Final Environmental Assessment for Ongoing Training

Marine Corps Air Ground Combat Center, Twentynine Palms, California

February 2018

Prepared by:
United States Department of the Navy and United States Marine Corps

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DEPARTMENT OF DEFENSE
UNITED STATES MARINE CORPS
FINDING OF NO SIGNIFICANT IMPACT FOR ONGOING TRAINING AT THE MARINE AIR GROUND TASK FORCE TRAINING COMMAND, MARINE CORPS AIR GROUND COMBAT CENTER, TWENTYNINE PALMS, CALIFORNIA

Pursuant to the Council on Environmental Quality regulations (40 Code of Federal Regulations Parts 1500-1508) implementing procedural provisions of the National Environmental Policy Act (NEPA) of 1969, as amended (42 United States [U.S.] Code §§ 4321-4370h); and U.S. Marine Corps (USMC) procedures for implementing NEPA, as described in Marine Corps Order P5090 2A, Change 3, dated 26 August 2013, *Environmental Compliance and Protection Manual,* the USMC gives notice that an Environmental Assessment (EA) has been prepared and an Environmental Impact Statement (EIS) will not be prepared for the proposed Ongoing Training at the Marine Air Ground Task Force Training Command (MAGTFTC), Marine Corps Air Ground Combat Center (MCAGCC) located at Twentynine Palms, California (herein referred to as the Combat Center). Based on the analysis provided in the EA, I have selected the Proposed Action and find that it will not have a significant impact on the human environment, and, therefore, an EIS is not required.

Background: This EA has been prepared to evaluate the potential environmental impacts associated with the proposed expansion of landing zones within existing training areas at the Combat Center. The purpose of the Proposed Action is to enhance the Combat Center's ability to accommodate the U.S. Department of Defense's need for combined arms live-fire, integrated training while simultaneously allowing less encumbered access within training areas without significantly impacting sensitive resources. The Proposed Action is needed to enhance training capacity and flexibility to ensure that Marines can conduct the training necessary for mission and battlefield readiness. Training at the Combat Center has become increasingly constrained in terms of training capacity and opportunities, in part due to increasing levels of training combined with restrictions on where training may occur, particularly with respect to rotary-wing and tilt-rotor aircraft landings. Implementation of the Proposed Action would remedy this situation.

Proposed Action: Under the Proposed Action, additional rotary-wing and tilt-rotor aircraft landing areas would be created within existing training areas that contain low densities (0-5 per square mile) of desert tortoises (*Gopherus agassizii*), are not known to contain any other special-status species, have been surveyed and confirmed to have no cultural resource concerns, and are not Category 1 (i.e., restricted) or Category 2 (i.e., sensitive) Special Use Areas. The Proposed Action would also allow landing at individual sites that do not contain desert tortoises or cultural resources, as verified by site-specific surveys, and would restrict rotary-wing and tilt-rotor aircraft from landing in highly sensitive areas.

The Proposed Action is limited to the approximate 597,371 acres (241,747 hectares) of training areas that existed before the 2012 Land Acquisition and Airspace Establishment EIS; the areas that have been added as a result of the implementation of the Military Land Withdrawals Act of 2013 are excluded from the Proposed Action.

Alternatives: The EA evaluates the Proposed Action and the No-Action Alternative. Under the No-Action Alternative, all training activities conducted at the Combat Center would proceed at current operational levels, and rotary-wing and tilt-rotor aircraft landing areas would not be expanded.

Summary of Environmental Impacts: The EA analyzes the potential environmental impacts associated with implementation of the Proposed Action and the No-Action Alternative. The resources most likely to be affected by this action are biological resources, geological resources, cultural resources, water resources, and health and safety. Conversely, impacts to the following

resources were considered to be negligible or non-existent and were not further analyzed in the EA: land use, recreation, socioeconomics and environmental justice, visual resources, transportation and circulation, noise, utilities, and air quality. Implementation of the Proposed Action will not result in significant environmental impacts. The Proposed Action will not have significant direct, indirect, or cumulative impacts on the quality of the local environment and will comply with all regulatory requirements. All proposed activities will be done in accordance with the Avoidance and Impact Minimization Measures/Special Conservation Measures listed in Section 2.5 of the EA. Formal consultations with the U.S. Fish and Wildlife Service and State Historic Preservation Officer have been completed. Cumulative effects of the Proposed Action in combination with other past, present, or reasonably foreseeable future actions would not be significant.

Findings: There will not be any disproportionately high and adverse human health or environmental effects from the Proposed Action on minority and low-income populations. There will not be any impacts on the protection of children from environmental health and safety risks.

The EA and FONSI addressing this action are on file, and interested parties may obtain a copy from: Environmental Affairs, Building 1418, MAGTFTC, MCAGCC, Twentynine Palms, California, 92278. Direct telephone inquiries to Mr. Scott Kerr at (760) 830-8190. A limited number of copies of the EA are available to fill single-copy requests.

9 Feb 18

Date

W. F. MULLEN III
Major General, United States Marine Corps

Acronyms and Abbreviations

AAV	amphibious assault vehicle
ACV	advanced combat vehicle
ALZ	Assault Landing Zone
AMZ	Aerial Maneuver Zone
APZ	Accident Potential Zone
AST	aboveground storage tanks
BASH	Bird/Animal Aircraft Strike Hazard
BECP	Business Emergency and Contingency Plan
bgs	below ground surface
BLM	Bureau of Land Management
BO	Biological Opinion
BR	Biological Resources
CalEPA	California Environmental Protection Agency
CCO	Combat Center Order
CDFW	California Department of Fish and Wildlife
CDWR	California Department of Water Resources
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CGS	California Geological Survey
CNPS	California Native Plant Society
COP	Combat Outpost
CR	Cultural Resources
CRPR	California Rare Plant Rank
CUPA	Certified Unified Program Agencies
CWA	Clean Water Act
DESFIREX	Desert Fire Exercise
DoD	Department of Defense
DoN	Department of the Navy
DRECP	Desert Renewable Energy Conservation Plan
DZ	drop zone
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
EOD	explosive ordnance disposal
EPCRA	Emergency Planning and Community Right-to-Know Act
ESA	Endangered Species Act
ESQD	explosive safety quantity distance
°F	degrees Fahrenheit
FAA	Federal Aviation Administration
FARP	Forward Ammunition Resupply Point
FOB	Forward Operating Base
FOIA	Freedom of Information Act
FONSI	Finding of No Significant Impact
FUDS	Formerly Used Defense Sites
ft	foot/feet
FY	Fiscal Year
GIS	geographic information system
GFZ	Garlock Fault Zone
GR	Geological Resources
ha	hectare(s)
HAZMIN	Hazardous Materials Minimization
HIMARS	high mobility artillery rocket system
HQMC	Headquarters Marine Corps
HS	Health and Safety
ICOP	Integrated Contingency and Operations Plan
ICRMP	Integrated Cultural Resources Management Plan
INRMP	Integrated Natural Resources Management Plan
IR	Installation Restoration
IRP	Installation Restoration Program
ITX	Integrated Training Exercise
km	kilometer(s)
LAR	light armored reconnaissance
LAV	light armored vehicle
LTO	landing and takeoff
LZ	landing zone
m	meter(s)
mm	millimeter(s)
MAGTF	Marine Air Ground Task Force
MAWTS-1	Marine Aviation Weapons and Tactics Squadron 1
MBTA	Migratory Bird Treaty Act
MC	munitions constituents
MCAGCC	Marine Corps Air Ground Combat Center
MCAS	Marine Corps Air Station
MCIC	Marine Corps Installations Command
MCO	Marine Corps Order
MEDEVAC	Medical Evacuation
MILCON	military construction
MLRS	multiple launch rocket system
MRP	Munitions Response Program
MSR	Main Supply Route
NAVFAC	Naval Facilities Engineering Command
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NOA	Notice of Availability
NRCS	Natural Resources Conservation Service
NREA	Natural Resources and Environmental Affairs
NRHP	Natural Register of Historic Places
OP	observation post
OPNAVINST	Office of the Chief of Naval Operations Instruction
PA	Programmatic Agreement
PMFZ	Pinto Mountain Fault Zone
POLs	petroleum, oil, and lubricants
PRTSS	Pre-designated Range Training Support Site

PV	photovoltaic
RCRA	Resource Conservation and Recovery Act
REVA	Range Environmental Vulnerability Assessment
ROD	Record of Decision
ROI	region of influence
RTAMS	Range/Training Areas Maintenance Section
RWQCB	Regional Water Quality Control Board
SCM	Special Conservation Measure
SCP	Spill Contingency Plan
SDZ	surface danger zones
SEIS	Supplemental EIS
SELF	Strategic Expeditionary Landing Field
SHPO	State Historic Preservation Office(r)
SOP	Standard Operating Procedure
SPCC	Spill Prevention, Control, and Countermeasures
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TDS	total dissolved solids
TPWD	Twentynine Palms Water District
TRED	Tortoise Regional Estimate of Density
TRI	Toxic Release Inventory
UAV	unmanned aerial vehicle
U.S.	United States
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
USMC	U.S. Marine Corps
UST	Underground Storage Tank
UXO	unexploded ordnance
WEG	Wind Erodibility Groups
WR	Water Resources

ENVIRONMENTAL ASSESSMENT

Lead Agency: United States Marine Corps, Department of the Navy

Title of Proposed Action: Ongoing Training, Marine Corps Air Ground Combat Center, Twentynine Palms, California

Affected Region: San Bernardino County, California

Designation: Environmental Assessment

Abstract

This Environmental Assessment (EA) has been prepared to evaluate the potential environmental impacts associated with Ongoing Training at the Marine Air Ground Task Force Training Command, Marine Corps Air Ground Combat Center at Twentynine Palms, California. This EA has been prepared by the United States Marine Corps in accordance with the National Environmental Policy Act (NEPA) of 1969 (42 United States Code §§ 4321-4370h); Council on Environmental Quality regulations (40 Code of Federal Regulations [CFR] Parts 1500-1508); Department of the Navy procedures for implementing NEPA (32 CFR Part 775); and Marine Corps Order P5090.2A, Change 3, dated 26 August 2013, *Environmental Compliance and Protection Manual*.

Prepared By: United States Marine Corps

Point of Contact: Department of the Navy
Naval Facilities Engineering Command Southwest
Attn: Ryan Maynard, Project Manager
1220 Pacific Highway
San Diego, California 92132-5190
E-mail: ryan.maynard1@navy.mil
Telephone (619) 532-3728

February 2018

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EXECUTIVE SUMMARY

This Environmental Assessment (EA) has been prepared to evaluate the potential environmental impacts associated with Ongoing Training at Marine Air Ground Task Force Training Command, Marine Corps Air Ground Combat Center at Twentynine Palms, California (hereafter referred to as the "Combat Center" or "installation").

This EA has been prepared by the United States (U.S.) Marine Corps in accordance with the National Environmental Policy Act (NEPA) of 1969 (42 U.S. Code §§ 4321-4370h); Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations [CFR] Parts 1500-1508); Department of the Navy procedures for implementing NEPA (32 CFR Part 775); and Marine Corps Order (MCO) P5090.2A, Change 3, dated 26 August 2013, *Environmental Compliance and Protection Manual*.

The purpose of the Proposed Action is to enhance the Combat Center's ability to accommodate the U.S. Department of Defense's (DoD's) need for combined arms live-fire, integrated training while simultaneously allowing less encumbered access within training areas without significantly impacting sensitive resources. The Proposed Action is needed to enhance training capabilities and flexibility to ensure that Marines can conduct the training necessary for mission and battlefield readiness. Such training requires pilots to practice rapid in-air decision-making (e.g., when pilots are told to find an alternate landing area while enroute because the enemy has overrun the designated landing zone [LZ]), which in turn requires that pilots be allowed flexibility in their choice of landing area. Training opportunities at the Combat Center are constrained due to the large volume of helicopter landing zone operations in support of dynamic Marine Corps combat deployment training combined with restrictions on where rotary-wing and tilt-rotor aircraft landings may occur (i.e., existing LZs). Implementation of the Proposed Action would remedy this situation.

Two alternatives are evaluated in this EA: the Proposed Action and the No-Action Alternative. Under the Proposed Action, all areas within the Combat Center would be designated as Go, Slow-Go, or No-Go for rotary-wing and tilt-rotor aircraft landing, as determined by a programmatic assessment of the presence or absence of sensitive resources. For example, proposed Go landing areas contain low densities (0-5 per square mile) of desert tortoises (*Gopherus agassizii*), are not known to contain occupied burrowing owl (*Athene cunicularia*) habitat, have been surveyed and confirmed to have no cultural resource concerns, and are not Category 1 (i.e., restricted) or Category 2 (i.e., sensitive) Special Use Areas. If implemented, rotary-wing and tilt-rotor aircraft would be approved to land in portions of existing training areas designated Go for aircraft landing without additional environmental review; this would increase the existing LZ area of 2,967 acres (1,201 hectares [ha]) by 112,287 acres (45,441 ha). Before aircraft could land in proposed Slow-Go landing areas, additional site-specific (e.g., desert tortoise presence surveys or cultural surveys) or programmatic (e.g., desert tortoise density surveys) environmental review would be required. Rotary-wing and tilt-rotor aircraft would be restricted from landing in No-Go areas as they contain highly sensitive biological or cultural resources. Implementation of the Proposed Action would not modify any other ongoing training activities at the Combat Center.

The Combat Center anticipates continuing biological and cultural resource surveys as funds are available. Over time, as new or updated information becomes available, the Combat Center would re-designate landing areas according to the criteria described later in this document. For example, areas designated as Slow-Go due to a lack of natural or cultural resources survey data could become Go or No-Go areas as those data are developed.

Under the No-Action Alternative, the Combat Center would not designate additional aircraft LZs within existing training areas. Instead, the Combat Center would continue to use existing LZs and could designate

additional LZs subject to a case-by-case environmental review of each proposed LZ. Presently, this involves conducting surveys for sensitive resources (e.g., desert tortoise, cultural resources) within existing training areas and approving new LZs to be designated within areas devoid of the sensitive resources. The Combat Center's ability to accommodate the DoD's need for combined arms live-fire, integrated training with less encumbered access in all training areas would not be improved, and training would remain constrained. This detrimental situation could negatively impact overall force readiness and would not meet the purpose of or need for the Proposed Action.

Alternatives to the Proposed Action must be considered in accordance with NEPA, CEQ regulations for implementing NEPA, and MCO P5090.2A. However, only those alternatives determined to be reasonable relative to their ability to fulfill the purpose of and need for the Proposed Action require detailed analysis. Other action alternatives were considered but were not carried forward for analysis in this EA because they do not meet the purpose of and need for the Proposed Action. Although the No-Action Alternative is not a viable alternative, it is evaluated in this EA as required by NEPA and CEQ regulations.

This EA focuses on biological resources, geological resources, cultural resources, water resources, and health and safety. Cumulative effects of the Proposed Action in combination with other past, present, or reasonably foreseeable actions were also analyzed. A summary of environmental consequences with implementation of the Proposed Action or the No-Action Alternative is presented in Table ES-1. No significant impacts were identified for either alternative.

Table ES-1. Summary of Environmental Consequences with Implementation of the No-Action Alternative or the Proposed Action Alternative

Resource	*No-Action Alternative*	*Proposed Action*
Biological Resources (BR)	Under the No-Action Alternative, the Combat Center would continue to use existing LZs and would continue to designate additional LZs subject to a case-by-case environmental review. Presently, this involves conducting surveys for sensitive resources (e.g., desert tortoise, cultural resources) within existing training areas and allowing new LZs to be designated within areas devoid of the sensitive resources. **Avoidance and Impact Minimization Measures/Special Conservation Measures (SCMs) included under the No-Action Alternative**: • **BR-1.** The Combat Center would continue to implement SCMs and the Terms and Conditions of the 2002 and 2017 Biological Opinions (BOs) to avoid or minimize potential impacts to biological resources, particularly the threatened desert tortoise. This includes measures such as (1) requiring all personnel at the Combat Center to remove or contain foodstuffs, trash, or other wastes that may attract predators; (2) ensuring that all personnel immediately report to a Combat Center-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; and (3) concentrating training activities within previously disturbed areas. No additional avoidance and impact minimization measures/SCMs are proposed.	The Proposed Action would allow for unrestricted tilt-rotor and rotary-wing aircraft landings within broad areas of low environmental sensitivity (designated as Go Areas) or in areas that can be used after they have been surveyed for biological resources (Slow-Go Areas). All aircraft landings would occur within existing training areas. **Avoidance and Impact Minimization Measures/SCMs included under the Proposed Action:** • **BR-1.** The Combat Center would continue to implement SCMs and the Terms and Conditions of the 2002 and 2017 Biological Opinions (BOs) to avoid or minimize potential impacts to biological resources, particularly the threatened desert tortoise. This includes measures such as (1) requiring all personnel at the Combat Center to remove or contain foodstuffs, trash, or other wastes that may attract predators; (2) ensuring that all personnel immediately report to a Combat Center-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; and (3) concentrating training activities within previously disturbed areas. • **BR-2**. Proposed LZs within designated Slow-Go areas would continue to be assessed through a case-by-case environmental review. This involves conducting surveys for sensitive resources (e.g., desert tortoise, cultural resources) within existing training areas and allowing temporary authorization of landing operations within areas devoid of sensitive resources. This will ensure landing operations are not authorized when desert tortoises or sensitive cultural resources are present. • **BR-3.** Pilots would avoid landing sites with vegetation or other vertical obstacles to reduce risk to personnel and equipment. This would have the effect of reducing impacts to native vegetation, and focusing operations in more barren areas less likely to have desert tortoises. • **BR-4.** A representative sample of landing zones within designated "Go" areas would be surveyed using a protocol approved by the Service during the first year of training under the Proposed Action, immediately following landing by rotary-wing and tilt-rotor aircraft, to ensure that no desert tortoises are injured or killed. • **BR-5**. The Combat Center would conduct additional surveys for biological resources (e.g., desert tortoise density surveys) as funds are available. The Proposed Action would result in an incremental but not significant increase in the effects of training and operations that were contemplated in the 2002 and 2017 BOs. Therefore, with implementation of the proposed avoidance and impact minimization measures/SCMs listed above, and having received concurrence from the U.S. Fish and Wildlife Service (see Appendix B), there would be no significant impact to biological resources, including the desert tortoise.

Table ES-1. Summary of Environmental Consequences with Implementation of the No-Action Alternative or the Proposed Action Alternative

Resource	*No-Action Alternative*	*Proposed Action*
Geological Resources (GR)	Under the No-Action Alternative, areas of unsuitable topography (e.g., steep and/or mountainous areas) or other locations that might be considered to have unique geological features (e.g., lava flows) would continue to be avoided during training activities. The measures listed below would be implemented to limit adverse impacts to soils as a result of ongoing training activities. **Avoidance and Impact Minimization Measures/SCMs included under the No-Action Alternative:** • **GR-1**. Encourage military units to utilize previously disturbed areas, especially for off-road maneuvers, digging, or berming. • **GR-2**. Avoid wet areas for vehicular traffic and creating a limited number of authorized crossings for Deadman Lake to minimize impacts to playa soils. • **GR-3**. Designate tank traps and other modifications to maintain the natural flow of water during run-off events, to maintain the natural alluvial sediment transport processes. This includes filling tank traps, trenches, and other major excavations to original grade (when feasible) when training exercises are completed. • **GR-4**. Restore disturbed washes to allow for proper functioning in alluvial sediment transport. This includes maintaining natural drainage at the lowest elevation possible and avoiding realignment or blockage of drainages by roads and other construction. • **GR-5**. Restore training lands to stabilize soils and provide long-term vegetative cover. • **GR-6**. Adjust some training scenarios and locations of training events to spread out impacts so that broad areas do not become completely compacted. • **GR-7**. In sandy areas with perennial grasses, keep activity low to moderate, avoid use of ignition sources, and place targets in a cleared area. These fire-prevention measures also reduce impacts to soil by preserving the vegetation that protects against erosion. • **GR-8**. In areas designated as Go for vehicles at the base of alluvial fans, spread-out low to moderate use training activities as widely as possible to disperse / diffuse the impact over a wide area. • **GR-9**. Minimize use footprint in areas designated "Sensitive" soil type or Slow-Go for vehicles, or when activity level is high. • **GR-10**. Areas of unsuitable topography (e.g., steep and/or mountainous areas) or other locations that might be considered to have unique	Under the Proposed Action, areas of unsuitable topography (e.g., steep and/or mountainous areas) or other locations that might be considered to have unique geological features (e.g., lava flows) would continue to be avoided during training activities. The area expanded to allow for aircraft landings would have no anticipated effect on mineral resources or paleontological resources. Impacts under the Proposed Action would be similar to those described under the No-Action Alternative, with the exception of soils impacts being slightly less under the No-Action Alternative. The same measures listed for the No-Action Alternative would be implemented to limit adverse impacts to soils as a result of ongoing training activities. With continued application of installation programs and procedures to avoid and minimize impacts, there would be less than significant impacts to geological resources under the Proposed Action. **Avoidance and Impact Minimization Measures/SCMs included under the Proposed Action:** The same LZ-related impact minimization measures/SCMs as listed under the No-Action Alternative would be implemented.

Table ES-1. Summary of Environmental Consequences with Implementation of the No-Action Alternative or the Proposed Action Alternative

Resource	*No-Action Alternative*	*Proposed Action*
	geological features (e.g., lava flows) would continue to be avoided during training activities. The No-Action Alternative does not involve the construction of new facilities so compliance with the Alquist-Priolo Act is not required. There is no evidence linking earthquake activity with the use of explosives such as the ordnance that would be used under the No-Action Alternative. With continued application of installation programs and procedures to avoid and minimize impacts, there would be less than significant impacts to geological resources under the No-Action Alternative.	
Cultural Resources (CR)	Under the No-Action Alternative, additional LZs would not be designated. Therefore, there would be no impacts to cultural resources with implementation of the No-Action Alternative. **Avoidance and Impact Minimization Measures/SCMs included under the No-Action Alternative:** • **CR-1.** The Combat Center is responsible for monitoring National Register of Historic Places (NRHP)-eligible sites that are avoided during training activities. An annual Historic Preservation Compliance Report summarizes the monitoring activities.	The Proposed Action would allow for unrestricted tilt-rotor and rotary-wing aircraft landings within broad areas that have either been confirmed to have no cultural resource concerns (Go Areas) or in areas that can be used after they have been confirmed to have no cultural resource concerns (Slow-Go Areas). All aircraft landings would occur within existing training areas. Therefore, implementation of the Proposed Action would not affect cultural resources and impacts would be less than significant. The California State Historic Preservation Office (SHPO), the San Manuel Band of Mission Indians, and the Twenty-nine Palms Band of Mission Indians have concurred with the U.S. Marine Corps' finding of No Historic Properties Affected (refer to Appendix B). **Avoidance and Impact Minimization Measures/SCMs included under the Proposed Action:** • **CR-1.** The Combat Center is responsible for monitoring NRHP-eligible sites that are avoided during training activities. An annual Historic Preservation Compliance Report summarizes the monitoring activities. • **CR-2.** LZs will not be designated within 350 feet (107 meters) of protected cultural resources. • **CR-3.** The Combat Center would conduct surveys for cultural resources and consultations as funds are available.
Water Resources (WR)	Vehicle maneuvers result in greater impacts to playas and dry washes than any other form of training conducted on the Combat Center. However, disturbance limiting environmental protection measures listed below are used to control impacts to playas and washes. Munitions constituents (MCs) are another concern, as these can migrate from the range training areas via dissolution and transport in periodic surface water flows and eventually deposit and accumulate within the playas. Potential impacts associated with MCs are avoided and minimized by ongoing monitoring and periodic assessment of MCs through the Range Environmental Vulnerability Assessment (REVA) program. A 2012 REVA assessment concluded that the low precipitation rate, long distance between ranges, intermittent nature of surface water bodies, and deep groundwater, limit the migration of MCs and thus the potential for impacts to water resources from	**Avoidance and Impact Minimization Measures/SCMs included under the Proposed Action**: The same LZ-related impact minimization measures/SCMs would be implemented as listed under the No-Action Alternative and there would be less than significant impacts to water resources.

Table ES-1. Summary of Environmental Consequences with Implementation of the No-Action Alternative or the Proposed Action Alternative

Resource	*No-Action Alternative*	*Proposed Action*
	the use of munitions. Therefore, with continued application of monitoring, conservation, and environmental awareness programs, the No-Action Alternative would result in less than significant impacts to water resources. **Avoidance and Impact Minimization Measures/SCMs included under the No-Action Alternative:** • **WR-1.** Impacts to playas and washes would be minimized by avoiding use of playas to the maximum extent possible when surfaces are wet, and identifying a limited number of crossing sites on playas and washes to minimize vehicle crossing damage. • **WR-2.** Designing tank traps and other modifications to maintain the natural flow of water during run-off events, to maintain the natural alluvial sediment transport processes. • **WR-3.** Restoring disturbed washes to allow for proper functioning in alluvial sediment transport. • **WR-4.** Continue implementation of the REVA Program. • **WR-5**. LZs are not located in washes and playas.	
Health and Safety (HS)	The Marine Corps and the Combat Center have numerous plans, policies, and procedures in place to prevent and minimize aircraft-related accidents, explosives safety hazards, accidental releases of hazardous materials and hazardous wastes, exposure to hazardous waste sites, and transportation accidents during military training activities. The Combat Center also has a policy for avoiding dangerous mine shafts within the Combat Center boundaries. Under the No-Action Alternative, these plans, policies, and procedures would continue to be followed per federal and state regulations and Marine Corps requirements. Therefore, no significant impact would occur with respect to the above-mentioned aspects of health and safety. The No-Action Alternative would not involve or affect police protection, fire protection, medical evacuation support and mutual aid agreements for the Combat Center or surrounding communities, so no significant impact would occur with respect to these aspects of health and safety. In summary, under the No-Action Alternative, no significant impact would occur to health and safety. **Avoidance and Impact Minimization Measures/SCMs included under the No-Action Alternative:** No avoidance and impact minimization measures/SCMs are proposed.	The Proposed Action includes expanding aircraft LZs within the Combat Center. The Marine Corps and the Combat Center have numerous plans, policies, and procedures in place to prevent and minimize aircraft-related accidents during military training activities. Under the Proposed Action, these plans, policies, and procedures would continue to be followed per federal and state regulations and Marine Corps requirements. Therefore, there would be no significant impacts to health and safety with implementation of the Proposed Action. **Avoidance and Impact Minimization Measures/SCMs included under the Proposed Action:** No avoidance and impact minimization measures/SCMs are proposed.

ENVIRONMENTAL ASSESSMENT
ONGOING TRAINING
MARINE CORPS AIR GROUND COMBAT CENTER
TWENTYNINE PALMS, CALIFORNIA

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CHAPTER 1
PURPOSE OF AND NEED FOR THE PROPOSED ACTION

1.1 INTRODUCTION

This Environmental Assessment (EA) has been prepared to evaluate the potential environmental impacts associated with ongoing training at the Marine Air Ground Task Force (MAGTF) Training Command, Marine Corps Air Ground Combat Center, Twentynine Palms, California (hereafter referred to as the "Combat Center" or the "installation").

This EA has been prepared by the United States (U.S.) Marine Corps (USMC) in accordance with the National Environmental Policy Act (NEPA) of 1969 (42 U.S. Code [USC] §§ 4321-4370h); Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations [CFR] Parts 1500-1508); Department of the Navy (DoN) procedures for implementing NEPA (32 CFR Part 775); and Marine Corps Order (MCO) P5090.2A, Change 3, dated 26 August 2013, *Environmental Compliance and Protection Manual*.

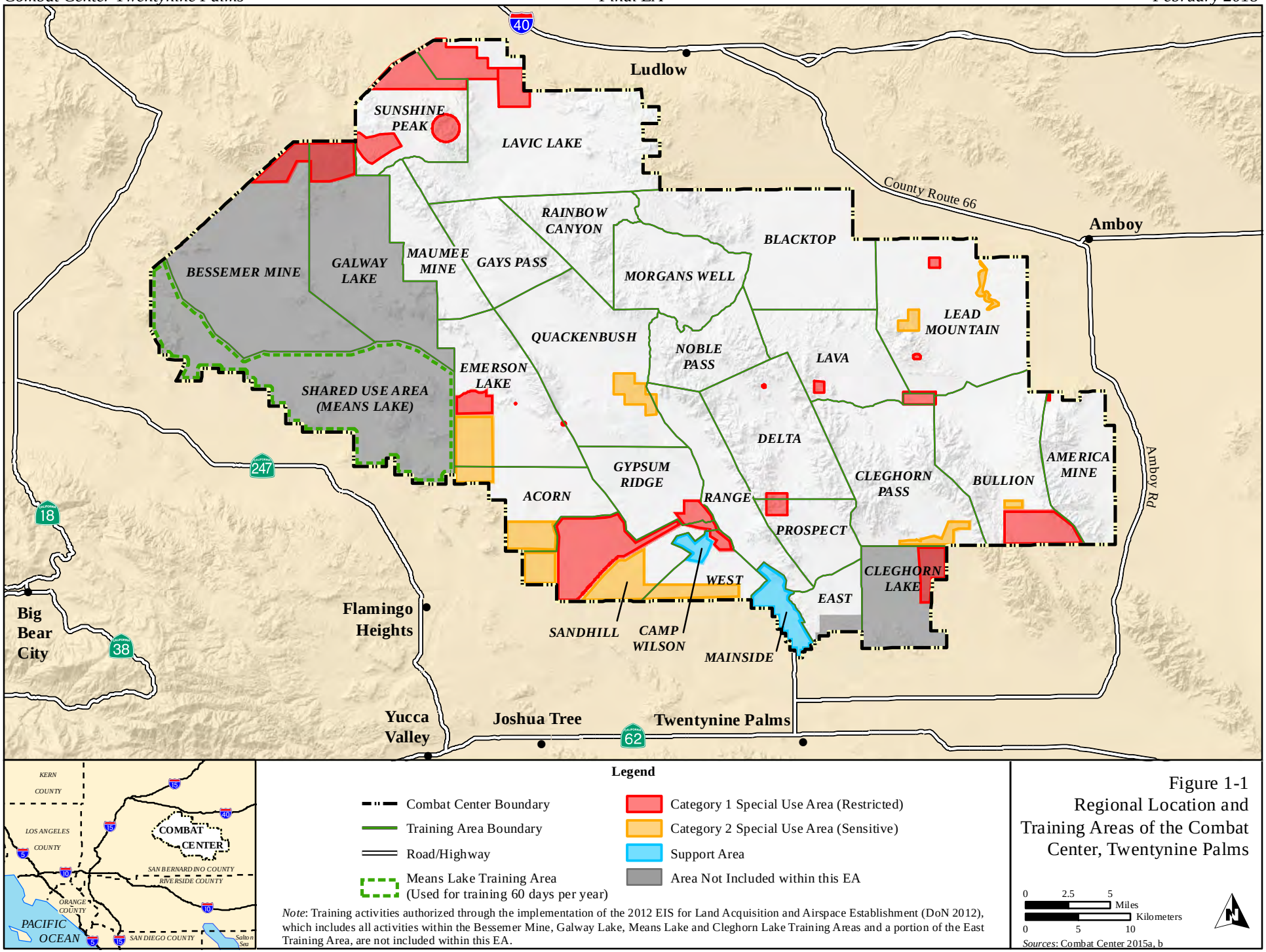
Two alternatives are evaluated in this EA: the Proposed Action and the No-Action Alternative. Under the Proposed Action, all areas within the Combat Center would be designated as Go, Slow-Go, or No-Go for rotary-wing and tilt-rotor aircraft landing, as determined by a programmatic assessment of the presence or absence of sensitive resources. For example, proposed Go landing areas contain low densities (0-5 per square mile) of desert tortoises (*Gopherus agassizii*), are not known to contain occupied burrowing owl (*Athene cunicularia*) habitat, have been surveyed and confirmed to have no cultural resource concerns, and are not Category 1 (i.e., restricted) or Category 2 (i.e., sensitive) Special Use Areas. If implemented, rotary-wing and tilt-rotor aircraft would be allowed to land in portions of existing training areas designated Go for aircraft landing without additional environmental review; this would increase the existing landing zone (LZ) area of 2,967 acres (1,201 hectares [ha]) by 112,287 acres (45,441 ha). Before aircraft could land in proposed Slow-Go landing areas, additional site-specific (e.g., desert tortoise presence surveys or cultural surveys) or programmatic (e.g., desert tortoise density surveys) environmental review would be required. Rotary-wing and tilt-rotor aircraft would be restricted from landing in No-Go areas as they contain highly sensitive biological or cultural resources. Implementation of the Proposed Action would not modify any other ongoing training activities at the Combat Center.

The Combat Center anticipates continuing biological and cultural resource surveys as funds are available. Over time, as new or updated information becomes available, the Combat Center would re-designate landing areas according to the criteria described in Section 2.3, *Description of the Proposed Action*. For example, areas designated as Slow-Go due to a lack of natural or cultural resources survey data could become Go or No-Go areas as those data are developed.

As the Proposed Action is located at the Combat Center, the environmental analysis and ultimate decision making responsibility falls to the USMC; thus, the USMC is the lead agency for the NEPA analysis as defined by 40 CFR § 1508.16.

1.2 PROJECT LOCATION

The Combat Center is located in the Mojave Desert approximately 130 miles (209 kilometers [km]) east of Los Angeles and 54 miles (87 km) northeast of Palm Springs in San Bernardino County, California (Figure 1-1).



Note: Training activities authorized through the implementation of the 2012 EIS for Land Acquisition and Airspace Establishment (DoN 2012), which includes all activities within the Bessemer Mine, Galway Lake, Means Lake and Cleghorn Lake Training Areas and a portion of the East Training Area, are not included within this EA.

Sources: Combat Center 2015a, b

Figure 1-1
Regional Location and Training Areas of the Combat Center, Twentynine Palms

The southern boundary of the installation is approximately 6 miles (10 km) north of Highway 62, and the northern boundary is south of Interstate 40. The City of Twentynine Palms is adjacent to the southern boundary of the installation.

The Combat Center is the Marine Corps' only combined arms live-fire and maneuver training range complex. It encompasses approximately 766,000 acres (310,000 hectares [ha]) and is composed of multiple training areas that include Category 1 Special Use Areas (i.e., restricted areas), Category 2 Special Use Areas (i.e., sensitive areas), and the Mainside and Camp Wilson support areas. The majority of the Combat Center is undeveloped and devoted to combined arms live-fire and maneuver training activities. Mainside, located in the southernmost portion of the installation, is the primary developed area on the installation, providing an array of maintenance, storage, administrative, commercial, and housing facilities.

The Proposed Action is limited to the approximate 597,371 acres (241,747 ha) of training areas that existed before the 2012 Land Acquisition and Airspace Establishment Environmental Impact Statement (EIS) (hereafter 2012 Land Acquisition EIS) (DoN 2012). The areas that have been added as a result of the implementation of the Military Land Withdrawals Act of 2013 are excluded from the Proposed Action assessed in this EA (refer to Figure 1-1).

1.3 PURPOSE OF AND NEED FOR THE PROPOSED ACTION

The purpose of the Proposed Action is to enhance the Combat Center's ability to accommodate the U.S. Department of Defense's (DoD) need for combined arms live-fire, integrated training while simultaneously allowing for less encumbered access within training areas without significantly impacting sensitive resources. The Proposed Action is needed to enhance training capabilities and flexibility to ensure that Marines can conduct the training necessary for mission and battlefield readiness. Such training requires pilots to practice rapid in-air decision-making (e.g., when pilots are told to find an alternate landing area while enroute because the enemy has overrun the designated landing zone), which in turn requires that pilots be allowed flexibility in their choice of landing area. Training capabilities at the Combat Center are constrained due to the large volume of helicopter landing zone operations in support of dynamic Marine Corps combat deployment training combined with restrictions on where rotary-wing and tilt-rotor aircraft landings may occur (i.e., existing LZs). Implementation of the Proposed Action would remedy this situation.

