaneer Plus	Gly-4 Plus	Glyphos X-TRA	
			Cornerstone Plus	Honcho Plus	Roundup Orig. Max	
Low Confidence	Aqua Star		Accord XRT		Accord XRT II	RapidFire
			Durango		DuraMax	Roundup WeatherMax
			Glyphomax XRT		Durango DMA	
			Mirage		Helosate Plus	RT 3

Source: SERA 2011a.

Effects to Terrestrial Plants: Direct Spray or Drift

E-4 - Glyphosate HQs

	HQ Values		
	Backpack	Ground Broadcast	Aerial
Distance Downwind (Feet)	Sensitive Species		
0	**769**	**769**	**769**
25	**6**	**27**	**172**
50	**3**	**14**	**132**
100	**1.9**	**7**	**75**
300	0.7	**3**	**24**
500	0.4	**1.6**	**15**
900	0.2	0.8	**10**
	Tolerant Species		
0	**2**	**2**	**2**
25	2E-02	8E-02	0.5
50	1E-02	4E-02	0.4
100	5E-03	2E-02	0.2
300	2E-03	8E-03	7E-02
500	1E-03	5E-03	4E-02
900	7E-04	2E-03	3E-02

Source: SERA 2011a. Note: HQs based on 1 lb a.e. / acre.

E-5 - Imazapyr HQs

Distance Downwind (feet)	Hazard Quotients Based on Drift for the Specified Application Methods			
	Aerial	High Boom Ground Broadcast	Low Boom Ground Broadcast	Backpack
	Sensitive Species			
0	**15,625**	**15,625**	**15,625**	**15,625**
25	**3,484**	**1,625**	**547**	**130**
50	**2,672**	**781**	**277**	**68**
100	**1,530**	**388**	**148**	**38**
300	**488**	**118**	**55**	**15**
500	**300**	**61**	**33**	**9**
900	**194**	**26**	**17**	**5**
	Tolerant Species			
0	**3**	**3**	**3**	**3**
25	0.6	0.3	9E-02	2E-02
50	0.4	0.1	4E-02	1E-02
100	0.2	6E-02	2E-02	6E-03
300	8E-02	2E-02	9E-03	2E-03
500	5E-02	1E-02	5E-03	1E-03
900	3E-02	4E-03	3E-03	8E-04

Source: SERA 2011c

Effects to Terrestrial Mammals & Birds: Direct Spray or Drift

E-6 - Triclopyr HQs

Non-Accidental Acute Exposures				
Contaminated Fruit (Lowest Residue Rate)				
	Small mammal (20g)	4E-02	5E-03	0.1
	Larger Mammal (400g)	4E-02	5E-03	0.1
	Large Mammal (70g)	0.3	4E-02	0.9
	Small bird (10g)	0.3	4E-02	**1.0**
	Large Bird (4 kg)	3E-02	4E-03	0.1
Contaminated Vegetation (Short Grass - Highest Residue Rate)				
	Small mammal (20g)	0.3	3E-02	**1.6**
	Larger Mammal (400g)	0.3	3E-02	**1.6**
	Large Mammal	**2**	0.2	**11**
	Small bird (10g)	**3**	0.3	**14**
	Large Bird (4 kg)	0.3	3E-02	**1.5**
Chronic/Longer Term Exposures				
Contaminated Fruit (Lowest Residue Rate)				
	Small mammal (20g)	0.3	3E-02	**1.8**
	Larger Mammal (400g)	0.3	3E-02	**1.8**
	Large Mammal (70g)	**2**	0.2	**13**
	Small bird (10g)	**1.8**	0.2	**11**
	Large Bird (4 kg)	0.2	2E-02	**1.3**
Contaminated Vegetation (Short Grass - Highest Residue Rate)				
	Small mammal (20g)	0.7	3E-02	**7**
	Larger Mammal (400g)	**5**	0.2	**53**
	Large Mammal (70g)	**5**	0.2	**54**
	Small bird (10g)	0.5	2E-02	**6**
	Large Bird (4 kg)			

Source: SERA 2011b.

E-7 - TCP HQs

Non-Accidental Acute Exposures			
Contaminated Fruit (Lowest Residue Rate)			
Small mammal (20g)	0.2	2E-02	0.7
Larger Mammal (400g)	4E-02	6E-03	0.2
Large Mammal (70g)	2E-02	3E-03	9E-02
Contaminated Vegetation (Short Grass - Highest Residue Rate)			
Small mammal (20g)	**1.6**	0.2	**8**
Larger Mammal (400g)	0.4	4E-02	**1.8**
Large Mammal	0.2	2E-02	**1.0**
Chronic/Longer Term Exposures			
Contaminated Fruit (Lowest Residue Rate)			
Small mammal (20g)	0.3	3E-02	**1.3**
Larger Mammal (400g)	7E-02	8E-03	0.3
Large Mammal (70g)	4E-02	4E-03	0.2
Contaminated Vegetation (Short Grass - Highest Residue Rate)			
Small mammal (20g)	0.9	4E-02	**10**
Larger Mammal (400g)	0.2	9E-03	**2**

Source: SERA 2011b

E-8 - Cultural Resource Coverage for Designated Ranges

Range	Acreage	Surveys	Years	Percent Inventoried
R-051	36.9	ABR023; CRR145	1998; 2007	100%
R-1	47.5	CRR036	1998	81.1%
R-1A	23.1	CRR036	1998	7.4%
R-2	2.6	CRR036	1998	100%
R-2A	1.3	CRR036	1998	100%
R-3	1.5	CRR036	1998	100%
R-3A	3.4	CRR036	1998	91.2%
R-100	1079.4	ABR020; ABR065; ABR070; ABR082; ABR124; ABR150; ABR171; CRR040; CRR186	1997; 2005; 2006; 2009; 2014; 2017; 2022; 1998; 2010;	13.2%
R-101	132.5	ABR118; CRR196	2014; 2011	82.7%
R-102	732.9	ABR072; CRR008; CRR066; CRR079; CRR140; CRR194	1993; 2001; 2002; 2011; 2006; 2006	95.7%
R-103	512.9	CRR140; CRR196; CRR251	2006; 2011; 2017	7.2%
R-104	348.7	CRR140	2006	89.2%
R-105	176.3	CRR140	2006	49%
R-105A	5.6	CRR140	2006	100%
R-106	412.2	ABR050; CRR140	2003; 2006	39%
R-106A	8.1	ABR050; CRR140	2003; 2006	100%
R-107	813.4	CRR140	2006	43.2%
R-108	875.6	CRR013; CRR140	1994; 2006	42.6%
R-109	485.3	CRR011; CRR087	1994; 2003	91.3%
R-110	635.8	CRR087	2003	28.6%
R-110A	12.5	ABR051; CRR087	2003a; 2003b	72%
R-111	256.9	CRR011; CRR218	1994; 2014	94.2%
R-112	2,777.5	ABR037; CRR218	2001; 2014	0.03%
R-113	987.2	CRR011; CRR038; CRR218	1994; 1998; 2014	91.2%
R-113A	175.9	CRR038; CRR218	1998; 2014	99.7%
R-114	77.2	CRR218	2014	17%
R-200	47.7	ABR027; ABR056; ABR059; ABR065; ABR070	1999; 2004a; 2004b; 2005; 2006	96.2%
R-205	84.1	CRR154; CRR173	2007; 2010	16.6%
R-210	142.8	ABR056; ABR076; ABR113; CRR091; CRR173; CRR251	2004; 2006; 2012; 2003; 2010; 2017	97.1%
R-215	142.8	ABR018; ABR060; ABR065; ABR070; CRR037	1996; 2004; 2005; 2006; 1998	100%
R-220	892.5	ABR084; CRR099; CRR127; CRR134	2003; 2005; 2006; 2008	100%
R-225	45.7	CRR066	2001	100%
R-230	45.1	ABR087; ABR168	2008; 2021	100%
R-400	958.7	ABR091; ABR169; CRR173	2009; 2010; 2021	0.9%
R-401	219	ABR055; CRR040	1998; 2004	36.6%
R-410	119.9	ABR029; ABR091; ABR174	1999; 2009; 2022	6.3%
R-410A	335	CRR173	2010	0.1%
R-500	1824	ABR011; ABR057; CRR038; CRR097	1995; 2003a; 1998; 2003b	97.8%

Range	Acreage	Surveys	Years	Percent Inventoried
R-500 BZO	14.8	ABR053; ABR057; CRR097	2003a; 2003b; 2003c	97.3%
R-620	248.3	CRR021; CRR245	1996; 2016	99.8%
R-630	990.4	ABR069; ABR080; ABR090; ABR101; ABR102; CRR028; CRR038	2006; 2007; 2009; 2010a; 2010b; 1997; 1998;	37.9%
R-700	9.75	ABR043; ABR082; CRR186	2002; 2009; 2010	55.4%
R-705	192.9	ABR008; ABR034; ABR042; ABR067; ABR072;ABR074; ABR079; ABR099; ABR164; ABR165; CRR008; CRR066; CRR079; CRR140; CRR183; CRR196; CRR248	1990; 2000; 2002a; 2006a; 2006b; 2006c; 2007; 2010; 2021a; 2021b; 1993; 2001; 2002b; 2006d; 2010; 2011; 2017	73.1%
R-705A	1193.4	ABR010; ABR020; ABR034; ABR044; ABR048; ABR067; ABR072; ABR079; ABR108; ABR118; ABR165; CRR008; CRR140; CRR194; CRR196; CRR251	1993a; 1997; 2000; 2002a; 2002b; 2006; 2007; 2012; 2014; 2021; 1993b; 2006a; 2011; 2006b; 2011; 2017	87%
R-800	508.3	ABR079; CRR008; CRR140	1993; 2006; 2007	97.7%

E-9 – Environmental Justice Population Data

Affected Environment	Total Population	Minority Population (%)	Low Income Population (%)	Environmental Justice Population? (50% Test)	Comparison to Reference Populations (Meaningfully Greater Test)
U.S. Census Data 2020					
San Bernardino County (***Reference***)	2,194,710	76.4	13.2	High minority	N/A
Joshua Tree CDP	7,414	28	20.5	No	Low Income (1.5 times higher)
Lake Havasu City	58,284	16.8	11.9	No	No exceedence
Lucerne Valley CDP	5,811	45.2	37.1	No	Low-income (2.8 times higher)
Twentynine Palms City	27,435	40	19.9	No	Low-income (1.5 times higher)
Yucca Valley Town	21,821	34.7	19	No	Low-income (1.4 times higher)
EJ Screen Version 2021					
North & East Areas	4,337	42	53	Low income	Low income (4 times higher)
West & South Areas	5,756	35	55	Low income	Low income (4 times higher)
Twentynine Palms	26,334	44	50	Low income	Low income (3.7 times higher)
EJ Screen Version 2.1					
Cadiz Polygon	55	48	71	Pocket of low income	Low income (5.4 times higher)
Lake Havasu Polygon	2,562	69	85	Pocket of low income and minority	Low income (6.4 times higher)
Landers Polygon	2,994	28	54	Pocket of low income	Low income (4 times higher)
Twentynine Palms Polygon	1,463	73	91	Pocket of low income and minority	Low income (7 times higher)
Yucca Polygon	2,753	58	57	Pocket of low income and minority	Low income (4 times higher)

Sources: US Census 2020, USEPA 2022d, and USEPA 2022e.

Note: The EJ Screen uses available data, to include U.S. Census data, however, the results of the queries may not be as exact as the Census QuickFact data. This is because the results are influced by how the polygons are drawn and some areas are averaged. For example, the town of Cadiz is located in a large tract, to include areas not adjacent to the Combat Center or under its exisiting airspace and a specific polygon drawn around Cadiz still references the values in the larger polygon, although the population total is adjusted. Despite this variation, all data reviewed is presented to ensure complaince with the CEQ guidance to identify overlooked environmental justice communities (pockets) within larger populations.

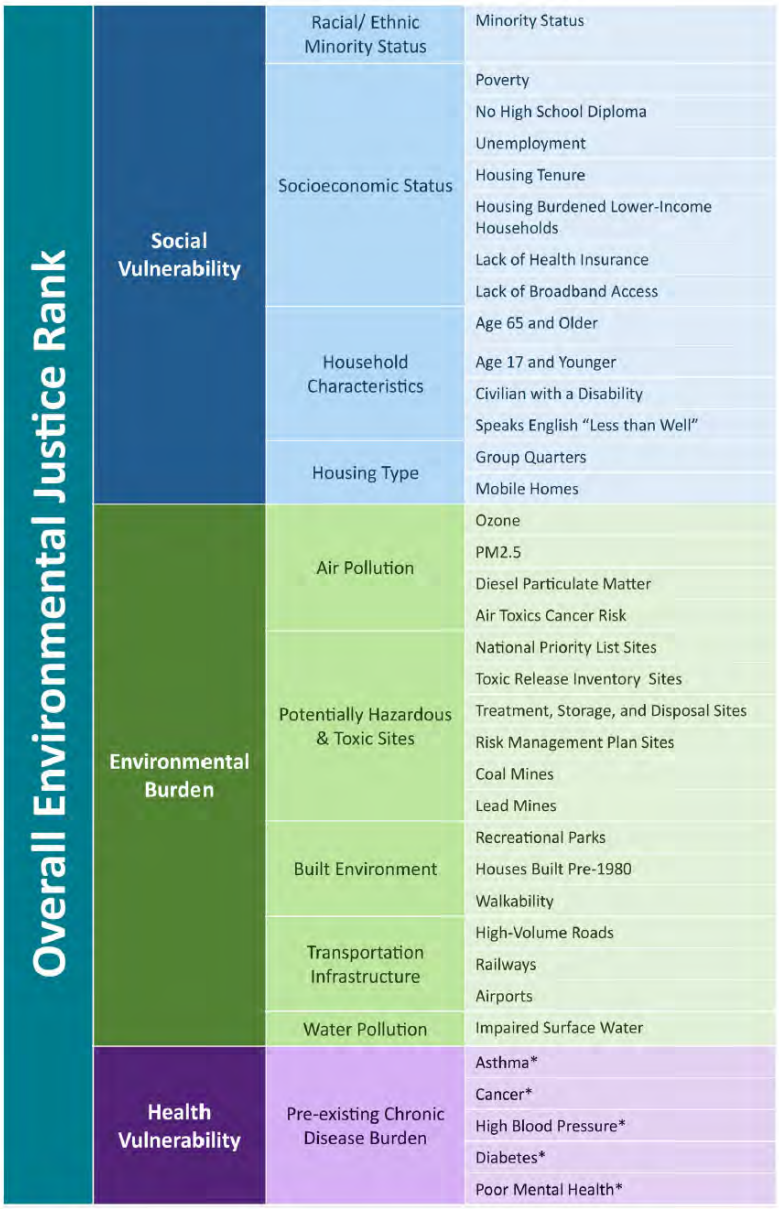
E-10 - Environmental Justice Index Data

Topic	Combat Center *Census Tract 104.02*	Area North *Census Tract 103*	Area South *Census Tract 104.16*	Area Southwest *Census Tract 104.10*	Area East *Census Tract 104.9*	Area Southeast *Census Tract 251*	Area West *Census Tract 104.24*
EJI Rank	0.15	0.82	0.57	0.52	0.62	0.85	0.83
Environmental Burden Rank	0.04	0.66	0.03	0.04	0.38	0.24	0.21
Social Vulnerability Rank	0.39	0.96	0.76	0.66	0.72	0.86	0.81
Air Pollution	0.3	0.26	0.23	0.22	0.22	0.33	0.2
Potentially Hazardous & Toxic Sites	0.2	0.87	0	0	0.56	0.19	0.56
Built Environment	0.62	0.7	0.86	0.94	0.87	0.51	0.94
Transportation Infrastructure	0	0.67	0	0	0.56	0.69	0.09
Water Pollution	0	0.14	0	0	0	0.19	0
Minority Status	0.59	0.6	0.45	0.52	0.67	0.69	0.47
Socioeconomic Status	0.46	0.85	0.72	0.64	0.72	0.84	0.78
Household Characteristics	0.08	0.89	0.95	0.84	0.77	0.79	0.94
Housing Type	0.65	0.98	0.43	0.43	0.39	0.67	0.47
High Pre-existing Chronic Disease Prevalence	1 of 5	2 of 5	3 of 5	3 of 5	2 of 5	5 of 5	5 of 5

Source: CDC-ATSDR 2022.

Note: “The Environmental Justice Index (EJI) scores census tracts using a percentile ranking which represents the proportion of tracts that experience cumulative impacts of environmental burden and injustice equal to or lower than a tract of interest. For example, an EJI ranking of 0.85 signifies that 85% of tracts in the nation likely experience less severe cumulative impacts on health and well-being than the tract of interest, and that 15% of tracts in the nation likely experience more severe cumulative impacts from environmental burden. Click here for more information on EJI background and methods.” (CDC-ATSDR 2022).

Environmental Justice Index Indicators



TEXT-ONLY VERSION

Social vulnerability module

- Racial/Ethnic Minority Status
  - » Minority Status
- Socioeconomic Status
  - » Poverty
  - » No High School Diploma
  - » Unemployment
  - » Housing Tenure
  - » Housing Burdened Lower-Income Households
  - » Lack of Health Insurance
  - » Lack of Broadband Access
- Household Characteristics
  - » Age 65 and Older
  - » Age 17 and Younger
  - » Civilian with a Disability
  - » Speaks English "Less than Well"
- Housing Type
  - » Group Quarters
  - » Mobile Homes

Environmental Burden Module

- Air Pollution
  - » Ozone
  - » PM2.5
  - » Diesel Particulate Matter
  - » Air Toxics Cancer Risk
- Potentially Hazardous and Toxic Sites
  - » National Priority List Sites
  - » Toxic Release Inventory Sites
  - » Treatment, Storage, and Disposal Sites
  - » Risk Management Plan Sites
  - » Coal Mines
  - » Lead Mines
- Built Environment
  - » Recreational Parks
  - » Houses Built Pre-1980
  - » Walkability
- Transportation Infrastructure
  - » High-Volume Roads
  - » Railways
  - » Airports
- Water Pollution
  - » Impaired Surface Water

Health Vulnerability Module

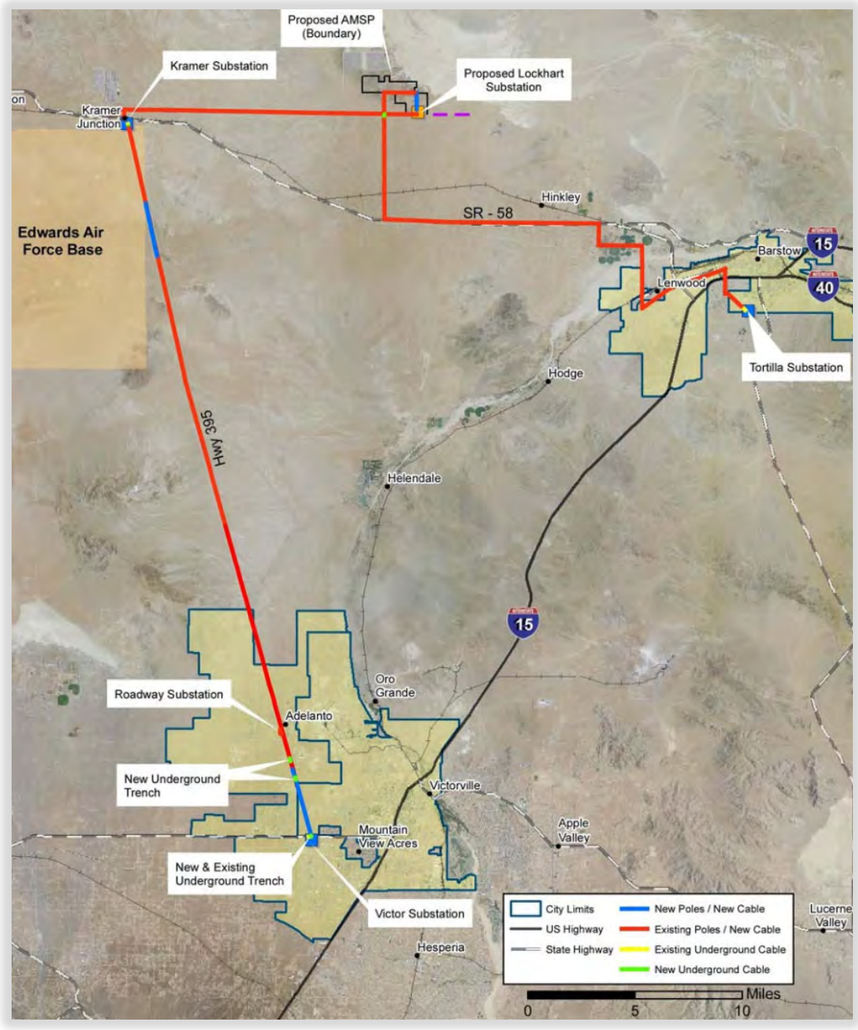
- Pre-existing Chronic Disease Burden
  - » Asthma*
  - » Cancer*
  - » High Blood Pressure*
  - » Diabetes*
  - » Poor Mental Health*

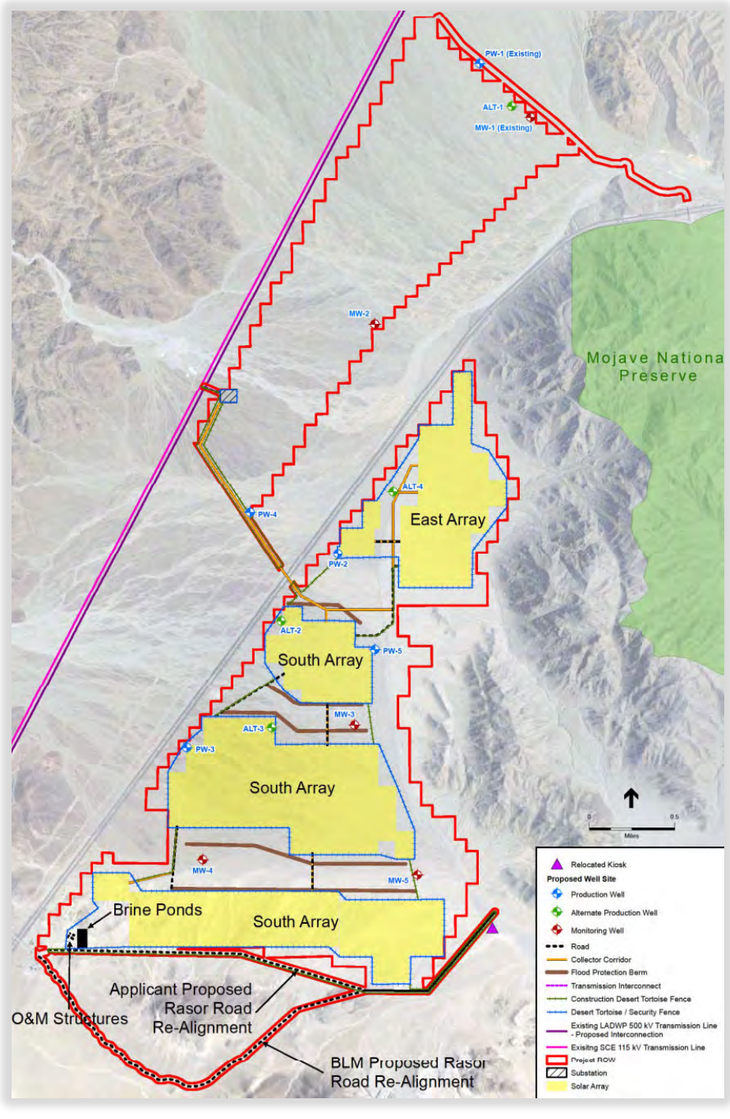
Health vulnerability measures are marked with asterisks because they are calculated differently than other indicators. While most indicators can have a range of values, the health vulnerability indicators represent only whether a given census tract experiences a high estimated prevalence of disease or not. See the technical documentation for more information on indicators and index scoring.