1.4 PUBLIC PARTICIPATION

As part of this EA and as described in Appendix A, the USMC conducted a public participation process to provide the public the opportunity to participate in the project by submitting comments on the adequacy and accuracy of the Public Draft EA. The public participation process commenced with publication of a Notice of Availability (NOA) of the Public Draft EA in two local newspapers: The Desert Trail on 21 and 28 April 2016 and the Hi-Desert Star on 21, 23, 28, and 30 April 2016. The Draft EA was made available at the Twentynine Palms Branch and Yucca Valley Branch county libraries and online on the Combat Center's website at:
http://www.29palms.marines.mil/Staff/G4InstallationsandLogistics/EnvironmentalAffairs.aspx or
http://www.29palms.marines.mil/Staff/G4InstallationsandLogistics/NREA.aspx.

The 30-day public comment period for the Draft EA commenced on 21 April 2016 and concluded on 20 May 2016. Two comment letters were received (Appendix A) and relevant comments have been addressed in this EA.

1.5 AGENCY CONSULTATIONS

As part of the NEPA process, USMC has consulted with the California State Historic Preservation Office (SHPO) under Section 106 of the National Historic Preservation Act (NHPA), as well as the U.S. Fish and Wildlife Service (USFWS) under section 7 of the Endangered Species Act (ESA). Agency correspondence is provided in Appendix B.

CHAPTER 2
PROPOSED ACTION AND ALTERNATIVES

Two alternatives are evaluated in this EA: the Proposed Action and the No-Action Alternative. The Proposed Action would designate additional aircraft landing areas within existing training areas. Under the No-Action Alternative, the Combat Center would continue to use existing LZs and could designate additional LZs subject to a case-by-case environmental review of each proposed LZ. Section 2.1 provides background information, Section 2.2 describes the No-Action Alternative (including existing training activities), and Section 2.3 describes the Proposed Action. Other alternatives considered but eliminated from detailed analysis are described in Section 2.4, and a summary of environmental consequences is provided in Section 2.5.

2.1 BACKGROUND

Current training activities at the Combat Center, as described in Section 2.2 below, have been authorized through a variety of documents. These documents include:

- 1997 EA for the Expeditionary Airfield/Exercise Support Base (Combat Center 1997)
- 2002 Biological Opinion (BO) for the Base-wide Training Operations and Routine Maintenance (USFWS 2002)
- 2003 Programmatic EA for Ongoing and Proposed Training Activities (DoN 2003b)
- 2003 EA for Range 500 Upgrades (Combat Center 2003)
- 2006 EA for MAGTF Training Command Combined Arms Military Operations in Urban Terrain (MOUT) Facility (Combat Center 2006)
- 2007 EA for Proposed Increase in End Strength and Temporary Facility Bed-down (DoN 2007)
- 2007 Programmatic EA for MAGTF Training Command East Training Area Range Enhancements (Combat Center 2007)
- 2009 EA for Permanent Facility Bed-Down of Increased End-Strength (DoN 2009a)
- 2009 EIS for the West Coast Basing of the MV-22 (DoN 2009b)
- 2010 EIS for the West Coast Basing of the F-35B Aircraft (DoN 2010a)
- 2010 EA for Aerial Maneuver Zones (AMZs) for MV-22 and Rotary-Wing Training (USMC 2010)
- 2012 EIS for Land Acquisition and Airspace Establishment (DoN 2012)
- 2014 Supplemental EA for Proposed Changes to the Permanent Beddown and Infrastructure Project (DoN 2014a)
- 2017 Supplemental EIS for Land Acquisition and Airspace Establishment (DoN 2017)
- Requests for Environmental Impact Reviews developed by the Combat Center since the 2003 Programmatic EA (Combat Center 2015b)

As a result of the National Defense Authorization Act of Fiscal Year (FY) 2014, the Proposed Action assessed in the 2012 Land Acquisition EIS (DoN 2012) was implemented and the Combat Center's boundary was expanded west to include the Bessemer Mine and Galway Lake training areas, and southeast to include what is now the Cleghorn Lake Training Area and the southeast corner of the East Training Area (refer to Figure 1-1). The expansion also includes a Shared Use Area (referred to as the Means Lake Training Area within this EA) that is managed by the Bureau of Land Management (BLM) except for when the Combat Center uses it for two 30-day events each year. However, training activities considered in this EA are limited to those authorized by the 2003 Programmatic EA, 2009 MV-22 EIS, the 2010 AMZ EA, other EAs and EISs noted above, and the various requests for Environmental Impact Reviews developed

since the 2003 Programmatic EA. Training activities proposed as part of the 2012 Land Acquisition EIS, including Marine Expeditionary Brigade training activities, the establishment and use of the four new training areas (Bessemer Mine, Galway Lake, Means Lake, and Cleghorn Lake), and the extension of the southeastern portion of the East Training Area (refer to Figure 1-1), are only considered in this EA as part of the cumulative impact analysis in Chapter 5.

2.2 DESCRIPTION OF THE NO-ACTION ALTERNATIVE

Under the No-Action Alternative, the Combat Center would not designate additional aircraft LZs within existing training areas. Instead, the Combat Center would continue to use existing LZs and could designate additional LZs subject to a case-by-case environmental review of each proposed LZ. Presently, this involves conducting surveys for sensitive resources (e.g., desert tortoise, cultural resources) within existing training areas and allowing new LZs to be designated within areas devoid of the sensitive resources.

The No-Action Alternative would not meet the purpose of or need for the Proposed Action. Under the No-Action Alternative, the opportunity for pilots to practice rapid in-air decision making would continue to be encumbered (see Section 1.3, *Purpose of and Need for the Proposed Action*). In addition, the Combat Center's ability to accommodate the DoD's need for combined arms live-fire, integrated training with less encumbered access in all training areas would not be improved, and training would remain constrained. This detrimental situation could negatively impact overall force readiness. However, as required under CEQ regulations (40 CFR § 1502.14[d]), it is carried forward for analysis as a baseline from which to compare the impacts of the Proposed Action. In this EA, the No-Action Alternative represents the baseline conditions described in Chapter 3.

This section describes existing training activities that take place on a regular basis at the Combat Center and is divided into three subsections: training activity components, infrastructure, and related procedures (Section 2.2.1); types of training activities (Section 2.2.2); and example of ongoing training exercises (Section 2.2.3).

2.2.1 Training Activity Components, Infrastructure, and Related Procedures

Major training activity components at the Combat Center are shown in Figure 2-1 and are described below.

2.2.1.1 Training Areas and Restrictions

The entire installation has been designated as a single training range, though for scheduling purposes it is divided into multiple training areas that include Category 1 Special Use Areas (restricted areas), Category 2 Special Use Areas (sensitive areas), the Mainside and Camp Wilson support areas. Training areas are functional, administrative units that enable different types of training to be conducted simultaneously without jeopardizing safety. The boundaries of training areas, though not marked, are defined by training requirements, topography, and other constraints.

Training areas vary in size, use, terrain, and training restrictions (Figure 2-2). Restrictions are characterized as either Category 1 Special Use Areas (restricted) or Category 2 Special Use Areas (sensitive). Category 1 Special Use Areas prohibit digging, ground disturbance, bivouacking, off-highway vehicle use, and/or training that involves vehicle activity outside of a Main Supply Route (MSR). Category 2 Special Use Areas are sensitive areas where training may occur, but personnel are warned that these areas have sensitive natural resources, cultural resources, or utilities.

Note: Training activities authorized through the implementation of the 2012 EIS for Land Acquisition and Airspace Establishment (DoN 2012), which includes all activities within the Bessemer Mine, Galway Lake, Means Lake and Cleghorn Lake Training Areas, are not included within this EA.

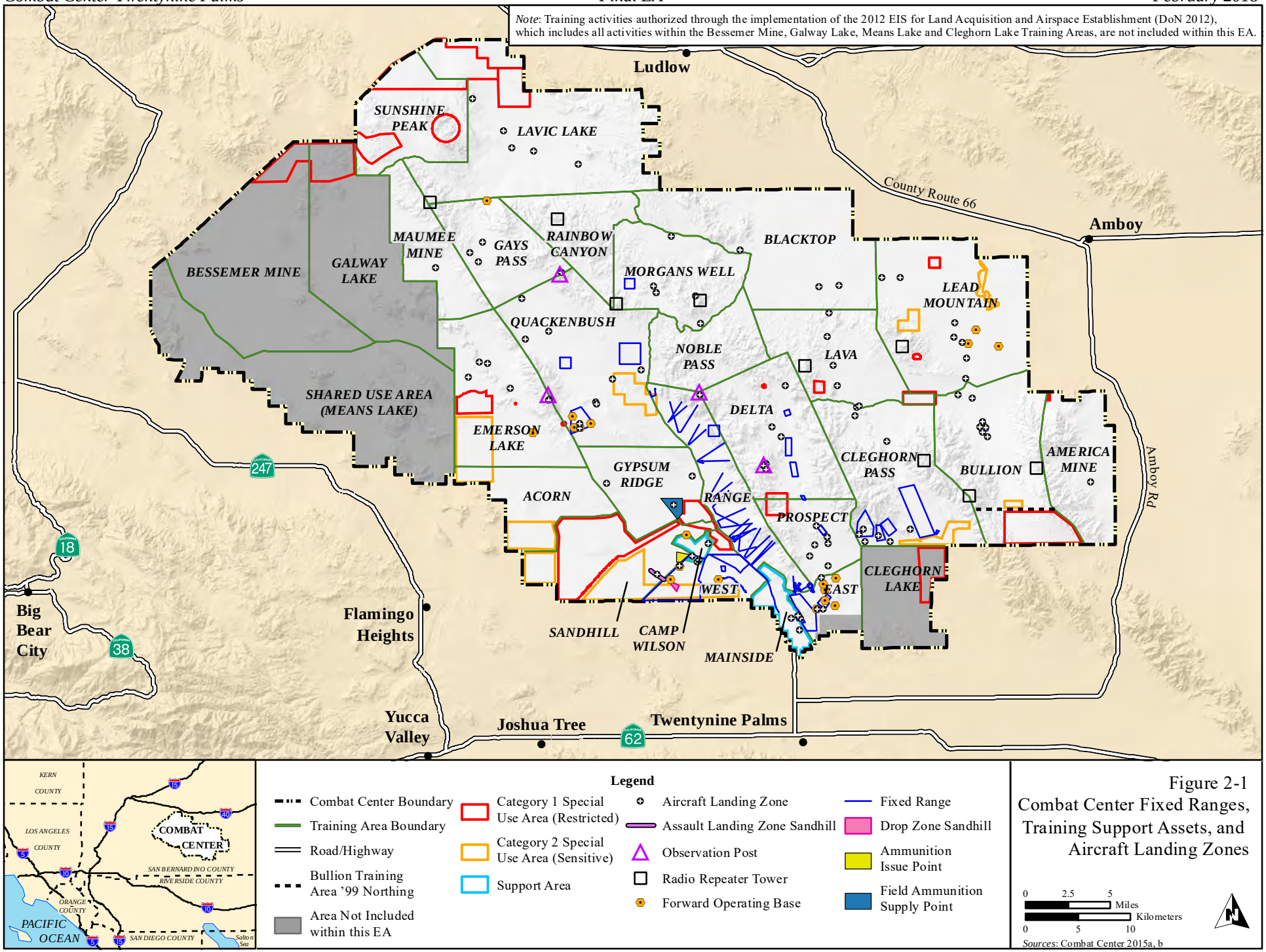
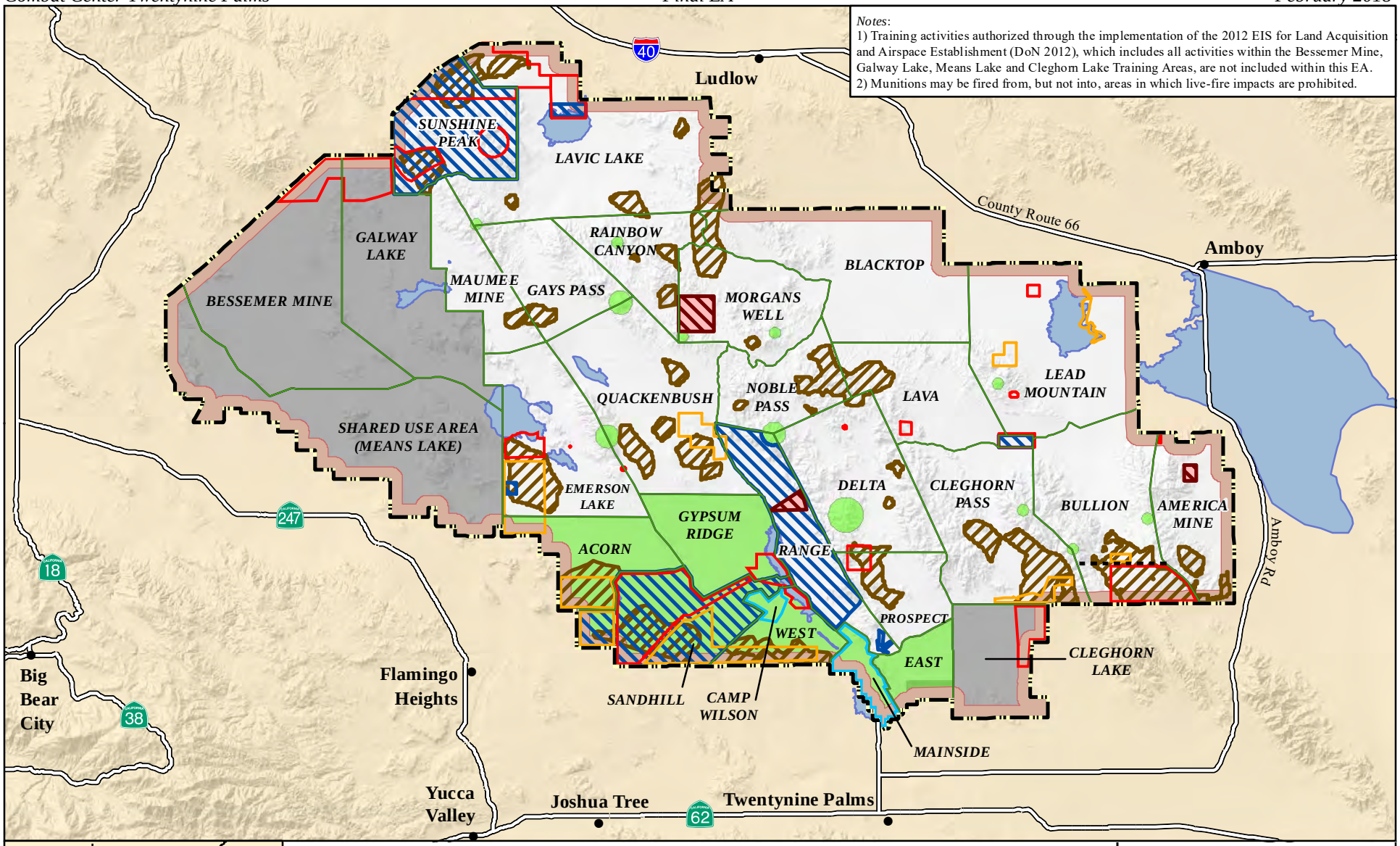


Figure 2-1
Combat Center Fixed Ranges, Training Support Assets, and Aircraft Landing Zones

Sources: Combat Center 2015a, b

Notes:
1) Training activities authorized through the implementation of the 2012 EIS for Land Acquisition and Airspace Establishment (DoN 2012), which includes all activities within the Bessemer Mine, Galway Lake, Means Lake and Cleghorn Lake Training Areas, are not included within this EA.
2) Munitions may be fired from, but not into, areas in which live-fire impacts are prohibited.



Legend

- Combat Center Boundary
- Training Area Boundary
- Road/Highway
- Bullion Training Area '99 Northing
- Area Not Included within this EA[1]
- Category 1 Special Use Area (Restricted)
- Category 2 Special Use Area (Sensitive)
- Support Area
- No Maneuvering
- Live-fire Impacts Prohibited[2]
- Avoid to Extent Possible
- Sensitive Fuse Area
- 1,000-m No Live-fire Buffer
- Dry Lake Beds (Avoid When Wet)

Figure 2-2
Combat Center Training Area Use Restrictions and Standard Operating Procedures

0 2.5 5 Miles
0 5 10 Kilometers

Sources: Combat Center 2015a, b

Training activities within Category 2 Special Use Areas must be coordinated with the Range Management Division and the Natural Resources and Environmental Affairs (NREA) Division on a case-by-case basis. Refer to Combat Center Order (CCO) 3500.4K (*Marine Air Ground Task Force Training Command, Marine Corps Air Ground Combat Center Range, Training Area, and Airspace Program*, 12 May 2014), CCO 5090.1F (*Environmental Protection*, 28 October 2013), CCO 5090.4F (*Environmental Protection Instruction Manual*, 10 November 2011), the Basewide BO (USFWS 2002), the 2012 Land Acquisition and Airspace Establishment EIS (DoN 2012) and associated BO (USFWS 2012), and the 2017 Land Acquisition and Airspace Establishment Supplemental EIS (DoN 2017) and associated BO (USFWS 2017) for a more detailed description of the individual Special Use Areas.

Training areas (or portions thereof) may also be subject to Standard Operating Procedures (SOPs) that limit or restrict their use for maneuvers, live-fire, or other training activities (refer to Figure 2-2). For example, a 3,280-foot (ft) (1,000-meter [m]) No Live-fire Buffer is designated immediately within the Combat Center boundary. When the Means Lake Training Area is in use, this buffer is extended to include Means Lake. Additionally, no maneuvers are allowed within the Range Training Area due to the location and use of static ranges within this training area. Live-fire and other SOP limitations on any training area within the Combat Center are established by direction of the Commanding General. Some of these SOPs can be lifted or changed at any time to support training needs (Combat Center 2015b).

In addition to the above, the Basewide BO (USFWS 2002) requires the following:

- To the extent possible, military activity that causes increased surface disturbance from that which already exists will be concentrated in areas such as pre-designated hardened sites or areas within 656 ft (200 m) of MSRs that have already been delineated as highly disturbed and supporting very low densities of desert tortoises.
- To the extent possible, ground-disturbing activities will not be conducted in areas where desert tortoises are known to occur in moderate to high densities. Areas that are currently restricted will continue to be managed in that manner.

2.2.1.2 Support Areas

Two primary support areas are located onboard the Combat Center: Mainside and Camp Wilson (refer to Figure 2-1). Mainside is located in the southernmost portion of the installation, is the primary developed area on the installation, and provides an array of maintenance, storage, administrative, commercial, and housing facilities. The Exercise Logistic Coordination Center, otherwise known as Camp Wilson, is located in the West Training Area and supports deployed units participating in live-fire training exercises (Combat Center 2015b).

2.2.1.3 Vehicle Maneuver Areas

Vehicle maneuver areas are restricted by training area use restrictions and SOPs (refer to Figure 2-2) as well as physical limitations due to terrain.

2.2.1.4 Fixed Ranges

Certain types of focused training activities at the Combat Center are concentrated within a series of fixed ranges (refer to Figure 2-1). Training on fixed ranges is controlled in terms of impact areas, types of weapons and munitions used, and allowable maneuvers. Each fixed range is subject to SOPs that specify allowable uses and relevant restrictions on use of the range. For example, certain fixed ranges do not allow live-fire while others do not permit vehicular travel (CCO 3500.4K, 12 May 2014) (Combat Center 2015b).

2.2.1.5 Range Control and Management of Unexploded Ordnance (UXO)

Command and control of all training at the Combat Center is managed and operated by the Assistant Chief of Staff G-3, *Operations and Training*. A variety of MCOs and CCOs direct training operations and related requirements, including but not limited to the following:

- MCO 3550.12, *Range Clearance Programs*
- CCO 3000.4A, *Marine Air Ground Task Force Training Command, Marine Corps Air Ground Combat Center, Mission Assurance*
- CCO 3070.1B, *Operations Security*
- CCO 3500.14A, *Marine Air Ground Task Force Training Command Integrated Training Exercise Order*
- CCO 3500.15, *Marine Air Ground Task Force Training Command Large Scale Exercise*
  CCO 3500.4K, *Marine Air Ground Task Force Training Command, Marine Corps Air Ground Combat Center, Range, Training Area, and Airspace Program*
- CCO 3571.1 Ch-1, *Explosive Ordnance Disposal*
- CCO 5050.6A, *Command and Foreign Visits Program*
- CCO 5090.1F, *Environmental Protection*
- CCO 5090.4F, *Environmental Protection Instruction Manual*

The following sections describe some of the various organizations within, and functions overseen by, the office of Assistant Chief of Staff G-3, including Range Control and Range Safety, Range/Training Areas and Maintenance (RTAMS), Range Facility Maintenance/Sustainment, Explosive Ordnance Disposal (EOD), and Range Clearance Operations.

<u>Range Control and Range Safety</u>

The Range Control Section (with the radio call sign "Bearmat") maintains communication with all training units and provides oversight of all activities being conducted at the Combat Center, both on the ground and in associated airspace. Range Safety personnel provide safety guidance, conduct formal classes for training units, and randomly check units to assist in range safety procedures.

Safety during training operations is also the responsibility of each unit commander conducting training or maneuvering onboard the Combat Center. All personnel (e.g., military, civilian, and contractor) entering the Combat Center training ranges are first required to attend a range safety briefing, the topics of which include, but are not limited to, desert survival, environmental protection, range control and operational procedures, and UXO.

<u>Range/Training Areas Maintenance</u>

Range maintenance is conducted through RTAMS whose responsibilities include:

- Managing target arrays in support of ongoing integrated live-fire training exercises.
- Re-grading or otherwise improving/maintaining existing unpaved roads.
- Supervising range clean-up after the conclusion of each live-fire exercise.
- Organizing and supervising annual clean-up of all training areas and fixed ranges.
- Providing support for various range and road maintenance projects.
- Maintaining a stockpile of military surplus vehicles, and replacing destroyed targets, as needed.
- Developing, building, and maintaining new ranges in support of ongoing integrated live-fire training.

- Maintaining a protection berm along Range Road.
- Periodically replacing Combat Center boundary warning signs.
- Developing unimproved roads to create a safe pathway leading to targets and objectives.

Range Facility Maintenance/Sustainment

Range facility maintenance/sustainment activities performed by G-3 Range Development routinely involve inspecting live-fire facilities to ensure they are in compliance with current safety standards. Safety tasks performed by G-3 Range Development include:

- Inspecting and scheduling rifle range impact berms for mining every 3 years.
- Inspecting and scheduling rifle range impact berms for its soil cement coating every 12 months.
- Inspecting and scheduling for replacement any damaged or destroyed shock-absorbing concrete buildings on ranges R111, R205, R210, and R230.
- Ensuring that training units return the training area to its natural state at the conclusion of the exercise.

Explosive Ordnance Disposal

EOD is particularly important for maintaining a safe training environment; accordingly, the EOD unit reports directly to the Director of Operations and Training. The mission of the EOD unit is to: (1) reduce the hazard from UXO, (2) remove ordnance residue from training areas, and (3) provide a safe and constructive training area for all training units.

Range Clearance Operations

The Director of Operations and Training, Range Safety personnel, and the Combat Center's EOD unit are constantly assessing the accumulation of UXO on the ranges. If a range is considered saturated (i.e., contains 10,000 pounds of net explosive weight of UXO), then a specific range clearance operation is conducted by EOD personnel and an outside government contractor. In addition, all personnel involved in training at the Combat Center perform constant monitoring of the training areas and ranges, and when personnel find UXO, it is reported and immediately resolved by the EOD unit.

Range Clearance Operations are conducted throughout the year and are focused on four categories of related materials:

- **Ammunition/Ordnance Derived Materials** are non-explosive and consist primarily of packaging for ordnance from item-handling material.
- **Range residue** is training ordnance that has been expended and recovered in pieces or substantially whole parts. Range residue is more dangerous than the Ammunition/Ordnance Derived Materials because there still remains a potential for the residue to contain explosive material. Range residue includes brass, projectiles, missiles, rockets, bombs, and non-fragmentary grenades. All range residues are cleared by a qualified EOD technician before it is processed for recycling or disposal.
- **UXO** includes ordnance that failed to detonate during training activities. UXO is never removed from the range; instead, it is detonated in place to create range residue, which is then cleared according to the relevant operating procedures.
- **Hulk removal** involves sectioning or cutting and then removing target hulks and all destroyed military surplus vehicles from the impact areas.

2.2.1.6 Expeditionary Training Facilities and Organizations

Many of the training sites and support facilities at the Combat Center are expeditionary in nature. Expeditionary training facilities are designed to be temporary to provide a realistic replication of a combat situation. These facilities and organizations include the Strategic Expeditionary Landing Field (SELF); the Exercise Logistic Coordination Center; the Assault Landing Zone (ALZ) Sandhill; parachute drop zone (DZ) Sandhill; observation posts (OP); radio repeater towers; Pre-designated Range Training Support Sites (PRTSSs), Forward Operating Bases (FOBs), and Combat Outposts (COPs) (refer to CCO 3500.4K).

- The **SELF** is a temporary support base for the Aviation Combat Element of Marine Corps units engaged in live-fire training exercises aboard the Combat Center. It is located in Camp Wilson in the south-central part of the installation within the West Training Area, on the border of the Sandhill Training Area (refer to Figure 2-1). The SELF has an 8,000-ft (2,438-m) aluminum matting runway, aircraft parking area, tactical airfield fuel dispensing system, expeditionary control tower, weather facilities, and emergency facilities.
- The **Exercise Logistic Coordination Center** (Camp Wilson) supports deployed units participating in live-fire training exercises. It lies northeast of the SELF, within the West Training Area (refer to Figure 2-1). Permanent and temporary structures are located at the site, and a Field Ammunition Supply Point is located southwest of the site.
- **ALZ Sandhill** is an unimproved airfield with a 5,000-ft (1,524-m) dirt runway used by fixed-wing aircraft and helicopters. Other LZs at which helicopters perform troop inserts, resupply, medical evacuation, and refueling are located throughout the Combat Center.
- **DZ Sandhill**, located about 0.6 mile (1 km) southeast of ALZ Sandhill (refer to Figure 2-1), is used for parachute drops of personnel and cargo. Parachute drops are permitted in other areas, but are not recommended without prior inspection due to the presence of large obstructions in these areas that could injure parachutists.
- **OPs** are located throughout the Combat Center on strategic high points and are used to evaluate training exercises (refer to Figure 2-1).
- **Radio repeater towers** are situated on mountain tops throughout the installation (refer to Figure 2-1).
- **PRTSSs, FOBs, and COPs** are combat support sites that have been established in fixed locations on the Combat Center to support units during training exercises. Forward arming refueling sites, Field Ammunition Supply Points, forward logistics bases, field mess areas, and shower units are some of the PRTSS, FOB, and COP facilities that currently exist to support combat training. The Combat Center has 35 of these training support sites strategically located within 15 different training areas (refer to CCO 3500.4K). Establishment of additional facilities would require excavation and other ground disturbance to create fuel containment berms, slit trenches, bivouac areas, and vehicle parking. Consequently, units are encouraged to utilize the existing multiple use PRTSSs, FOBs, and COPs as a means to reduce the environmental burdens associated with establishing new sites, to ensure environmental compliance, and to extend the use of valuable training lands.

2.2.1.7 Aircraft LZs

Currently, 92 aircraft LZs at the Combat Center are used by rotary-wing and tilt-rotor aircraft (refer to Figure 2-1). Aircraft LZs range in size from 0.23 acre (0.1 ha) to 596 acres (241 ha), with a median size of 7.8 acres (3.1 ha) and a total of 2,967 acres (1,201 ha), and are located in all training areas except for Acorn, Range, Rainbow Canyon, Noble Pass, and Sunshine Peak (Combat Center 2013). Before landing, units

must determine that the selected site will support the safe landing of the aircraft. Such a determination is based on a combination of factors, including but not limited to the area's size, topography (e.g., MV-22 aircraft must land on surfaces that do not exceed a 16% slope), vegetation (which can obscure landing surfaces), soil types, geology (e.g., no large boulders), and presence or absence of open water.

The Combat Center may designate new LZs as needed. Presently, this involves conducting surveys for sensitive resources (e.g., desert tortoise, cultural resources) within existing training areas and allowing new LZs to be designated within areas devoid of the sensitive resources.

2.2.1.8 Targets, Target Systems, and Objectives

A variety of targets, target systems, and objectives are used at the Combat Center in support of ongoing combined arms live-fire training (Combat Center 2015b).

- A total of 16 training areas contain Laser Target Areas which are used for laser ground-to-ground and air-to-ground firing. Strict regulations and guidelines are enforced to prevent exposure to hazardous levels of laser radiation.
- Placement and redistribution of non-automated targets are used for direct and indirect live-fire munitions delivered from mortars, artillery, tanks, and aircraft. These targets consist of stationary plywood targets representing a tank or other military silhouettes. Large and small military surplus vehicles, along with tire stacks and 8-ft by 8-ft (2.4-m by 2.4-m) HESCO bunkers, are arranged to form representative enemy-fortified positions and silhouettes of enemy personnel. These are temporary target arrays and are occasionally moved to support changes to exercise design, or replaced or repaired due to damage by direct or indirect live-fire.
- Three types of automated target systems are used in the training areas:
    - The Portable Infantry Target System requires minor digging and trenching to install.
    - The Moving Infantry Target System requires levelling a 50-ft (15-m) area for the target rails as well as constructing a 50-ft (15-m) berm to protect the system from the effects of direct fire.
    - The Portable Armor Target System requires extensive excavation to construct a 2-ft (0.6-m) tall and 15-ft (4.6-m) thick berm along with a 15-ft (4.6-m) square target area on which to set the target. There are currently 172 Portable Armor Target System targets onboard the Combat Center that are engaged by direct live-fire weapons.
- Company Objective Areas (1,640 ft by 1,640 ft [500 by 500 m]) are established at specific locations in designated training areas that support dismounted live-fire attacks by at least two rifle companies in the infantry battalion. These objectives are primarily composed of three integrated platoon-sized trench lines with some targets composed of tires, wire obstacles, HESCO bunkers, and small and large military surplus vehicles. Trenches are 6-ft (1.8-m) wide, 8-ft (2.4-m) deep, and 150-ft (46-m) long. Sometimes these trenches are lined with plywood to act as revetment.

2.2.1.9 Vehicular Circulation

Vehicular circulation throughout the Combat Center occurs on 1,258 miles (2,025 km) of unpaved MSRs and secondary roads. MSRs have an average width of 32 ft (10 m) and a maximum speed limit of 30 miles (48 km) per hour. Secondary roads average 20 ft (6 m) in width and are also limited to 30 miles (48 km) per hour. However, such speeds are not possible on substantial portions of these roads due to terrain and other factors. Areas within 0.9 mile (1.5 km) of the MSRs are subject to intense training activity, especially by tracked and heavy wheeled vehicles as they participate in realistic combat training.

The Combat Center places signs that read "RESTRICTED AREA, NO OFF-ROAD TRAFFIC/NO UNNECESSARY OFF-ROAD USE" at common training area entry points in Category 1 and Category 2 Special Use Areas (refer to Figure 2-2), and along some MSRs, to alert personnel to the presence of the desert tortoise, restrict all off-road use in these areas, or to restrict all unnecessary off-road use in these areas (Combat Center 2015b).

2.2.2 Types of Training Activities

All training activities at the Combat Center can be grouped into six general categories, or types: infantry dismounted maneuvers, vehicle maneuvers, defensive operations, engineer operations, aircraft operations, and ordnance delivery. Each type of activity is described below, is an integral part of the training mission of the Combat Center, and contributes to the overall combat readiness and success of the USMC. The training exercises described in Section 2.2.3, *Ongoing Training Exercises*, typically involve some or all of these activities occurring simultaneously and at varying scope and scale.

2.2.2.1 Infantry Dismounted Maneuvers

Infantry dismounted maneuvers are essential elements of training at the Combat Center. Dismounted attacks are necessary and must be practiced to ensure that Marine units are capable of achieving mission objectives. Unless otherwise restricted (refer to Figure 2-2), these operations occur in all training areas, including those that are geographically restricted to vehicles. Infantry dismounted maneuvers are often extensive in distance and area covered on foot, with an average of 5 miles (8 km) traveled per day by each Marine involved in training. Ground training exercises and activities can last for extended periods of time and require bivouacking, in which Marines camp in the training area and conduct various operations. Digging activities associated with staged operations create ground disturbance below the normal soil horizon of 12 inches (0.3 m) and can be for both sanitation and force protection reasons (e.g., protection against enemy fire) (refer to Section 2.2.2.3, *Defensive Operations*). On average, an estimated 180 Marines will dig a fighting hole on any given day. Finally, infantry dismounted maneuvers also require the use of barbed wire with associated berms, trenches, and digging-in of targets to facilitate realistic battle scenarios (Combat Center 2015b).

2.2.2.2 Vehicle Maneuvers

Vehicles use the Combat Center's training areas, fixed ranges, and road network daily and are a crucial element in maneuvers and operational activities. Secondary roads and MSRs are also used to transport troops and supplies to fixed ranges and other training sites. Off-road use by vehicles is an integral part of the real life battle scenarios that take place during all major exercises, including the Integrated Training Exercise (ITX), Steel Knight Exercise, Desert Fire Exercise (DESFIREX), Desert Scimitar, and unit level training; large numbers of tracked and heavy wheeled vehicles travel off road for varying periods of time during these exercises (Combat Center 2015b).

Vehicles involved in this type of training are categorized as follows:

- **Tracked vehicles** have non-rubber wheels (e.g., tanks, amphibious assault vehicles [AAVs], multiple launch rocket systems [MLRS] or self-propelled artillery).
- **Heavy-wheeled vehicles** have multiple axles and more than four rubber tires (e.g., light armored vehicles [LAVs], advanced combat vehicles [ACVs], 5- and 7-ton trucks and personnel carriers, and the entire series of Mine Resistant Ambush Protected vehicles).
- **Light-wheeled vehicles** have four rubber tires (e.g., utility vehicles, high mobility multi-purpose wheeled vehicle, joint light tactical vehicles, and small trucks).

Each type of vehicle is discussed in more detail below, and Table 2-1 provides the distance travelled by each type of vehicle during a typical year of training activities on the Combat Center.

Table 2-1. Existing (2014) Vehicle Use (Annual Average)

Vehicle Category	*Average Daily Number of Vehicles at Peak Use*	*Average Distance per Day at Peak Use (miles [km])*	*Average Annual Days per Year of Peak Use*	*Average Annual Distance per Year at Peak Use (miles [km])*
Tracked	72	253 (407)	250	63,250 (101,791)
Wheeled (Heavy)	213	3,772 (6,070)	250	943,000 (1,517,608)
Wheeled (Light)	230	5,175 (8,328)	250	1,293,750 (2,082,084)
Total	**515**	**9,200 (14,805)**	**N/A**	**2,300,000 (3,701,483)**

Notes: Peak use includes major training exercises only (refer to Section 2.2.3, *Ongoing Training Exercises*). Data regarding the levels of vehicle use during minor training exercises are not available, but such use is estimated to be considerably lower than peak use levels.
N/A = not applicable.
Source: Combat Center 2015b.

Tracked Vehicles

Tracked Vehicles function as weapons systems, armored personnel carriers, engineer platforms, and recovery systems. Excessive slopes and rough terrain can severely impair mobility or stop tracked vehicle travel altogether. The M1A1 Main Battle Tank and AAVs are the main components of mechanized operations. The M1A1's mission is to close with and destroy enemy forces on the integrated battle field using mobility, firepower, and shock effect. The AAV is an armored, amphibious, and fully tracked vehicle. The AAV carries troops from ship to shore and to inland locations. When moving into position, tracked vehicles use terrain to cover and mask their movement. Depending on the tactical situation and terrain, tracked vehicles may travel off-road rather than on existing roads. In addition to traveling throughout the Combat Center, vehicle crews also perform 1st through 3rd echelon maintenance while supporting major exercises taking place aboard the Combat Center. This maintenance includes removing and replacing vehicle engines and/or transmissions while in the field.