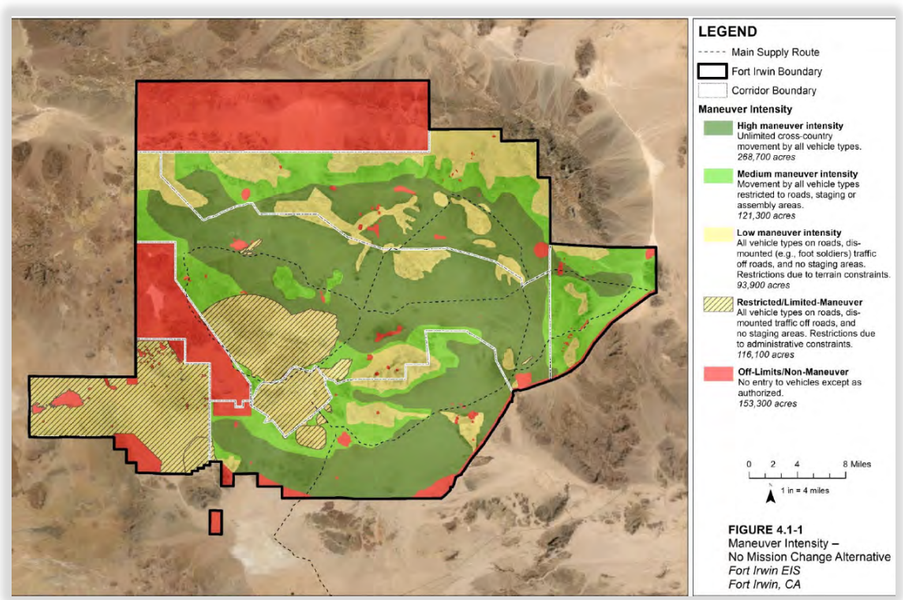
CDC ATSDR

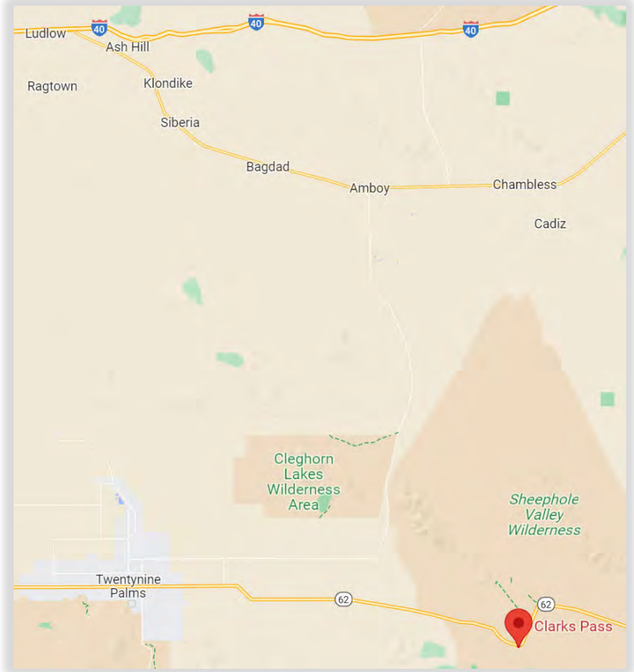
https://www.atsdr.cdc.gov/placeandhealth/eji/index.html#:~:text=The%20Environmental%20Justice%20Index%20uses%20data%20from%20the,environmental%20injustice%20on%20health%20for%20every%20census%20tract.

E-11 – Cumulative Impact Projects & Summaries of Relevant Impacts

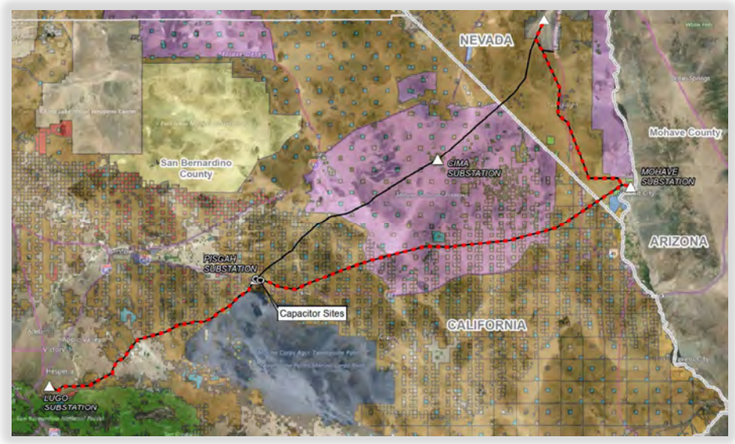
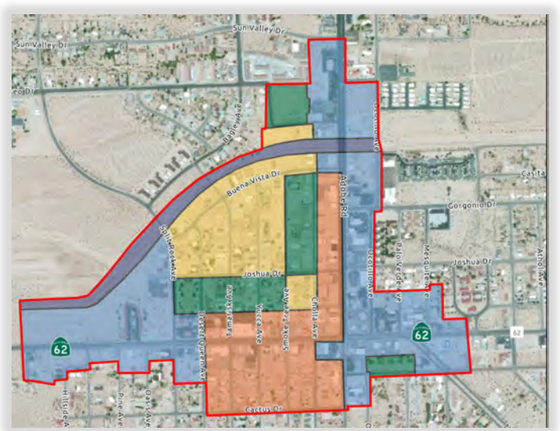
Project #	Project Summary	Air Quality	Desert Tortoise	Cultural Resources	Climate Change	Environmental Justice	Public Health & Safety
Project 1	**Southern California Edison (SCE) Abengoa Mojave Solar Power Plant** Project Scope: Construction of 2 solar facilities and fiber optic lines on 1,765 acres, primarily on private lands and some BLM-managed land. Connected Actions: • BLM Rights-of-Way: Five authorizations covering approximately 173 acres. Project Area: West of Combat Center  (BLM 2011 and DOE 2011)	*De minimis*	Adverse effects mitigated per the project's Desert Tortoise Clearance and Relocation/Translocation Plan (e.g., clearance surveys, exclusion fencing, etc.). Temporary impact to habitat (approximately 452 acres) to include 37 acres of designated critical habitat.	None	Estimated annual emissions (metric tons CO2e) = 21,803 (construction) and 10,884 (operations). Project would result in potential reduction of 350,000 metric tons CO2 per year in state.	No disproportionate impact	Toxic air pollutants and electromagnetic fields.

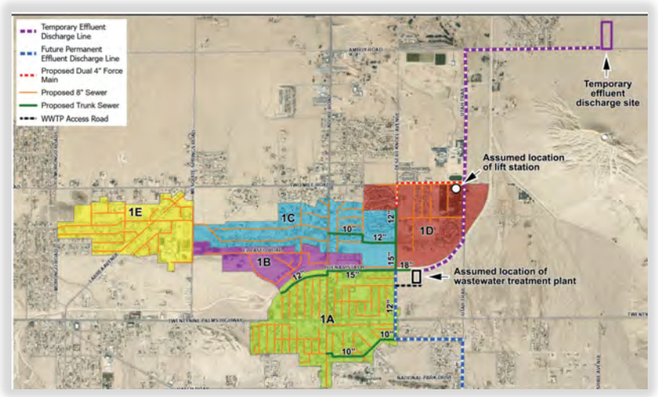
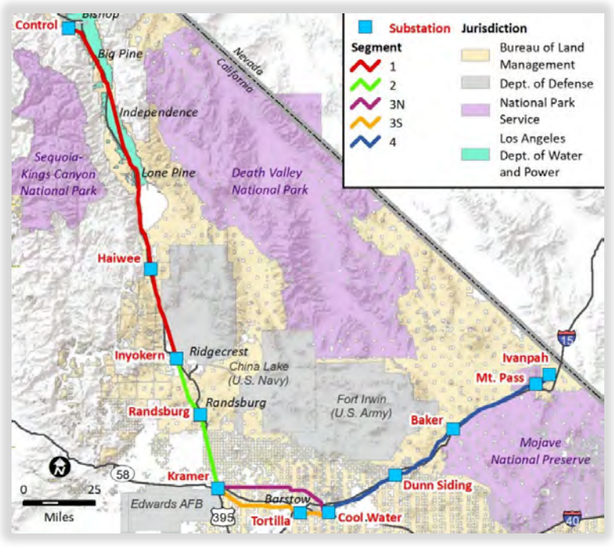
Project #	Project Summary	Air Quality	Desert Tortoise	Cultural Resources	Climate Change	Environmental Justice	Public Health & Safety
Project 2	**<u>Soda Mountain Solar Project</u>** <u>Project Scope</u>: Construction of solar facility covering 4,179 acres, with 2,557-acre disturbance footprint on BLM-managed public lands (CDCA Plan amendment required and rights-of-way to be issued). Variant of Alternative B selected. <u>Project Area</u>: North of Combat Center  (BLM 2015)	Alternative B would conform to the SIP and the BLM would be exempt from performing a conformity determination.	Adverse effects mitigated (e.g., surveys, exclusion fencing, clearance and translocation, etc.). Impacts to approximately 1,817 acres of habitat.	Direct impacts to 3 archeological sites and 31 isolates would be mitigated by implementation of a Cultural Resources Discovery and Monitoring Plan.	Project would result in potential reduction of 206,820 metric tons CO2e per year	No disproportionate impacts	Accidental release of hazardous materials and potential worker exposure to Valley fever.

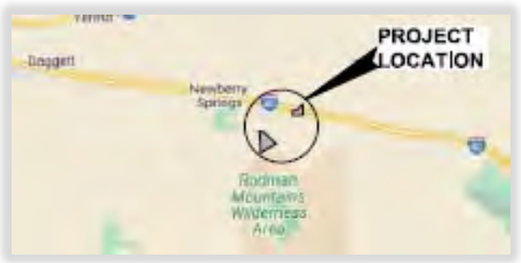
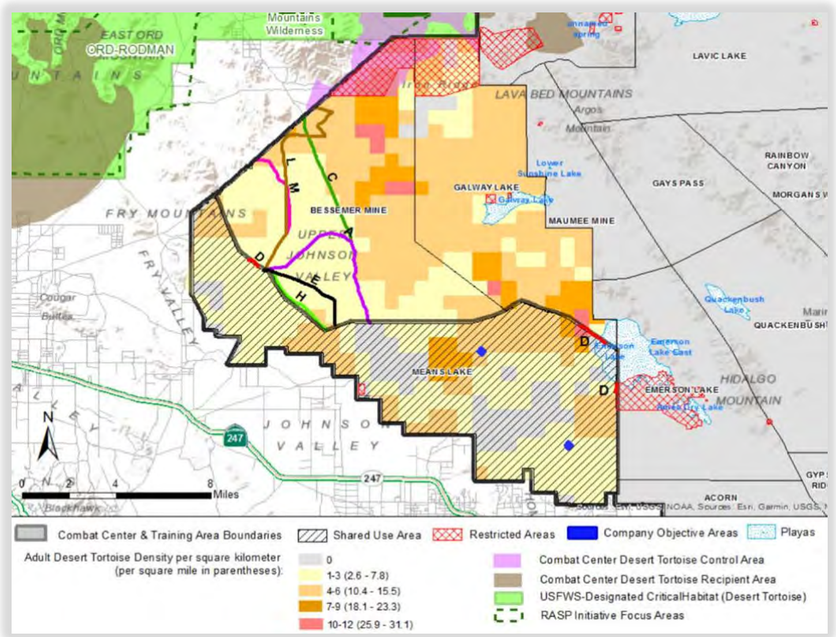
Project #	Project Summary	Air Quality	Desert Tortoise	Cultural Resources	Climate Change	Environmental Justice	Public Health & Safety
Project 3	**2022 Rebelle Rally** Project Scope: Navigational event in Nevada and California; 100 competitors on a 745 to 1,243-mile route. Project Area: North, East and South of Combat Center  (BLM 2022b)	None	None	None	None	None	None
Project 4	**Army Military Training & Public Land Withdrawal Extension** Project Scope: Land withdrawal re-authorization (110,000 acres), ongoing and future training activities, and increased maneuver alternatives in the western training area (currently maneuver limited). Project Area: North of Combat Center.  (USAEC 2021)	*De minimis* air quality impact with mitigation to minimize fugitive dust and ensure compliance with the Clean Air Act (e.g., stabilize training routes, revegetation, etc.).	Desert tortoises occur at low numbers. Adverse effects mitigated by standard avoidance and minimization measures applicable during training (e.g., desert tortoise briefing) and continued management of 4 conservation areas (4,270 acres) that are off-limits to all training activities, fenced and marked with signs visible during day and night.	Adverse effects from activities that may affect integrity of cultural resources and historic properties (e.g., maneuver training affecting archeological sites). Compliance with ICRMP, PA, and mitigation incorporated into the proposed action (e.g., surveys, evaluations, resolution of adverse effects, and inadvertent discovery protocols).	None	No disproportionate impacts.	Adverse effects mitigated by standard avoidance measures (e.g., buffer abandoned mines, educate personnel on Valley fever, UXO clearance, limit personnel in areas used for bomb drops), but no effects to the general public.

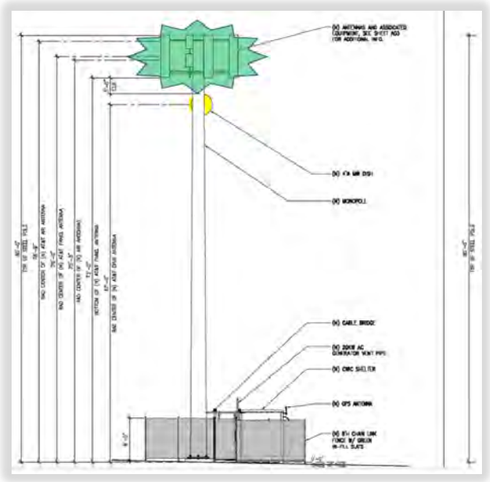
Project #	Project Summary	Air Quality	Desert Tortoise	Cultural Resources	Climate Change	Environmental Justice	Public Health & Safety
Project 5	**CalTrans District 8 Road Projects** Project Scope: • Interstate 40 Regrade Existing Median. Regrade the existing median cross slopes within the 30-foot clear recovery zone (CRZ) on Interstate 40 from Homer Wash bridge near the Town of Ludlow to the California/Arizona State Line. • State Route 62 Widen Shoulders and Install Rumble Strips. Widen the outside shoulder of State Route 62 to eight feet in both directions and install ground-in rumble strips on the centerline and on the outside shoulders. The project is within the Cadiz Valley Southeast, Valley Mountain, and Clarks Pass. Project Area: North (Ludlow) and Southeast (Clarks Pass) of Combat Center  Source: Google Maps (CalTrans 2023)	Information not readily available on Caltrans District 8 project webpages or California's Office of Planning and Research CEQAnet Web Portal. A California Department of Fish and Wildlife Incidental Take Permit was issued for Interstate 40 Regrade Existing Median. Adverse impacts to 247 acres of desert tortoise habitat mitigated (e.g., Desert Tortoise Translocation Plan and compensatory mitigation via conservation or mitigation bank (741 acres required to be purchased/protected into perpetuity). (CDFW 2019).				

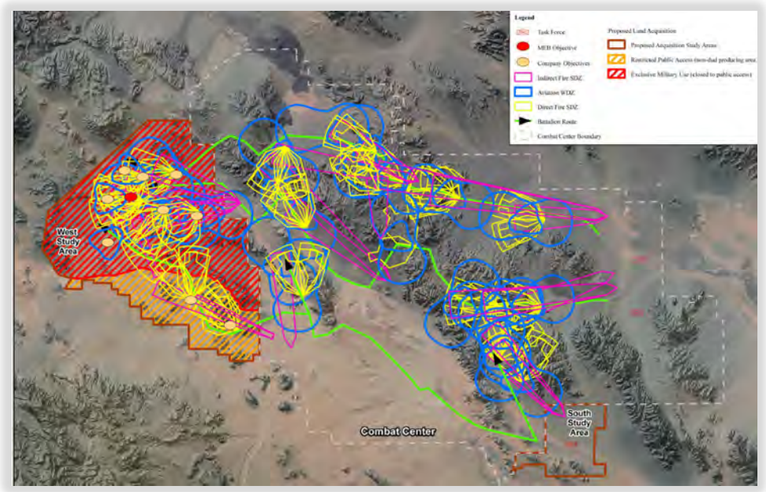
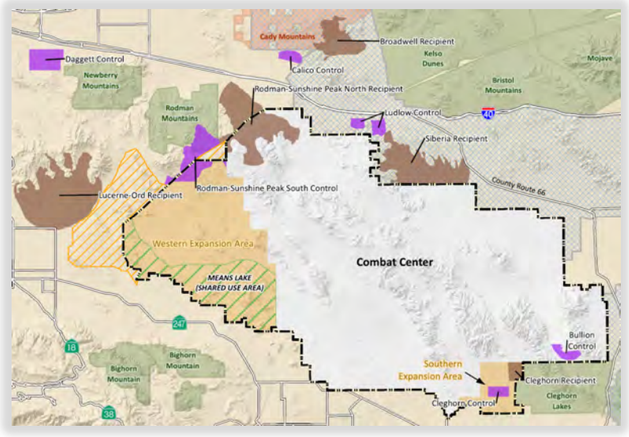
Project #	Project Summary	Air Quality	Desert Tortoise	Cultural Resources	Climate Change	Environmental Justice	Public Health & Safety
Project 6	**<u>Cadiz Oil & Gas Pipeline to Transport Water Project</u>** <u>Project Scope</u>: conversion an existing natural gas pipeline to transport water over private and federal lands; 58 miles of the 220-mile pipeline is on BLM public lands. Connected Actions: Cadiz Real Estate MLA Assignment; and Cadiz 41-Foot Pipeline ROW. <u>Project Area</u>: North of Combat Center  (BLM 2020, BLM 2021, and Cadiz Inc., 2023)	Information not available. Pending development of environmental documents.					
Project 7	**<u>SCE Lugo-Victorville/Eldorado Lugo 500kV Remedial Action Scheme</u>** <u>Project Scope</u>: installation and upgrades of telecommunication facilities and fiber optic cables within rights-of-way crossing federal, state, and private land (e.g., BLM and NPS); 84 miles total. <u>Project Area</u>: North of Combat Center  (BLM 2023b)	De minimis	Adverse impacts mitigated (e.g., Desert Tortoise Take Avoidance and Minimization Plan, authorized biologist, etc.) Approximately 63 acres of tortoise habitat temporarily affected, which includes 31 acres in critical habitat.	Adverse impacts to cultural resources would be mitigated (e.g., Cultural Resources Management Plan). Approximately 159 cultural resources located in the project alignment.	None	No disproportionate impacts	None

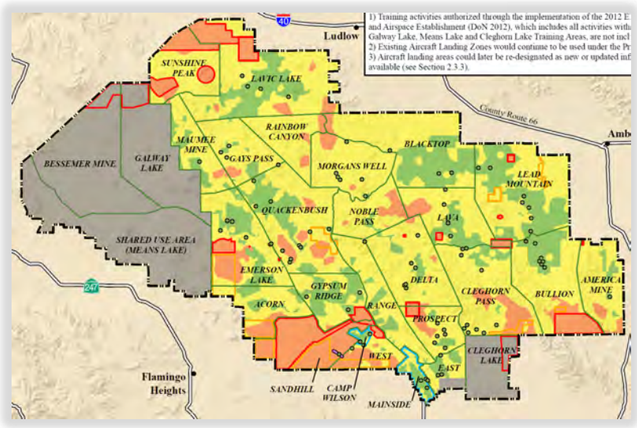
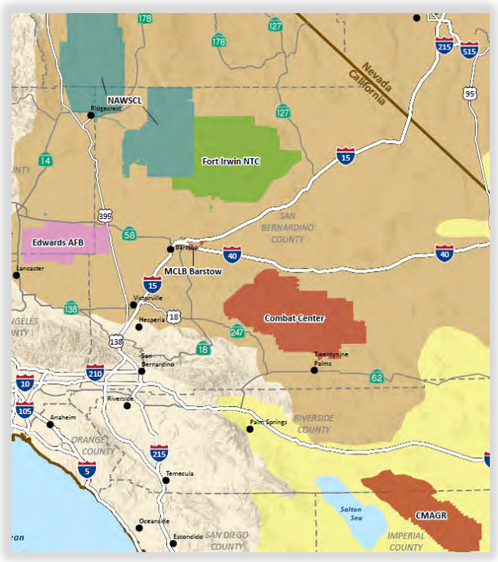
Project #	Project Summary	Air Quality	Desert Tortoise	Cultural Resources	Climate Change	Environmental Justice	Public Health & Safety
Project 8	**SCE Eldorado Lugo Mohave Pesticide Use Permit** Project Scope: pesticide use permit for managing invasive species along right-of-way on BLM public land. Treatment area is approximately 5,350 acres. Herbicides can include any analyzed in *Final Vegetation Treatments Using Herbicides Programmatic Environmental Impact Statement*, including those with the active ingredients glyphosate, imazapyr, and triclopyr (BLM 2017). Project Area: North of Combat Center  (BLM 2023c)	No adverse impacts	Adverse effects mitigated (e.g., authorized biologist, minimization measures for herbicide application). Approximately 33.84 acres of critical habitat affected.	None	None	No disproportionate impacts	Potential exposure to workers and public, engaging in activities in or near herbicide treatment area. Mitigation adopted from 2007 BLM ROD (BLM 2017).
Project 9	**Twentynine Palms Downtown Specific Plan** Project Scope: Physical revitalization of the downtown area. Over the next 20 years, additional commercial, housing, lodging, office, and civic center space would exist in a 188-acre plan area. Additional improvements include public space, transportation and mobility, and parking. Plan Area: South of Combat Center  (Twentynine Palms 2022b)	De minimis	No Impact. Vacant lots with creosote (Larrea tridentata) but degraded with limited habitat to support native wildlife including the desert tortoise.	18 cultural resources located within the plan area, including: 17 historic-age buildings and 1 historic-age road (Twentynine Palms Highway). None determined eligible. 567 parcels were surveyed included 166 historic-age buildings. None retain integrity for eligibility. No prehistoric archaeological resources.	Adverse, but mitigated by future development requirements (e.g., California Green Building Standards), which would result in lower emissions than the existing buildings. Future development would create a more sustainable and walkable downtown area, resulting in less vehicle emissions.	No disproportionate impacts	Adverse, but mitigated during future development (e.g., remediation of contaminated site, compliance with building codes, compliance with occupational safety requirements for workers, etc.) and additional plan improvements (e.g., transportation safety).