Heavy-wheeled Vehicles

These vehicles collectively function as weapons systems, armored personnel carriers, engineer platforms, and recovery systems. Many of the same tactics and limitations that apply to tracked vehicles apply to wheeled vehicles; excessive slopes and rough terrain can severely impair mobility or stop travel. Depending on the tactical situation and terrain, wheeled vehicles will spread when not using roads to present a smaller target. Heavy-wheeled vehicles travel greater distances than tracked vehicles but typically do not travel as far as light-wheeled vehicles (refer to Table 2-1). In addition to traveling throughout the Combat Center, vehicle crews also perform 1st and 2nd echelon maintenance while supporting major exercises taking place aboard the Combat Center. This maintenance includes removing and replacing vehicle engines and/or transmissions while in the field.

Light-wheeled Vehicles

These vehicles function as transport vehicles and combat support vehicles. Many of the same tactics and limitations that apply to tracked vehicles and heavy-wheeled vehicles apply to light-wheeled vehicles (e.g., excessive slopes and rough terrain can severely impair mobility or stop travel altogether), but this is often less so. Depending on the tactical situation and terrain, wheeled vehicles will spread when not using roads

to present a smaller target. Due to their mobility, light-wheeled vehicles travel the greatest distance of any vehicle category (refer to Table 2-1).

2.2.2.3 Defensive Operations

When in a stationary position for an extended period of time, such as in defense or in preparation for an enemy attack or ambush, vehicles must be protected and removed from sight by "digging in." Digging in is the act of constructing a fighting position below the surface of the ground to provide the vehicle and crew protection against direct and indirect enemy fire and to conceal their position from the enemy forces. This critical skill typically utilizes engineering equipment or other heavy machinery to prepare the fighting positions (refer to Section 2.2.2.4, *Engineer Operations*). To reduce environmental impacts, all disturbed areas are returned to their natural grade at the end of each training event.

Digging in is normally done during defensive operations and takes place in numerous training areas aboard the Combat Center. Digging in also involves building obstacles to channel, slow down, or stop the forward movement of enemy forces. There are various types of natural and mechanical obstacles that can be constructed, the most common of which is a tank ditch. A tank ditch is a large berm-and-trench system that extends across the entire front of the defensive position. Tank ditch berms can be from 3,280 ft (1,000 m) to 11,480 ft (3,500 m) in length; the chosen size and placement is based on the commander's current tactical situation.

2.2.2.4 Engineer Operations

Engineer operations are an integral part of the training mission of the Combat Center and contribute to the overall combat readiness and success of the USMC. Engineer operations are exceptionally detailed, must be rehearsed to ensure all deploying units are proficient and capable of accomplishing mission objectives, and are frequently included as a component of larger training exercises. Currently, engineer operations training events, when conducted solely for the purpose of training Marines to perform these activities outside of larger exercises, occur seven times per year. Each event is 7-10 days long and involves 150 Marines (Combat Center 2015b). Engineer operations aboard the Combat Center require the following actions:

- Digging hull defilade positions (known as "digging in") involves digging all combat vehicles below the surface of the ground.
- Digging anti-tank ditches and defensive berms that normally span 3,280 to 11,480 ft (1,000 to 3,500 m). This task consists of digging a 10-ft (3-m) wide and 6-ft (1.8-m) deep tank ditch, with attached 10-ft (3-m) tall berm to deny the enemy freedom of movement based on the training force's intent.
- Digging in crew-served weapon positions, which involves using a backhoe to dig in fighting holes approximately 4-ft (1.2-m) deep by 6-ft (1.8-m) wide by 4-ft (1.2-m) long.
- Establishing Forward Ammunition Resupply Points (FARPs). This involves digging holes large enough to position 1,000-gallon (3,800-liter) fuel bladders into the ground to protect them from enemy fire and high winds. This type of training takes place in the 15 PRTSSs.
- Establishing forward logistics bases to support field mess and field shower facilities.
- Building patrol bases by constructing 10-ft (3-m) tall berms with accompanying anti-tank ditches for security. The construction of the patrol bases enables the heavy equipment operators to become proficient in expeditiously building patrol bases that will be employed by Ground Combat Element and Logistical Command Element Marines.
- Rebuilding and reshaping existing FOB/COP berms by pushing soil from the inside of the existing FOB/COP to rebuild or reshape the perimeter berm.

- Entry Control Point construction involves building a series of obstacles designed to deny, allow, or restrict access into a FOB/COP by building a 20-ft by 20-ft (6-m by 6-m) foundation made out of HESCO barriers. Once the foundation is completed, a wooden guard tower is then built directly on top of the HESCO compound.
- Conducting bridging operations that consist of digging a 20-ft (6-m) by 40-ft (12-m) canal and then building or placing a wooden bridge or medium girder bridge to span the canal. At the conclusion of the exercise, all disturbed soil would be returned to its natural grade and all wood would be collected and brought to the local wood lot.
- Conducting road grading/maintenance operations that consist of assisting the local RTAMS division with grading, maintaining, and repairing over 500 miles (800 km) of unimproved roads, including the MSRs, aboard the Combat Center.
- Placing culverts to prevent main roads and MSRs from being washed out. This requires digging across the road and leveling the area for the placement of the culvert.
- Constructing live-fire objectives from 7-ft (2-m) HESCO barriers. This task consists of grading a flat surface to set the HESCO barriers on and then scraping soil from the local area to use as fill for the HESCO barriers.
- Constructing aircraft LZs at existing FOBs and COPs by grading a 150-ft by 150-ft (46-m by 46-m) flat area to form a flat LZ. To keep the dust to an acceptable level, the area is covered with soil cement.
- Constructing 1,640-ft by 1,640-ft (500-m by 500-m) Company Objective Areas at specific locations in designated training areas that support dismounted live-fire attacks by at least two rifle companies in the infantry battalion. These objectives would primarily be composed of three integrated platoon-sized trench lines with targets composed of tires, wire obstacles, HESCO bunkers, and small and large military surplus vehicles. Trenches would be 6-ft (1.8-m) wide, 8-ft (2.4-m) deep, and 150-ft (46-m) long. In some cases, the trenches would be lined with plywood to act as revetment.

Engineer operations are prohibited in all Category 1 Special Use Areas (restricted), including but not limited to: Sandhill (desert tortoise), Bullion (south of the 99 northing for desert tortoise protection), the petroglyph area at the southeast corner of Lava, and a portion of Lavic Lake (archaeological sites).

2.2.2.5 Current and Future Aircraft Operations

A variety of fixed-wing, rotary-wing, and tilt-rotor aircraft are used at the Combat Center on a regular basis for air-to-ground ordnance delivery, troop transport, and other integrated training scenarios. Most training-related aircraft operations originate and/or terminate at the SELF in the West Training Area; aircraft engaged in training exercises may also fly to the Combat Center from another airfield and return without ever landing at the SELF. Specific aircraft operations and activities associated with ongoing training may include the following: low-level bombing; strafing; close air support; limited ground controlled intercepts; air combat maneuvers; dissimilar air combat; parachute operations; close fire support; target marking; forward air control; electronic warfare; visual reconnaissance; troop inserts; troop lifts; tactical control party; medical evacuation support; aerobatic flights; tactical air control party; resupply; low-level training; night vision goggle training; photo and photoflash runs; and spotter of artillery and/or air strikes. Air operations independent of major exercises include numerous individual aircrew training flights by Marine, Navy, Army and Air Force aircraft; low-level air defense firing exercises; air command and control indoctrination training; and a small number of contracted aviation flights.

In this EA, an "aircraft sortie" refers to one flight. For an example, a helicopter that flies to the Combat Center from its home base at another installation to perform seven landings before returning to its home base would have performed eight sorties (one for each landing at the Combat Center and one for the return flight to its home base). Total aircraft sorties (including training-related sorties as well as non-training related sorties) at the Combat Center airspace in any given year can range from 60,000 to 62,000. Table 2-2 displays representative aircraft sorties at the Combat Center.

As assessed in the MV-22 West Coast Basing EIS, the transition of CH-46 aircraft to MV-22 aircraft at Marine Corps Air Station (MCAS) Miramar and MCAS Camp Pendleton began in FY 2010 and is expected to be complete by FY 2020 (DoN 2009b). Associated MV-22 training exercises and operations at the Combat Center began with the arrival of the first MV-22 aircraft to the MCASs in FY 2010. In the future, the F-35 will assume most of the sorties now flown by FA-18 C/D and AV-8B. No other change in aircraft operations is currently planned. Overall, there would be a net reduction in the total number of annual average aircraft sorties with the full transition from CH-46 to MV-22 aircraft (Table 2-2). These transitions would occur with or without implementation of the Proposed Action described in this EA.

Table 2-2. Representative Current and Future Aircraft Sorties (Annual Average)

Aircraft	*Aircraft Sorties in 2014**	*Approved Changes in Process of Being Implemented*	*Total Future Sorties*
A-10	200	0	200
B-1	50	0	50
B-707	100	0	100
FA-18 C/D	4,938	-4,938	0
F-5E	158	0	158
F-16	200	0	200
F-15	200	0	200
F-22	500	0	500
F-35	200	8,981	9,181
KC-130	1,169	0	1,169
AV-8B	4,043	-4,043	0
AH-1	**22,242**	**0**	**22,242**
UH-1Y	**10,121**	**0**	**10,121**
CH-53	**4,858**	**0**	**4,858**
CH-46	**4,558**	**-4,558**	**0**
MV-22	**4,998**	**3,000**	**7,998**
UAV	1,997	0	1,997
Total	**60,532**	**-1,558**	**58,974**

Notes: *Aircraft sorties in any given year can vary, typically ranging from 60,000 to 62,000 sorties, including non-training related flights. As such, the sorties provided are representative of a typical year.
Aircraft types in **bold** are rotary wing or tilt-rotor aircraft.
Source: Combat Center 2015b.

As described in Section 2.2.1.7, *Aircraft LZs*, 92 aircraft LZs are currently used by rotary-wing and tilt-rotor aircraft (refer to Figure 2-1). These LZs are located in all training areas except for Acorn, Range, Rainbow Canyon, Noble Pass, and Sunshine Peak (Combat Center 2013).

2.2.2.6 Ordnance Delivery

Categories of ordnance use at the Combat Center include aircraft delivered, artillery delivered, tanks and other armor delivered, small arms, grenades/signal illumination, mortars, and rockets/missiles. Each of

these is described below, and existing use is provided in Table 2-3. Table 2-4 lists the training areas where each type of ordnance is used. While some types of ordnance use will overlap with one another (e.g., when tanks and aircraft attack the same target), not all types of ordnance use will overlap (e.g., static ranges for small arms training are not shelled by artillery or bombed by aircraft).

Table 2-3. Existing (2014) Ordnance Delivery (Annual Average)

Category	***Existing Use (individual munitions)***
Aircraft	50,082
Artillery	57,118
Tanks and Other Armor	87,957
Small Arms	12,235,460
Grenades/Signal Illumination	93,634
Demolitions	51,686
Mortars	55,892
Rockets/Missiles	2,181
Total	**12,634,010**

Source: Combat Center 2015b.

Aircraft-delivered Ordnance

The delivery of air-to-ground ordnance (e.g., machine gun munitions and conventional bombs) is one of the characteristic training activities conducted at the Combat Center. The manner and type of ordnance delivered are highly variable due to differences in aircraft, weapons systems, and missions. The majority of air-to-ground ordnance delivery occurs on approximately 80,000 acres (32,400 ha) (13% of the project area). Table 2-4 lists the training areas where aircraft-delivered ordnance is allowed outside of Category 1 Special Use Areas (restricted areas) and the 3,280-ft (1,000-m) buffer along the Combat Center's boundary. Fixed Range 601 within the Morgans Well Training Area is used exclusively for aircraft-delivered ordnance.

Artillery-delivered Ordnance

Artillery fire occurs on approximately 110,000 acres (44,500 ha) (18% of the project area) of the Combat Center but is concentrated on approximately 45,000 acres (18,200 ha) (8% of the project area). Most artillery firing is directed at fixed targets and areas that are already heavily disturbed. Most of the fired explosive ordnance leaves craters about 3-ft (0.9-m) wide and 2-ft (0.6-m) deep (Combat Center 2015b). Very little artillery use occurs in the mountainous areas of the Combat Center. Table 2-4 lists the training areas where artillery use is allowed outside of Category 1 Special Use Areas (restricted areas) and the 3,280-ft (1,000-m) buffer along the Combat Center's Boundary. Artillery may not be used in a training area that is not controlled or scheduled by the firing party.

Table 2-4. Ongoing Live-fire Ordnance Delivery Methods by Training Area

Training Area	*Aircraft Delivered*	*Artillery Delivered*	*Tanks and Other Armor Delivered*	*Grenades, Demolitions, and Signal Illumination*	*Mortars and Rockets/Missiles*
Acorn	Prohibited	Approved*	Prohibited	Prohibited	Prohibited
America Mine	Approved	Approved	Approved	Approved	Approved
Blacktop	Approved	Approved	Approved	Approved	Approved
Bullion (South of the '99 Northing; refer to Figure 2-1)	Prohibited	Prohibited	Prohibited	Prohibited	Prohibited
Bullion (North of the '99 Northing; refer to Figure 2-1)	Approved	Approved	Approved	Approved	Approved
Cleghorn Pass	Approved	Approved	Approved	Approved	Approved
Delta	Approved	Approved	Approved	Approved	Approved
East	Prohibited	Approved*	Prohibited	Prohibited	Prohibited
Emerson Lake	Approved	Approved	Approved	Approved	Approved
Gays Pass	Approved	Approved	Approved	Approved	Approved
Gypsum Ridge	Prohibited	Approved*	Prohibited	Prohibited	Prohibited
Lava	Approved	Approved	Approved	Approved	Approved
Lavic Lake	Approved	Approved	Approved	Approved	Approved
Lead Mountain	Approved	Approved	Approved	Approved	Approved
Mainside	Prohibited	Prohibited	Prohibited	Prohibited	Prohibited
Maumee Mine	Approved	Approved	Approved	Approved	Approved
Morgans Well	Approved	Approved	Approved	Approved	Approved
Noble Pass	Approved	Approved	Approved	Approved	Approved
Prospect	Approved	Approved	Approved	Approved	Approved
Quackenbush	Approved	Approved	Approved	Approved	Approved
Rainbow Canyon	Approved	Approved	Approved	Approved	Approved
Range	Approved	Approved	Approved	Approved	Approved
Sandhill	Prohibited	Prohibited	Prohibited	Prohibited	Prohibited
Sunshine Peak	Approved	Prohibited	Prohibited	Prohibited	Prohibited
West	Prohibited	Prohibited	Prohibited	Prohibited	Prohibited

Notes:
- Munitions are not used (shot or delivered) in Category 1 Special Use Areas (Restricted) or within the 3,280-ft (1,000-m) buffer along the Combat Center's boundary.
- Small arms and related ordnance is used during infantry maneuvers and related training activities throughout the Combat Center, subject to restrictions described in Section 2.2.1.1, *Training Areas and Restrictions*.
- Prohibited areas refer to both shooting and delivery of ordnance.
- * = units are allowed to fire artillery out of the training area but not into the training area.

Source: CCO 3500.4K.

Tanks and Other Armor Delivered

Ordnance, including both explosive and inert munitions, is fired by tanks (120 millimeter [mm]), AAVs (30 mm), and light armored reconnaissance (LAR) (25 mm) at the Combat Center. Tank operations are conducted over approximately 200,000 acres (80,900 ha) (33% of the project area) of the Combat Center, but most of the ordnance delivered from tanks and associated maneuvers are concentrated on 132,000 acres (53,419 ha) (22% of the project area). The majority of tank operations take place in areas that are already moderately to highly disturbed. Table 2-4 lists the training areas where ordnance delivered by tanks and other armor is allowed outside of Category 1 Special Use Areas (restricted areas) and the 3,280-ft (1,000-m) buffer along the Combat Center's boundary. Unit-level tank, AAV, and LAR training and annual gunnery qualifications occur at Range 500 in the Cleghorn Pass Training Area.

Small Arms and Other Ordnance

A wide variety of small arms and related ordnance is used during infantry maneuvers and related training activities throughout the Combat Center, subject to restrictions described in Section 2.2.1.1, *Training Areas and Restrictions*. Overall, approximately 12,200,000 rounds of small arms ordnance are fired annually within the Combat Center, the majority of which are fired from rifles, machine guns, and other small arms.

Small arms and other ordnance operations occur at certain Fixed Ranges such as the 400/401 Series Ranges in the Cleghorn Pass Training Area and throughout various other training areas during major exercises. In addition to the small arms component of major exercises, qualification and annual requalification with the service rifle and service pistol occurs at the Marksmanship Training Unit ranges located at the north end of Mainside. The Marksmanship Training Unit ranges include known-distance and unknown-distance rifle ranges; a Battle Sight Zero range for calibrating rifle sights; known-distance, moving target, and a multi-purpose shotgun range; and an indoor simulated marksmanship trainer. In 2013, 6,502 Marines fired for annual requalification with the Service Rifle at the Marksmanship Training Unit, and 2,103 fired for annual qualification or requalification with the Service Pistol. An additional 12,052 Marines and other personnel were trained during supplemental Marksmanship Training Unit operations, unit training or other live-fire training operations.

Grenades, Demolitions, and Signal Illumination

Infantry maneuvers and other training exercises also rely upon a variety of mines, explosive charges, signal illumination, smoke grenades, practice grenades, etc., to increase the realism of the battlefield environment. Table 2-4 lists the training areas where grenades, demolitions, and signal illumination are allowed outside of Category 1 Special Use Areas (restricted areas) and the 3,280-ft (1,000-m) buffer along the Combat Center's Boundary.

Mortars and Rockets/Missiles

Mortar and rocket/missile fire occurs on approximately 110,000 acres (44,500 ha) (18% of the project area) of the Combat Center but is concentrated on approximately 45,000 acres (18,200 ha) (8% of the project area). Most mortar, rocket, and missile firing is directed at fixed targets and areas that are already heavily disturbed. Most of the mortars, rockets, and missiles fired leave craters about 12 inches (30.5 centimeters) wide and 6 inches (15 centimeters) deep (Combat Center 2015b). Very little mortar, rocket, and missile use occurs in the mountainous areas of the Combat Center. Currently, mortars, rockets, and missiles are used in fixed ranges 104 and 109 as well as the training areas identified in Table 2-4 (outside of Category 1 Special Use Areas [restricted areas] and the 3,280 ft [1,000 m] buffer along the Combat Center's boundary). In addition, no live-fire is allowed within 3,280 ft (1,000 m) of a training area that is not controlled or scheduled by the firing party.

2.2.3 Ongoing Training Exercises

This section describes specific training exercises that currently occur onboard the Combat Center, with the exception that training activities proposed as part of the 2012 Land Acquisition and Airspace Establishment EIS (DoN 2012) are not included. The excluded activities assessed in the 2012 EIS include Marine Expeditionary Brigade training activities, the establishment and use of the four new training areas (Bessemer Mine, Galway Lake, Means Lake, and Cleghorn Lake), and the extension of the southeastern portion of the East Training Area (refer to Figure 1-1). These activities are only considered in Chapter 5, *Cumulative Impact Analysis*, of this EA.

The Marine Corps is constantly taking new steps in training evolutions and pre-deployment preparation, since the demands of war are constantly evolving. As such, the actual name, duration, location(s), specific activities, and direction of any given exercise may change somewhat year to year. Despite this constant state of change, the information provided herein is considered representative, as the overall size, scope, and intensity of an exercise does not change.

As shown in Table 2-5, approximately 584-647 days of training event activities are conducted each year. To accommodate this amount of training activity during a 365-day calendar year, some type of training occurs every day of the year, and on most days, more than one training exercise is conducted onboard the Combat Center. In addition, and as shown on Table 2-5, the vast majority of these training days (approximately 80-85%) are associated with major training exercises. Major training exercises are exercises that are given priority and cannot be interrupted, modified, or otherwise changed by other training exercises. Currently, major training exercises are conducted over 250 days per year (70%); the remainder of the year (less than 115 days per year [30%]) is devoted to smaller types of activities and exercises.

2.2.3.1 The Integrated Training Exercise Program

The primary mission of the Combat Center is to develop, conduct, administer, and assess the ITX Program. The ITX program, formerly known as the Combined Arms Exercise Program and Enhanced Mojave Viper, is the longest-lasting activity that occurs at the Combat Center and has priority over all other types of training exercises. Each ITX is comprised of an intensive training cycle involving a series of progressive live-fire exercises that test the ability and adaptability of a force of approximately 3,500 Active Duty or Reserve Fleet Marine Force Personnel through a series of live-fire training exercises followed by a mission rehearsal exercise or stability operations exercise. Infantry troops, artillery and armored battalions, fixed-wing aircraft, and attack helicopters are employed closely together in various maneuvers and exercises. Currently, five ITX programs are conducted each year, each of which lasts 30 days. An additional ITX program is also conducted annually for reserve units that lasts 15 days (Table 2-5).

Table 2-5. Existing (2014) Ongoing Training Exercises

Training Exercise	*Duration (Days)*	*Frequency (# Per Year)*	*Total Annual Training Days*	*Personnel*	*Total Annual Personnel Days*	*Units and Maneuvers Involved*	*Training Area*																						
							Acorn	America Mine	Blacktop	Bullion	Cleghorn Pass	Delta	East	Emerson Lake	Gays Pass	Gypsum Ridge	Lava	Lavic Lake	Lead Mountain	Mainside	Maumee Mine	Morgans Well	Noble Pass	Prospect	Quackenbush	Rainbow Canyon	Range	Sandhill	Sunshine Peak	West
Major Training Exercises																														
ITX (Active Duty)	30	5	150	3,500	525,000	All air and ground procedures, including air/helicopters and ground/vehicle maneuvers, tanks, artillery, reconnaissance, and Engineer operations (including obstacle reduction).			X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X			X
ITX (Reserve Units)	15	1	15	3,500	52,500	All air and ground procedures, including air/helicopters and ground/vehicle maneuvers, tanks, artillery, reconnaissance, and engineer operations (including obstacle reduction).			X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X			X
Steel Knight	14	1	14	7,000	98,000	All air and ground procedures, including air/helicopters and ground/vehicle maneuvers, tanks, artillery, reconnaissance, and engineer operations (including obstacle reduction).			X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X		X		X
Desert Fire Exercise	7-14	2	14-28	2,000	28,000-56,000	Air, artillery, and ground/vehicle maneuvers.			X	X		X		X	X	X	X	X	X		X	X	X	X	X	X				
Desert Scimitar	14	1	14	7,000	98,000	All air and ground procedures, including air/helicopters and ground/vehicle maneuvers, tanks, artillery, reconnaissance, and engineer operations (including obstacle reduction).		X	X	X	X	X		X	X	X	X	X	X		X	X	X	X	X	X				
Marine Aviation Weapons and Tactics Squadron 1 (MAWTS-1)	3	2	6	1500	9,000	Air assault with rotary wing and tilt wing (MV-22) aircraft and ground maneuvering.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Allied Forces	20-42	5	122	180-500	47,560	All air and ground procedures, including air/helicopters and ground/vehicle maneuvers, tanks, artillery, reconnaissance, and engineer operations (including obstacle reduction).	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Formal Schools	4-18	18	160-178	100-150	19,440-21,740	Examples include Fire Support Coordination Application Course (live-fire, air ordnance), Tactical Air Control Party (artillery, non-live-fire air support), and the Infantry Officer's Course (air, artillery, mortars, and ground maneuvers).			X	X		X		X	X	X	X	X	X		X	X	X	X	X	X	X			
Major Training Exercises Subtotal	N/A		495-527	N/A	877,500-907,800	N/A																							

Table 2-5. Existing (2014) Ongoing Training Exercises

Training Exercise	*Duration (Days)*	*Frequency (# Per Year)*	*Total Annual Training Days*	*Personnel*	*Total Annual Personnel Days*	*Units and Maneuvers Involved*	*Training Area*																						
							Acorn	**America Mine**	**Blacktop**	**Bullion**	**Cleghorn Pass**	**Delta**	**East**	**Emerson Lake**	**Gays Pass**	**Gypsum Ridge**	**Lava**	**Lavic Lake**	**Lead Mountain**	**Mainside**	**Maumee Mine**	**Morgans Well**	**Noble Pass**	**Prospect**	**Quackenbush**	**Rainbow Canyon**	**Range**	**Sandhill**	**Sunshine Peak**	**West**
Minor Training Exercises																														
Weapons/ Equipment Testing	Variable			150	Variable	Various testing and training activities (e.g., Fallbrook Shoot, Barstow Shoot).	X	X	X	X		X	X	X	X	X	X	X	X		X	X	X	X	X	X	X			
Unit Level Training (Squad-Company Level)	Variable					Air, artillery, mortars, tanks, ground/vehicle off-road maneuvers, and extensive defensive operations.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Unit Level Training (Battalion Level)	10	4-5	40-50	1500-2000	60,000-100,000	All air and ground procedures, including air/helicopters and ground/vehicle maneuvers, tanks, artillery, reconnaissance, and engineer operations (including obstacle reduction).	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Engineer Operations	7-10	7	49-70	150	7,350-10,500	Digging to build berms, canals, bridges, for force protection, and to construct objectives, targets, and LZs.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Additional Exercises	Variable					Similar to the activities described above, for numerous Marine Corps, Air Force, Army and Navy Units.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Minor Training Exercises Subtotal*	N/A		89-120	N/A	67,350-110,500	N/A																								
Training Exercises Total*	**N/A**		**584-647**	**N/A**	**944,850-1,018,300**	**N/A**																								

Notes:

- Training areas since the 2003 EA (DoN 2003b) have been redesigned; some areas have been modified (generally reduced in size) to allow for the creation of Camp Wilson and Morgans Well Training Area.
- Training activities proposed as part of the 2012 Land Acquisition and Airspace Establishment EIS (DoN 2012), including Large Scale Exercises, Marine Expeditionary Brigade training activities, the establishment and use of the four new training areas (Bessemer Mine, Galway Lake, Means Lake, and Cleghorn Lake), and the extension of the southeastern portion of the East Training Area (refer to Figure 1-1), are only considered in this EA as part of the cumulative impact analysis in Chapter 5.
- Digging during Engineer Operations and other training activities are limited to unrestricted areas.
- *summed subtotals and totals do not include an undetermined amount of testing activities for the variable training exercises (i.e., Weapons/Equipment Testing, Unit Level Training [Squad-Company Level], and Additional Exercises).

N/A = Not Applicable.

Source: Combat Center 2015b.

MAGTF Training Command exercise forces involved in ITX include a Command Element, Ground Combat Element, Aviation Combat Element, and a Logistical Command Element:

- The Command Element is normally made up of an Infantry Regiment.
- The Ground Combat Element normally consists of two infantry battalions (approximately 2,000 Marines) reinforced by a Tank/LAR and AAV platoon (14 M1A1/15 LAVs, 14 AAVs, and 2 M-88 retrievers) and an artillery battalion (12-18 howitzers and support trucks).
- The Air Combat Element consists of a fixed-wing squadron (approximately 12 F/A-18s or 12 AV-8Bs, or 8 F-35s), an attack helicopter squadron (6-8 AH-1s and 2-4 UH-1s), and a composite helicopter/tilt rotor squadron (CH-46s/CH-53s/MV-22s) for transportation and heavy lift.
- The Logistical Command Element includes a Combat Logistics Battalion of approximately 320 Marines and provides supplies and repair services to the MAGTF.

During the first 20 days, ITX focuses an integrated combined arms training for Marine infantry battalions using air and ground procedures simultaneously. During this time, fire support coordination exercises are conducted that consist of attacking multiple targets with mortar, artillery, and aircraft-delivered ordnance. The Ground Combat Element, consisting of infantry squads, platoons, and companies, also practices attacking enemy positions using mortars and machine guns without the assistance of air or artillery support during this time. ITX training activities during the final 10 days combine all the tactics, techniques, and procedures practiced during the first 20 days; this involves extensive ground maneuvers and numerous live-fire exercises over a variable 50 to 75-mile (80 to 121-km) course within the Combat Center.

Following each ITX or other live-fire exercise, reset and clean-up operations take place in accordance with the installation's UXO Range Management Plan, including removal of UXO and repair or replacement of targets; refer to Section 2.2.1.5, *Range Control and Management of Unexploded Ordnance*, for additional details.

A large portion of the ITX occurs in the 400/401 Series of Fixed Ranges in the Cleghorn Pass and Quackenbush training areas (refer to Figure 2-1). Lava, Gays Pass, Bullion, Black Top, Lavic Lake, and Emerson Lake are other training areas that experience heavy use during the ITX, especially during training days 9-20. Maumee Mine and Gypsum Ridge are also used, but operations are generally limited to maneuvers and LAV operations. Morgans Well, Noble Pass, Prospect, and Rainbow Canyon are also typically used.

2.2.3.2 Steel Knight Exercises

Steel Knight (7,000 Marines) occurs once per year, usually in December, and is one of the larger tank exercises held at the Combat Center. It is a Division-level, live-fire, 2-week exercise that employs all 68 M1A1 tanks of the 1st Tank Battalion. The individual training scenarios vary from year to year, but exercise events typically include: deliberate attack, counterattack, day/night deliberate defense, withdrawal, battlefield interdiction, direct air support, close air support, night tactical withdrawal, withdrawal not under enemy fire, and engineer operations that include obstacle reduction. Exercises also include aerial reconnaissance/surveillance and long range artillery missions. Steel Knight exercises can encompass a wide array of forces, including Division Headquarters, 2 Regimental Headquarters, Artillery Regimental Headquarters, 3 infantry battalions, a tank battalion, 2 LAR battalions, 1 AAV battalion, and a Logistical Command Element. Although most training areas are usually employed, the most heavily used are Delta, Noble Pass, Black Top, Lead Mountain, Lavic Lake, Emerson Lake, Quackenbush, and Gays Pass. Less frequently used training areas are Bullion and Cleghorn Pass. Major staging areas for Steel Knight include the Acorn, East, and West training areas.

2.2.3.3 Desert Fire Exercises (DESFIREX)

DESFIREX is primarily an artillery training exercise at the Regimental level involving 3,000 Marines for 7-14 days twice per year. It normally consists of a Regimental Headquarters, two M777A2 towed howitzer battalions, and one high mobility artillery rocket system (HIMARS) battalion. HIMARS units range from a battery (9 launchers) to a battalion (27 launchers). DESFIREX is sometimes combined with Mission Rehearsal Exercise. When HIMARS are incorporated into DESFIREX, the HIMARS batteries routinely fire the MLRS M28A1 practice rocket.

Other DESFIREX training scenarios can include an EXCALIBER Shoot, Helicopter-borne raids, and Unmanned Aerial Vehicle operations. Scenario for a DESFIREX is variable and can encompass most of the training areas. The heaviest artillery use occurs in Quackenbush, Gays Pass, Lavic Lake, Blacktop, Lava, and Lead Mountain, with moderate artillery firing into Emerson Lake, Maumee Mine, Prospect, Delta, Noble Pass, Cleghorn Pass, Bullion and America Mine.

2.2.3.4 Desert Scimitar

The Desert Scimitar is primarily a Division-level training exercise (7,000 Marines) that emphasizes artillery maneuvers with infantry and tanks that are supported by air and rotary-wing live-fire. It is conducted once each year for 1-2 weeks.

Desert Scimitar normally consists of the following units: Division Headquarters, Regimental Headquarters, two M777A2 towed howitzer battalions, and one HIMARS battery (9 launchers) or battalion (27 launchers). Desert Scimitar is sometimes combined with a Mission Rehearsal Exercise. When HIMARS are incorporated into Desert Scimitar, the HIMARS batteries routinely fire the MLRS M28A1 practice rocket. In addition, one firing battery will also take part in an EXCALIBER shoot. Similar to Steel Knight, Division-level forces involved in a Desert Scimitar can encompass a wide array of forces, including Division Headquarters, two Regimental Headquarters, Artillery Regimental Headquarters, three infantry battalions, a tank battalion, two LAR battalions, one AAV battalion, and a Logistical Command Element.

Other Desert Scimitar training scenarios can include helicopter-borne raids and unmanned aerial vehicle (UAV) operations. The scenario for a Desert Scimitar is variable and can encompass most of the training areas. The heaviest artillery use occurs in Quackenbush, Gays Pass, Lavic Lake, Blacktop, Lava, and Lead Mountain, with moderate artillery firing into Emerson Lake, Maumee Mine, Prospect, Delta, Noble Pass, Cleghorn Pass, Bullion, and America Mine.

2.2.3.5 Marine Aviation Weapons and Tactics Squadron-1 (MAWTS-1)

MAWTS-1 is primarily an aviation exercise with ground maneuvers with 1,500 Marines that lasts 3 days and is conducted two times each year. The purpose of the exercise is to allow participating units to exercise flight leadership at all levels to successfully execute a day/night battalion air assault conducting all six functions of Marine aviation while integrating fixed-wing and rotary-wing Armed Reconnaissance/Close Air Support /Escort, aerial resupply, refuel operations, and unmanned aircraft in an austere environment to support the ground tactical plan. MAWTS-1 is characterized by two phases:

- Phase 1 is a Non-Combatant Evacuation Operation into Lance Corporal Torrey Gray Field LZ-1 and Del Valle Track and Field.
- Phase 2 is a 2-day event that involves all live-fire training areas aboard the Combat Center. It is designed to provide the Perspective Weapons Tactics Instructor the opportunity to plan, brief, and execute a high threat strike and a battalion air assault while conducting all six functions of Marine aviation.

2.2.3.6 Other Training Exercises

Allied Forces

Forces from various allied nations occasionally train at the Combat center; two regularly-occurring exercises are described below.

Training is conducted four times per year by 500 personnel from the United Arab Emirates. This training is designed to provide them the opportunity sharpen their skills in the art of live-fire and maneuver involving ground infantry and mechanized forces. These exercises typically last 20 days and can occur in any training area.

Black Alligator is a company level exercise conducted once each year and is executed by 180 personnel from the United Kingdom (Commando Units). This exercise normally last 42 days, can occur in any training area, and involves ground maneuvers and the employment of aircraft, artillery, and mortars.

Formal Schools

Many different types of training exercises regularly occur at the Combat Center to support formal school training activities; some of these exercises (not all inclusive) are described below.

The Fire Support Coordination Application Course occurs four times per year for 12-14 days and involves 100 Marines. A Fire Support Coordination Application Course exercise involves live-fire, most of which is aircraft-delivered ordnance in the Delta, Quackenbush, Lead Mountain, and Prospect training areas, with non-live-fire activities occurring in the Gypsum Ridge Training Area.

Tactical Air Control Party live-fire evolutions are the primary means by which the Marine Corps is able to provide Marines the requisite qualifications to be a Forward Air Controller. Tactical Air Control Party training occurs over a 4-5 day period, is held 10 times per year, and involves 150 Marines. Tactical Air Control Party training involves an 81 mm mortar platoon, an artillery battery, and one section of aircraft support. This training normally takes place in, but is not limited to, the Quackenbush, Lead Mountain, and Bullion training areas.

The Infantry Officer Course consists of approximately 95 infantry officers and a supporting staff of 25 Marines. Training events occur four times per year to train infantry officers in the operations and employment of all crew-served weapons in both offensive and defensive situations. In addition, infantry officers also learn the art of calling in and adjusting mortars, artillery, and aircraft-delivered ordnance. This training lasts approximately 18 days and usually takes place in the following training areas: America Mine, Bullion, Lead Mountain, Delta, Prospect, and Quackenbush. In addition, building block training also takes place on the following fixed ranges: R400/401 series, R220, and R104-R113.