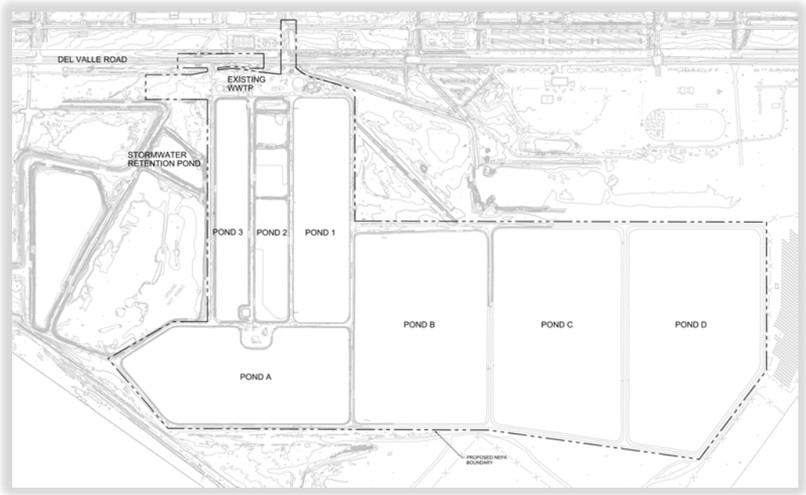
Project #	Project Summary	Air Quality	Desert Tortoise	Cultural Resources	Climate Change	Environmental Justice	Public Health & Safety
Project 10	**<u>Twentynine Palms Wastewater Reclamation Project Phase 1</u>** <u>Project Scope</u>: Construct a new wastewater collection (sewer) system to convey City wastewater flows to a centralized City-owned wastewater treatment plant (WWTP) known as the Wastewater Reclamation Project (Project). <u>Project Area</u>: South of Combat Center  (Twentynine Palms 2023)	De minimis	No Impact anticipated due to lack of desert tortoise presence, but standard avoidance measures recommended (e.g., inspections under vehicles, worker awareness training, biological monitor, etc.) due to presence of vegetation in project area and presence of desert tortoise habitat surrounding the project area.	A total of 5 sites and 2 historic roadways are within the area of potential effects. Adverse impacts could occur to 3 eligible and important sites (Oasis of Mara, Chemehuevi Cemetery, and an area of lithic scatters), but impacts would be avoided or mitigated during future development (e.g., archeological monitor, Phase I and Phase II cultural resource investigations, etc.).	Adverse but not significant. Project will emit a total of 116.61 tons per year which includes annual operational emissions and amortized construction emissions and is substantially below the established MDAQMD threshold of 100,000 tons per year.	No disproportionate impacts	Potential adverse impacts would be mitigated as part of project design and construction (e.g., geotechnical study, seismic safety requirements, hazardous material safety requirements, transportation plan, etc.)
Project 11	**<u>SCE Ivanpah Control Transmission Line Project</u>** <u>Project Scope</u>: Demolish segments and build a new alignment to remediate discrepancies across 358 miles of existing 115 kilovolt sub transmission lines; 174 miles to be rebuilt. <u>Project Area</u>: North of Combat Center  (BLM 2023a)	Limited information available. Pending development of environmental documents. NEPA scoping results include wildlife (e.g., desert tortoise) and cultural resources as key resource issues to be analyzed.					

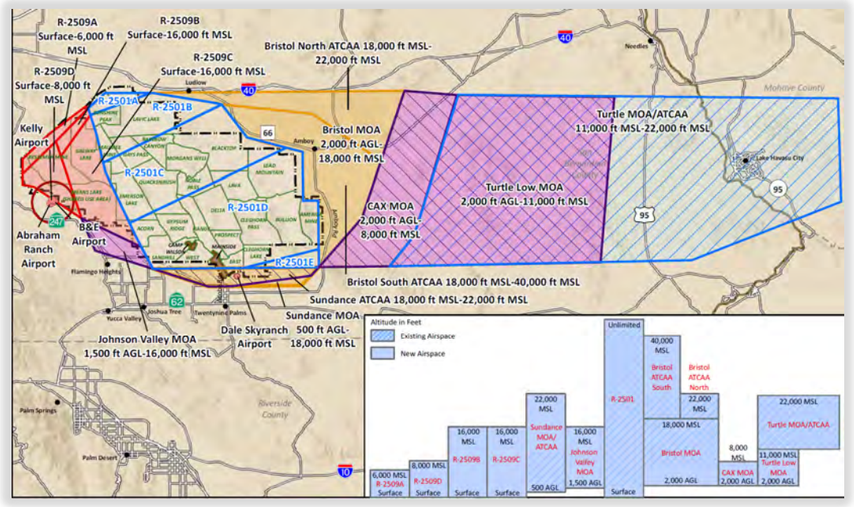
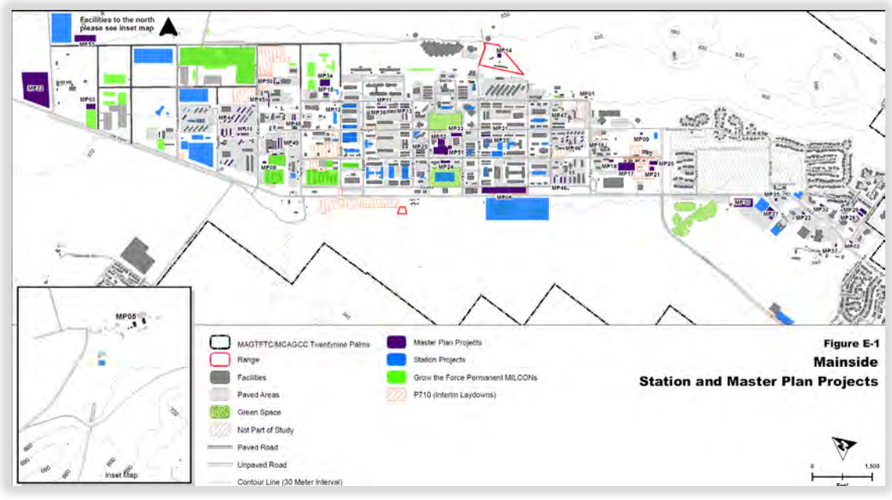
Project #	Project Summary	Air Quality	Desert Tortoise	Cultural Resources	Climate Change	Environmental Justice	Public Health & Safety
Project 12	**<u>Cady Solar Energy Project</u>** <u>Project Scope</u>: Solar panels to be installed in areas adjacent to the Combat Center, with additional acreage for transmission line installation and connections to the SCE Pisgah Substation (north of Interstate 40 and Route 66) and laydown areas. Total project area approximately 1,417 acres. <u>Project Area</u>: Northwest Boundary of Combat Center 	Limited information available, in preliminary design stage. MAGTFTC and BLM in discussions with Applicant due to potential interference with Project 16, Project 17, and this SEA's mitigation. Some portion of the solar panels would overlap with a desert tortoise translocation site.					
Project 13	**<u>King of the Hammers OHV Race Event (2023 to 2027)</u>** <u>Project Scope</u>: Annual race event, using 1,300 acres and 200 miles of routes on BLM public lands and up to 39 miles of existing routes on the Combat Center <u>Project Area</u>: BLM's Johnson Valley OHV Area, BLM-MAGTFTC's Shared Use Area, and the Combat Center's Exclusive Military Use Area (shown below).  (BLM 2022a & MAGTFTC 2022d)	De minimis	Impacts to resources avoided and minimized per BLM and MAGTFTC project requirements. On Combat Center, race event limited to pre-approved and existing routes (39 miles).	None	No disproportionate impacts	UXO risk to public that chose to recreate within the Combat Center. Some risk mitigated per pre-event UXO clearance but limited to authorized routes. Beyond this, the public assumes risk of harm.

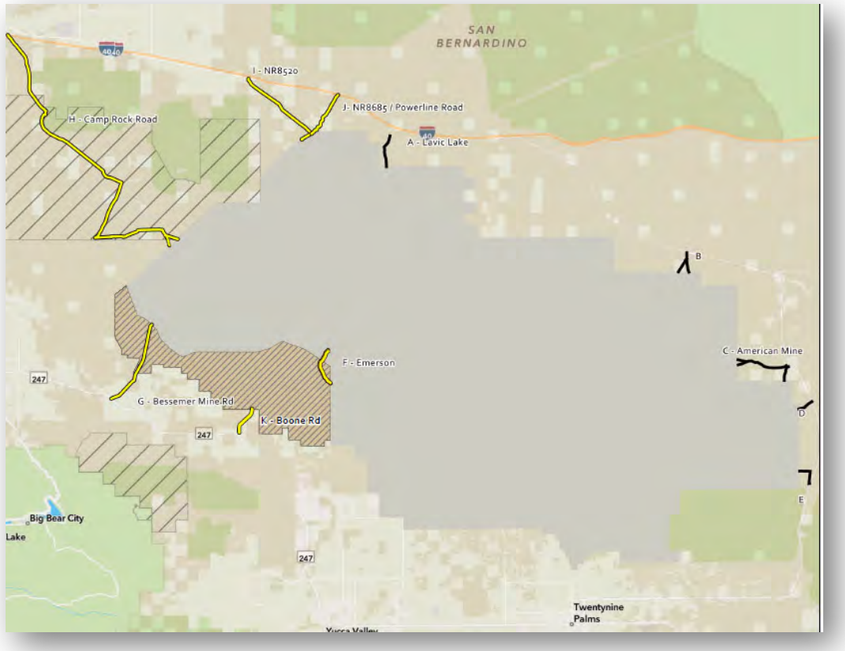
Project #	Project Summary	Air Quality	Desert Tortoise	Cultural Resources	Climate Change	Environmental Justice	Public Health & Safety
Project 14	**AT&T Desert Winds Wireless Tower** Project Scope: 30-foot by 30-foot area to be leased to AT&T for installation of an 80-foot monopole to provide improved wireless coverage to Combat Center. Project Area: Combat Center. 	De minimis	No impact (pre-disturbed areas between housing and golf course areas)	No Impact (pre-disturbed areas between housing and golf course areas)	None	Improved wireless connectivity to AT&T customers living near the southern boundary of Combat Center.	Hazardous radiation occurs within 94 feet of the antennae panels when in operation, but only above 72 feet from the ground surface. No radiation risk to public or golf course patrons. Worker risk mitigated by signs and fencing.
Project 15	**USMC Off-Installation Training and Transit** Project Scope: Establish and/or formalize transportation corridors to facilitate training activities between Marine Corps and Department of Navy installations throughout Southern California. Project Area: DON Installations in Southern California and other federal and non-federal land needed to support training and transit.  (USMC 2023)	Information not available. Pending development of environmental documents.					