Weapons/Equipment Testing

The Fallbrook Shoot is a highly valuable exercise that typically involves 150 Marines that occurs when the Naval Ordnance Center, Pacific Division, Fallbrook, brings sample lots of ammunition, fuses, or propellants to verify the integrity and performance of each lot and to ensure that the lots are capable of meeting manufacture's tolerances. These exercises occur as needed and only at select ranges that are suitable for these types of artillery. This type of exercise is normally conducted in, but not limited to, Quackenbush or Lead Mountain training areas. Table 2-5 provides additional areas where the Fallbrook Shoot may occur.

The Barstow Shoot occurs periodically as needed to test fire Howitzers that have been rebuilt by the Marine Corps Logistical Base, Barstow, and also typically involves 150 Marines. The nature of this test requires that the gun be fired horizontally, into the side of a mountain. Tests like this are normally conducted in,

but not limited to, the Delta Training Area. Table 2-5 provides additional areas where the Barstow Shoot may occur.

Field testing of new weapons systems, vehicles, and equipment occurs on a sporadic, case-by-case basis in individual training areas or fixed ranges that best meet the requirement of the system, vehicle, or equipment being tested. Testing operations may involve vehicle maneuvers, ordnance delivery, or other general categories of training activity as necessary to achieve the objective of the test.

Unit Level Training

Unit level training of active and reserve Marines consists of a building block process wherein units begin at the squad level and progress through a series of exercise scenarios, ending with a battalion-level exercise. Training at the squad through company level is continuous and takes place in all training areas throughout the year. Battalion-level exercises combine various units and attachments, normally take place four times per year, and involve anywhere from 1,500 to 2,000 Marines. Unit level training events can occur in any training area but typically occur in the following training areas: America Mine, Bullion, Morgans Well, Lead Mountain, Black Top, Delta, Prospect, Quackenbush, Gays Pass, Lavic Lake, Rainbow Canyon, Maumee Mine, and Noble Pass. Early stages of unit-level training normally will take place on the following fixed ranges: Ranges 103-R113, R400/401 series, R210, R230, R220, R215, and the East and West training areas.

Engineer Operations

Example engineer operations are identical to those described in Section 2.2.2.4, *Engineer Operations*.

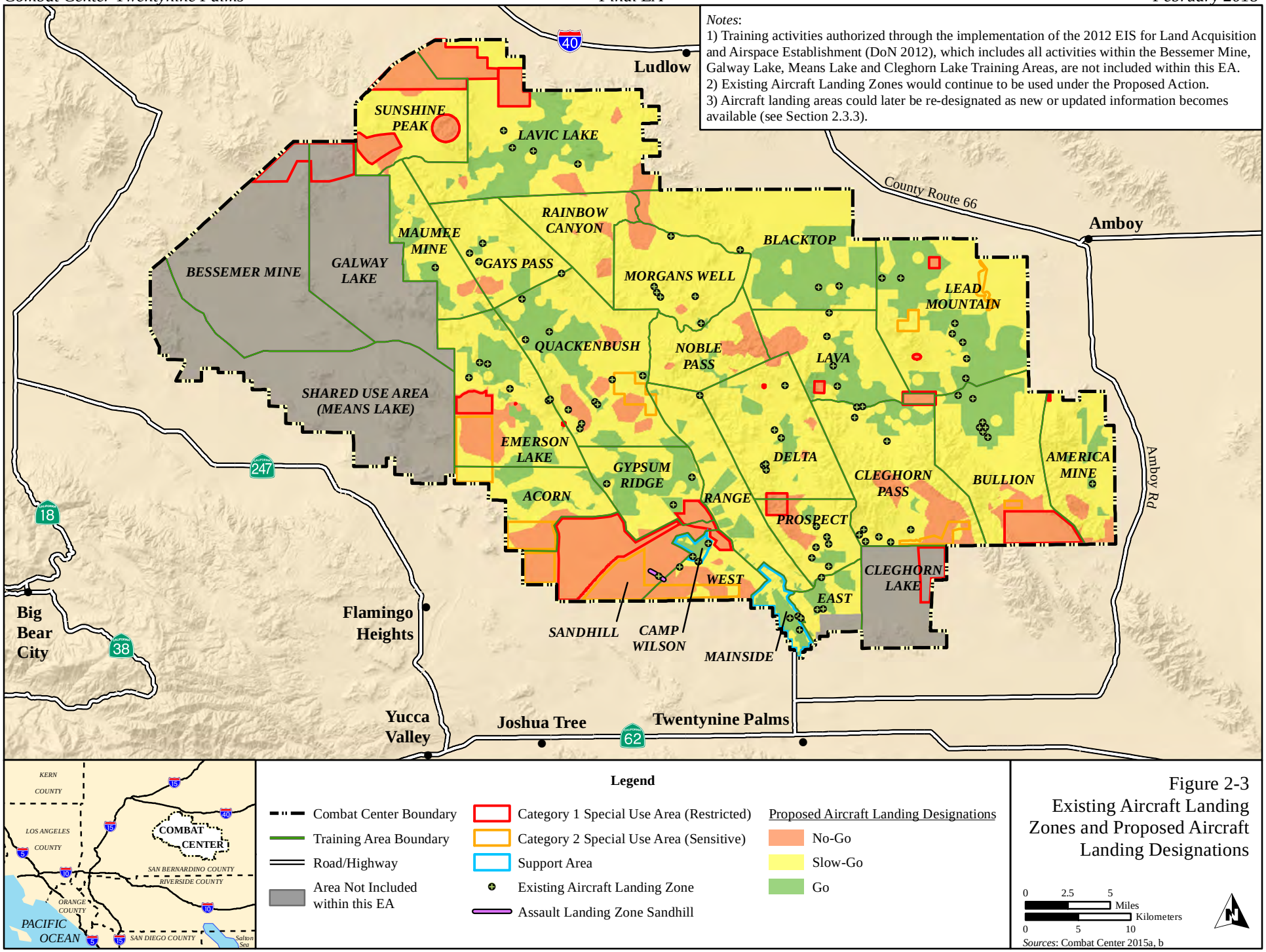
Additional Exercises

Several other similar or ancillary training programs, exercises, and activities occur on an annual or semi-annual basis at the Combat Center. Transient commands (those not stationed permanently at the Combat Center) that schedule training at the Combat Center include numerous Marine Corps, Air Force, Army, and Navy Units.

2.3 DESCRIPTION OF THE PROPOSED ACTION

The Proposed Action includes all ongoing training activities described above under the No-Action Alternative and would expand the existing LZs (described in Section 2.2.1.7) by designating additional aircraft landing areas within existing training areas. Areas within the Combat Center would be designated as Go, Slow-Go or No-Go for rotary-wing and tilt-rotor aircraft landing (Figure 2-3). Implementation of the Proposed Action would approve rotary-wing and tilt-rotor aircraft to land on suitable terrain anywhere within the proposed Go aircraft landing areas; this would increase the existing LZ area of 2,967 acres (1,201 ha) by 112,286 acres (45,441 ha).

Notes:
1) Training activities authorized through the implementation of the 2012 EIS for Land Acquisition and Airspace Establishment (DoN 2012), which includes all activities within the Bessemer Mine, Galway Lake, Means Lake and Cleghorn Lake Training Areas, are not included within this EA.
2) Existing Aircraft Landing Zones would continue to be used under the Proposed Action.
3) Aircraft landing areas could later be re-designated as new or updated information becomes available (see Section 2.3.3).



Sources: Combat Center 2015a, b

Figure 2-3
Existing Aircraft Landing Zones and Proposed Aircraft Landing Designations

The Proposed Action does not include any construction and would not change the current levels of ongoing training activities. Training activities proposed as part of the 2012 Land Acquisition EIS, including Marine Expeditionary Brigade training activities, the establishment and use of the four new training areas (Bessemer Mine, Galway Lake, Means Lake, and Cleghorn Lake), and the extension of the southeastern portion of the East Training Area, are only considered in this EA as part of the cumulative impact analysis in Chapter 6. Since the Proposed Action would not modify fixed-wing aircraft or UAV activities (see Table 2-2), fixed-wing aircraft and UAV activities will not be considered in the analysis in this EA.

The proposed landing designations are based on the presence or absence of sensitive biological and/or cultural resources as described below and as shown in Table 2-6. See Section 3.1, *Biological Resources*, and Section 3.3, *Cultural Resources*, for additional detail regarding these areas. Figure 2-4 describes how the many sets of data were processed to create the proposed landing designations (as shown on Figure 2-3) based on the rules described below; this process ensures impacts to the Combat Center's most sensitive biological and cultural resources are minimized. Within the Go and Slow-Go areas, some of the acreage potentially available would be unsuitable for landings and would not be used due to the factors mentioned in Section 2.2.1.7, *Aircraft LZs*. Additionally, existing avoidance and impact minimization measures/SCMs specified in the Integrated Natural Resources Management Plan (INRMP), prior USFWS BOs, and newly proposed SCMs would be implemented that would further reduce the area available for landing (Table 2-7).

- **Go aircraft landing areas** would approve rotary-wing and tilt-rotor aircraft to land on suitable terrain without further environmental review. These areas include all existing aircraft LZs; the built environment within Mainside, Camp Wilson, and the Range training area; and areas that have the following characteristics indicating a relatively low sensitivity to environmental impacts:
    - low densities (0-5 per square mile) of desert tortoises (Woodman et al. 2001; LaRue 2013)
    - where occupied burrowing owl habitat is not known to occur (Combat Center 2015a, LaRue 2013)
    - have been surveyed and confirmed to have no cultural resource concerns (Combat Center 2015a)
    - do not contain any Category 1 Special Use Areas (restricted) or Category 2 Special Use Areas (sensitive) (DoN 2017)

  In addition, some areas containing bedrock outcrop, lava flow, or dry lake have not been surveyed for desert tortoises. In these areas, the Combat Center presumes that the sensitivity of desert tortoises to impacts from the Proposed Action is low when there are no data to indicate otherwise.

  When combined with existing LZs and the built environment at Mainside, Camp Wilson, and Range, proposed Go aircraft landing areas include approximately 115,254 acres (46,642 ha) (19% of the project area) (Figure 2-3).

- **Slow-Go aircraft landing areas** would approve rotary-wing and tilt-rotor aircraft to land on suitable terrain only after additional, site-specific environmental review is performed. These areas do not have any known characteristic that is highly sensitive to environmental impacts (defined below) but do have at least one of the following characteristics indicating a moderate sensitivity to environmental impacts:
    - moderately low densities (6-20 per square mile) of desert tortoises (Woodman et al. 2001)
    - more recent survey data that indicates desert tortoise density may be greater than 0-5 per square mile (LaRue 2013)

- desert tortoise density is not available in Woodman et al. (2001) and bedrock outcrop, lava flow, not present in dry lake bed
- occupied burrowing owl habitat is present (Combat Center 2015a; LaRue 2013)
- areas that may contain sensitive cultural resources as determined by prior surveys or lack thereof (Combat Center 2015a)
- Category 2 Special Use Areas (sensitive) (DoN 2017)

Under the Proposed Action, tilt-rotor aircraft could land in designated Slow-Go landing areas when the requisite environmental review (e.g., biological and/or cultural surveys, and consultation [as needed]) has been performed prior to landing. Consistent with current practice, if an area is designated Slow-Go due to biological resource (i.e., desert tortoise or burrowing owl) concerns, the Combat Center would perform a site-specific survey for desert tortoise presence or nesting burrowing owls. If no desert tortoise sign or occupied burrowing owl habitat is detected, rotary-wing aircraft would be authorized to land for one training event. The Combat Center would repeat this process for each training event as needed. Proposed Slow-Go aircraft landing areas include approximately 387,170 acres (156,682 ha) (65% of the project area) (refer to Figure 2-3).

- **No-Go areas** would prohibit the landing of rotary-wing and tilt-rotor aircraft. Proposed No-Go areas have at least one of the following characteristics indicating a high sensitivity to environmental impacts:
  - moderately high or high densities (21-50 and 51-100 per square mile, respectively) of desert tortoises
  - Category 1 Special Use Areas (which include all areas that contain particularly sensitive cultural resources per CCO 5090.1F, *Environmental Protection*)

  Proposed No-Go areas include approximately 94,947 acres (38,424 ha) (16% of the project area) (refer to Figure 2-3).

The Combat Center anticipates continuing biological and cultural resource surveys as funds are available. Over time, as new or updated information becomes available, the Combat Center would re-designate landing areas according to the criteria described above. For example, areas designated as Slow-Go due to a lack of natural or cultural resources survey data could become Go or No-Go areas as those data are developed.

Table 2-6. Biological and Cultural Resource Sensitivities and the Proposed Action

Resource Sensitivity		***Cultural Resource Level of Concern***		
		Low *(Area confirmed to have no cultural resource concerns)*	***Moderate*** *(Area may contain sensitive resources)*	***High*** *(Area contains particularly sensitive resources)*
Biological Resource Level of Concern	***Low*** *(Area contains either 0-5 desert tortoises per square mile or bedrock outcrop, lava flow, or dry lake bed and is not known to contain occupied burrowing owl habitat)*	Go	Slow-Go	No-Go
	Moderate *(Area contains 6-20 desert tortoises per square mile, is lacking desert tortoise density data, may contain desert tortoise densities greater than 0-5 per square mile based on more recent surveys, or contains occupied burrowing owl habitat)*	Slow-Go	Slow-Go	No-Go
	High *(Area contains 21-100 desert tortoises per square mile)*	No-Go	No-Go	No-Go

Notes:

- The colored cells are not indicative of size of area, only an operational category (i.e., Go, Slow-Go, or No-Go). As discussed in the text and shown on Figure 2-3:
  - Proposed **Go** aircraft landing areas account for 115,254 acres (46,642 ha) (19% of the project area).
  - Proposed **Slow-Go** aircraft landing areas account for approximately 387,170 acres (156,682 ha) (65% of the project area).
  - Proposed **No-Go** areas account for approximately 94,947 acres (38,424 ha) (16% of the project area).
- Areas containing bedrock outcrop, lava flow, or dry lake have not been surveyed for desert tortoises. Based on the desert tortoise's preferred habitat, the Combat Center presumes that the biological resource sensitivity of these areas is low if no data are available to indicate otherwise.
- Any area containing a Category 1 Special Use Area (Restricted) is also designated No-Go for aircraft landing regardless of the presence (or absence) of biological or cultural resources. In addition, any area containing a Category 2 Special Use Area (Sensitive) is designated Slow-Go for aircraft landing unless the presence of highly sensitive biological or cultural resources requires that the area be designated No-Go.
- Existing aircraft LZs, as well as the built environment at Mainside, Camp Wilson, and within the Range Training Area, are designated Go regardless of any other site characteristics.

Figure 2-4. Landing Designation Development Process

The process used to develop the proposed landing designations involved five steps performed in the order listed below to ensure that impacts to the Combat Center's most sensitive biological and cultural resources are minimized.

Step 1: Designate Go Landing Areas

- Areas with low densities (0-5 per square mile) of desert tortoises[1]
- Areas with bedrock outcrop, lava flow, or dry lake[1]
- Areas with low cultural resource sensitivity (i.e., areas confirmed to have no cultural resource concerns)[2]

Step 2: Designate Slow-Go Landing Areas

- Areas with moderately low densities (6-20 per square mile) of desert tortoises[1]
- Any area where desert tortoise density may be greater than 0-5 per square mile based on more recent surveys[1]
- Areas without desert tortoise density data[1]
- Areas with burrowing owls[1]
- Areas with moderate or unknown cultural resource sensitivity (i.e., may contain cultural resources)[2]
- Areas within a Category 2 Special Use Area (Sensitive)[3]

Step 3: Designate No-Go Landing Areas

- Areas with moderately high or high densities (21-50 and 51-100 per square mile, respectively) of desert tortoises[1]
- Areas with high cultural resource sensitivity (i.e., contains particularly sensitive cultural resources)[2]
- Areas within a Category 1 Special Use Area (Restricted) [3]

Step 4: Re-designate the Existing Landing Zones and Built Environment to Go Landing Areas

Upon completion of Steps 1-3, above, the Combat Center re-designated following features as Go landing areas:

- Existing landing zones[4]
- The built environment within Mainside, Camp Wilson, and the Range Training Area[1]

Step 5: Adjust Go Landing Areas per Tribal Consultation

Upon completion of Step 4, above, the Combat Center consulted with the SHPO and the tribes. One tribe requested that 11 sites in previously-disturbed or previously-built areas be protected by re-designating them from Go to Slow-Go as they may contain cultural resources. One such site was located at an existing landing zone. Proposed landing designations were modified by:

- Applying a 164-ft (50-m buffer) around each of the 11 sites (including the site at the existing landing zone)
- Re-designating the 11 sites (including the buffer) from Go to Slow-Go.

Notes:

[1]As shown on Figure 3.1-2
[2]As shown on Figure 3.3-1
[3]As shown on Figure 2-2
[4]As shown on Figure 2-1

2.4 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

During the planning process, the Combat Center identified and then eliminated the following potential action alternatives because they did not meet the purpose of and need for the proposed action or were not otherwise feasible.

2.4.1 Conducting Combat Center Operations/Training at Other Installations

An alternative to conduct the ongoing training that occurs at the Combat Center at other installations was considered. The Combat Center provides the best training venue for Combined Arms Training (including direct fire, indirect fire, rotary wing, fixed wing, and/or close air support and maneuvering, all attacking the same target at the same time) in a "Full Spectrum Environment." Other installations (e.g., Fort Irwin, Marine Corps Base Camp Pendleton, Marine Corps Base Camp Lejeune) were considered as locations within which the Proposed Action could be implemented but were eliminated because they did not meet the "Full Spectrum Environment" requirement.

2.4.2 Limiting the Proposed Action to Specific Training Areas

An alternative to limit the ongoing training to specific training areas was considered. Due to the size and scope of major exercises, training activities (live-fire training activities in particular) stage and operate throughout the Combat Center simultaneously, and a major component of the Proposed Action is to integrate rotary-wing and tilt-rotor aircraft with these exercises. As such, it is not practical to limit the Proposed Action to specific training areas. Additionally, the purpose of the Proposed Action is to allow for this training integration to occur throughout all training Areas at the Combat Center, subject to restrictions due to the presence of sensitive resources, and is needed to allow pilots to practice rapid in-air decision making (refer to Section 1.3, *Purpose of and Need for the Proposed Action*). Moreover, the analysis in this EA is intended to be programmatic to avoid incrementally designating and segmenting the analysis of Landing Zones.

2.4.3 Limiting the Proposed Action Temporally

An alternative to limit the ongoing training temporally (by only allowing less encumbered access during specific times of the year) was considered. Each year roughly one-third of the Fleet Marine Force and Marine Reserve Units – some 50,000 Marines in all – participate in the Combat Center's training exercise program. These training exercises involve every weapons system in the Marine Corps' arsenal, from small arms to attack aircraft. These exercises are absolutely essential to maintaining high levels of readiness of the USMC to defend national interests (Global Security 2011; Center for Land Use Interpretation 2015). Training activities analyzed in this EA alone can require over 600 days of training exercises and over 1,000,000 personnel training days in a 365-day calendar year (refer to Table 2-5). This immense amount of training is only accomplished by conducting multiple training exercises simultaneously and requires a large amount of preparation (e.g., 2 years of planning for each ITX event) to ensure personnel safety. Additionally, per the MAGTF Training Program, all Marine Units are required to cycle through the Combat Center once every 2 years per their individual deployment cycle; these training activities are also scheduled 2 years in advance. Accommodating this vast amount of training also requires the Combat Center to operate every day of the year, with the possible exception of a very limited number of holidays. As such, limiting the Proposed Action temporally would prevent or significantly delay units from deploying while also detrimentally impacting training safety, thereby jeopardizing the USMC's ability to remain battle-ready. Given this, limiting the Proposed Action temporally is not a feasible alternative.

2.4.4 Allowing Rotary-wing and Tilt-rotor Aircraft to Land Throughout the Combat Center

Expanding proposed Go landing areas to include the entire Combat Center was considered. Such an action, however, would significantly impact sensitive biological and cultural resources and would not meet the purpose of the Proposed Action, which is to expand landing opportunities without significantly impacting sensitive resources (refer to Section 1.3, *Purpose of and Need for the Proposed Action*).

2.5 SUMMARY OF ENVIRONMENTAL CONSEQUENCES

In accordance with CEQ regulations, this EA focuses on those resource areas potentially affected by the Proposed Action. Table 2-7 provides a summary of environmental consequences by resource area and those Avoidance and Impact Minimization Measures/Special Conservation Measures (SCMs) that would be implemented under the Proposed Action or No-Action Alternative. No significant impacts were identified for either the Proposed Action or No-Action Alternative; refer to Chapter 4, *Environmental Consequences*, for a detailed description and analysis. In addition, the Minimization, Mitigation, and Monitoring Implementation Plan (Appendix C) provides this information in a tabular format for tracking purposes.

Table 2-7. Summary of Environmental Consequences with Implementation of the No-Action Alternative or the Proposed Action Alternative

Resource	*No-Action Alternative*	*Proposed Action*
Biological Resources (BR)	Under the No-Action Alternative, the Combat Center would continue to use existing LZs and would continue to designate additional LZs subject to a case-by-case environmental review. Presently, this involves conducting surveys for sensitive resources (e.g., desert tortoise, cultural resources) within existing training areas and allowing new LZs to be designated within areas devoid of the sensitive resources. **Avoidance and Impact Minimization Measures/SCMs included under the No-Action Alternative**: • **BR-1.** The Combat Center would continue to implement SCMs and the Terms and Conditions of the 2002 and 2017 Biological Opinions (BOs) to avoid or minimize potential impacts to biological resources, particularly the threatened desert tortoise. This includes measures such as (1) requiring all personnel at the Combat Center to remove or contain foodstuffs, trash, or other wastes that may attract predators; (2) ensuring that all personnel immediately report to a Combat Center-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; and (3) concentrating training activities within previously disturbed areas. No additional avoidance and impact minimization measures/SCMs are proposed.	The Proposed Action would allow for unrestricted tilt-rotor and rotary-wing aircraft landings within broad areas of low environmental sensitivity (designated as Go Areas) or in areas that can be used after they have been surveyed for biological resources (Slow-Go Areas). All aircraft landings would occur within existing training areas. **Avoidance and Impact Minimization Measures/SCMs included under the Proposed Action:** • **BR-1.** The Combat Center would continue to implement SCMs and the Terms and Conditions of the 2002 and 2017 Biological Opinions (BOs) to avoid or minimize potential impacts to biological resources, particularly the threatened desert tortoise. This includes measures such as (1) requiring all personnel at the Combat Center to remove or contain foodstuffs, trash, or other wastes that may attract predators; (2) ensuring that all personnel immediately report to a Combat Center-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; and (3) concentrating training activities within previously disturbed areas. • **BR-2**. Proposed LZs within designated Slow-Go areas would continue to be assessed through a case-by-case environmental review. This involves conducting surveys for sensitive resources (e.g., desert tortoise, cultural resources) within existing training areas and allowing temporary authorization of landing operations within areas devoid of sensitive resources. This will ensure landing operations are not authorized when desert tortoises or sensitive cultural resources are present. • **BR-3.** Pilots would avoid landing sites with vegetation or other vertical obstacles to reduce risk to personnel and equipment. This would have the effect of reducing impacts to native vegetation, and focusing operations in more barren areas less likely to have desert tortoises. • **BR-4.** A representative sample of landing zones within designated "Go" areas would be surveyed using a protocol approved by the Service during the first year of training under the Proposed Action, immediately following landing by rotary-wing and tilt-rotor aircraft, to ensure that no desert tortoises are injured or killed. • **BR-5**. The Combat Center would conduct additional surveys for biological resources (e.g., desert tortoise density surveys) as funds are available. The Proposed Action would result in an incremental but not significant increase in the effects of training and operations that were contemplated in the 2002 and 2017 BOs. Therefore, with implementation of the proposed avoidance and impact minimization measures/SCMs listed above, and having received concurrence from the U.S. Fish and Wildlife Service (see Appendix B), there would be no significant impact to biological resources, including the desert tortoise.

Table 2-7. Summary of Environmental Consequences with Implementation of the No-Action Alternative or the Proposed Action Alternative

Resource	*No-Action Alternative*	*Proposed Action*
Geological Resources (GR)	Under the No-Action Alternative, areas of unsuitable topography (e.g., steep and/or mountainous areas) or other locations that might be considered to have unique geological features (e.g., lava flows) would continue to be avoided during training activities. The measures listed below would be implemented to limit adverse impacts to soils as a result of ongoing training activities. **Avoidance and Impact Minimization Measures/SCMs included under the No-Action Alternative:** • **GR-1**. Encourage military units to utilize previously disturbed areas, especially for off-road maneuvers, digging, or berming. • **GR-2**. Avoid wet areas for vehicular traffic and creating a limited number of authorized crossings for Deadman Lake to minimize impacts to playa soils. • **GR-3**. Designate tank traps and other modifications to maintain the natural flow of water during run-off events, to maintain the natural alluvial sediment transport processes. This includes filling tank traps, trenches, and other major excavations to original grade (when feasible) when training exercises are completed. • **GR-4**. Restore disturbed washes to allow for proper functioning in alluvial sediment transport. This includes maintaining natural drainage at the lowest elevation possible and avoiding realignment or blockage of drainages by roads and other construction. • **GR-5**. Restore training lands to stabilize soils and provide long-term vegetative cover. • **GR-6**. Adjust some training scenarios and locations of training events to spread out impacts so that broad areas do not become completely compacted. • **GR-7**. In sandy areas with perennial grasses, keep activity low to moderate, avoid use of ignition sources, and place targets in a cleared area. These fire-prevention measures also reduce impacts to soil by preserving the vegetation that protects against erosion. • **GR-8**. In areas designated as Go for vehicles at the base of alluvial fans, spread-out low to moderate use training activities as widely as possible to disperse / diffuse the impact over a wide area. • **GR-9**. Minimize use footprint in areas designated "Sensitive" soil type or Slow-Go for vehicles, or when activity level is high. • **GR-10**. Areas of unsuitable topography (e.g., steep and/or mountainous areas) or other locations that might be considered to have unique	Under the Proposed Action, areas of unsuitable topography (e.g., steep and/or mountainous areas) or other locations that might be considered to have unique geological features (e.g., lava flows) would continue to be avoided during training activities. The area expanded to allow for aircraft landings would have no anticipated effect on mineral resources or paleontological resources. Impacts under the Proposed Action would be similar to those described under the No-Action Alternative, with the exception of soils impacts being slightly less under the No-Action Alternative. The same measures listed for the No-Action Alternative would be implemented to limit adverse impacts to soils as a result of ongoing training activities. With continued application of installation programs and procedures to avoid and minimize impacts, there would be less than significant impacts to geological resources under the Proposed Action. **Avoidance and Impact Minimization Measures/SCMs included under the Proposed Action:** The same LZ-related impact minimization measures/SCMs as listed under the No-Action Alternative would be implemented.

Table 2-7. Summary of Environmental Consequences with Implementation of the No-Action Alternative or the Proposed Action Alternative

Resource	*No-Action Alternative*	*Proposed Action*
	geological features (e.g., lava flows) would continue to be avoided during training activities. The No-Action Alternative does not involve the construction of new facilities so compliance with the Alquist-Priolo Act is not required. There is no evidence linking earthquake activity with the use of explosives such as the ordnance that would be used under the No-Action Alternative. With continued application of installation programs and procedures to avoid and minimize impacts, there would be less than significant impacts to geological resources under the No-Action Alternative.	
Cultural Resources (CR)	Under the No-Action Alternative, additional LZs would not be designated. Therefore, there would be no impacts to cultural resources with implementation of the No-Action Alternative. **Avoidance and Impact Minimization Measures/SCMs included under the No-Action Alternative:** • **CR-1.** The Combat Center is responsible for monitoring NRHP-eligible sites that are avoided during training activities. An annual Historic Preservation Compliance Report summarizes the monitoring activities.	The Proposed Action would allow for unrestricted tilt-rotor and rotary-wing aircraft landings within broad areas that have either been confirmed to have no cultural resource concerns (Go Areas) or in areas that can be used after they have been confirmed to have no cultural resource concerns (Slow-Go Areas). All aircraft landings would occur within existing training areas. Therefore, implementation of the Proposed Action would not affect cultural resources and impacts would be less than significant. The California State Historic Preservation Office (SHPO), the San Manuel Band of Mission Indians, and the Twenty-nine Palms Band of Mission Indians have concurred with the U.S. Marine Corps' finding of No Historic Properties Affected (refer to Appendix B). **Avoidance and Impact Minimization Measures/SCMs included under the Proposed Action:** • **CR-1.** The Combat Center is responsible for monitoring NRHP-eligible sites that are avoided during training activities. An annual Historic Preservation Compliance Report summarizes the monitoring activities. • **CR-2.** LZs will not be designated within 350 ft (107 m) of protected cultural resources. • **CR-3.** The Combat Center would conduct surveys for cultural resources and consultations as funds are available.
Water Resources (WR)	Vehicle maneuvers result in greater impacts to playas and dry washes than any other form of training conducted on the Combat Center. However, disturbance limiting environmental protection measures listed below are used to control impacts to playas and washes. Munitions constituents (MCs) are another concern, as these can migrate from the range training areas via dissolution and transport in periodic surface water flows and eventually deposit and accumulate within the playas. Potential impacts associated with MCs are avoided and minimized by ongoing monitoring and periodic assessment of MCs through the Range Environmental Vulnerability Assessment (REVA) program. A 2012 REVA assessment concluded that the low precipitation rate, long distance between ranges, intermittent nature of surface water bodies, and deep groundwater, limit	**Avoidance and Impact Minimization Measures/SCMs included under the Proposed Action**: The same LZ-related impact minimization measures/SCMs would be implemented as listed under the No-Action Alternative and there would be less than significant impacts to water resources.

Table 2-7. Summary of Environmental Consequences with Implementation of the No-Action Alternative or the Proposed Action Alternative

Resource	*No-Action Alternative*	*Proposed Action*
	the migration of MCs and thus the potential for impacts to water resources from the use of munitions. Therefore, with continued application of monitoring, conservation, and environmental awareness programs, the No-Action Alternative would result in less than significant impacts to water resources. **Avoidance and Impact Minimization Measures/SCMs included under the No-Action Alternative:** • **WR-1.** Impacts to playas and washes would be minimized by avoiding use of playas to the maximum extent possible when surfaces are wet, and identifying a limited number of crossing sites on playas and washes to minimize vehicle crossing damage. • **WR-2.** Designing tank traps and other modifications to maintain the natural flow of water during run-off events, to maintain the natural alluvial sediment transport processes. • **WR-3.** Restoring disturbed washes to allow for proper functioning in alluvial sediment transport. • **WR-4.** Continue implementation of the REVA Program. • **WR-5**. LZs are not located in washes and playas.	
Health and Safety (HS)	The Marine Corps and the Combat Center have numerous plans, policies, and procedures in place to prevent and minimize aircraft-related accidents, explosives safety hazards, accidental releases of hazardous materials and hazardous wastes, exposure to hazardous waste sites, and transportation accidents during military training activities. The Combat Center also has a policy for avoiding dangerous mine shafts within the Combat Center boundaries. Under the No-Action Alternative, these plans, policies, and procedures would continue to be followed per federal and state regulations and Marine Corps requirements. Therefore, no significant impact would occur with respect to the above-mentioned aspects of health and safety. The No-Action Alternative would not involve or affect police protection, fire protection, medical evacuation support and mutual aid agreements for the Combat Center or surrounding communities, so no significant impact would occur with respect to these aspects of health and safety. In summary, under the No-Action Alternative, no significant impact would occur to health and safety. **Avoidance and Impact Minimization Measures/SCMs included under the No-Action Alternative:** No avoidance and impact minimization measures/SCMs are proposed.	The Proposed Action includes expanding aircraft LZs within the Combat Center. The Marine Corps and the Combat Center have numerous plans, policies, and procedures in place to prevent and minimize aircraft-related accidents during military training activities. Under the Proposed Action, these plans, policies, and procedures would continue to be followed per federal and state regulations and Marine Corps requirements. Therefore, there would be no significant impacts to health and safety with implementation of the Proposed Action. **Avoidance and Impact Minimization Measures/SCMs included under the Proposed Action:** No avoidance and impact minimization measures/SCMs are proposed.

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CHAPTER 3
AFFECTED ENVIRONMENT

The Proposed Action is limited to the approximate 597,371 acres (241,747 ha) of training areas that existed before the 2012 Land Acquisition EIS (DoN 2012); the training areas that have been added as a result of the implementation of the Military Land Withdrawals Act of 2013 (i.e., Means Lake, Bessemer Mine, Galway Lake, Cleghorn Lake, and a portion of East totaling approximately 105,000 acres [42,500 ha]) are excluded from the proposed expanded training opportunities assessed in this EA (refer to Figure 1-1).

NEPA, CEQ regulations, and DoN and USMC procedures for implementing NEPA specify that an EA should focus only on those environmental resource areas potentially subject to impacts. In addition, the level of analysis should be commensurate with the anticipated level of impact. Accordingly, the discussion of the affected environment and associated environmental analysis presented herein focuses on biological resources, geological resources, cultural resources, water resources, and health and safety. Conversely, the following resources were not carried forward for analysis in this EA, as potential impacts were considered to be negligible or non-existent.

Land Use. The Combat Center is divided into multiple training areas. Each training area varies by size, use, terrain type, and training restrictions. The training activities associated with the Proposed Action would continue to use these established training areas and no changes to existing land use would occur, with the exception that rotary-wing and tilt-rotor aircraft would be allowed to land in more locations within existing training areas while performing ongoing training activities. Consequently, implementation of the Proposed Action would not impact land use.

Recreation. Access to the proposed project area by the public is restricted and the Proposed Action would not affect recreational opportunities within or adjacent to the project area. Therefore, no impacts to recreation would occur with implementation of the Proposed Action.

Socioeconomics and Environmental Justice. Implementation of the Proposed Action would not affect socioeconomic resources and would comply with Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations*, and EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*. The Proposed Action would not involve site improvements, construction of facilities, or an increase in personnel. Also, the Proposed Action would occur at existing training areas within the boundaries of the Combat Center. Therefore, no impacts to schools, children, or minority populations would occur and the Proposed Action would have no direct or indirect effects to the economy. In addition, proposed training activities are similar to ongoing rotary-wing and tilt-rotor aircraft training that currently occurs at existing LZs throughout the Combat Center. As no permanent population centers, low-income communities, or minority communities exist in the project vicinity, no communities would be susceptible to socioeconomic or environmental justice impacts.

Visual Resources. The Proposed Action would not involve site improvements, construction of facilities, or an increase in personnel. Implementation of the Proposed Action would not adversely affect visual resources since the Proposed Action would be conducted in established training areas. In addition, the training activities described in the Proposed Action are similar to ongoing training including MV-22 and rotary-wing aircraft training that currently occurs throughout the Combat Center. Therefore, the visual character of individual training areas at the Combat Center would not change. Consequently, implementation of the Proposed Action would not impact visual resources.

Transportation and Circulation. The Proposed Action would not involve site improvements, construction of facilities, or an increase in personnel that would place an additional demand on the transportation and circulation network. In addition, the training activities described in the Proposed Action are similar to ongoing training including MV-22 and rotary-wing aircraft training that currently occurs throughout the Combat Center. Ground activities associated with current rotary-wing aircraft training currently occur throughout the Combat Center and have been analyzed in previous NEPA documentation (DoN 2003b); no new ground activities are part of the Proposed Action. Consequently, implementation of the Proposed Action would not impact the transportation and circulation network.