Project #	Project Summary	Air Quality	Desert Tortoise	Cultural Resources	Climate Change	Environmental Justice	Public Health & Safety
Project 16	**<u>Combat Center Land Expansion and Airspace Establishment</u>** <u>Project Scope</u>: Ongoing military training activities, increased training in the newly acquired western and southern training areas, and BLM land withdrawal. Combat Center to expand by approximately 167,971 acres. Alternative 6 was selected. <u>Project Area</u>: Combat Center  (DON 2012 and DON 2013)	Increased training activities exceeded de minimis thresholds. Amendment to SIP completed. Connected actions (e.g., communication towers) de minimis.	Adverse impacts mitigated (e.g., desert tortoise translocation). Increased training could result in take of 3,769 tortoises and an additional 125,265 acres of desert tortoise habitat would be affected.	Adverse impacts mitigated per terms of the ICRMP and 2007 Programmatic Agreement (expired in 2014).	Adverse but mitigated by agency level efforts and adaptation planning.	Low-income population identified, but no disproportionate effects from Combat Center operations (e.g., noise) and potential beneficial impacts from Combat Center's continued presence and expansion (e.g., employment).	Potential risks at the Combat Center due to nature of military training and support operations (e.g., ordnance, hazardous materials, radiation, etc.). Standard operating procedures and practices are in place to manage risk (e.g., UXO clearance, contaminated site cleanup, spectrum management, etc.) and minimize public exposure (e.g., no live fire near installation boundary, routine REVA evaluations, no dud-producing munitions in the Shared Use Area, etc.).
Project 17	**<u>Combat Center Desert Tortoise Translocation</u>** <u>Project Scope</u>: Implement desert tortoise translocation plan to mitigate for the effects of the increased training at the Combat Center. Alternative 2 selected. <u>Project Area</u>: Combat Center and BLM-managed public lands.  (DON 2017 and BLM 2017)	De minimis	Beneficial impacts. Approximately 1,138 desert tortoises to be translocated from the Combat Center to recipient sites.	None The proposed action would be implemented to avoid helicopter landing and installing fences in areas where cultural resources exist (8 sites documented).	None	None	Potential risks during translocation mitigated by measures in the Aviation Safety Management Plan and Health and Safety Plan.

Project #	Project Summary	Air Quality	Desert Tortoise	Cultural Resources	Climate Change	Environmental Justice	Public Health & Safety
Project 18	**<u>Ongoing Training Activities</u>** <u>Project Scope</u>: Limit rotary wing and tilt rotor landings and take offs in the training areas. <u>Project Area</u>: Combat Center  (DON-USMC 2018a)	De minimis	Impacts avoided by imposing limitation on take offs and landings in the training areas.		None	None	None
Project 19	**<u>Common Raven Management</u>** <u>Project Scope</u>: Facilitate raven management (e.g., prevention, depredation, etc.) across DoD installations to minimize impacts to the military mission and the desert tortoise. Potential initial take of 11,830 to 13,293 ravens with annual maintenance take of 1,477 to 1,715 ravens. <u>Project Area</u>: DoD Installations in the Mojave Desert.  (MAGTFTC 2022a)	De minimis	Beneficial impacts to desert tortoise if proposed action implemented at DoD installations. Measures incorporated into the proposed action to minimize risk of desert tortoises ingesting avicide DRC-1339, if used at DoD installations.	Some raven management actions could affect cultural resources depending on location and type of raven management action (e.g., installing exclusion devices on buildings), but DoD installation would aim to avoid or resolve potential impacts per the Section 106 process or per the terms of any existing Programmatic Agreement.	None	None	None Potential exposure to workers and public avoided and minimized by measures incorporated into the proposed action (e.g., focused application of DCR-1339 by licensed application and collecting deceased ravens if reported by public to APHIS).

Project #	Project Summary	Air Quality	Desert Tortoise	Cultural Resources	Climate Change	Environmental Justice	Public Health & Safety
Project 20	**Notable Combat Center Projects** Project Scope: Priority projects listed below represent typical actions occurring at the Combat Center to support training. • Electrical Pole Repair & Replacement. Repair and replace existing electrical poles throughout the installation and treat wood poles to prevent rot. Project to be authorized under CATEX # 35 – "*Acquisition, installation, modernization, repair, or operation of utility (including, but not limited to, water, sewer, and electrical) and communication systems (including, but not limited to, data processing cable and similar electronic equipment) that use existing rights of way, easements, distribution systems, and facilities*)." 32 CFR §775.6(f)(35).  • Wastewater Treatment Plant Upgrades. Upgrades would be conducted within the footprint of the existing treatment plant. Project to be authorized under CATEX #35. 	De minimis impact finding anticipated for both projects.	Electrical Pole Repair & Replacement: 30 electric poles are in a Restricted Area where tortoises are present. Appropriate avoidance measures would be incorporated into the project (e.g., monitor, Wastewater Treatment Plant Upgrades: No impacts. The upgrades would be implemented in develop area within Mainside where tortoises are not typically present. However, due to surrounding area being undeveloped, appropriate avoidance measures would be incorporated into the project to prevent impacts to tortoises that may enter the project area (e.g., monitor, exclusion fence, etc.)	Electrical Pole Repair & Replacement: Anticipated that any potential adverse effects to cultural resources (e.g., Surprise Spring area) would be avoided as part of project design and/or as part of mitigation measures incorporated into the proposed action. Wastewater Treatment Plant Upgrades: No adverse impacts to cultural resources confirmed. CASHPO concurred in 2020 (consultation # USMC_2020_0828_001).	None	None	Electrical Pole Repair & Replacement: Site workers may be exposed to chemicals in wood preservatives that would be applied to electrical poles, but personal protection measures would be incorporated into the proposed action to minimize exposure. Potential substances: *OsmoPlastic, Dursban, WoodFume, Hollow Heart, Cop-R-Nap.* For more information: *https://www.osmose.com/products-remedial-treatment* Wastewater Treatment Plant Upgrades: Project requirements would be developed to ensure no public health or safety risk to Combat Center residents during the upgrades (e.g., sewage overflow).

Project #	Project Summary	Air Quality	Desert Tortoise	Cultural Resources	Climate Change	Environmental Justice	Public Health & Safety
Project 21	**<u>Permanent Special Use Airspace</u>** <u>Project Scope</u>: MAGTFTC requested new airspace and modifications to existing airspace. <u>Project Area</u>: Airspace over the Combat Center, Shared Use Area, and east of the Combat Center. 	Public comment on proposed action was completed in 2019. Since that time MAGTFTC and FAA have been working together to determine how to minimize impacts to airspace management. The Draft Environmental Assessment is being prepared for public comment (2023 or 2024). Anticipated resources/issues to be analyzed in detail include *Airspace Management, Air Quality (includes Greenhouse Gas Emissions), Biological Resources, Cultural Resources, Noise, Land Use and Recreation, and Socioeconomics and Environmental Justice.*					
Project 22	**<u>Combat Center Master Plan</u>** <u>Project Scope</u>: MAGTFTC is updating its existing Combat Center Master Plan (NAVFAC 2009). <u>Project Area</u>: Combat Center, with continued emphasis on Mainside and Camp Wilson (2009 Master Plan map below). 	Data gathering underway. NEPA analysis would occur at the project level, to implement plan direction and specific proposed actions.					

Project #	Project Summary	Air Quality	Desert Tortoise	Cultural Resources	Climate Change	Environmental Justice	Public Health & Safety
Project 23	**BLM Access Routes** Project Scope: MAGTFTC would seek to supplement the 2005 EA for existing access route use and maintenance (black routes) (DOI-BLM 2005) and initiate a new request for additional access routes (yellow). Project Area: Existing access routes leading into the Combat Center. 	Information not available. Pending development of environmental documents. Because MAGTFTC only seeks to traverse existing routes used by the public, it is unlikely that there would be any notable environmental effects beyond existing conditions. As part of the existing right of way (DOI-BLM 2005), MAGTFTC is required to adhere to BLM's environmental stipulations and conducted route maintenance due to effects from use. It is likely that similar requirements would apply to any additional access route request.					

APPENDIX F

Record of Non-Applicability & Air Quality Applicability Analysis

Record of Non-applicability for Clean Air Act Conformity
&
Air Quality Applicability Analysis

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List of Tables

RECORD OF NON-APPLICABILITY FOR CLEAN AIR ACT CONFORMITY

The Proposed Action falls under the Record of Non-Applicability (RONA) category and is documented with this RONA.

Introduction

The EPA published Determining Conformity of General Federal Actions to State or Federal Implementation Plans; Final Rule, in the November 30, 1993, Federal Register (40 Code of Federal Regulations [CFR] parts 6, 51, and 93). On April 5, 2010, the EPA finalized revisions to the General Conformity Rule (75 Federal Register 17253–17279). The U.S. Department of the Navy (Navy) published Navy Guidance for Compliance with the Clean Air Act (CAA) General Conformity Rule (July 30, 2013), as referenced in Chief of Naval Operations Manual M-5090.1, Environmental Readiness Program Manual dated June 25, 2021. These publications provide implementing guidance to document CAA Conformity Determination requirements. This RONA is provided to document compliance of the Proposed Action.

Federal regulations state that "no department, agency, or instrumentality of the Federal Government shall engage in, support in any way or provide financial assistance for, license or permit, or approve any activity that does not conform to an applicable State Implementation Plan." It is the responsibility of the federal agency to determine whether a federal action conforms to the applicable State Implementation Plan before the action is taken (40 CFR section 51.850[a]).

Federal actions may be exempt from conformity determinations if their emissions do not exceed designated de minimis levels for the criteria pollutants of nonattainment or maintenance in the areas of the federal action (40 CFR section 51.853[b]). The Proposed Action falls under the Record of Non-Applicability (RONA) category and is documented with this RONA.

Proposed Action

Action Proponent: Marine Air Ground Task Force Training Command (MAGTFTC)

Locations: Marine Corps Air Ground Combat Center (MCAGCC), Twentynine Palms, California

Affected Area(s): Mojave Desert Air Basin, designated as Severe-15 for the 2008 and 2015 8-hour ozone National Ambient Air Quality Standards and Moderate Nonattainment for PM_{10}.