Noise. The existing aircraft noise environment at the Combat Center range complex was initially based on the baseline condition from the MV-22 West Coast Basing EIS (DoN 2009b). For consistency purposes, the baseline condition was updated to include the CH-46E and CH-53E use of AMZs in 2010 (USMC 2010). The addition of the CH-46E and CH-53E AMZ operations increased the total annual flight operations under the baseline condition resulting in an 8% increase relative to the MV-22 West Coast Basing EIS noise baseline; however, it was determined in the AMZ EA that there would be no effect to the noise environment.

The Proposed Action would not involve a change in the noise environment for human receptors; impacts to biological resources are described in Section 4.1.2. There would be no impact to human receptors given: (1) the 3,280-ft (1,000-m) No Live-fire Buffer is designated immediately within the Combat Center boundary, (2) the fact that no new weapons systems are proposed, (3) no military construction projects are proposed, and (4) the noise analysis performed for the AMZ EA clearly concluded there would be no noise impacts.

Utilities. The Proposed Action would not involve site improvements, construction of facilities, or an increase in personnel that would place an additional demand on the spectrum of utilities including electricity, potable water, sanitary sewer, phone, information technology, and gas transmission lines at the Combat Center. In addition, the training activities described in the Proposed Action are similar to ongoing training including MV-22 and rotary-wing aircraft training that currently occurs throughout the Combat Center. Consequently, implementation of the Proposed Action would not impact utilities.

Air Quality. The existing air quality environment at the Combat Center range complex was initially based on the baseline condition from the MV-22 West Coast Basing EIS (DoN 2009b). For consistency purposes, the baseline condition was updated to include the CH-46E and CH-53E use of AMZs in 2010 (USMC 2010). The addition of the CH-46E and CH-53E AMZ operations increased the total annual flight operations under the baseline condition relative to the MV-22 West Coast Basing EIS air quality baseline; however, it was determined in the AMZ EA that there would be no significant effect to regional air quality. The training activities at potential LZs described in the Proposed Action are similar to ongoing training including MV-22 and rotary-wing aircraft training that currently occurs at existing LZs throughout the Combat Center. No other change in aircraft or other operations that would result in increases in emissions at the Combat Center would occur under the Proposed Action. Emissions, primarily particulate matter associated with dust from downwash, from aircraft landing and takeoffs (LTO) at potential new LZs were not quantitatively analyzed since existing LZs are already located throughout the Combat Center (refer to Figure 2-1) and are geographically representative of the potential LZs within proposed Go and Slow-Go areas addressed under the Proposed Action. Allowing aircraft to land in proposed Go or Slow-Go areas would not have a substantial effect on the number of LTOs or other aspects of aircraft usage of existing or potential future LZs within the Combat Center. Consequently, implementation of the Proposed Action would not impact regional air quality.

3.1 BIOLOGICAL RESOURCES

3.1.1 Definition of Resource

Biological resources include plants and animals and the habitats in which they occur. Biological resources are further subdivided into vegetation alliances, wildlife, and special-status species.

The region of influence (ROI) for biological resources includes the Combat Center excluding the Bessemer Mine, Galway Lake, Means Lake, Cleghorn Lake training areas and a portion of the East Training Area (Figure 3.1-1).

3.1.2 Regulatory Framework

Biological resources occurring within the project area that would potentially be impacted by proposed activities are protected by, and managed in accordance with, various statutory and executive requirements including, but not limited to, the following:

- ESA (16 USC §§ 1531-1599)
- Migratory Bird Treaty Act (MBTA) (16 USC §§ 703-712)
- Sikes Act Improvement Act of 1997 (16 USC § 670 *et seq*.)
- EO 13112, *Invasive Species*
- EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*

3.1.3 Existing Conditions

3.1.3.1 Vegetation Alliances

Located in the south-central region of the Mojave Desert, the Combat Center contains vegetation alliances typical of the arid, upland desert climate of the region. The most recent vegetation association and mapping effort for the Combat Center, based on the classification system developed by Sawyer et al. (2009), describes 18 vegetation alliances (MultiMAC Joint Venture 2016) (Table 3.1-1 and Figure 3.1-1). These associations, along with five additional land categories or landforms (playa, sparsely vegetated desert pavement, developed, disturbed, and mud hills), account for the approximate 597,371 acres (241,747 ha) of land cover within the Proposed Action area.

Table 3.1-1. Vegetation Associations and Land Cover at the Combat Center

Classification	*Acres*	*% Land Cover*
Vegetation Association		
Larrea tridentata-Ambrosia dumosa - Creosote Bush Scrub-White Bursage	243,857	40.82
Larrea tridentata - Creosote Bush Scrub	221,530	37.08
Larrea tridentata-Encelia farinosa - Creosote Bush Scrub-Brittlebush	62,597	10.48
Psorothamnus spinosus - Smoketree	9,953	1.67
Atriplex polycarpa - Allscale Saltbush	9,124	1.53
Encelia farinosa - Brittlebush	5,063	0.85
Acacia greggii - Catclaw Acacia	4,826	0.81
Ambrosia salsola - Burrobrush	4,592	0.77
Pleuraphis rigida - Big Galleta	2,699	0.45
Yucca schidigera - Mojave Yucca	2,101	0.35
Hyptis emoryi - Desert Lavender	2,091	0.35
Atriplex canescens - Hoary Saltbush	1,678	0.28
Chilopsis linearis - Desert Willow	1,031	0.17
Ambrosia dumosa - White Bursage	470	0.08

Table 3.1-1. Vegetation Associations and Land Cover at the Combat Center

Classification	***Acres***	***% Land Cover***
Prosopis glandulosa - Honey Mesquite	326	0.05
Scutellaria mexicana – Desert Chicory	200	0.03
Atriplex hymenelytra - Desertholly Saltbush	190	0.03
Ephedra californica - Desert Tea	134	0.02
Other Land Cover		
Playa	8,121	1.36
Sparsely Vegetated Desert Pavement	7,882	1.32
Developed	7,227	1.21
Disturbed	1,532	0.26
Mud Hills	146	0.02
Total	**597,371**	**100**

Source: MultiMAC Joint Venture 2016.

Vegetation Alliances

The *Larrea tridentata-Ambrosia dumosa* (creosote bush scrub-white bursage) alliance consists of stands with taller *Larrea tridentata* and shorter *Ambrosia dumosa* shrubs. This is the modal vegetation type of the bajadas, alluvial fans, and lower slopes and is also found in minor washes and rills, alluvial fans, bajadas, upland slopes. Soils are well-drained, alluvial, colluvial, sandy, or sometimes underlain by a hardpan that may be calcareous and/or covered with desert pavement. This alliance occurs on relatively diverse mesic sites with high diversity. Shrubs are less than 3 m tall and the canopy is open to intermittent and two-tiered. The herbaceous layer is open to intermittent with seasonal annuals (MultiMAC Joint Venture 2016).

The *Larrea tridentata* (creosote bush scrub) alliance contains expansive areas dominated by *Larrea tridentata*. Shrubs reach less than 3 m tall and the canopy is intermittent to open. The herbaceous layer is open to intermittent with seasonal annuals or perennial grasses. This alliance is found on deep, sandy soils as well as on weakly developed soils of alluvial sites. In largely unaltered settings, this alliance includes shrub species, especially *Ambrosia dumosa*. *Atriplex polycarpa* may be a co-dominant in sandy soils with perennial grasses, and along washes and wash terrace deposits with somewhat alkaline soils. Plants also may form semi-riparian stands along low-gradient sandy or silty washes with predominantly wash species (MultiMAC Joint Venture 2016).

The *Larrea tridentata-Encelia farinosa* (creosote bush scrub-brittlebush) alliance is found on small washes, rills, alluvial fans, bajadas, colluvium on upland slopes. Soils are well drained, rocky, may have desert pavement surfaces, and are often derived from granitic or volcanic rock. Shrubs are less than 3 m tall and the canopy is open to intermittent. Herbaceous layer is open with seasonal annuals. The alliance is found on hotter, rockier, and often steeper environments than the *Larrea tridentata-Ambrosia dumosa* alliance and tends to be less diverse with a lower proportion of annual herbs in rainy years (MultiMAC Joint Venture 2016).

The *Psorothamnus spinosus* (smoketree) alliance is found in arroyos, intermittently flooded channels, and washes in California's hot deserts. It is more likely to occupy sandy wash bottoms as opposed to margins. Soils are sandy and well drained, moderately acidic or slightly saline. Trees are less than 8 m tall and the canopy is open to intermittent. The shrub layer is open to intermittent and the herbaceous layer is sparse to seasonally abundant with annuals (MultiMAC Joint Venture 2016).

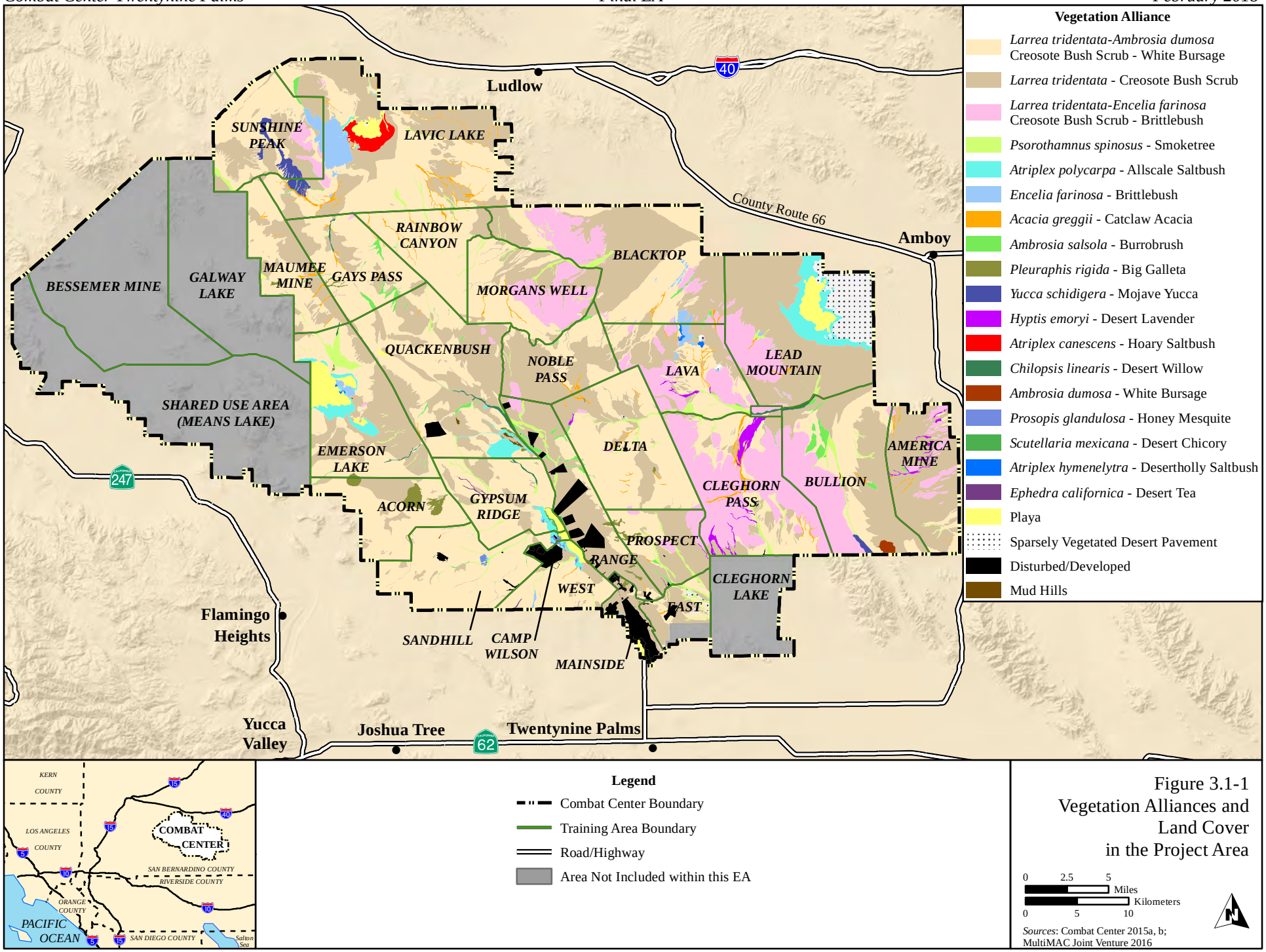


Figure 3.1-1
Vegetation Alliances and Land Cover in the Project Area

The *Atriplex polycarpa* (allscale saltbush) alliance is found in washes, playa lake beds and shores, dissected alluvial fans, rolling hills, terraces, and edges of large, low gradient washes. Soils may be carbonate rich, alkaline, sandy, or sandy clay loams. Shrubs are less than 3 m tall and the canopy is open to continuous. The herbaceous layer is variable, including seasonal annuals. *Atriplex polycarpa* tolerates moderately saline conditions or xeric, nonsaline upland sites with shallow water tables. Its limited but varied salt tolerance and high drought tolerance define the broad habitat boundaries of the alliance, which is one of the most widespread saltbush alliances in the Mojave Desert (MultiMAC Joint Venture 2016).

The *Encelia farinosa* (brittlebush) alliance is found on alluvial fans, bajadas, colluvium, rocky hillsides, slopes of small washes and rills. The soils are well drained, rocky, and may be covered by desert pavement. It is common on steep, rocky sites, especially south-facing slopes. Shrubs are less than 2 m tall and the canopy is open to intermittent. The herbaceous layer is open with seasonal annuals (MultiMAC Joint Venture 2016).

The *Acacia greggii* (catclaw acacia) alliance may occupy arroyos, channels, washes, bajadas, canyon walls, rocky slopes, and valleys. It is characteristic of hot, low elevations. Shrubs are less than 3 m tall and the canopy is open to intermittent. The herbaceous layer is sparse to intermittent with seasonal annuals. Soils are coarse, well-drained, and moderately acidic to slightly saline, and may grow where outcrops and boulders channel the surface water to roots. Stands are typically uneven-aged (MultiMAC Joint Venture 2016).

The *Ambrosia salsola* (burrobrush) alliance is found in valleys, flats, rarely flooded low-gradient deposits, arroyos, intermittent channels and washes. It may occupy upland sites as well as bottomland sites. Soils are alluvial, sandy and gravelly, and disturbed desert pavement. Shrubs are less than 2 m tall and the canopy is open to intermittent. The herbaceous layer is sparse or seasonally present. The alliance is a widespread, native, and is commonly associated with washes. It is also found in burned and heavily grazed areas, military camps, off-highway vehicle areas, abandoned town and old farming sites, and roadsides. In arroyo and wash settings, flooding regimes are generally high in frequency and variable in intensity (MultiMAC Joint Venture 2016).

The *Pleuraphis rigida* (big galleta) alliance is found on flat ridges, lower bajadas, slopes, dune aprons, and stabilized dunes. Soils may be clayey, sandy, or rocky. Herbs are less than 1 m tall and cover is open to intermittent with seasonal annuals. The grass has more cover than do the shrubs. The alliance has a bimodal distribution in which it occurs as open stands around dune margins and other sandy areas at low elevations, and as closed stands on upland slopes and bajadas at middle elevations where growth is reduced on clay soil (MultiMAC Joint Venture 2016).

The *Yucca schidigera* (Mojave yucca) alliance is found on alluvial fans, rocky slopes, and upper bajadas. Soils are well-drained sandy loams. Shrubs are less than 5 m tall and shrub and grass layers are open to intermittent. *Yucca schidigera* rarely dominates but acts as an indicator species at low cover in stands at slightly lower elevations and on shallower soils than those of the *Yucca brevifolia* alliance. Some stands attain the highest shrub diversities, up to 30 species, found in hot deserts of California (MultiMAC Joint Venture 2016).

The *Hyptis emoryi* (desert lavender) alliance is found in drainages, seeps, and springs and steep, very rocky colluvium on lower canyon slopes as well as rocky alluvial washes. Soils are gravelly sands and loams that surround boulders and bedrock. Shrubs are less than 3 m tall and the canopy is open to intermittent. The herbaceous layer is open with seasonal annuals. Small stands occur in narrow washes below 800 m as narrow strips that ascend drainages in old, dissected alluvial fans or badlands or are associated with rocky and boulder-strewn stretches (MultiMAC Joint Venture 2016).

The *Atriplex canescens* (hoary saltbush) alliance is found on playas, old beach and shores, lake deposits, dissected alluvial fans, and rolling hills. Soils are carbonate rich, alkaline, sandy, or sandy clay loams. Shrubs are less than 3 m tall and the canopy is open or intermittent. The herbaceous layer is variable with seasonal herbs and non-native grasses (MultiMAC Joint Venture 2016).

The *Chilopsis linearis* (desert willow) alliance is found in washes, intermittent channels, canyon bottoms, and arroyos, as well as along floodplains and wash terraces where flooding is infrequent but where subterranean water is available. The alliance favors washes with relatively wide flood paths, and can also be found in natural "narrows" in valleys; most large-stature stands are on small terraces above the active wash channels. Stands do not range as high into mountain valleys and narrow arroyos as do other wash alliances, nor do they occupy the most active wash centers. Soils are well-drained sands and gravels that are moderately acidic to slightly alkaline. Trees are less than 6 m tall; the canopy is two-tiered and open to intermittent. Shrubs are less than 6 m tall; the canopy is also two-tiered and open to intermittent. The herbaceous layer is sparse with seasonal annuals. Stands are local and absent in many washes that appear suitable (MultiMAC Joint Venture 2016).

The *Ambrosia dumosa* (white bursage) alliance dominates sandy substrates, rocky hills, or alluvial fans, particularly within older soils with caliche or clay layers, and is found in older washes and river terraces, alluvial fans, bajadas, rocky hills, partially stabilized and stabilized sand fields, and upland slopes. Soils are sandy, clay-rich, or calcareous and may have pavement surfaces. Shrubs are less than 1 m tall and the canopy is open to intermittent. The herbaceous layer is open to intermittent with seasonal annuals. This is one of the several alliances in the creosote bush scrub with *Ambrosia dumosa, Encelia farinosa,* and *Larrea tridentata* present in various amounts. The cover of *A. dumosa* in this alliance is high relative to that of *Larrea tridentata*, while the cover of other low shrubs may equal to that of *A. dumosa*. Shrub density and species richness (3 to 30 perennial shrubs) is highly variable (MultiMAC Joint Venture 2016).

The *Prosopis glandulosa* (honey mesquite) alliance occurs in a variety of desert and semidesert settings where plants access permanent water, including fringes of playa lakes, river terraces, stream banks, floodplains, rarely flooded margins of arroyos and washes, sand dunes. Trees are less than 10 m tall and the canopy is open to continuous. The shrub and herbaceous layers are open to intermittent. Stands appear primarily as woodlands, though shrublands stands occur away from rivers (MultiMAC Joint Venture 2016).

The *Scutellaria mexicana* (desert chicory) alliance commonly occupies actively eroding edges of alluvial terraces with other disturbance-related taxa along washes and arroyos on alluvial fans and bajadas. Soils are sands, gravels, or clays of alluvial or colluvial origin. Shrubs are less than 3 m tall and the canopy is open to continuous. The herbaceous layer is sparse (MultiMAC Joint Venture 2016).

The *Atriplex hymenelytra* (desertholly saltbush) alliance is found on alluvial fans, along washes, steep colluviums, recent lava flows, cinder cones, and heavy alkaline lake sediments. Soils develop from metamorphic, igneous, and sedimentary rocks that may be carbonate, alkaline, or salt rich with desert pavements. The alliance is floristically and structurally simple. It commonly exists in desert pavement areas where vegetation is very sparse; it also occurs on rough lava and limestone deposits with skeletal soils and in heavy alkaline sediments (MultiMAC Joint Venture 2016).

The *Ephedra californica* (desert tea) alliance is found in intermittently flooded arroyos, washes, and adjacent alluvial fans or residual dunes and xeric fine-grained sedimentary substrates. Soils are coarse to medium sands, loamy sands, and sandy clay loams. Shrubs are less than 2 m tall and the canopy is open to intermittent. The herbaceous layer is open to intermittent with seasonal annuals and perennial grasses. The alliance is most common on low-gradient wash sites within an ecological zone similar to that of to *A.*

salsola, but also on slightly less disturbed microsites, such as along low terraces and banks of washes Some stands associate with sand sheets, dunes, and other sandy substrates (MultiMAC Joint Venture 2016).

Other Land Classifications

Playas are dry or intermittently dry lake beds. Surface drainage at the Combat Center is internal; most runoff flows inward, from all directions, into playas. As collected water evaporates from playas, alkali salts tend to accumulate near surface soils. This strongly influences what plant species tend to grow near playa margins. There are 14 playas throughout the Combat Center totaling approximately 7,750 acres (3,136 ha) (Combat Center 2012).

Sparsely vegetated desert pavement is a surface layer that consists of closely packed, interlocking, or cemented rock fragments. Rock fragment size ranges from pebble to cobble. In these areas, finer materials (e.g., sand) have been removed from the surface. Though theories have been proposed, the precise mechanism that creates desert pavement is unclear.

Developed areas are highly modified and usually altered by anthropogenic structures. Substrates not covered by structures often consist of impervious surfaces (e.g., asphalt, concrete) and void of any natural vegetation. Vegetation that is present usually consists of weeds or horticultural species, but may include areas of impacted native vegetation. The "landscaped" areas of the base are restricted to Mainside. Mainside vegetation consists of a variety of ornamental trees, shrubs, and ground covers that require routine maintenance efforts such as mowing, weeding, pruning, fertilizing, pest control, and irrigation. Most of these areas contain non-native, drought-tolerant plants commonly used in landscaped areas in Mojave Desert communities (Combat Center 2012).

Disturbed areas are heavily impacted, but not permanently modified. Some areas of the training ranges, primarily in flat valleys and bajadas, have been disturbed intensively by military activities with consequent degradation of vegetation.

Mud hills, also known as "badlands," are a type of terrain where softer sedimentary rocks and clay-rich soils have been extensively eroded by wind and water to form steep slopes with minimal terrain. Canyons, ravines, gullies, buttes, and mesas are common geologic forms in these areas. On the Combat Center, this land classification occurs entirely within the Quackenbush Training Area (MultiMAC Joint Venture 2016).

Several non-native plant species occur on Mainside and in training areas, such as salt cedar (*Tamarix ramosissima* and *T. aphylla*), Mediterranean grass (*Schismus barbatus*), Russian-thistle or tumbleweed (*Salsola tragus*), and Sahara mustard (*Brassica tournefortii*). Non-native species present a threat to sensitive native plant communities, as often these species out compete native species for resources and land cover. Also, many invasive species tend to establish large monocultures that carry heavy fuel loads. Non-native grasses such as brome (*Bromus spp.*) and Mediterranean grass are examples of species that have become established at the Combat Center and which may result in sufficiently dense vegetation after high rainfall years to carry a fire, possibly causing long-term adverse effects on the Mojave Desert ecosystem and biodiversity contained within the installation and surrounding areas (Combat Center 2012).

3.1.3.2 Wildlife

Numerous vertebrate and invertebrate species have been recorded or have the potential to occur in the vicinity of the proposed project area. Wildlife species at the Combat Center are typical of Mojave Desert fauna with the exception of a wide variety of species only found to occur at the golf course or sewage ponds at Mainside, including the California toad (*Anaxyrus boreas halophilus*), desert cottontail (*Sylvilagus audubonii*), common raccoon (*Procyon lotor*), and 126 species of primarily migrant birds (Cutler et al.

1999). Of the 256 vertebrate species observed within the Combat Center by Cutler et al. (1999), about half were only observed at Mainside. A description of many of these species can be found in the 2012 Land Acquisition EIS (DoN 2012). After the Record of Decision (ROD) for the EIS was signed, LaRue (2013) and Stepek et al. (2013) performed extensive vertebrate surveys onboard the Combat Center, and the results of these surveys are incorporated into this analysis. LaRue (2013) surveyed 21 of 22 Range and Training Areas, but did not survey Mainside, and found 92 species of reptiles, birds, and mammals; no fish or amphibians were observed. Stepek et al. (2013) surveyed specific sample points within 20 Range and Training Areas and documented 52 species, including 23 species of non-volant mammals, 6 bat species, and 23 reptiles; since the study did not focus on surveying water sources in Mainside or at Surprise Spring, no amphibians were found. Most wildlife species on the Combat Center (except Mainside) are adapted to desert scrub habitats that provide little cover and xeric conditions (Cutler et al. 1999; Combat Center 2012).

As is typical of most desert systems, large mammal species (e.g., bobcat [*Lynx rufus*], coyote [*Canis latrans*], desert bighorn sheep [*Ovis canadensis nelsoni*]) are uncommon and widely dispersed. Small mammals (e.g., round-tailed ground squirrel [*Spermophilus tereticaudis*], kangaroo rat [*Dipodomys* spp.]) and reptiles (e.g., side-blotched lizard [*Uta stansburiana*], desert horned lizard [*Phrynosoma platyrhinos*]) are highly adapted to harsh desert conditions and are much more common but are often secretive, nocturnal, or active for only short periods of the year. Birds are among the most conspicuous species, usually occurring in greatest concentration in the vicinity of washes and springs where more structures and complex vegetative assemblages occur. With some exceptions, wildlife species (such as birds and larger mammals) are generally more mobile and not limited to a single habitat type. Some species (*e.g.*, fish, amphibians, and some reptiles and mammals) are highly adapted to one habitat type and restricted to these specialized areas (Combat Center 2012).

Faunal species found at the Combat Center include 2 amphibian, 28 reptile, 41 mammal, and 211 bird species (University of California, Riverside 1993; Fromer and Dodero 1982; Brown and Berry 1998; Cutler et al. 1999; Circle Mountain Biological Consultants 2010; LaRue 2013; Stepek et al. 2013). The most recent wildlife surveys at the Combat Center were conducted in 2013 at sites that were widely distributed in training areas across the Combat Center (LaRue 2013; Stepek et al. 2013). The majority of species that were identified in the survey are commonly observed on the Combat Center. The results are representative of the areas subject to use under the Proposed Action and are summarized below.

Up to 87 resident bird species (i.e., those that spend the entire year, breeding season, or winter months at the Combat Center) have been identified at the Combat Center, with the remainder of species being migrants or vagrants (Cutler et al. 1999; Circle Mountain Biological Consultants 2010). LaRue (2013) encountered 58 species through visual or audio detection in surveys. The MAGTF Training Command Combat Center Natural Resources Management Plan (University of California, Riverside 1993) and the MAGTF Training Command Combat Center Bird Inventory (Fromer and Dodero 1982) identified a total of 135 to 140 species of birds present at the Combat Center. Birds are among the most commonly seen species at the Combat Center and occur throughout the entirety of the installation. Washes and springs provide habitat for the greatest concentration of desert bird species, as these areas tend to have water, and more complex vegetative assemblages than most desert plant communities. With no known perennial seeps or springs on the Combat Center, most bird sightings occur in developed areas of Mainside, including the golf course and wastewater treatment ponds. Most bird species are common year-round residents that nest on the base, including chukar (*Alectoris chukar*), Gambel's quail (*Callipepla gambelii*), mourning dove (*Zenaida macroura*), greater roadrunner (*Geococcyx californianus*), northern flicker (*Colaptes auratus*), Say's phoebe (*Sayornis saya*), horned lark (*Eremophila alpestris*), common raven (*Corvus corax*), verdin (*Auriparus flavipes*), cactus wren (*Campylorhynchus brunneicapillus*), rock wren (*Salpinctes obsoletus*), phainopepla (*Phainopepla*

nitens), black-throated sparrow (*Amphispiza bilineata*), sage sparrow (*Amphispiza belli*), western meadowlark (*Sturnella neglecta*), yellow-headed blackbird (*Xanthocephalus xanthocephalus*), house finch (*Carpodacus mexicanus*), red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), common barn owl (*Tyto alba*), and great horned owl (*Bubo virginianus*) (Circle Mountain Biological Consultants 2010). The MBTA is the primary law that provides for the protection of migratory birds. Further discussion of birds listed under the MBTA is provided below under special-status species.

Common reptile species include desert iguana (*Dipsosaurus dorsalis*), common chuckwalla (*Sauromalus ater* [= *obesus*]), zebra-tailed lizard (*Callisaurus draconoides*), side-blotched lizard (*Uta stansburiana*), desert horned lizard (*Phrynosoma platyrhinos*), western whiptail (*Cnemidophorus tigris*), western patch-nosed snake (*Salvadora hexalepis*), long-nosed snake (*Rhinocheilus lecontei*), speckled rattlesnake (*Crotalus mitchellii*), and sidewinder (*Crotalus cerastes*) (Circle Mountain Biological Consultants 2010; LaRue 2013; Stepek et al. 2013).

Common mammal species include round-tailed ground squirrel (*Spermophilus tereticaudis*), antelope ground squirrel (*Ammospermophilus leucurus*), Botta pocket gopher (*Thomomys bottae*), kangaroo rat (*Dipodomys* spp.), desert wood rat (*Neotoma lepida*), black-tailed hare (*Lepus californicus*), Audubon cottontail (*Sylvilagus audubonii*), coyote, kit fox (*Vulpes macrotis*), American badger (*Taxidea taxus*), and bobcat (Circle Mountain Biological Consultants 2010; LaRue 2013; Stepek et al. 2013).

Daily and seasonal bird and wildlife movements in the vicinity of the SELF create various potential hazards to aircraft. The goal of a Bird/Animal Aircraft Strike Hazard (BASH) Plan is to minimize the risk of bird/wildlife strikes that may cause injuries to aircrews and damage to or loss of aircraft. The 2003 BASH Plan determined that the Combat Center and the SELF have a low risk of airstrikes due to the remoteness of the airfield from any source of water (Combat Center 2012), which is demonstrated by historically low numbers of both birds and coyotes that have been struck by aircraft arriving or departing the SELF.

3.1.3.3 Special-status Species

Special-status species include species listed or proposed for listing under the ESA, California-listed threatened and endangered or candidate species, bird species listed under the MBTA, and species of concern as recognized by California or federal agencies. Species of concern are monitored and managed by the Combat Center per the Sikes Act and its mandated INRMP (Combat Center 2012). By studying and managing populations of these species on the Combat Center, it would help prevent the species from becoming listed under the ESA, prevent the need to designate critical habitat on the Combat Center, and reduce restrictions on training that may result from such designations.

<u>Plants</u>

Although no federally or state-listed plant species are known to occur on the Combat Center, nine special-status plant species are known to occur (Combat Center 2012). Three of these species have a California Rare Plant Rank (CRPR) of 1B or 2B (California Native Plant Society [CNPS] 2015) (Table 3.1-2). Species listed as CRPR 1B and 2B meet the definitions of the California ESA and are eligible for state listing but have not yet been formally listed.

Table 3.1-2. Special-Status Plant Species Known to Occur at the Combat Center

Scientific Name	*Common Name*	*Federal Status*	*State Status*	*CRPR**
Allium parishii	Parish's onion	None	None	4.3
Castela emoryi	Emory's crucifixion thorn	None	None	2B.2
Cryptantha holoptera	Winged cryptantha	None	None	4.3
Coryphantha alversonii (=*Escobaria vivipara* var. *alversonii*)	Foxtail cactus	None	None	4.3
Funastrum utahense (=*Cynanchum utahense*)	Utah vine milkweed	None	None	4.2
Galium angustifolium ssp.*gracillimum*	Slender bedstraw	None	None	4.2
Muilla coronata	Crowned muilla	None	None	4.2
Penstemon albomarginatus	White-margined beardtongue	None	None	1B.1
Wislizenia refracta ssp. *refracta*	Jackass clover	None	None	2B.2

Definitions: * 1B.1 = Plants rare, threatened, or endangered in California and elsewhere; seriously threatened in California (over 80% of occurrences threatened/high degree and immediacy of threat).
2B = Plants rare, threatened, or endangered in California, but more common elsewhere:
.2 = Moderately threatened in California (20-80% occurrences threatened/moderate degree and immediacy of threat).
4 = Plants of limited distribution (a watch list):
.2 = Moderately threatened in California.
.3 = Not very threatened in California; not very threatened in California (less than 20% of occurrences threatened/low degree and immediacy of threat or no current threats known).
Sources: Combat Center 2012; California Department of Fish and Wildlife (CDFW) 2017; CNPS 2015.

Emory's crucifixion thorn is a deciduous perennial shrub that occurs in gravelly soils on playas and Mojave and Sonoran desert scrub (CNPS 2010). There are more than 50 known populations of crucifixion thorn on the Combat Center with the largest found in the eastern portion of the Rainbow Canyon Training Area (see Figure 3.1-3, below) (Agri Chemical & Supply, Inc. 2006). Crucifixion thorn was not observed in more recent focused surveys of 81 AMZs (Circle Mountain Biological Consultants 2010) but two occurrences were documented during the most recent vertebrate surveys (LaRue 2013).

White-margined beardtongue is a perennial herb that occurs on stabilized desert dunes and desert scrub with sandy soils. Based on surveys conducted in 2006, one population with only two individuals of this species is known to occur in the Lavic Lake Training Area (Agri Chemical & Supply, Inc. 2006).

Jackass clover is a low-stature, herbaceous plant generally found in sandy washes, roadsides, and alkaline flats in the Mojave and northern Sonoran Deserts. There is one large, well established population known to occur on the Combat Center at Surprise Spring in the Sandhill Training Area (Agri Chemical & Supply, Inc. 2006).

Wildlife

A total of 31 special-status animal species are known to occur on the Combat Center (Cutler et al. 1999; Circle Mountain Biological Consultants 2010; Combat Center 2012; LaRue 2013; Stepek et al. 2013) (Table 3.1-3). Many of these species are migratory or seasonal residents and have only been recorded near the manmade water bodies of Mainside. The threatened Agassiz's desert tortoise (hereafter 'desert tortoise') is the only resident ESA-listed species that has been documented within the Combat Center and is described in further detail below.

Table 3.1-3. Special-Status Animal Species Known to Occur at the Combat Center

Common Name	*Scientific Name*	*Federal Status*	*State Status*
Residents			
Mojave fringe-toed lizard	*Uma scoparia*	None	CSSC
Agassiz's desert tortoise	*Gopherus agassizii*	ESA-T	CESA-T
Loggerhead shrike	*Lanius ludovicianus*	MBTA	CSSC
Le Conte's thrasher	*Toxostoma lecontei*	MBTA, BCC	CSSC
Northern harrier	*Circus cyaneus*	MBTA	CSSC, FP
Golden eagle	*Aquila chrysaetos*	BGEPA, MBTA, BCC	FP
Prairie falcon	*Falco mexicanus*	MBTA, BCC	FP
American peregrine falcon	*Falco peregrinus anatum*	MBTA, BCC	FP
Cooper's hawk	*Accipiter cooperii*	MBTA	CWL
Burrowing owl	*Athene cunicularia*	MBTA, BCC	CSSC, FP
Long-eared owl	*Asio otus*	MBTA	CSSC, FP
American badger	*Taxidea taxus*	None	CSSC
California leaf-nosed bat	*Macrotus californicus*	None	CSSC
Western mastiff bat	*Eumops perotis californicus*	None	CSSC
Pallid bat	*Antrozous pallidus*	None	CSSC
Townsend's big-eared bat	*Corynorhinus townsendii*	None	CESA-CT, CSSC
Pocketed free-tailed bat	*Nyctinomops femorosaccus*	None	CSSC
Pallid San Diego pocket mouse	*Chaetodipus fallax pallidus*	None	CSSC
Desert bighorn sheep	*Ovis canadensis nelsoni*	None	FP
Non-residents			
Willow flycatcher[(1)]	*Empidonax traillii extimus*	ESA-E, MBTA	CESA-E
Least Bell's vireo[(2)]	*Vireo bellii pusillus*	ESA-E, MBTA	CESA-E
Western snowy plover[(3)] (Pacific population)	*Charadrius alexandrinus nivosus*	ESA-T, MBTA	CSSC
Gilded flicker	*Colaptes chrysoides*	MBTA, BCC	CESA-E
Bank swallow	*Riparia*	MBTA	CESA-T
Short-eared owl	*Asio flammeus*	MBTA	CSSC, FP
Yellow warbler	*Dendroica petechia*	MBTA, BCC	CSSC
Black tern	*Chlidonias niger*	MBTA	CSSC
Vaux's swift	*Chaetura vauxi*	MBTA	CSSC
Ferruginous hawk	*Buteo regalis*	MBTA	CWL
Swainson's hawk	*Buteo swainsoni*	MBTA, BCC	CESA-T
Osprey	*Pandion haliaetus*	MBTA	CWL

Notes: [(1)]All subspecies are state-listed as endangered. It is not known what subspecies occurs at the Combat Center.
[(2)]It is not known what subspecies occurs at the Combat Center.
[(3)]Only the Pacific coast population is federally listed as endangered. Both coastal and interior populations are CSSC. It is not known what population migrates through the Combat Center.