Proposed Action Name: Ongoing and Future Military Training, Support Operations, and Resource Management at the Marine Corps Air Ground Combat Center

Proposed Action and Emissions Summary:

MAGTFTC evaluated ongoing and future actions conducted at the Marine Air Ground Combat Center, to include military training, support operations, and resource management. MAGTFTC proposes the following actions:

- Improve the Combat Center route network and continue maintenance of approximately 500 miles of existing routes per year.
- Install new targets, as needed, in the training areas and fixed ranges. These targets would support any increased ordnance use that occurs under Force Design 2030.

- Allow development of new sustainment support sites throughout the training areas, on an as needed basis, in support of or during unit level training and exercises when the specific tactics and methods being employed require new sites.
- Remove constraints on rotary wing and tilt rotor operations subject to the general limitations to authorize current operations throughout the Combat Center.
- Allow development of temporary austere expeditionary airfields, on an as needed basis, when the specific tactics and methods being employed require development as part of the training or exercise and construct two semi-permanent and minimally developed expeditionary airfields or landing strips.
- Modernize Range 500 (Multi-Purpose Range Complex) and expand the range to the east for a new permanent, designated range.
- Install new ground and air location sensors throughout the training areas to improve real time coverage of ground and air movement into and within the Combat Center.

The proposed action would occur within an ozone and PM_{10} nonattainment area. Ozone is a secondary pollutant tracked by its precursor, Oxides of Nitrogen (NO_x) and Volatile Organic Compounds (VOC). As a result, Proposed Action emissions were evaluated to assess compliance with the General Conformity Rule *de minimis* thresholds for NO_x, VOC, and PM_{10} (Tables F.1-1 and F.1-2).

Table F.1-1: *De minimis* Levels for 2008 and 2015 Ozone Severe-15 Nonattainment Area

Criteria Pollutant/Precursor	*De minimis* Levels (Tons/Year)
NO_x	25
VOC	25

NO_x = nitrogen oxides, VOC = volatile organic compounds

Table F.1-2: *De minimis* Levels for 1987 PM_{10} Moderate Nonattainment Area

Criteria Pollutant/Precursor	*De minimis* Levels (Tons/Year)
PM_{10}	100

PM_{10} = Particulate matter less than 10 microns in diameter

Air emissions analyzed mainly occur from site preparation, target and sensor installations, and construction activities. Operational emissions were not analyzed, since the current and anticipated operational emissions are consistent with the emissions previously analyzed in the 2012 General Conformity Determination. Emissions from site preparation and construction activities were estimated using the California Emissions Estimator Model® (CalEEMod). Aircraft emissions were estimated based on the operational data and emission factors developed by the Navy Aircraft Environmental Support Office (AESO). Emissions from vehicle use during activities were estimated using California's emissions inventories of onroad and offroad mobile sources, EMFAC2021 (v1.0.2). The analysis conservatively assumes that all the Proposed Action activities could occur each year. Table F.1-3 shows that the maximum estimated emissions of applicable pollutants would be well below the conformity *de minimis* levels for the MDAB Ozone Severe-15 Nonattainment Area and PM_{10} Moderate Nonattainment Area. Therefore, emissions from the Proposed Action would show conformity under the CAA.

Table F.1-3: Maximum Estimated Emissions (Tons/Year)

Activity	NO_x	VOC	PM_{10}
Route Development (Maneuver Training & Military Vehicle Use/ Fixed Ranges)	0.80	0.08	0.09
Live-Fire Training	1.36E-03	1.16E-05	2.95
Sustainment Training	0.22	0.02	0.10
Expeditionary Airfields, Landing Areas, and Landing Zones	2.81	0.13	0.68
Fixed Ranges	0.26	0.02	3.80
Range Control Operations	0.16	0.04	0.11
Total	**4.25**	**0.29**	**7.72**
General Conformity Applicability Thresholds	25	25	100
Exceeds threshold?	No	No	No

[1] Table includes criteria pollutant precursors (e.g., volatile organic compounds).
[2] Ozone is a secondary pollutant tracked by its precursor, NO_x and VOC.
Notes: NO_x = nitrogen oxides, VOC = Volatile Organic Compound, PM_{10} = Particulate matter less than 10 microns in diameter

Date RONA Prepared: April 13, 2023

RONA Prepared by: Massie Hatch, PE, M. S. Hatch Consulting

Proposed Action Exemptions

The Proposed Action is exempt from the General Conformity Rule requirements based on the determination that the emissions are well below the *de minimis* threshold for all applicable pollutants.

Emissions Evaluation Conclusion

The Marine Corps concludes that *de minimis* thresholds for affected pollutants would not be exceeded as a result of implementation of the Proposed Action. The emissions data supporting that conclusion is shown in Table F.1-3, presented herein. The calculations, methodology, data, and references are contained in Section 3.1 (Air Quality) and in this appendix. Therefore, the Marine Corps concludes that further formal Conformity Determination procedures are not required, resulting in this RONA.

RONA Approval

Signature: _____

Name/Rank: _____

Date: _____

Position: _____

AIR QUALITY APPLICABILITY ANALYSIS

Emission Estimates

Air emissions analyzed in this SEA mainly occur from site preparation, target and sensor installations, and construction activities. Emissions from site preparation and construction activities were estimated using the California Emissions Estimator Model® (CalEEMod). Aircraft emissions were estimated based on the operational data and emission factors developed by the Navy Aircraft Environmental Support Office (AESO). Emissions from vehicle use during activities were estimated using California's emissions inventories of onroad and offroad mobile sources, EMFAC2021 (v1.0.2).

Activity and Emission Estimate Tables

Table F.2-1 presents a summary of activities and emissions sources that were analyzed in this SEA. Assumptions used to estimate the emissions are also presented.

Table F.2-1: Summary of Activities and Emission Sources

Activity	Size	Emission Sources	Emission Calculation Methodology
Route Development (Maneuver Training & Military Vehicle Use/ Fixed Ranges)	Widen up to 160 miles of routes (from 8-16 feet) per year Develop up to 6 miles of new routes per year (16-feet wide)	Dust, off road vehicle/equipment combustion emissions	CalEEMod; Land use: Parking Lot; other non-asphalt surfaces Total: 166.79 acres
Live-Fire Training	Install up to fifty (50) new targets per year in the training areas	Dust, on-road vehicle combustion emissions	EMFAC2021 (v1.0.2) Emission Rates for T6 Utility Class 7 to model Medium Tactical Vehicle Replacement (MTVR)
Sustainment Training	Develop up to 10 new sustainment support sites annually, directly disturbing up to 365 acres per year	Dust, off road vehicle/equipment combustion emissions	CalEEMod; Land use: Parking Lot; other non-asphalt surfaces
Expeditionary Airfields, Landing Areas, and Landing Zones	Develop temporary airfields by scraping the top layer of soil/vegetation, of up to 194 acres per year Develop semi-permanent airfields by removing vegetation, grading, and scaping the soil, up to 270 acres per year (includes importing 23,500 cubic yards of road base materials)	Dust, off road vehicle/equipment combustion emissions	CalEEMod; Land use: Parking Lot; other non-asphalt surfaces
Fixed Ranges	Construct a 70-foot tall, 616-square foot control tower at Range 500 Install up to 80 new targets per year at Range 500/501	Dust, off road vehicle/equipment combustion emissions	CalEEMod; Land use: Industrial, General Light Industry; Parking, Other Non-Asphalt Surfaces EMFAC2021 Emission Rates for T6 Utility Class 7 to MTVR
Range Control Operations	Install/replace up to 43 new or existing sensors; Trip distance = 45 miles one way	Aircraft emissions	Helicopter modeled: H-60

Table F.2-2 presents the assumptions and model parameters used to estimate the emissions from route development.

Table F.2-2: Summary of Route Development CalEEMod Input Parameters and Emissions

MCAGCC 29 Palms Supplemental EA - Road Development - Mojave Desert AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

MCAGCC 29 Palms Supplemental EA - Road Development

Mojave Desert AQMD Air District, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	7,265.28	1000sqft	166.79	7,265,280.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	30
Climate Zone	10			**Operational Year**	2025
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	390.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - No demolition, site preparation, paving, construction, or architectural coating activities apply. Only grading is modeled. Project duration is estimated at approximately 90 days by the Marine Corps.

Grading - estimated by MC

Road Dust - Estimated the % road that is not paved. The SEA indicates that only 78 miles of 1752 miles are paved.

Off-road Equipment - This action will only require grading; therefore, some of the vehicles, such as excavators and dozers are not needed.

Trips and VMT - Assumed work will be performed by MC personnel.

Construction Off-road Equipment Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	310.00	90.00
tblGrading	AcresOfGrading	225.00	166.79

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023	0.0784	0.8008	0.6424	1.5400e-003	0.0544	0.0313	0.0857	8.1600e-003	0.0288	0.0370	0.0000	135.3557	135.3557	0.0402	2.7000e-004	136.4398
2024	0.0289	0.2848	0.2414	5.9000e-004	0.0454	0.0111	0.0565	5.7800e-003	0.0102	0.0160	0.0000	51.8964	51.8964	0.0154	9.0000e-005	52.3105
Maximum	**0.0784**	**0.8008**	**0.6424**	**1.5400e-003**	**0.0544**	**0.0313**	**0.0857**	**8.1600e-003**	**0.0288**	**0.0370**	**0.0000**	**135.3557**	**135.3557**	**0.0402**	**2.7000e-004**	**136.4398**

Table F.2-3 presents the activity levels and assumptions used to estimate on-road vehicle emissions. Tables F.2-4 and F.2-5 present the vehicle emission factors and maximum annual emissions, respectively. Table F.2-6 presents the dust emissions estimated from the use of on-road vehicles on unpaved roads.

Table F.2-3: Activity Level and Assumptions for On-Road Vehicle Emission Estimates

Activity		Transport						
Activity	**Frequency**	**Vehicle**	**Category**	**Fuel**	**Number of Vehicles**	**Number of Miles, Roundtrip**	**Number of Trips**	**Total Miles**
Live-Fire Training	One round trip per target installation	similar to Medium Tactical Vehicle Replacement (MTVR), mass: 29,100 lbs. Used EMFAC T6 Utility Class 7, Medium-Heavy Duty Utility Fleet Truck (26,001-33,000 lbs.)	On-Road Truck	Diesel	1	50	50	2,500
Fixed Ranges	One round trip per target installation	similar to Medium Tactical Vehicle Replacement (MTVR), mass: 29,100 lbs. Used EMFAC T6 Utility Class 7, Medium-Heavy Duty Utility Fleet Truck (26,001-33,000 lbs.)	On-Road Truck	Diesel	1	40	80	3,200

Table F.2-4: On-Road Vehicle Emission Factors

Activity		Emissions Factors, grams per mile (g/mile)						
Activity	**Frequency**	**CO**	**NO_x**	**VOC**	**SO_x**	**PM_{10}**	**$PM_{2.5}$**	**CO_2**
Live-Fire Training/Fixed Ranges	One round trip per target installation	0.05	0.49	4.22E-03	0.01	0.05	0.02	1,078.29

Notes: CO = carbon monoxide, CO_2 = carbon dioxide, LTO = Landing and Takeoff, NO_x = nitrogen oxides, Pb = Lead, PM = particulate matter, SO_x = sulfur oxides, VOC = volatile organic compounds

Reference: EMFAC2021 (v1.0.2) Emission Rates (https://arb.ca.gov/emfac/emissions-inventory/aee07b328697ba7593356700c526fb2acf1d381e); Region Type: County Region: San Bernardino Calendar Year: 2023, Season: Annual, Vehicle Classification: EMFAC202x Categories

Table F.2-5: Estimated Combustion Emissions from On-Road Vehicles

Activity		Emissions (tons/year)						Emissions (MT/year)
Activity	**Frequency**	**CO**	**NO_x**	**VOC**	**SO_x**	**PM_{10}**	**$PM_{2.5}$**	**CO_2**
Live-Fire Training	One round trip per target installation	1.30E-04	1.36E-03	1.16E-05	2.81E-05	1.26E-04	4.63E-05	2.696
Fixed Ranges	One round trip per target installation	0.0002	0.0017	0.0000	0.00004	0.0002	0.0001	3.450

Notes: CO = carbon monoxide, CO_2 = carbon dioxide, LTO = Landing and Takeoff, NO_x = nitrogen oxides, Pb = Lead, PM = particulate matter, SO_x = sulfur oxides, VOC = volatile organic compounds

Table F.2-6: Estimated Particulate Matter Emissions from On-Road Vehicles

Pollutant	$PM_{2.5}$	PM_{10}	TSP
Live-Fire Training			
VMT	2,500	2,500	2,500
k	0.15	1.5	4.9
s	9	9	9
W-full	16.5	16.5	16.5
a	0.9	0.9	0.7
b	0.45	0.45	0.45
P	20	20	20
Emissions (lbs./year)	589.22	5,892.18	20,387.71
Emissions (tons/yr.)	0.29	2.95	10.19
Fixed Ranges			
VMT	3,200	3,200	3,200
k	0.15	1.5	4.9
s	9	9	9
W-full	16.5	16.5	16.5
a	0.9	0.9	0.7
b	0.45	0.45	0.45
P	20	20	20
Emissions (lbs./year)	754.20	7,541.99	26,096.27
Emissions (tons/year)	0.38	3.77	13.05

Notes: lbs. = pounds, PM_{10} = particulate matter ≤ 10 microns in diameter, $PM_{2.5}$ = particulate matter ≤ 2.5 microns in diameter, TSP = total suspended particulates

Equation:

AAE = VMT * k*(s/12)a * (W/3)b * (365-P)/365

Equations is from AP-42 13.2.2 Unpaved Roads (November 2006), https://www3.epa.gov/ttn/chief/ap42/ch13/final/c13s0202.pdf

where:

VMT = vehicle miles traveled

k = particle size multiplier for particle size range and units of interest

for unpaved roads use: $PM_{2.5}$ = 0.15, PM_{10} = 1.5 and TSP = 4.9

W = average weight (tons) of the vehicle traveling the road, assumed 33,000 pounds

s = surface material silt content, 9% (ENSR Report July 1994)

a = constant; $PM_{2.5}$ = 0.9, PM_{10} = 0.9 and TSP = 0.7

b = constant; $PM_{2.5}$ = 0.45, PM_{10} = 0.45 and TSP = 0.45

P = number of rain days per year; 20

N = the number of days in the annual averaging period (default = 365)

Table F.2-7 presents the assumptions and model parameters used to estimate the emissions from Sustainment Training.

Table F.2-7: Summary of Sustainment Training CalEEMod Input Parameters and Emissions

MCAGCC 29 Palms Supplemental EA - New Sustainment Sites - Mojave Desert AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

MCAGCC 29 Palms Supplemental EA - New Sustainment Sites

Mojave Desert AQMD Air District, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	365.00	Acre	365.00	15,899,400.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	30
Climate Zone	10			**Operational Year**	2025
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	390.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - No demolition, site preparation, paving, construction, or architectural coating activities apply. Only grading is modeled. Project duration is conservatively estimated at 30 days. Marine Corps estimates that

Grading - estimated by MC

Road Dust - Estimated the % road that is paved. The SEA indicates that only 78 miles of 1752 miles are paved.

Off-road Equipment - The task involves grading only. Therefore, excavators and dozers would not be needed.

Trips and VMT - Conservatively assuming that all work will be performed by non-MC personnel.

Construction Off-road Equipment Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	620.00	30.00
tblGrading	AcresOfGrading	45.00	365.00

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023	0.0215	0.2186	0.1683	4.3000e-004	0.0943	8.3000e-003	0.1026	0.0113	7.6400e-003	0.0189	0.0000	38.2105	38.2105	0.0107	1.2000e-004	38.5148
Maximum	**0.0215**	**0.2186**	**0.1683**	**4.3000e-004**	**0.0943**	**8.3000e-003**	**0.1026**	**0.0113**	**7.6400e-003**	**0.0189**	**0.0000**	**38.2105**	**38.2105**	**0.0107**	**1.2000e-004**	**38.5148**

Table F.2-8 presents the assumptions and model parameters used to estimate the emissions from Expeditionary Airfields, Landing Areas, and Landing Zones.

Table F.2-8: Summary of Expeditionary Airfields, Landing Areas, and Landing Zones CalEEMod Input Parameters and Emissions

MCAGCC 29 Palms Supplemental EA - Air Fields, Temp and Semi-perm. - Mojave Desert AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

MCAGCC 29 Palms Supplemental EA - Air Fields, Temp and Semi-perm.

Mojave Desert AQMD Air District, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	194.00	Acre	194.00	8,450,640.00	0
Other Non-Asphalt Surfaces	3,248.80	1000sqft	74.58	3,248,800.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	30
Climate Zone	10			**Operational Year**	2025
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	390.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - No demolition,paving, construction, or architectural coating activities apply. Only site preparation and grading are modeled. Activity durations are estimated by the Marine Corps.

Trips and VMT - Lead Mountain Airfield - Distance to Yucca: 80 miles one way (assumed two roundtrips)

Grading - estimated by MC

Road Dust - Estimated the % road that is paved. The SEA indicates that only 78 miles of 1752 miles are paved.

Off-road Equipment - Estimated horsepower for vibrating rollers.

Construction Off-road Equipment Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	465.00	40.00

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023	0.1266	2.8084	1.0296	0.0125	0.6039	0.0760	0.6799	0.1999	0.0710	0.2708	0.0000	1,184.2426	1,184.2426	0.0511	0.1614	1,233.6058
2024	0.0111	0.3248	0.0958	1.6500e-003	0.1225	7.4200e-003	0.1299	0.0247	6.9800e-003	0.0317	0.0000	157.0160	157.0160	4.5800e-003	0.0225	163.8350
Maximum	**0.1266**	**2.8084**	**1.0296**	**0.0125**	**0.6039**	**0.0760**	**0.6799**	**0.1999**	**0.0710**	**0.2708**	**0.0000**	**1,184.2426**	**1,184.2426**	**0.0511**	**0.1614**	**1,233.6058**

Table F.2-9 presents the assumptions and model parameters used to estimate the emissions from Fixed Ranges (control tower construction).

Table F.2-9: Summary of Fixed Ranges (Control Tower Construction) CalEEMod Input Parameters and Emissions

MCAGCC 29 Palms Supplemental EA - Range 500 Control Tower Construction - Mojave Desert Air Basin, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

MCAGCC 29 Palms Supplemental EA - Range 500 Control Tower Construction

Mojave Desert Air Basin, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Light Industry	0.62	1000sqft	0.01	616.00	0
Other Non-Asphalt Surfaces	5.81	1000sqft	0.13	5,810.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	31
Climate Zone	10			**Operational Year**	2024
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	390.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - The concrete foundation for the tower is estimated at 616 square feet.

Construction Phase - No demolition is planned. No architectural coating is needed for the

Trips and VMT - Assumed 80 miles round trip for worker, vendor and hauling

Grading -

Road Dust - Most of the roads within the installation are unpaved.

Construction Off-road Equipment Mitigation -

Off-road Equipment - Added two trenchers for the utility trench

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023	0.0236	0.2591	0.2553	6.7000e-004	0.0169	0.0115	0.0284	5.0900e-003	0.0106	0.0157	0.0000	60.7602	60.7602	0.0109	3.5400e-003	62.0874
2024	0.0238	0.1359	0.1719	3.4000e-004	7.6200e-003	6.2200e-003	0.0138	2.0500e-003	5.7400e-003	7.8000e-003	0.0000	30.1040	30.1040	6.9500e-003	5.8000e-004	30.4503
Maximum	**0.0238**	**0.2591**	**0.2553**	**6.7000e-004**	**0.0169**	**0.0115**	**0.0284**	**5.0900e-003**	**0.0106**	**0.0157**	**0.0000**	**60.7602**	**60.7602**	**0.0109**	**3.5400e-003**	**62.0874**

Table F.2-10 presents the emission factors used to estimate aircraft emissions for Range Control Operations. Table F.2-11 presents the estimated emissions.

Table F.2-10: CH-60 Engine Emissions Indices/Factors and Sources – Cruise and Landing/Takeoff Modes

General Information					Emission Indices (lb./1,000 lb. fuel)						Emissions Factors (lb./hr.)					
Engine Model	**Engines (#)**	**Fuel Flow (lb./hr.) /Engine**	**Fuel Flow (gal/hr.)**	**Mode**	**CO**	**NO_x**	**VOC**	**SO_x**	**PM**	**CO_2**	**CO**	**NO_x**	**VOC**	**SO_x**	**PM**	**CO_2**
T700-GE-401C	2	600	171	Cruise	6.25	6.40	0.63	0.37	4.20	3,221	7.50	7.68	0.76	0.44	5.04	3,866

General Information					Emissions from Single LTO (lb./LTO)					
Engine Model	**Engines (#)**	**Total Fuel Used for LTO**	**Fuel Flow (gal/hr.)**	**Mode**	**CO**	**NO_x**	**VOC**	**SOx**	**PM**	**CO_2**
T700-GE-401C (2)	2	661	94	LTO	12.31	3.36	1.58	0.24	2.34	2,110

Notes: CO = carbon monoxide, CO_2 = carbon dioxide, LTO = Landing and Takeoff, NO_x = nitrogen oxides, lb. = pounds, Pb = Lead, PM = particulate matter, SO_x = sulfur oxides, VOC = volatile organic compounds

Reference: Navy Aircraft Environmental Support Office Memorandum Report No. 9929 Revision D, December 2019, Cruising speed estimated at 174 miles per hour.

Table F.2-11: CH-60 Estimated Emissions

Helicopter Takeoff and Landing			Emissions (Tons/Year)					CO_2 (MT/ year)
# of Events per Year	# of Flights per Event	Total Annual LTO	CO	NO_x	VOC	SO_x	PM	
43	1	43	0.26	0.07	0.03	0.01	0.05	41

Helicopter Emissions during Sensor transport						Emissions (Tons/Year)					CO_2 (MT/ year)
# of Events per Year	# Miles per Event	Total Miles	# of Events Below 3,000 ft	Cruise Speed (miles/hour)	Total Time (hr./year)	CO	NO_x	VOC	SO_x	PM	
43	90	3,870	3,870	174	22.24	0.08	0.09	0.01	0.00	0.06	39