Legend: BCC = Bird of Conservation Concern (within the U.S. portion of the Sonoran & Mojave Deserts Bird Conservation Region); BGEPA = Bald and Golden Eagle Protection Act; CESA = California Endangered Species Act; CSSC = California Species of Special Concern; CT = candidate for listing as threatened; CWL = CDFW Watch List; E = endangered; ESA = Federal Endangered Species Act; FP = Fully protected in accordance with the California Fish and Game Code; MBTA = Migratory Bird Treaty Act; T = threatened.

Sources: Cutler et al. 1999; USFWS 2008; Circle Mountain Biological Consultants 2010; Combat Center 2012; LaRue 2013; Stepek et al. 2013; CDFW 2017.

ESA-listed Species

BIRDS. The western snowy plover (*Charadrius alexandrinus nivosus*), willow flycatcher (*Empidonax traillii*), and Bell's vireo (*Vireo bellii*) are uncommon migrants that have been observed at water sources

and landscaped areas associated with Mainside and adjacent training areas (Cutler et al. 1999; Combat Center 2012), but are unlikely to occur in other areas of the Combat Center. All subspecies of willow flycatcher are state-listed as endangered, but only the southwestern subspecies (*Empidonax traillii extimus*) is federally listed as endangered. The Pacific coast population of snowy plover is federally listed as threatened, while both the coastal and interior populations are California species of special concern. There are two subspecies of Bell's vireo known to occur in California, but only the least Bell's vireo (*Vireo bellii pusillus*) is federally and state-listed as endangered. These subspecies/populations are very difficult to distinguish outside of their breeding habitat, and observations at the Combat Center have only identified these birds to the species level (Combat Center 2012).

DESERT TORTOISE. The desert tortoise was listed as threatened by the State of California in 1989, and the Mojave Desert population (all tortoises north and west of the Colorado River in Arizona, Utah, Nevada, and California), now known as Aggasiz's desert tortoise, was federally listed as threatened by the USFWS in 1990. The decline in desert tortoise numbers is thought to be due to a number of causes, including loss of habitat, upper respiratory tract disease, predation by common ravens on young tortoises, off-highway vehicle use, livestock grazing, the spread of invasive plant species, and direct disturbance and collection by humans (Combat Center 2012).

Currently, much focus is being put on the control and management of common raven populations in desert areas, as predation by this species is considered to be one of the greatest threats to the long-term survival and recovery of the desert tortoise. The Combat Center is coordinating with the Desert Managers Group and the Desert Tortoise Management Oversight Group to support development of a region-wide management approach to predation by the common raven on the desert tortoise. The Combat Center is developing and implementing its own raven management program aboard the installation. This includes, for example, working to reduce raven resource subsidies (e.g., water, food, nest substrate, and roosting sites) and seeking a depredation permit from the USFWS.

Desert tortoises on the Combat Center occur predominantly in creosote scrub habitat at elevations below 4,300 ft (1,311 m) above mean sea level. The desert tortoise spends much of the year underground to avoid extreme temperatures during summer and winter. It constructs and maintains burrows, of which there may be several within an individual's home range. The desert tortoise is active above ground during the spring, summer, and autumn when daytime temperatures are below 90 degrees Fahrenheit (°F). Most activity occurs during spring and early summer (Combat Center 2012).

The Combat Center is within the southern Mojave subdivision of the Western Recovery Unit for the desert tortoise. The Combat Center contains no designated critical habitat. However, it shares a 6-mile (10-km) boundary with the Ord-Rodman Critical Habitat Unit to the northwest, and the Pinto Mountain Critical Habitat Unit is 6 miles (10 km) southeast of the installation (Combat Center 2012).

On the Combat Center, the highest desert tortoise densities (>50 per square mile) are found at elevations between 2,300 and 2,950 ft (700 and 900 m) above mean sea level. Second highest densities (21-50 per square mile) are found at elevations between 1,970 and 3,610 ft (600 and 1,100 m) above mean sea level (Combat Center 2012). As noted on Figure 3.1-2, certain areas containing bedrock outcrop, lava flow, and dry lake have not been surveyed for desert tortoises. Based on the desert tortoise's preferred habitat, the Combat Center presumes that the biological resources sensitivity (including the desert tortoise density) of these areas is low.

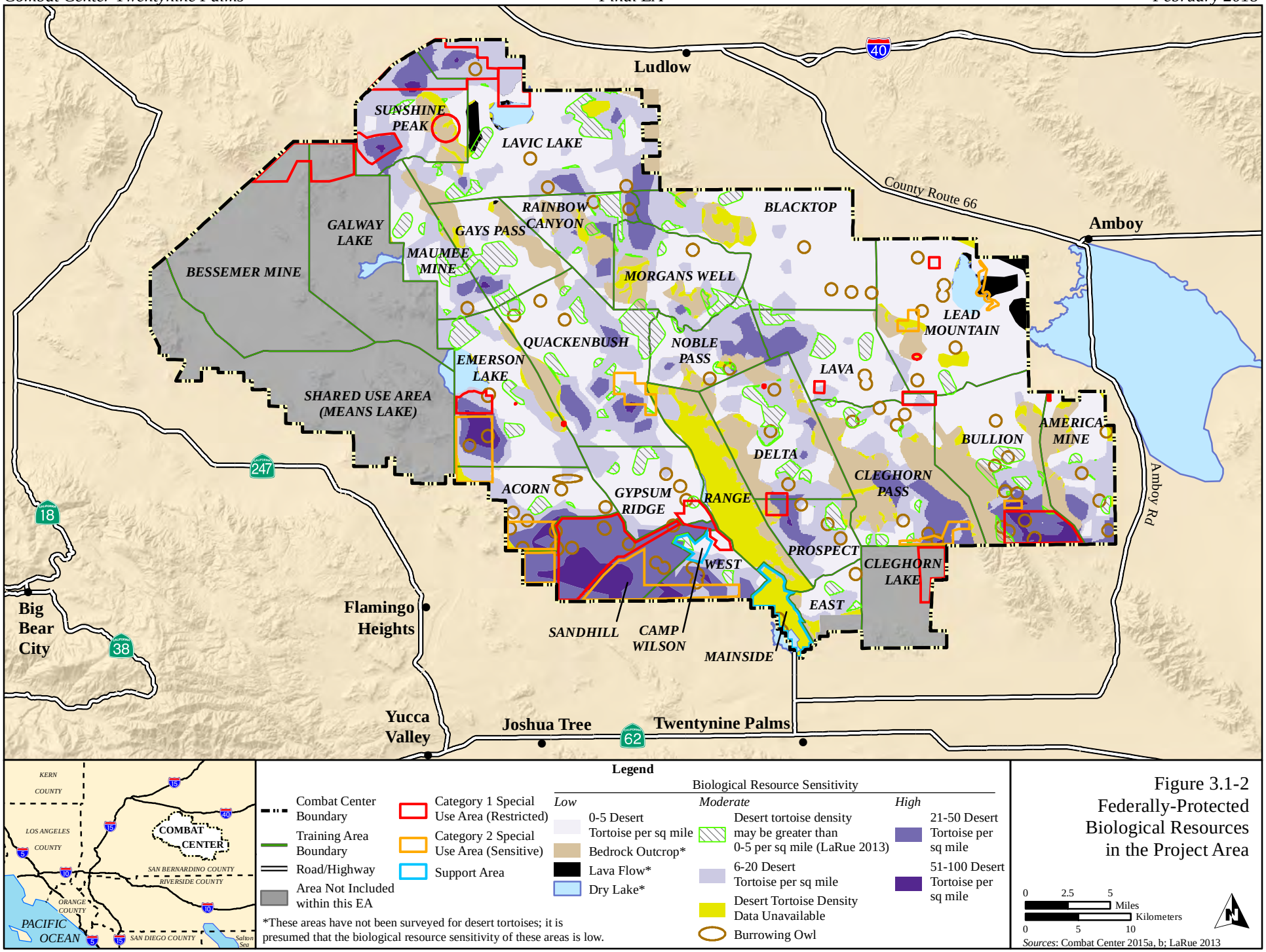


Figure 3.1-2
Federally-Protected Biological Resources in the Project Area

In 1997 and 1999, Woodman et al. (2001) performed surveys using survey protocols similar to those used to conduct Tortoise Regional Estimate of Density (TRED) surveys. As suggested by the protocol's name, TRED surveys allow desert tortoise densities to be estimated regionally. In addition to performing widely-spaced triangular survey transects, TRED survey protocols require surveyors to also perform a calibration survey to allow tortoise density to be estimated based on the number of tortoise burrows detected during each survey transect (note: Woodman et al. [2001] results were from scat- and burrow-based total corrected sign). Figure 3.1-2 illustrates the estimated densities of desert tortoise per square mile within the Combat Center, based on data available from Woodman et al. (2001).

In 2011, LaRue (2013) performed surveys similar to those performed by Woodman et al. (2001). LaRue's (2013) surveys, however, did not include a calibration survey. Because of this, LaRue concluded that the "data cannot be analyzed to determine tortoise densities." However, regional patterns of tortoises and their sign could still be compared between the late 1990's and 2011, and LaRue (2013) provided such an analysis, which suggested that the survey results were similar with the exception that there was less tortoise sign in Prospect and south Lavic Lake, and more sign in Bullion and in portions of Delta, than Woodman et al. (2001) had found. Accordingly, to rigorously identify areas that may contain more than 0-5 desert tortoises per square mile, the Combat Center used the following approach:

1) Imported all data collected by LaRue (2013) into a geographic information system (GIS).
2) Individually considered the center point of each triangular survey transect where scat or burrows were detected (similar to Woodman et al. [2001]) by comparing each point to the areas that Woodman et al. (2001) determined to have low densities (0-5 per square mile) of desert tortoises as well as any area that is presumed to have low densities of desert tortoises (i.e., bedrock outcrop, lava flow, and dry lake bed).
    a. All survey transects that detected two or more total corrected sign (scat or burrows), as well as any survey that detected only one sign that neighbored another survey that detected at least one sign, were included in the analysis.
    b. Surveys that detected only one scat or burrow that were not adjacent to another survey that detected at least one scat or burrow were excluded from the analysis, as the Combat Center assumes that some tortoise sign would be found within areas containing low densities (0-5 per square mile) of desert tortoises.
3) Created polygons by using a GIS tool (i.e., minimum convex hull) to connect neighboring surveys included in the analysis, per step 2 above.
4) Increased the size (i.e., buffered) these polygons to ensure the entirety of the area represented by each triangular transect where sign was found was included in the polygon.

The results of the above analysis of the LaRue (2013) data are shown as "Desert tortoise density may be greater than 0-5 per mi^2" on Figure 3.1-2.

In 2014, estimated adult desert tortoise density in the Western Mojave Recovery Unit ranged from 6.5 to 12.2 individuals per square mile (2.5 to 4.7 individuals per square kilometers), with an overall average density of 7.3 tortoises per square mile (2.8 tortoises per square kilometers), the result of an overall downward trend in the population of adult tortoises (USFWS 2015). In the recent past, from 2004 to 2014, desert tortoise populations among all recovery units decreased by 27%-67%, except for the Northeastern Mojave Recovery Unit that increased by 270%; in the Western Mojave Recovery Unit, the adult tortoise population decreased by 51% between 2004 and 2014 (USFWS 2015). Lovich et al. (2014) also found a steep decline of over 75% from 1996 to 2012 in the adult desert tortoise population at a 1 square mile (2.59 square kilometers) study site, known as the Barrow Plot, located at the nearby Joshua Tree National Park. The low tortoise density in the West Mojave Recovery Unit in general is of particular concern as the

USFWS has determined that the minimum adult tortoise density necessary to sustain a viable population, assuming there is no gender bias (i.e., 50% of the population is male, 50% of the population is female), is 10 individuals per square mile (3.85 individuals per square kilometers) (USFWS 1994, 2016).

A "Special Use Area" of approximately 6,672 acres (2,700 ha), which has moderate to high densities of desert tortoises, was established in the Sand Hill Training Area to protect natural resources (CCO 5090.4F). Another Special Use Area of approximately 5,483 acres (2,219 ha), which also has moderate to high densities of desert tortoises, was established in the Bullion Training Area to protect desert tortoises (DoN 2017). Desert tortoises benefit from these Special Use Area designations, as training is restricted in these areas. Desert tortoises also receive some degree of protection near the edges of the Combat Center because live-fire activities are not permitted within approximately 3,280 ft (1,000 m) of its boundaries (Combat Center 2012).

In 2002 and 2012, the USFWS issued BOs that identified the terms and conditions under which the USMC may operate on the Combat Center while remaining in compliance with the ESA (USFWS 2002, 2012). The BOs address the military mission and conservation and protection of the desert tortoise. The 2012 BO superseded the 2002 BO for training and the preparation of training sites, and the 2017 BO superseded the 2012 BO. For all other aspects of Combat Center operations that are not associated with the proposed action in the 2017 BO (e.g., the construction and maintenance of infrastructure), the take exemptions from the 2002 BO remain in effect. The Combat Center NREA has monitored training-related take of desert tortoises on the Combat Center per the requirements outlined in these BOs; from 2007 through 2015, 17 desert tortoises (an average of 1.9 per year) had been reported to the USFWS as taken. As of 7 July 2016, two additional tortoises were taken in 2016 (Henen 2016). Neither the 2017 Supplemental EIS (DoN 2017) nor the associated BO (USFWS 2017) altered the ongoing or proposed training activities considered in this EA.

MBTA-listed Species

Special consideration is given to bird species protected under the MBTA and EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*. Under the MBTA, it is unlawful to pursue, hunt, take, capture, kill, possess, sell, purchase, barter, import, export, or transport any migratory bird, or any part, nest, or egg of any such bird. As discussed in greater detail in Section 4.1.2.3 (*Special-Status Species*), special exemptions are allowed for military readiness activities. Additionally, the Combat Center maintains plans and actions to comply with the MBTA and EO 13186 while meeting mission objectives. The MBTA provides for the protection of designated birds excluding non-native species such as the English house sparrow, European starling and the rock dove. It was originally developed for migrating birds that crossed international borders; however, it now protects most non-migratory species as well. All native bird species that occur on the Combat Center are protected under the MBTA. The MBTA prohibits many actions that may have negative effects on migratory birds, most notably the killing, collection or transport of birds. The relocation or transport of migratory birds for management purposes may be accomplished through special purpose permits issued by the USFWS (Combat Center 2012).

The survey effort by LaRue (2013) indicates that burrowing owls, golden eagles (*Aquila chrysaetos*), and prairie falcons (*Falco mexicanus*) are the raptor species most likely to nest at the Combat Center; additional information on these species is provided below. LaRue (2013) also noted that Cooper's hawks (*Accipiter cooperii*) may nest at the Combat Center but are more likely to do so at Mainside than within Training Areas and that ferruginous hawk (*Buteo regalis*), northern harrier (*Circus cyaneus*), osprey (*Pandion haliaetus*), and Swainson's hawk (*Buteo swainsoni*) are not expected to nest at the Combat Center.

BURROWING OWL. The burrowing owl is a California species of special concern and lives in dry, open areas with no trees and short grass. Found on golf courses, cemeteries, airports, vacant lots, university campuses, pastures, and prairie dog towns, burrowing owl populations are declining in many areas. Collisions with cars are a major source of mortality, but human activities have increased the species' range in some areas (Cornell Laboratory of Ornithology 2015). The Combat Center maintains a proactive management program to conserve the species and continues to monitor burrowing owl populations and their habitat (Combat Center 2012). As shown on Figure 3.1-2, burrowing owls on the Combat Center generally occur sporadically throughout the Combat Center.

GOLDEN EAGLE. The golden eagle is protected under the Bald and Golden Eagle Protection Act, is a USFWS Bird of Conservation Concern, and a California fully protected species. Golden eagles require relatively inaccessible cliff dwellings in steep, rugged terrain; LaRue (2013) expected that they would be most likely to nest in the Lava Bed Mountains to the northwest, Bullion Mountains through the center and to the southeast, and Hidalgo Mountain. LaRue (2013) observed 11 golden eagles between 15 March and 28 June 2011, including three in Quackenbush, two in Noble Pass, and one each in Sunshine Peak, Maumee Mine, Gypsum Ridge, Blacktop, West, and Bullion training areas. Golden eagle surveys conducted in 2012 and 2013 found that golden eagle nesting activity was concentrated in the west-northwest area of the Combat Center; no nesting was documented in the eastern portions. In addition to this concentration of nesting in the more western regions of the Combat Center, there was also a considerable variation in eagle breeding activity between the 2012 and 2013 seasons. Of the five active territories that were located during 2012, only one territory attempted nesting in 2013 (MAGTF Training Command 2014).

PRAIRIE FALCON. The prairie falcon is a California watch-listed species and breeds from Canada south through the western half of the U.S. into Mexico and winters throughout its breeding range. Prairie falcon habitat includes sagebrush, desert, prairie, some agricultural fields, and alpine meadows up to about 11,000 feet elevation (Cornell Laboratory of Ornithology 2015). Prairie falcons usually nest in a scrape on a sheltered ledge of a cliff overlooking a large, open area, often within a quarter-mile of a water source and are found throughout the western Mojave Desert (CDFW 2010). Prairie falcons are resident at the Lead Mountain Training Area on the Combat Center (Cutler *et al.* 1999), are expected to be residents as well as winter visitors on the Combat Center, and were observed 32 times by LaRue (2013) and consequently were the most commonly observed special status raptor species during LaRue's study. Human disturbance at certain prairie falcon nest sites is a threat. Urbanization surrounding an area historically occupied by falcons gradually degrades the foraging habitat and increases disturbance at nest sites. New mining projects also occasionally threaten certain nest sites.

California-listed Species

The Marine Corps understands the importance of sensitive species to the health of any ecosystem and will take State-listed species into consideration when developing management strategies. Establishing management strategies for sensitive species can help to slow their decline and may preclude listing under the Federal ESA. Congress has not waived sovereign immunity under the Federal ESA; therefore, MAGTF Training Command is not legally required to comply with California endangered species laws. However, it is the Marine Corps policy to consider state-listed species in the NEPA process (Combat Center 2012). A description of many of these species can be found in this section, or in the 2012 Land Acquisition EIS (DoN 2012).

Species of Concern

Most species management on the Combat Center is directed towards the federally listed desert tortoise, primarily due to compliance requirements. However, conservation measures for this species may also

benefit many other wildlife species such as the Mojave fringed-toed lizard (*Uma scoparia*) and burrowing owl (described above).

MOJAVE FRINGE-TOED LIZARD. The Mojave fringe-toed lizard, a California species of concern, is restricted to areas containing fine wind-blown sand, including dunes, the margins of dry lakebeds, flats with sandy hummocks formed around the bases of vegetation, desert washes, and hillsides. Their habitat ranges from 300-3,000 ft (91-914 m) in elevation. As shown on Figure 3.1-3, the largest areas on the Combat Center occupied by Mojave fringe-toed lizards are in the Emerson Lake and Acorn Training Areas; smaller occupied areas occur in the central Lavic Lake, southeastern Quackenbush, northeastern Gypsum Ridge, eastern West, southeastern Delta, northern Lead Mountain, and central East Training Areas. This species is highly vulnerable to off-road vehicle activity and the establishment of windbreaks that affect how windblown sand is deposited (CaliforniaHerps 2015). The Combat Center continues its objectives to monitor Mojave fringe-toed lizard populations and the condition of their habitat, minimize mortality and injury from off-road maneuvers, and maintain a proactive management program (Combat Center 2012).

DESERT BIGHORN SHEEP. In 1991, as part of a reintroduction program the California Department of Fish and Game (now known as the California Department of Fish and Wildlife [CDFW]) and the Combat Center worked together to relocate a herd of 20 desert bighorn sheep (*Ovis canadensis nelsoni*) (5 rams and 15 ewes) to the Bullion Mountains on the Combat Center. The Combat Center, CDFW, and the Society for the Conservation of Bighorn Sheep have formed a partnership for the monitoring of this population. Figure 3.1-3 depicts the locations of guzzlers installed within the Bullion Training Area to support desert bighorn sheep (Figure 3.1-3). Although population counts have not taken place since 1997, the population is believed to be stable and the Combat Center and CDFW currently have plans to jointly monitor the status, distribution, and abundance of the installation's bighorn sheep population (Combat Center 2012).

3.2 GEOLOGICAL RESOURCES

3.2.1 Definition of Resource

Geological resources are generally defined as the topography, geology, soils, and geologic hazards of a given area. Topography is typically described in terms of observable surface shapes and features and their arrangement within a given area. Long term geological, seismic, erosional, and depositional processes influence the topographic relief of an area. The geology of an area includes bedrock materials, mineral resources, and paleontological resources. Bedrock refers to consolidated earthen materials that may consist of either interlocking crystals (igneous and metamorphic rocks), or fragments of other rocks compressed and cemented together over time by pressure or dissolved minerals that have hardened in place (sedimentary rocks). Mineral resources are metallic or non-metallic earth materials that can be extracted for a useful purpose (e.g., iron ore that can be refined to make steel, or gravel that can be used to build roads). Paleontological resources (fossils) are the remains or traces of dead plants and animals that have hardened into rocks over a long period of time. Soil refers to unconsolidated earthen materials overlaying bedrock or other parent material. Geologic hazards can include many phenomena including earthquakes, landslides, and liquefaction.

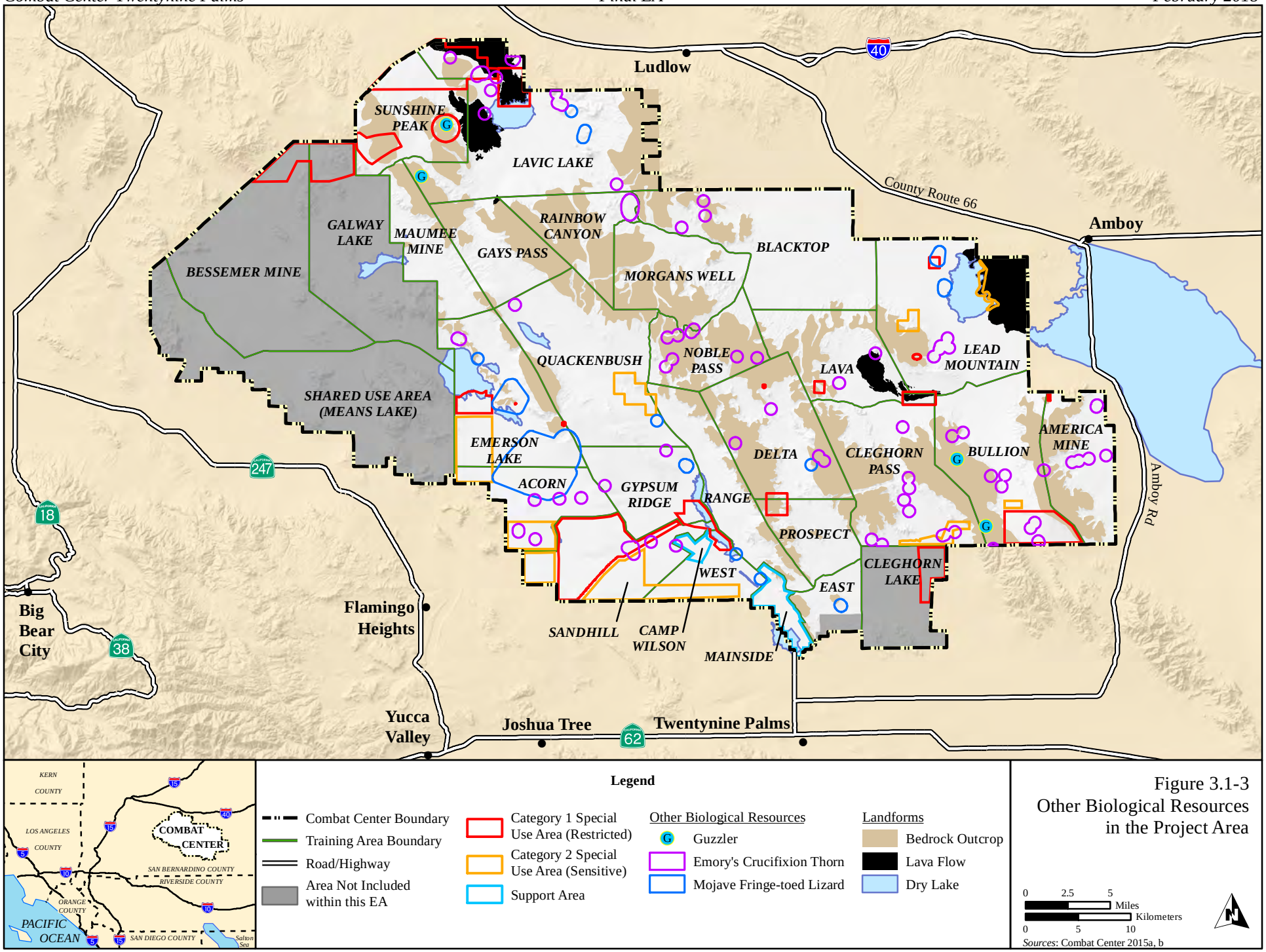


Figure 3.1-3
Other Biological Resources in the Project Area

The ROI for geological resources includes the Combat Center excluding the Bessemer Mine, Galway Lake, Means Lake, and Cleghorn Lake training areas and a portion of the East Training Area (Figure 3.2-1).

3.2.2 Regulatory Framework

Soil erosion at the Combat Center is addressed in the installation's INRMP which includes measures for minimizing erosion, protecting soil stability, and restoring training lands (Combat Center 2012).

Health and safety regarding earthquake-related hazards are addressed by the Alquist-Priolo Earthquake Fault Zoning Act (California Public Resources Code §§ 2621-2630; 1972 amended 1994), State Seismic Hazards Mapping Act (California Public Resources Code §§ 2690-2699, 1990), and the California Building Code (California Building Standards Commission 2007; California Geological Survey [CGS] 2008). The Alquist-Priolo Act prohibits the construction of structures for human occupancy within 50 ft (15 m) of an active earthquake fault, as indicated on maps issued by the State Geologist establishing regulatory zones (known as Earthquake Fault Zones) centered around the surface traces of active faults. The State Seismic Hazards Mapping Act addresses other earthquake-related hazards including seismically induced landslides and liquefaction.

3.2.3 Existing Conditions

3.2.3.1 Topography

The Combat Center is located along the Bullion Mountain Range in the Mojave Desert, a part of the Basin and Range Physiographic Province. The Basin and Range Physiographic Province is topographically unique, characterized by abrupt changes in elevation, alternating between narrow faulted mountain chains and flat arid valleys or basins. Accordingly, the terrain of the Combat Center is characterized by alternating rocky uplands with steep slopes and low valleys with broad alluvial plains, washes, and dry lakebeds. Numerous ancient lava fields form significant features within some training areas. Most of the Combat Center terrain is at elevations between 1,500 and 3,000 ft (460 and 920 m) above mean sea level. However, the highest elevation on the Combat Center is 4,699 ft (1,432 m) at OP Round in the Bullion Mountains, and the lowest is 604 ft (184 m) at Dry Lake in the Lead Mountain Training Area. A major topographic feature within the Combat Center is Hidalgo Mountain, a region-wide landmark.

3.2.3.2 Geology

In terms of geology, the Combat Center is located within the Mojave Desert Geomorphic and Tectonic Province, also called the Mojave Block, a name that reflects the geologic and tectonic framework of the province. The Mojave Block consists of low mountain ranges and isolated rock outcrops separated by narrow to broad alluvial bases and lava flows. The northwest-southeast trending Combat Center geological basin lies between the Ludlow Fault and the Camp Rock-Emerson-Copper Mountain Fault (CGS 2005) (Figure 3.2-1).

The Combat Center geological setting consists of Tertiary Age (65 to 1.6 million years ago) basement rock with overlying Quaternary Age (1.6 million years ago to present) alluvial deposits. The basement rock is nearly impermeable except where it has been fractured or weathered (Combat Center 2012). Alluvial deposits, varying in age and thickness, lie within valleys between mountain ranges. Alluvial deposits flanking the mountain ranges have developed into numerous, gently dipping alluvial fans that when connected form bajadas.

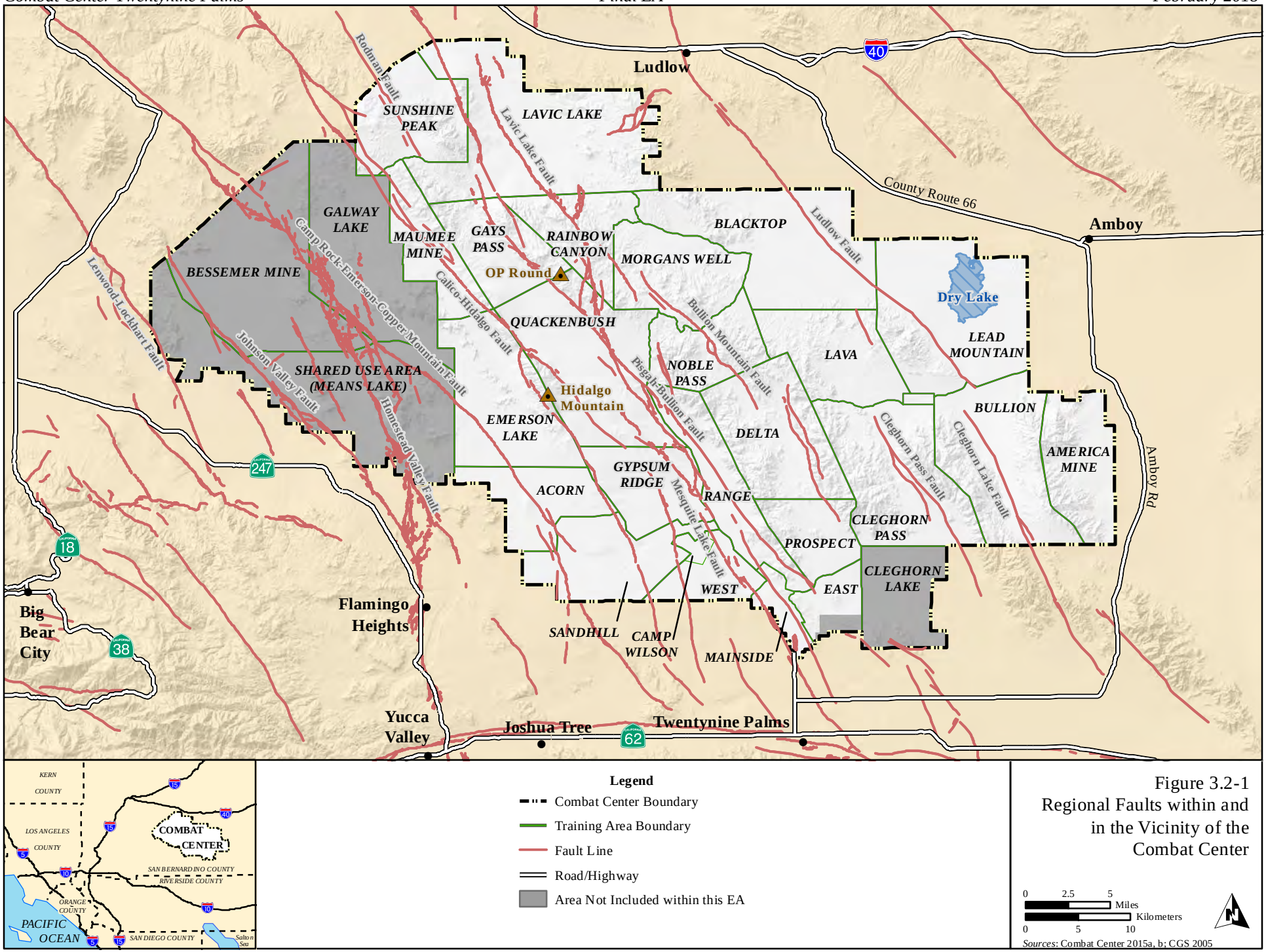


Figure 3.2-1
Regional Faults within and in the Vicinity of the Combat Center

Sources: Combat Center 2015a, b; CGS 2005

Sediments composing alluvial fans primarily come from the weathering and erosion of local mountains. Newer, more recent deposits consist of layers of alluvium containing primarily sand and gravel. Older deposits, often cemented with silica and calcium carbonate, contain sand, gravel, and tightly cemented clay and silt (Combat Center 2012).

The alluvium that overlay the bedrock can hold a significant quantity of water upon saturation. As a result, alluvial deposits are frequently dissected in many locations by storm or runoff-fed streams or washes that generally discharge into dry lakes or playas. The dry lakebeds are composed of stratified impermeable alluvium deposits, overlain by silts and clays, and frequently with a salt pan on the exposed surface (Combat Center 2012).

Mineral Resources

There is a rich history of mining activity both on and adjacent to the Combat Center. Abandoned mines are known to be present in and around the Emerson Lake, Bullion, Delta, Prospect, Maumee Mine, Sunshine Peak, Lavic Lake, and Lead Mountain training areas. Minerals found on the Combat Center include lead, zinc, copper, silver, and gold (Combat Center 2012). The DoN has the authority to reject mining claims with the exception of "certain hardrock minerals known as locatables" (DoD Directive 4700.3). "Locatables" include gold and silver. No active mineral production occurs in the area evaluated in this EA (DoN 2012; Combat Center 2012). In recent years, military installations have been open to mining of certain minerals, most notably oil and gas. However, given the geology of the area, the possibility of oil and gas mining is extremely remote.

Paleontological Resources

The Combat Center Natural and Cultural Resources Branch is responsible for day-to-day operations and long-term management of natural and cultural resources, including paleontological resources, within the Combat Center boundaries (MAGTF Training Command 2011; Combat Center 2012).

In 2007, the Combat Center opened the Archaeology and Paleontology Curation Center to provide the proper storage environment for archaeological and paleontological artifacts recovered from the Combat Center (Zimmerman 2007).

3.2.3.3 Soils

The soils at the Combat Center formed through the weathering of fragments of granitic and volcanic parent rocks from the upland areas and carried downslope by gravity (colluvium) or water (alluvium). No single parent rock type predominates (Natural Resources Conservation Service [NRCS] 1999). Wind has also played a major role in transporting and distributing material for soil placement and formation (MAGTF Training Command 2001). Additional processes involved in the formation of soils at the Combat Center include the translocation of silicate clay, accumulation of silica lime and minerals, and accumulation of organic material. The amount of organic material that accumulates in desert soils, such as those of the Combat Center, is insignificant in comparison with soils of wetter environments that are capable of supporting dense vegetation. Due to the limited moisture and organic material, some Combat Center soils have weak horizon development (layers that have different physical and chemical properties than those above and below). Those Combat Center soils with strong horizons are old soils that developed during earlier (in the geologic time-scale) and wetter climate conditions than occur there today (NRCS 1999). There are three common surface horizons at the Combat Center: (1) a soft, fluffy surface layer that is found mostly in playas; (2) a compact surface crust that occurs in well-drained areas; and (3) a dense pavement that is found in areas where coarse fragments make up the majority of the sediment (MAGTF Training Command 2001).

Desert soils have special characteristics as a result of the limited moisture, vegetation, and extreme temperature conditions where they form. They form very slowly from the parent rock material and it may take centuries for desert soils that have been disturbed to return to their original state. Desert soils are very fragile, susceptible to disturbance by wind and water erosion, as well as to compaction (Combat Center 2012).

A stabilizing factor unique to the desert environment is a type of soil surface known as cryptobiotic or cryptogamic crusts. These are biological soil crusts formed by living organisms (e.g., bacteria, fungi, and lichens) and their by-products, which create a surface covering of soil particles (sand and silt) bound together by organic materials. Cryptobiotic soil crusts form a protective barrier against wind and water erosion and hold soils in place on level surfaces and slopes. Cryptobiotic soil crusts also contribute nitrogen to the soil, which helps support the growth of higher plants. Patches of cryptobiotic soil crust occur at the Combat Center and appear uneven and darker than surrounding soil. The time required for soil crusts to develop and their recovery rates following disturbance are unknown; however, one study estimated a minimum period of recovery to be 100 years (Combat Center 2012). Desert pavement is another kind of surface unique to dry environments. It consists of an unvegetated surface gravel layer of tightly packed pebbles, often just one pebble deep. The top rocky coating protects underlying layers of finer textured material, often a layer of wind-blown sand above soil formed from alluvial deposits. Desert pavement is easily disturbed by vehicle passage, leaving the underlying soil subject to erosion (MAGTF Training Command 2001).

The 1999 NRCS soil survey provides a description of the physical makeup and drainage capacity of the soils types, their locations, and rated their suitability and limitations for various uses (NRCS 1999). The soil types fall into nine basic mapping units (series) as described in Table 3.2-1. Limitations for the soil types at the Combat Center as defined by NRCS (1999) are included in Table 3.2-2.

Table 3.2-1. Combat Center Soil Types and Characteristics

Soil Order	*Soil Series*	*Description*	*Occurrence on Combat Center*	*Percent of Combat Center Covered by this Series*[1]
Aridisols (Soils that form in water-deficient conditions, with subsurface horizons where clay/and or minerals accumulate)	Dalvord-Goldroad-Rock Outcrop	Very shallow to shallow, loamy-skeletal (consisting of stones) soils formed in residuum and colluvium (i.e. a loose deposit of rock debris) from granitic and metamorphic sources.	Southeastern areas on granitic mountains.	18
	Haleburu	Very shallow to shallow, loamy-skeletal soils formed in residuum and colluvium from volcanic sources.	Northwestern areas on volcanic mountains.	13
	Edalph-Narea-Calcio	Deep, sandy soils formed in granitic alluvium.	Southwestern areas.	9
	Eastrange-Owlshead-Gayspass	Very shallow to very deep soils formed in alluvium from mixed sources.	Throughout on older alluvial fan piedmonts (the highlands around and above the fans).	6
	Sunrock-Haleburu-Lava Flows	Very shallow to shallow, loamy-skeletal soils formed in residuum and colluvium from volcanic sources.	Northern areas.	6
	Playa (Typic Haplosalids-Amboy Crater)	Deep, salt-affected soils formed in dry lake deposits.	Basin floors.	6

Table 3.2-1. Combat Center Soil Types and Characteristics

Soil Order	*Soil Series*	*Description*	*Occurrence on Combat Center*	*Percent of Combat Center Covered by this Series*[1]
Entisols (Very young, poorly developed soils with subsurface horizons)	Arizo	Very deep, sandy-skeletal soils formed in mixed alluvium.	Northwestern, central, and southeastern areas on recent fan piedmonts.	20
	Carrizo	Very deep, sandy-skeletal soils formed in mixed alluvium.	Northeastern areas on recent fan piedmonts.	16
	Cajon-Bluepoint	Deep soils formed in sandy material.	Southwestern areas on smooth granitic fan piedmonts.	9

Sources: NRCS 1999; Combat Center 2012.
Notes: [1]Percentages provided sum to 103% due to rounding.

Table 3.2-2. Training Limitations of Combat Center Soils

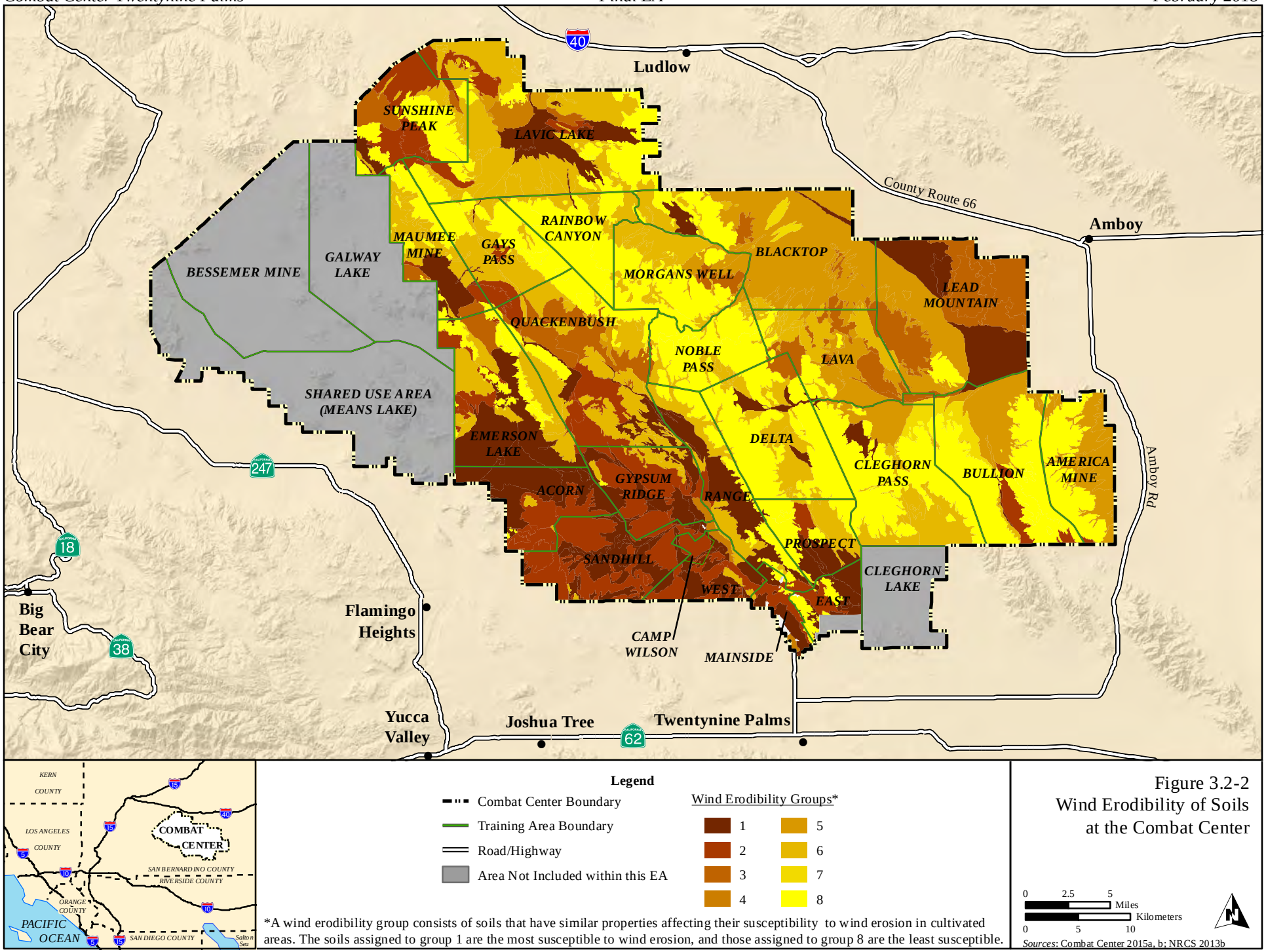
Soil Series	*Limitation Area*	*Limitations*
Playa (Typic Haplosalids-Amboy Crater)	Playa lakebeds	Severely limited for vehicle or aircraft use due to periodic wetness and excessive fine dust that reduces maneuverability.
Cajon-Bluepoint; Edalph-Narea-Calcio; Arizo; Carrizo; and Eastrange-Owlshead-Gayspass	8 to 30% slopes	Limited wheeled vehicle mobility. Source of blowing sand during windy conditions.
Dalvord-Goldrock Rock outcrop; Haleburu; and Sunrock-Haleburu-Lava flows	Slopes greater than 20%	Vehicle maneuverability difficult. Dalvord and Haleburu severely limited for vehicle use due to blowing sand.

Source: NRCS 1999.

As previously noted, desert soils are very fragile and susceptible to erosion, and the most prevalent erosive force at the Combat Center is wind. The NRCS uses an index to determine relative wind erosion by dividing soils of similar properties into eight Wind Erodibility Groups (WEG) (NRCS 2013). An individual WEG consists of soils that have similar properties affecting their susceptibility to wind erosion. The soils assigned to WEG 1 are the most susceptible to wind erosion and those assigned to WEG 8 are the least susceptible. Many of the predominant soils within the Combat Center are rated to have low susceptibility to wind erosion (rating of 5 to 8), but some soils are rated to have fairly high susceptibility to wind erosion (rating of 1-4) (Figure 3.2-2).

3.2.3.4 Geologic Hazards

The Combat Center is located in a highly active seismic region that is crisscrossed by numerous faults of varying shake magnitude potential. The Combat Center is partially encircled by the Garlock Fault Zone (GFZ), ranging from 90 miles (145 km) to the north to 150 miles (241 km) to the northwest of Mainside; the San Andreas Fault Zone (SAFZ), ranging from 150 miles (241 km) to the northwest to a mere 30 miles (48 km) to the southwest of Mainside; and the Pinto Mountain Fault Zone (PMFZ), ranging from 38 miles (61 km) to the southwest to just 6 miles (10 km) to the south of Mainside. All three of these fault zones have been active within the past 15,000 years (U.S. Geological Survey [USGS] and Google Earth 2015).



*A wind erodibility group consists of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible.

Figure 3.2-2
Wind Erodibility of Soils at the Combat Center

Sources: Combat Center 2015a, b; NRCS 2013b

In this area, all of the SAFZ and most of the GFZ have slip-rates of greater than 5 mm/year, while the PMFZ has a slip-rate of 1-5 mm per year, which is generally more movement than other faults display in the region (USGS and CGS 2006). The predicted moment-magnitude (M_w; a successor to the Richter scale) potential of the GFZ is 6.8 – 7.6 M_w, 6.8 - 8.0 M_w for the SAFZ, and 6.5 - 7.5 M_w for the PMFZ, which are substantially large earthquakes. Significant shaking was felt on the Combat Center during the 1992 Landers 7.3 M_w earthquake, located 21 miles (34 km) from Mainside, and the 2010 El Mayor-Cucapah 7.2 M_w earthquake, located 130 miles (209 km) south of Mainside (California Institute of Technology 2015).

The Combat Center also has approximately 50 named and unnamed inactive faults within its own boundary (refer to Figure 3.2-1) (Combat Center 2012). In 1999, a 7.1 M_w earthquake occurred along a rupture involving three of these: the Lavic Lake, Bullion Mountain, and Mesquite Lake fault zones (USGS and CGS 2006). This was the largest earthquake to occur within the Combat Center boundaries since it was established.

The unique topography (steep slopes and flat basins) and seismic activity of the region make the Combat Center area susceptible to both landslides and liquefaction. One of the largest known landslides in North America occurred only 40 miles (64 km) from the Combat Center in Lucerne Valley. The Blackhawk slide along the north side of the San Bernardino Range is approximately 5-miles (8-km) long by 2-miles (3-km) wide, and 30-100 ft (9-30 m) thick. The Blackhawk slide is believed to have occurred between approximately 17,000 and 20,000 years ago (Rodrigue 2003; House 2010).

The City of Twentynine Palms General Plan identifies the terrain of steep hills and low basins of the area, including the Combat Center, as susceptible to localized landslide and liquefaction potential (City of Twentynine Palms 2012a). Moreover, a Safety Plan Overlay made to accompany the General Plan shows all of Mainside and the area to the south as being within an area of liquefaction susceptibility (City of Twentynine Palms 2012b).

There are multiple volcanic features within or adjacent to the Combat Center, including lava fields, cinder cones, craters, and various volcanic rocks and soils. Volcanic eruptions have occurred many times throughout the geologic past of the Great Basin and Mojave Desert Region; however, the most recent eruption within or adjacent to the area now occupied by the Combat Center was approximately 10,000 years ago at the Lavic Lake Volcanic Field (USGS 2015a). The USGS maintains a database of U.S. Volcanoes and Current Activity Alerts, and designates low-to-high alert levels of Unassigned, Normal, Advisory, Watch, and Warning. The only two volcanic features within or adjacent to the Combat Center with a USGS designation are the Lavic Lake Volcanic Field and Amboy Crater, both with an activity level of "Unassigned" (USGS 2015b).

3.3 CULTURAL RESOURCES

3.3.1 Definition of Resource

Cultural resources include buildings, structures, sites, districts, and objects eligible for or included in the National Register of Historic Places (NRHP), cultural items, Indian sacred sites, archaeological artifact collections, and archaeological resources (Secretary of the Navy Instruction 4000.35A, *Department of the Navy Cultural Resources Program*). Cultural resources can be divided into three major categories: archaeological resources, architectural resources, and traditional cultural resources.

- Archaeological resources are material remains of past human life that are capable of contributing to scientific or humanistic understanding of past human behavior, cultural adaptation, and related topics through the application of scientific or scholarly techniques. Archaeological resources can

include village sites, temporary camps, lithic scatters, roasting pits/hearths, milling features, rock art (both petroglyphs and pictographs), rock features, and burials.

- Architectural resources include real properties, sites, buildings, structures, works of engineering, industrial facilities, fortifications, and landscapes.
- Traditional cultural resources are tangible places or objects that are important in maintaining the cultural identity of a community or group and can include archaeological sites, buildings, neighborhoods, prominent topographic features, habitats, plants, animals, and minerals.

Historic properties are cultural resources that meet one or more criteria for eligibility for nomination of the resource to the NRHP. Under the NHPA of 1966 as amended, only significant cultural resources warrant consideration with regard to adverse impacts from a federal agency's proposed action. To be considered significant, archaeological or architectural resources must meet one or more criteria as defined in 36 CFR 60.4 for inclusion in the NRHP. Resources generally must be more than 50 years old to be considered for protection under the NHPA. However, more recent structures associated with significant national events may warrant protection if they are "exceptionally significant."

3.3.2 Regulatory Framework

Regulatory requirements concerning cultural resources on federal property are contained, principally, in NEPA (42 USC §§ 4321 *et seq*.) and in Sections 106 and 110 of the NHPA (54 USC §§ 300101 *et seq*.). Section 106 is implemented through 36 CFR Part 800, which defines a historic property as any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the NRHP maintained by the Secretary of the Interior. Section 101(a)(I)(A) of the NHPA establishes the NRHP, which is implemented through regulation 36 CFR Part 60. The responsibilities of MAGTF Training Command under Section 110 of the NHPA are outlined in the MAGTF Training Command's Integrated Cultural Resources Management Plan (ICRMP) which identifies measures to be employed to avoid or minimize impacts to cultural resources, with emphasis on projects involving construction and similar ground disturbing activities.

Several other federal laws and regulations have been established to manage cultural resources, including the Archeological and Historic Resources Preservation Act (1974), the Archaeological Resources Protection Act (1979), and the Native American Graves Protection and Repatriation Act (1990). In addition, coordination with federally recognized American Indian tribes must occur in accordance with the American Indian Religious Freedom Act (1978); EO 13007, *Indian Sacred Sites*; and EO 13175, *Consultation and Coordination with Indian Tribal Governments*, which emphasizes the importance of respecting and consulting with tribal governments on a government-to-government basis. This policy requires an assessment through consultation of the effect of proposed federal actions that could significantly affect tribal resources, tribal rights, and Indian lands before decisions are made by the respective services. In addition, DoD Instruction 4710.02 (*DoD Interactions with Federally-Recognized Tribes*) and MCO P5090.2A (Chapter 8, *Cultural Resources Management*) provides additional guidance on consultation with tribes.

The 2012-2016 ICRMP for the Combat Center provides a framework of cultural resource management and for government-to-government consultation. The Combat Center cultural resources program coordinates with the SHPO, the tribes, and other interested parties by submitting an annual Historic Preservation Compliance Report, as prescribed by the ICRMP. The cultural resources program has been recognized for outstanding cultural resource stewardship over the last two decades (MAGTF Training Command 2011).

The ROI for cultural resources includes the Combat Center excluding the Bessemer Mine, Galway Lake, Means Lake, and Cleghorn Lake training areas, and a portion of East Training Area.

3.3.3 Existing Conditions

3.3.3.1 Cultural Context

Archaeological research on the prehistory of the Mojave Desert has been conducted for roughly a century, with particular attention paid to chronology and human-environment adaptations.

Native Americans occupied the Twentynine Palms region for at least the past 12,000 years. In the mid-1800s, the Chemehuevi and the Serrano were documented at the Oasis of Mara in Twentynine Palms. The lands currently occupied by the Combat Center appear to have been variously used and occupied by the Serrano, Chemehuevi and Mojave Indians as well as others during the prehistoric and early historic periods. Documentation indicates that Native Americans occupied reservation land near the Oasis of Mara until the early 1910s when they removed to the Indian Reservation at Morongo.

Prehistoric sites in the Twentynine Palms region are generally located along streams, lakeshores (both extinct and modern) and adjacent to springs. Accumulations of alluvium may have buried complex prehistoric habitation sites, and intact cultural deposits may be present. Beginning with the 1849 California Gold Rush, and lasting until World War II, the Twentynine Palms region first attracted miners and in the 1920s, homesteaders made their way to the desert community. The military presence in the Twentynine Palms area began in 1941 with the establishment of Camp Condor, a U.S. Army glider-training base. The base was officially commissioned as a Marine Corps installation in 1957, and became known as the Combat Center in 1979 (MAGTF Training Command 2011).

Archaeological resources on the Combat Center have been studied since the late 1970s. Most of the studies completed in the 1980s and early 1990s were project-specific cultural resources surveys, with basic inventory and evaluation projects taking precedence since that time. Approximately 54% of the base property has been inventoried for cultural resources (Figure 3.3-1). As a result of completed inventories, some 1,871 archaeological sites have been located and recorded (71 historic sites, 14 multi-component, and the remainder are prehistoric sites) (Table 3.3-1).

Table 3.3-1. Archaeological Sites on the Combat Center by Training Area

Training Area	*National Register Eligible*	*Recommended Ineligible*	*Listed*	*Unevaluated*	*Grand Total*
Acorn	25	23	0	45	93
America Mine	1	1	0	1	3
Black Top	0	15	0	275	290
Bullion	0	1	0	0	1
Camp Wilson	0	6	0	17	23
Cleghorn Pass	2	5	0	9	16
Delta	5	1	0	1	7
East	0	1	0	2	3
Emerson Lake	40	32	0	111	183
Gays Pass	3	3	0	12	18
Gypsum Ridge	10	13	0	33	56
Lava	2	55	1	141	199
Lavic Lake	24	10	0	185	219
Lead Mountain	6	18	0	38	62
Mainside	0	0	0	4	4

Table 3.3-1. Archaeological Sites on the Combat Center by Training Area

Training Area	*National Register Eligible*	*Recommended Ineligible*	*Listed*	*Unevaluated*	*Grand Total*
Maumee Mine	2	5	0	8	15
Noble Pass	3	13	0	49	65
Prospect	7	0	0	6	13
Quackenbush	19	107	0	233	359
Rainbow Canyon	1	3	0	42	46
Range	1	10	0	22	33
Sandhill	14	11	0	76	101
Sunshine Peak	8	2	0	15	25
West	2	3	0	32	37
Total	**175**	**338**	**1**	**1,357**	**1,871**

Source: MAGTF Training Command 2011.

A total of 514 sites have been formally evaluated for inclusion in the NRHP (MAGTF Training Command 2011). Of these, 175 sites have been recommended eligible for listing in the NRHP. One site, the Foxtrot Petroglyph site, is listed in the NRHP. All installation buildings and structures that predate 1989 were evaluated and none were deemed eligible for listing in the NRHP (MAGTF Training Command 2011).

No sacred sites or traditional cultural properties have been identified on the Combat Center by the tribes. Federally recognized American Indian tribes who have cultural affinity with the land on which the Combat Center lies include the Agua Caliente Band of Cahuilla Indians, Chemehuevi Indian Tribe, Colorado River Indian Tribes, Fort Mojave Indian Tribe, Morongo Band of Mission Indians, San Manuel Band of Mission Indians, and Twenty-Nine Palms Band of Mission Indians. MAGTF Training Command consults on a government-to-government basis with these tribes (MAGTF Training Command 2011).

3.3.3.2 Site Protection Measures

The Combat Center has several archaeological site protection measures. The SHPO and MAGTF Training Command have agreed avoidance of archaeological sites is the preferred mitigation measure (MAGTF Training Command 2011). A site monitoring program was established in 2003 that serves two purposes: (1) to conduct annual monitoring of NRHP-eligible sites that are avoided during training; and (2) to conduct semi-annual observations of the effects of natural processes and training activities on study plots and the sites within these plots. Furthermore, the majority of maneuverable lands that have been utilized historically for military training have, for the most part, been surveyed in the past years (MAGTF Training Command 2011).

Before entering the Combat Center, all personnel (e.g. military, civilian, and contractor) are first required to attend a range safety briefing. This briefing includes the topic of cultural resource protection.

Many NRHP eligible sites within the Combat Center are located within designated limited access areas. The largest is in the southwest corner of the base between Sand Hill, Acorn, and Gypsum Ridge training areas. The area has been restricted in use due to the presence of potable water, archaeological resources, and a high density of desert tortoise.

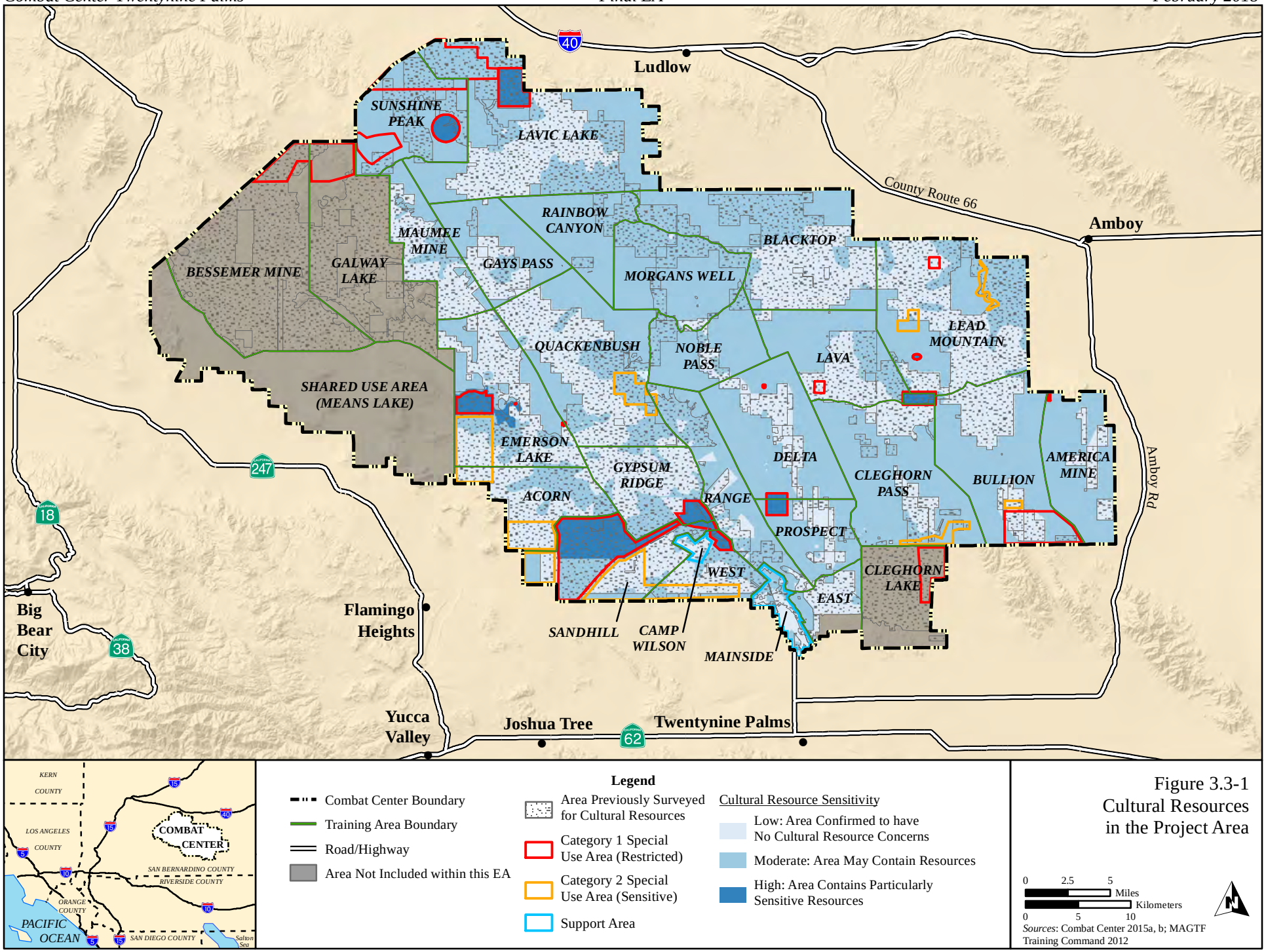


Figure 3.3-1
Cultural Resources in the Project Area

Vehicles are allowed on established roads and dismounted maneuvers are allowed. However, the area is not used for live fire training or major maneuvers. Sites located in the Lavic Lake Training Area, all of the installation's mines/mining sites, sites along the southern border of Emerson Lake Training Area, and all of the eastern border of Dry Lake in the Lead Mountain Training Area have been placed into special use or limited use areas. The western periphery of the Deadman Lake playa, encompassing portions of the West, Gypsum Ridge, Sand Hill, and Camp Wilson training areas, has been demarcated to protect the sites within the designated Deadman Lake Cultural Resources Management Area (MAGTF Training Command 2011).

3.4 WATER RESOURCES

3.4.1 Definition of Resource

Water resources include surface and subsurface water and associated water quality. Surface water includes all lakes, ponds, rivers, streams, impoundments, and wetlands. Subsurface water, commonly referred to as groundwater, is typically found in aquifers, which consist of mostly high porosity alluvium or fractured rock where water can be stored within pore spaces or fractures. Water quality describes the chemical and physical composition of water as affected by natural conditions (e.g., erosion) and human activities (e.g., hazardous waste spills).

The ROI for water resources includes the Combat Center excluding the Bessemer Mine, Galway Lake, Means Lake, Cleghorn Lake training areas and a portion of the East Training Area (Figure 3.4-1).

3.4.2 Regulatory Framework

Waters of the U.S. are regulated resources and are subject to federal authority under Section 404 of the Clean Water Act (CWA). Waters of the U.S. include navigable waters, tributary streams, wetlands, and various other water bodies that are deemed to have a significant nexus to a navigable water. Areas meeting the waters of the U.S. definition are under the jurisdiction of the U.S. Army Corps of Engineers (USACE).

Section 401 of the CWA requires any applicant for a federal license or permit that may result in a discharge of a pollutant into waters of the U.S. to obtain a certification from the state in which the discharge originates or would originate. In California, the State Water Resources Control Board (SWRCB) and Regional Water Quality Control Board (RWQCB) are responsible for establishing the water quality standards (objectives) required by the CWA, and regulating discharges to ensure dischargers meet water quality objectives. The Combat Center is located in the Colorado River Basin (Region 7) and therefore, subject to regulatory requirements of the Colorado River Basin RWQCB (SWRCB 2015).

3.4.3 Existing Conditions

3.4.3.1 Surface Water

The Combat Center overlies portions of 16 internally draining watersheds (closed basins) characterized by ephemeral stream channels that terminate at playa lakes (Figure 3.4-1). The larger watersheds are Lake, Bristol Lake, Deadman Lake, Lavic Lake, and Dale Lake (USGS 2015d). There are 11 playa lakes that are entirely or partially within the Combat Center: Lavic Lake, Galway Lake, Emerson Lake, Little Emerson Lake, Ames Dry Lake, Quackenbush Lake, Miller Dry Lake, South Miller Dry Lake, Deadman Lake, Dry Lake (Lead Mountain), and Mesquite Lake (Figure 3.4-1).

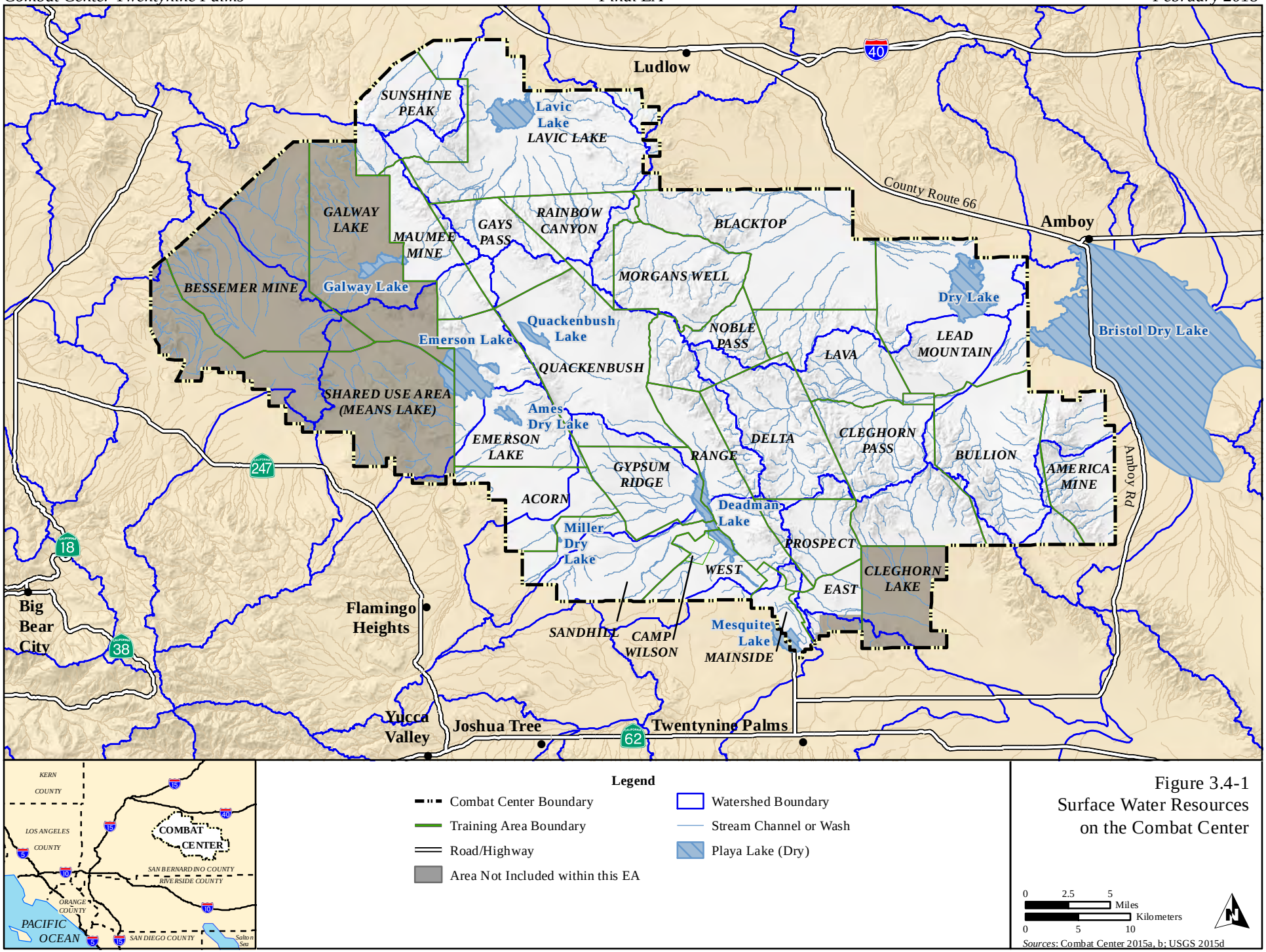


Figure 3.4-1
Surface Water Resources on the Combat Center

Sources: Combat Center 2015a, b; USGS 2015d

These playas have a combined surface area of 7,674 acres (3,100 ha). Following rain events, when surface waters are present, playas attract wintering waterfowl, shorebirds, and other bird species, whereas when dry, playas are often populated by terrestrial birds and mammals where adequate vegetative cover exists (USACE 1994).

Although there are several surface water features, the Combat Center has received a Jurisdictional Determination from the USACE stating that none of these are jurisdictional waters of the U.S. As a result of this Jurisdictional Determination, the Combat Center was granted a Notice of Termination for all stormwater permitting by the Colorado River Basin RWQCB. However, all activities are required to comply with the Combat Center's Stormwater Pollution Prevention Plan (SWPPP) and adhere to the Combat Center's requirements related to stormwater pollution prevention and stormwater controls. Standard erosion control measures are identified in the Combat Center's SWPPP that reduce potential impacts from erosion and other pollutants.

Vehicle maneuvers conducted on the Combat Center have resulted in impacts to playas and dry washes. Regular vehicle activity in affected areas has created compacted and rutted surfaces that can reduce water absorption into the soil and otherwise alter stormwater flow. Emerson, Deadman, and Lavic lakes each have over 4 miles (6 km) of roads passing through them. Vehicles are also used regularly in dry washes; as of 1994 there were about 76 miles (122 km) of desert wash roads at the Combat Center (Combat Center 2012).

There are no known perennial springs within the Combat Center. However, there are two intermittent springs: the Surprise Spring in the Deadman Lake watershed and an unnamed spring at the northwest boundary of the Lavic Lake watershed. Surprise Spring was a historically important source of surface water, but it no longer flows as a result of lowered subsurface water levels due to groundwater pumping. Seasonal seeps are located in the Imperial Lode mining area and Lead Mountain area (Combat Center 2012). Seeps and springs are a valuable resource for many types of wildlife, particularly when standing or flowing water is present.

Man-made water bodies at the Combat Center include stormwater retention ponds to the northeast of Mesquite Lake (Mainside) and golf course ponds. Man-made water bodies are utilized by wildlife, most often migrating birds (Combat Center 2012).

All treated, domestic wastewater is re-used to support irrigation demands within the boundaries of the Combat Center as regulated by the Colorado River Basin RWQCB. Wastewater from treatment facilities and stormwater runoff are collected in separate retention ponds. The retention ponds do not have impermeable synthetic liners; however, the impermeable clay cap on the Mesquite Lake bed effectively prevents percolation (Combat Center 2012). The retention ponds include:

- Two ponds (with a capacity of 12 million gallons [45 million liters]) near the golf course that store recycled water for golf course irrigation.
- Three active retention ponds are located at the Mainside Wastewater Treatment Plant. Overflow from these ponds is kept in four storage ponds that retain water during winter for summer use. The seven ponds associated with the treatment plant cover approximately 136 acres (55 ha).

The Combat Center uses a series of stormwater conveyance and retention systems to prevent discharges of potentially polluted stormwater to the environment. The Combat Center utilizes a series of four stormwater retention ponds in the Mainside area to capture and contain stormwater runoff where the water is allowed to evaporate. One of the stormwater retention ponds incorporates a wildlife viewing area for educational purposes. The stormwater retention ponds are generally dry except after significant precipitation. Additionally, Camp Wilson has its own stormwater retention basin. Other stormwater control systems

include settling basins to trap sediment that would otherwise flow into Mesquite Lake (Combat Center 2012).

The Range Environmental Vulnerability Assessment (REVA) program is a non-regulatory, proactive, and comprehensive approach for environmental sustainability of Marine Corps operational ranges. It meets the requirements established by DoD Instruction 4715.14, *Operational Range Assessments*. This DoD Instruction requires the military services to conduct assessments of all operational ranges within the United States. The purpose of the assessments are to better understand the potential long-term impacts of the use of Marine Corps training lands and to help ensure that these resources are available to future generations of Marines. The 2012 REVA provided a screening level assessment of the potential for release of munitions constituents (MC) from the existing operational ranges or range complex areas at the Combat Center to affect human and sensitive wildlife in off-site areas (Marine Corps Installations Command [MCIC] 2012). The assessment was based on modeling the behavior and fate of the indicator constituents trinitrotoluene, cyclotetramethylene tetranitramine, cyclotrimethylene trinitramine, perchlorate, and lead. The REVA concluded that MC can migrate from the range training areas via dissolution and transport in periodic surface water flows and eventually deposit and accumulate within the playas. The greatest potential exists for MC to be transported via surface runoff from Range Training Areas on the installation boundary to receiving playas located downstream and off installation. The REVA only considers potential receptors outside Combat Center range boundaries (MCIC 2012).

The predicted concentrations of MC in sediment at the edge of the receiving playas were below REVA trigger values. All predicted MC concentrations in surface water runoff entering Bristol Dry Lake, Dry Lake, and Dale Lake were substantially below toxicity thresholds for sensitive indicator species. The REVA also concluded that lead from small-arms ammunition represented minimal environmental concern due to the low precipitation rate, long distance between ranges and intermittent receiving surface water bodies, and deep groundwater, which further limits lead migration and its potential for impacts (MCIC 2012).

3.4.3.2 Groundwater

The groundwater basins within or partially within the Combat Center boundary are shown in Figure 3.4-2.

The Surprise Spring Subbasin is bounded by the Emerson and Copper Mountain Faults to the west and the Surprise Spring Fault on the east, which separates this subbasin from the Deadman Lake Subbasin. The depth to groundwater in the Surprise Spring Sub-basin ranges from 200 to over 400 ft (60 to 120 m) below ground surface (bgs) (USGS 2003). Groundwater levels have declined more than 190 ft (58 m) as a result of pumping since the 1950s and groundwater no longer discharges at the land surface (Li and Martin 2011).

Groundwater within the Surprise Spring sub-basin is the primary source of potable water for the Combat Center. The 11 groundwater wells in the Surprise Spring Subbasin are located in a Restricted Area of the Combat Center where mechanized maneuvers and off-road vehicle training are not permitted. The Surprise Spring subbasin contains fossil water dated to be approximately 5,000 years old (Izbicki and Michel 2004). The quality of groundwater in the Surprise Spring Subbasin varies, but groundwater from the southern portion of the basin, where the Combat Center production wells are located, meets criteria established under the Safe Drinking Water Act and associated amendments (California Department of Water Resources [CDWR] 2004).

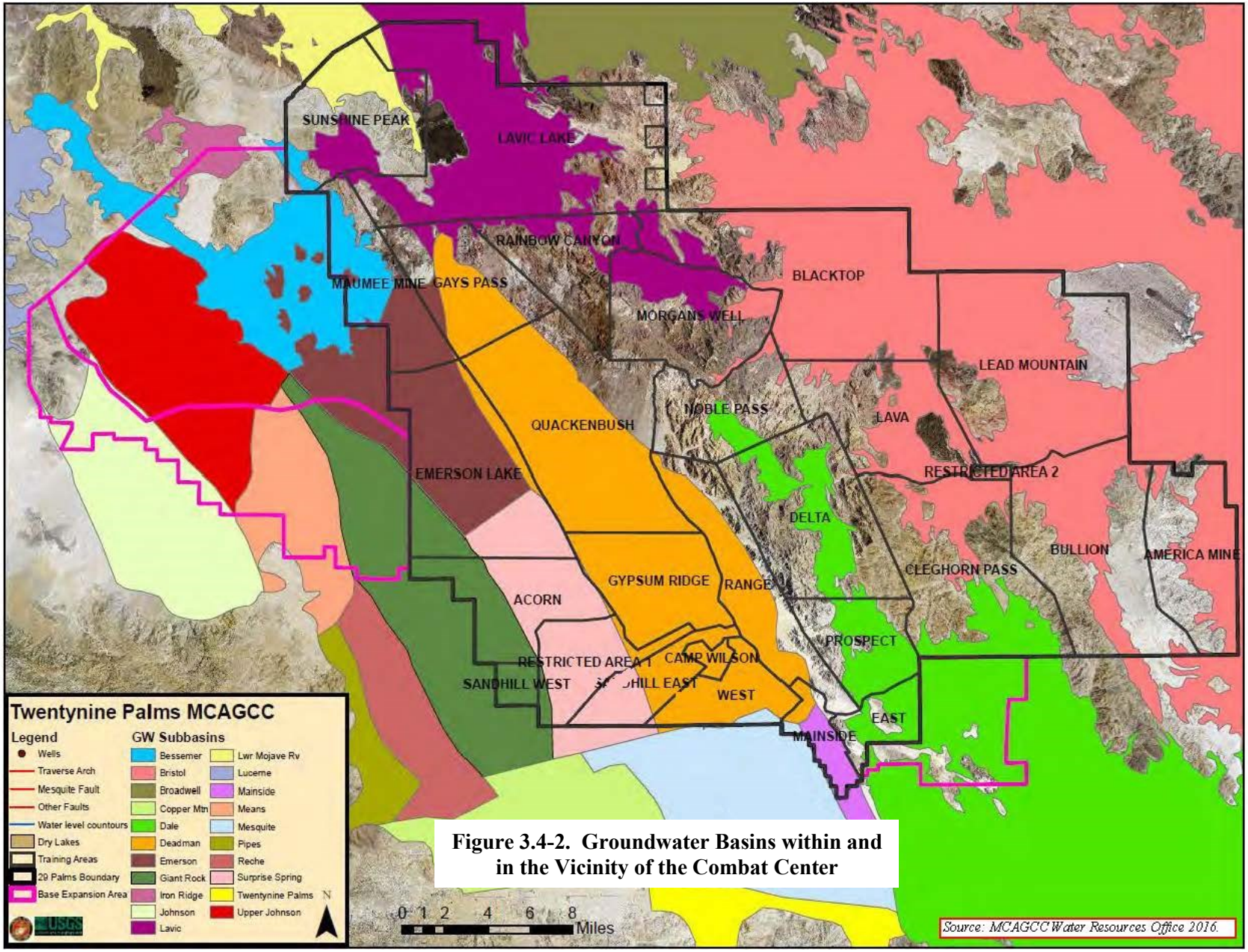


Figure 3.4-2. Groundwater Basins within and in the Vicinity of the Combat Center

Three other groundwater subbasins are known to exist beneath the Combat Center in the southwestern part of the installation. In the Giant Rock Subbasin, located west of the Surprise Spring Subbasin, groundwater is found at depths of 175 ft (53 m) and greater. In the Deadman Subbasin, located east of the Surprise Spring Subbasin, groundwater has been measured at depths of 30 ft (9 m) to 280 ft (85 m). Lastly, in the Mainside Subbasin, located to the east of the Mesquite Subbasin beneath the Mainside Area, groundwater has been encountered at 75 ft (23 m) in one well but is more commonly found at more than 200 ft (60 m) (Combat Center 2012). These subbasins are not used as sources of potable water due to naturally occurring high concentrations of sulfates and fluoride, although they can be uses as sources of water for purposes other than drinking (Combat Center 2012).

Bristol Valley Basin is located in the eastern part of the Combat Center, with depths to groundwater typically ranging from 125 to 200 ft bgs (38 to 61 m), although perched zones exist near Bristol Dry Lake and Dry Lake, where water levels range from 14 to 89 ft bgs (4 to 27 m). Recharge is from percolation of surface runoff through stream beds and washes. There are no drinking water wells in this portion of the Combat Center because groundwater quality does not appear to be suitable for human consumption due to the high total dissolved solids (TDS), chloride, and arsenic concentrations.

The Combat Center includes the northern portions of the Dale Valley Groundwater Basin. The water quality in this basin is generally unsuitable for domestic and agricultural uses. TDS and fluoride concentrations impair domestic use, and boron and sodium concentrations impair agricultural use of groundwater in this basin (CDWR 2004).

The Lavic Valley Basin is located in the northern part of the Combat Center. The water quality in this basin is generally unsuitable for domestic and agricultural uses because of elevated TDS. Water at one well in the basin also exceeds drinking water standards for sulfate and chloride content (CDWR 2004).

3.5 HEALTH AND SAFETY

3.5.1 Definition of Resource

Health and safety can be defined as the science of identifying and analyzing potential risk factors and developing appropriate regulations and procedures intended to prevent accident or injury in the workplace or public environment. Health and safety issues addressed in this EA include: risks of public exposure to military operations, hazardous materials and wastes, and Combat Center emergency response capacity. Risks related to military operations may be related to flight safety, ground training and munitions-related hazards. Flight safety issues may include potential accidents resulting from mid-air collisions, collisions with manmade structures or terrain, weather-related accidents, mechanical failure, pilot error, or wildlife-aircraft collisions, which are covered under the BASH program. Ground safety issues may be related to vehicle and infantry maneuvers, munitions use, range maintenance activities, traffic safety, and other military activities.

The terms "*hazardous materials*" and "*hazardous waste*" refer to substances defined as hazardous by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 USC 9601 *et seq*.); the Occupational Safety and Health Act (29 USC 651 *et seq*.); and the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act (RCRA) (42 USC 6901 *et seq*.). In general, *hazardous materials* are chemical substances that pose a substantial hazard to human health or the environment when improperly treated, handled, used, packaged, stored, transported or disposed. This includes ignitable, corrosive, reactive or toxic materials (Federal Standard 313D; Office of the Chief of Naval Operations Instruction [OPNAVINST] 5100.23G, Navy Safety and Occupational Health and Program Manual; and 22 California Code of Regulations 66260.10). Hazardous materials are identified and regulated under CERCLA (42 USC 9601 *et seq*.); the Occupational Safety and Health Act (29 USC

651 *et seq*.); and the Emergency Planning and Community Right-to-Know Act (EPCRA) (42 USC 11001 *et seq*.). Hazardous materials commonly used at installations include solvents, antifreeze, and petroleum, oil, and lubricants (POLs).

RCRA and the Hazardous and Solid Waste Amendments of 1984 (42 USC 6901 *et seq*.) define hazardous waste as a solid waste, or combination of wastes that due to its quantity, concentration, or physical, chemical or infectious characteristics, may cause or significantly contribute to an increase in mortality or an increase in serious irreversible or incapacitating reversible illness, or may pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, disposed of, or otherwise managed. A solid waste is a hazardous waste if it is not excluded from regulation as a hazardous waste under 40 CFR 261.4(b) and if it exhibits identified characteristics of hazardous waste or meets other specified criteria (refer to 40 CFR 261.3(a)) (DoN 2004). Hazardous wastes commonly generated at installations include: hazardous materials with an expired shelf life, paint and paint-contaminated media, and fluid from change out processes, such as oil.

In addition, the evaluation of health and safety in this EA addresses issues related to the capacity of emergency response organizations (police, fire, medical) to respond to emergencies as needed at the Combat Center.

Key sources of information on existing conditions relative to health and safety include the *Range Environmental Vulnerability Assessment (REVA) Five Year Review* (MCIC 2012); the installation's INRMP (Combat Center 2012); Integrated Contingency and Operations Plan (ICOP) (DoN 2004); Air Installations Compatible Use Zone Study (DoN 2003a); and CCO 3500.4K, *Marine Air Ground Task Force Training Command, Marine Corps Air Ground Combat Center Range, Training Area, and Airspace Program* (May 2014).

3.5.2 Regulatory Framework

Operational Risk Management. The Marine Corps practices Operational Risk Management as specified in Office of the OPNAVINST 3500.39C, *Operational Risk Management* (July 2010) and MCO 3500.27C, *Risk Management* (November 2014). Requirements addressed in these documents provide a process for maintaining readiness in peacetime and achieving success in combat while safeguarding people and resources.

Combat Center Safety Guidance. CCO 5090.1F, *Environmental Protection* (October 2013) provides guidelines for on-base facility environmental issues including: waste management, air quality, water usage, natural resources protection, cultural resources, and training area activities. In addition, CCO 5100.15J, *Safety Program* (January 2015), establishes procedures, responsibilities, and instructions for the Combat Center safety program. Marine Corps and other base-specific SOPs and training procedures are also utilized to ensure safety during aircraft and ground operations, use of ordnance and munitions, and possible encounters with UXO.

Hazardous Materials. The ICOP for the Combat Center meets specific regulatory requirements for an Oil and Hazardous Substance Spill Contingency Plan (SCP); Spill Prevention, Control, and Countermeasures (SPCC) Plan; Business Emergency and Contingency Plan (BECP); Clean Air Act, Risk Management Plan; and Marine Corps requirements for a Hazardous Waste Management Plan and a Hazardous Waste Minimization Plan (DoN 2004). The purpose of the ICOP is to eliminate the redundancy of information among the existing plans, and to update current facility operations (DoN 2004).

Hazardous Wastes. Hazardous wastes are characterized and regulated, in part, according to their ignitability, corrosivity, reactivity, and toxicity. Title 22, Division 4.5 of the California Code of Regulations prescribes regulatory requirements for the management of hazardous waste, and MCO P5090.2A

(*Environmental Compliance and Protection Manual* [26 August 2013]) establishes Marine Corps policy and responsibilities for compliance with statutory requirements for hazardous waste management. Accidental releases of hazardous materials or wastes could potentially affect various areas, including past and current construction sites, and past and current hazardous materials/waste use and storage sites at the Combat Center (DoN 2009a).

California Unified Program Agencies (CUPA). Californians are protected from hazardous waste and materials by a Unified Program that ensures consistency throughout the state in regard to administrative requirements, permits, inspections, and enforcement. California Environmental Protection Agency (CalEPA) oversees the program as a whole, and certifies 83 local government agencies known as CUPA to implement the hazardous waste and materials standards set by five different state agencies (CalEPA 2016). The local agency under the CUPA program for the Combat Center and San Bernardino County is the Hazardous Materials Division of the San Bernardino County Fire Department (San Bernardino County Fire Department 2016).

Installation Restoration Program (IRP). As part of the Defense Environmental Restoration Program, the DoD has created the IRP. This program was instituted to satisfy requirements of CERCLA for former and current hazardous waste sites. The CERCLA definitions of hazardous substances (42 USC § 9601[14]) and pollutants or contaminants (42 USC § 9601[33]) exclude petroleum unless specifically listed. The U.S. Environmental Protection Agency (USEPA) interprets the term petroleum to include hazardous substances found naturally in crude oil and crude oil fractions, such as benzene and other hazardous substances normally added to crude oil during refining. Petroleum additives or contaminants that increase in concentration in petroleum during use are not excluded from CERCLA regulations.

Emergency Response. Police protection at the installation is provided by a military police force. San Bernardino County Sheriff's Department and the California Highway Patrol tour, guard, or watch the communities surrounding the installation. Sheriff's Department officers work with installation police and have the authority to arrest individuals at Mainside on the installation; however, they usually will not do so unless requested by the Marine Corps (DoN 2009a).

Fire Protection for the Morongo Basin, in which Mainside is located, is provided by the California State Department of Forestry and Fire Protection, County of San Bernardino, Twentynine Palms Fire Department, and San Bernardino County Fire Protection District (previously known as the Yucca Valley Fire Protection District). The installation fire department operates under mutual aid and automatic response agreements with all local fire agencies including Twentynine Palms Fire Department and Joshua Tree National Park. The installation fire department's agreement with the California State Department of Forestry and Fire Protection is primarily for Strike Team Response (DoN 2009a). In addition, other agencies will respond to fires on installation property if requested to do so by the Marine Corps.

Medical Evacuation (MEDEVAC) procedures are described in CCO 3500.4K. The Combat Center has contracted dedicated civilian air ambulance services to support training. In addition to contracted air ambulance MEDEVAC support, the Combat Center Fire Department also provides advanced life support MEDEVAC response via ground ambulance, including response to training accidents within the training areas.

3.5.3 Existing Conditions

3.5.3.1 Aircraft Operations

The primary health and safety risks associated with military aircraft operations are aircraft-related accidents and use of aircraft-delivered ordnance.

Aircraft-related Accidents

Airspace management and flight rules are the primary method used for avoidance of mid-air accidents. The Federal Aviation Administration (FAA) designates Special Use Airspace to identify areas where military activity or unusual flight conditions may occur. Special Use Airspace is "airspace of defined dimensions wherein activities must be confined because of their nature, or wherein limitations may be imposed upon aircraft operations that are not part of those activities" (FAA Order JO 7400.2K, *Procedures for Handling Airspace Matters* [Chg 1, 3 April 2014]). These airspace designations alert non-participating aircraft (civilian or military) to the possible presence of hazardous activities. The Notice to Airmen system is used to alert pilots of hazards or other conditions important to maintaining flight safety. Notices to Airmen are an unclassified notice, distributed by means of telecommunication containing information concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel concerned with flight operations (OPNAVINST 3721.20D, *Department of Defense Notice to Airmen [NOTAM] System* [3 June 2011]).

The enroute structure in this region is used extensively by commercial air traffic transiting between Los Angeles basin airports and eastern destinations. Real time coordination between Los Angeles Air Route Traffic Control Center, terminal Air Traffic Control facilities, and the range scheduling agencies ensure the smooth flow of air traffic through this region with little impact on either civil or military flight activities. The Marine Corps has also established a Letter of Agreement with the FAA to facilitate transit of exercise aircraft between blocks of airspace to accommodate refueling and other tactical operations.

Airfield safety is determined using various programs, including identification of hazards within the airfield vicinity that obstruct or interfere with aircraft movement, designation of Accident Potential Zones (APZs) where the potential for mishaps may be higher, and tracking the history of aircraft accidents to ensure that programs are instituted that reflect actual conditions (DoN 2003a). The APZs are established to delineate recommended surrounding land uses for the protection of people and property on the ground. The APZs also define the areas in the vicinity of an airfield that would have the highest potential to be affected if an aircraft mishap were to occur. The potential for ground impacts in the event of an air operations accident is addressed by the use of APZs, which describe a probable impact area but not the probability of an accident occurring (DoN 2003a). The determination of APZs are based on review of local historical accident and operations data and on DoD criteria developed from analysis of all Marine Corps, Navy, and Air Force aircraft accidents. The Air Installation Compatible Use Zone guidelines identify three types of APZs for airfields based on aircraft mishap patterns: Clear Zone, APZ I, and APZ II. The standard Clear Zone is a trapezoidal area that extends 3,000 ft (914 m) from the end of a runway and has the highest probability of being impacted by a mishap. APZ I, which typically extends 5,000 ft (1,524 m) from the end of the Clear Zone, has a lower mishap probability. APZ II, which typically extends 7,000 ft (2,134 m) from the end of APZ I, has the lowest mishap probability of the three zones. To minimize the potential for accidents involving aircraft operating from the Combat Center, APZs have been established for the Combat Center's SELF.

Military aircraft operations are inherently dangerous, and occasionally a mishap or incidents occur. Aircraft mishaps include all reportable accidents and range from the most serious to less significant events (e.g., a fuel port door opening during flight) (DoN 2003a). Aircraft mishaps are classified as A, B, or C. Class A

mishaps are the most severe with total property damage of $2 million or more and a fatality and/or permanent total disability. Class B mishaps are less severe with total property damage of $500,000 or more but less than $2 million and a permanent partial disability or three or more persons are hospitalized as inpatients. Class C mishaps are the least severe with total property damage of $50,000 or more but less than $500,000 and a nonfatal injury involving or more personnel resulting in one or more days away from work.

Since 1980, 10 Class A mishaps have occurred within a 5 mile (8 km) radius of the SELF, the most recent in January 2015 when a UH-1 crashed at the SELF and both crew members were killed (DoN 2012; Combat Center 2015c) (Table 3.5-1). Mishaps within a 5 mile (8 km) radius are reviewed because these aircraft are more likely to be approaching or departing the airfield. All of the aircraft mishaps occurred within Combat Center boundaries.

Table 3.5-1. Class A Aircraft Mishaps – Combat Center (1980 – 2015)

Aircraft Type	*Date*	*Comment*
AV-8B	2 February 1983	Equipment failure on Runway 28
A4	18 February 1983	Caught fire on Runway 28 approach
F/A-18	7 February 1984	Caught fire on departure; ditched off Runway 10 end
A-7E	15 August 1984	Equipment failure on Runway 10 departure
OV-10	10 September 1985	Crashed after take-off from Runway 10
CH-53E	9 May 1986	Crashed and exploded after take-off from ALZ Sandhill
CH-46	4 May 1990	Equipment failure on take-off from LZ Wilson
UH-1	31 May 1991	Attempted running landing after equipment failure
F/A-18	1 November 1992	Equipment failure on Runway 28 on departure
UH-1	January 2015	Crashed at SELF

Sources: DoN 2003a; Combat Center 2015c.

The Combat Center maintains detailed emergency and mishap response plans to react to an aircraft accident. These plans assign agency responsibilities and prescribe functional activities necessary to react to major mishaps, whether on- or off-base. Response would normally occur in two phases. The initial response focuses on rescue, evacuation, fire suppression, safety, elimination of explosive devices, ensuring security of the area, and other actions immediately necessary to prevent loss of life or further property damage (DoN 2009b). The initial response element usually consists of the Fire Chief, who would normally be the first On-scene Commander, fire-fighting and crash-rescue personnel, medical personnel, security police, and crash-recovery personnel. The second phase is the mishap investigation, which includes an array of organizations whose participation is governed by the circumstances associated with the mishap and the actions required to be performed (DoD Instruction 6055.07, *Mishap Notification, Investigation, Reporting, and Recordkeeping* [6 June 2011]).

Bird/Animal Aircraft Strike Hazard

BASH is a serious threat to aircraft. Most bird and wildlife strikes do not result in any aircraft damage, but some bird and wildlife strikes have led to serious accidents involving aircraft of every size. Bird and other wildlife strikes to aircraft result in an estimated cost of over $900 million in damage to the U.S. civil aviation industry each year. Worldwide, 255 people have been killed and 243 aircraft destroyed from 1988-2013 as a result of aircraft encounters with birds and other wildlife (FAA 2014).

A BASH plan for the Combat Center was completed in 2004 (Naval Facilities Engineering Command [NAVFAC] Southwest 2004). The BASH Plan identified areas at and near Camp Wilson and Mainside

that attract large numbers of birds, and provided BASH management recommendations for the SELF to reduce the BASH potential at the Combat Center (NAVFAC Southwest 2004). There have been no updates to the 2004 BASH Plan (MCGACC 2015e). There were two BASH incidents at the Combat Center from 2009 through 2015 (Naval Safety Center 2016).

Aircraft-delivered Ordnance

The delivery of air-to-ground ordnance is one of the characteristic training activities conducted at the Combat Center. The manner and type of ordnance delivered are highly variable due to differences in aircraft, weapon platforms and systems, munitions, and missions. There are a number of existing procedures related to aviation operations that maintain standards to ensure safety during training, such as CCO 3500.4K (Section 4008, *Aviation Ordnance Deliverance Procedures*). Air-to-ground ordnance weapon safety requires development of Weapons Danger Zones for all targets, which translate aviation safety concerns into degrees of safety that can be reasonably attained. To ensure additional safety, Allowable Target Placement Areas have been established to keep weapon impacts within the installation and ensure that weapon safety footprints do not extend off range onto public or private lands (DoN 2003c).

3.5.3.2 Ground Training Operations

The Combat Center is divided into 23 distinct training areas (refer to Figure 1-1). Training areas are functional administrative units that enable different types of training to be conducted simultaneously without jeopardizing safety. The boundaries of training areas, though not marked in the field, are defined by training requirements, topography, and other constraints. The training areas also vary in size, terrain, and use restrictions. Training areas or portions thereof, are subject to range regulations/SOPs to provide for range safety. Range safety policy is provided in Marine Corps range safety documents, with local policy established by the Commanding General of the Combat Center. Safety with live-fire operations is ensured by first planning and developing fixed ranges, setting surface danger zones (SDZs), and following CCO 3500.4K. Each of the fixed training ranges is designed so the ordnance fired from weapons is contained within the SDZs (DoN 2003c). Each field commander must ensure that the SDZs are determined and enforced when a training area is in operation. Live-fire is not allowed within 3,280 ft (1,000 m) of the installation boundary (DoN 2012).

Range clearance operations conducted by EOD teams play a crucial role in creating and maintaining a safe training environment at the Combat Center. EOD personnel clear ranges routinely to neutralize UXO and reduce safety risks. EOD units are constantly assessing the accumulation of UXO on the ranges. A routine clearance schedule has been developed, with individual training areas cleared on a rotating basis. Range sweeps are conducted following every major exercise by unit personnel. EOD units perform surface range clearance by systematically sweeping each training area and fixed ranges throughout the year. Any UXO found is marked and reported to EOD units for disarming, disposal, and destruction. EOD units also perform limited subsurface clearance in conjunction with contracted construction activities on the Combat Center (DoN 2003b).

Ground-delivered Ordnance

Explosives and ammunition are stowed in specially-designed structures (magazines) or in associated hardstand areas. Explosive safety quantity distance (ESQD) arcs surround each magazine used for the storage or handling of ordnance. The type and quantity of the explosives stored in a magazine determine the type and size of ESQD arcs. ESQD arcs have been developed to protect humans from possible sabotage or accidental detonation of explosives or ammunition. Regulations associated with ESQD arcs prohibit the placement of inhabited buildings, public traffic routes, and other human activities within unsafe distances

from ordnance storage facilities. Training activities are not permitted within an ESQD arc associated with ordnance storage facilities (DoN 2003b).

The Officer in Charge of each firing site has overall responsibility for the control, handling, and accountability of ammunition and explosives at that range. Ground-delivered ordnance consists of the following:

- *Artillery* – Artillery use occurs on approximately 110,000 acres (44,515 ha) (18%) of the installation, but is concentrated on approximately 45,000 acres (18,211 ha) (7.5%). Most artillery firing is directed at fixed targets and areas that are already heavily disturbed. Very little artillery use occurs in the mountainous areas of the Combat Center.
- *Tank and Other Armor Ordnance* – Tank operations are conducted over approximately 200,000 acres (80,937 ha) (33%) of the Combat Center, but most of the ordnance delivered from tanks and associated maneuvers are concentrated in 132,000 acres (53,419 ha) (22%). The majority of tank operations take place in areas that are already moderately to highly disturbed.
- *Other Ordnance* – A wide variety of small arms, mortars, ground missiles, and other ordnance is used during infantry maneuvers and related training activities. These operations occur at certain fixed ranges such as the 400 Series Ranges and throughout various training areas during major exercises. In addition to the small arms component of major exercises, qualification and annual requalification with service rifle and service pistol occurs at the Marksmanship Training Unit ranges located at the north end of Mainside.
- *Grenades, Demolitions, and Signal Illumination* – Infantry maneuvers and other training exercises also rely on a variety of explosive charges, signal illumination, smoke grenades, practice grenades, and other ordnance to increase the realism of the battlefield environment.

Training Areas and Fixed Ranges

With the exception of Mainside (which is considered a special use area) and several restricted areas, the entire area within the Combat Center boundaries has been designated as an operational training range complex. Five of the training areas are designated for non-live-fire and maneuver training; these training areas are located in the southwestern section of the installation, west of Mainside. Live-fire is approved within the remaining training areas, with some exceptions (e.g., live-fire is not allowed within 3,280 ft [1,000 m] of the installation boundary). A total of 45 fixed ranges covering approximately 19,240 acres (7,786 ha) are also present across the installation, with the majority located in the Range training area (refer to Figure 2-1). The fixed ranges vary in the types of weapons and munitions used, allowable maneuvers, and impact areas. The installation also contains 12 small arms ranges, all located within the Range training area. The boundaries of each training area are defined by training requirements, topography, and other constraints. Different types of training can be conducted simultaneously in multiple training areas without jeopardizing safety. The training areas (or portions thereof) may also be subject to limitations or restrictions on the use for maneuvers, live-fire, or other training activities (DoN 2003b). The training areas are managed by the Range Operations Section/Range Control. The current operational profile at the Combat Center, including the location and general training conducted at the training areas, fixed ranges, and small arms ranges includes:

Training Areas. Training areas provide the Marine Corps with large open areas of land on which to conduct live-fire maneuver training. Training areas are functional, administrative units that enable different types of training to be conducted at the same time without jeopardizing safety. The boundaries of training areas are not marked. They are defined by training requirements, topography, and other constraints. Training areas vary in size, use terrain, and training restrictions (DoN 2003b). Artillery and aviation firing and target

points on training areas are generally exercise-dependent and are moved accordingly. Thus, few specific impact areas are designated at the Combat Center, and munitions are distributed throughout the training area. Firing is allowed anywhere throughout a training area, with the exception of a 3,280-ft (1,000-m) buffer established along the interior of the installation boundary to prevent military munitions from being fired beyond the installation borders, as well as the restricted areas noted above. Five training areas (Acorn, East, Gypsum Ridge, Sand Hill, and West) located in the southwest corner of the installation are designated as non-live-fire maneuver areas. Limited live firing is allowed from the East training area; however, all fire from this zone is directed into the Prospect and Delta training areas. Training is not conducted in the Mainside cantonment area or the 7,900-acre (3,197-ha) Restricted Area. The remaining training areas allow live-fire training anywhere within the training area, although most firing is directed at ITX targets and typically no higher in elevation than the base of any nearby mountain ranges (Headquarters Marine Corps [HQMC] 2008).

Small Arms Ranges. There are 12 small arms ranges at the Combat Center; all are in the Range Training Area. Seven of these ranges are located within the Marksmanship Training Unit range complex. The Marksmanship Training Unit trains more than 10,000 active duty Marines per year for service rifle and pistol requalification. The remaining small arms ranges, which are part of the 100 Series fixed ranges, are located further north in the training area. Operational ranges that are exclusively used for small arms training at the Combat Center are listed in Table 3.5-2.

Table 3.5-2. Operational Small Arms Ranges at the Combat Center

Range	*Type*
Range 1	Known distance rifle range
Range 1A	Unknown distance rifle range
Range 2	Known distance pistol range
Range 2A	Combat pistol range
Range 3	Battle sight zero grouping range
Range 3A	Battle sight zero grouping range
Range 4	Multipurpose range
Range 101	Armor, gun training range (subcaliber)
Range 101A	Small arms Battle sight zero range
Range 103	Small Arms Transition Range
Range105	Small Arms Enhanced Marksmanship Range
Range 106A	Multipurpose Machine Gun Range
Range 110	Multipurpose Machine Gun Range Unknown Distance
Range 105A	Small arms Battle sight zero range
Range 113	Multipurpose machine gun range
Range 113A	Machine gun Battle sight zero range

Source: HQMC 2008.

Restricted Areas. Although the fire of military munitions generally is allowed anywhere within a live-fire training area, several areas within the installation are protected due to the presence of cultural and natural resources, as defined in CCO 5090.4F. Restricted areas are areas designated for no impact, no mechanized maneuvers, no bivouacs, no off-highway vehicles, nor any training involving vehicle activity. Therefore, these restricted areas are not expected to contain hazardous or other wastes related to military training activities that have occurred since these areas were designated as restricted. These areas include the following:

- Restricted Area training area – Surprise Spring/Sand Hill
- Foxtrot petroglyphs
- Deadman Lake Cultural Resources Management Area
- Historical sites
- Historical mines or prospects
- Lead Mountain acquisition study plots

Areas designated as Environmentally Sensitive Areas do not have limitations to training; however, military units are cautioned to be aware of sensitive natural and cultural resources. Therefore, these sensitive areas could have hazardous or other wastes related to military training activities. These areas include the following:

- Sand Hill Training Area
- Emerson Lake and Acorn Training Areas
- Cleghorn Pass (outside the fixed ranges)
- Wood Canyon
- Northern Sunshine Peak
- Southern Bullion Training Area
- All dry lake beds (playas)

Per CCO 3500.4K, all personnel are required to receive safety briefs, including briefs on UXO, and hazardous materials/wastes before entering the range training areas. This requirement minimizes the risks to personnel from potential historical UXO or hazardous waste that may be present on the Combat Center.

3.5.3.3 Unauthorized Entry

In many Combat Center areas there is no fencing to delineate installation boundaries due to practical limitations over the very large perimeter, so there is a potential for the public to cross onto military property. The Combat Center provides signage on, around, and near the installation property, road crossings, and likely access points to ensure the public are informed that the area they are entering is an exclusive military use area with active military exercises. Unauthorized public access occurs by scrappers, off-highway vehicle users, and recreational users. Scrappers are of particular concern, as they are civilians who are illegally on the Combat Center removing salvageable materials (aluminum, brass, copper, etc.) from the training areas. Marine Corps procedures have been established and are followed during unauthorized entry in the training areas (CCO 3500.4K).

3.5.3.4 Hazardous Materials and Hazardous Waste

This section describes existing conditions with regard to storage, use, and handling of hazardous materials, hazardous waste, solid waste, and contaminated sites. The NREA is responsible for pollution prevention, installation and environmental restoration, environmental compliance (including hazardous materials management) and managing solid waste, hazardous waste, and range-related waste. The Compliance Support and Pollution Prevention branches of NREA work together very closely in joint efforts to inspect for compliance and to prevent, respond to, and clean up releases of hazardous materials (Combat Center 2012).

Management and control of hazardous materials and wastes at the Combat Center is guided by the ICOP (DoN 2004). This comprehensive plan consolidates a number of related management action plans and policies into one central source, which is made available to all appropriate personnel and is posted on the installation's Internet site. Among the many components of the ICOP are an Oil and Hazardous Substance

SCP; SPCC Plan; BECP; SWPPP; and a Hazardous Waste Management Plan and a Hazardous Waste Minimization Plan. The ICOP clearly defines all responsibilities, procedures, requirements, and responses associated with hazardous material and waste management. The ICOP also provides a hazardous materials inventory summary for the Combat Center and identifies all operations and facilities at the Combat Center that use or store hazardous materials and generate or manage hazardous wastes. NREA Division meets directly with military personnel who specifically focus on hazardous materials and hazardous waste, to determine what waste will be generated and approximately how many containment barrels will be needed.

Hazardous Materials

A variety of hazardous materials are used and stored at the Combat Center for daily training and other operations. The primary hazardous materials used during a typical ITX are fuels of various types (e.g., diesel, F-24). Other hazardous materials typically used during ITX events include batteries, POLs, hydraulic fluid, and antifreeze/coolant (Combat Center 2015d).

Hazardous materials aboard the Combat Center are managed, stored and issued to Authorized Units through the designated Hazardous Materials Minimization (HAZMIN) Center in Mainside Building 1102T1. Hazardous materials at the HAZMIN Center are properly labeled and stored in accordance with federal and state regulations, and per MCO 4450.12A (*Storage and Handling of Hazardous Materials*) and CCO 5090.4F. Unused hazardous materials are returned to the HAZMIN Center for reissue and re-use, evaluation for recycling, or disposal as hazardous waste. This system enables the Combat Center to minimize the volume of hazardous materials used and hazardous waste generated at the installation, and to maintain an accurate inventory of the types and volumes of hazardous materials/waste aboard the Combat Center (DoN 2004).

The Combat Center records toxic chemicals released during training events as part of the EPCRA. The EPCRA establishes requirements for federal, state, and local governments and industry regarding reporting of hazardous and toxic chemicals. Access to this information contributes to improving chemical safety and protecting public health and the environment. Hazardous material releases to the environment from ordnance used in training require annual reporting to the USEPA under the EPCRA Toxic Release Inventory (TRI) program. Under TRI, an installation must report the quantity of ordnance-related chemicals that exceeds applicable reporting thresholds on a "Form R". The Form R must also include information related to how these chemicals were released to the environment, recovered, or recycled. The Form R for each calendar year must be submitted to the USEPA by July 1 of the following year.

The Combat Center has developed procedures to comply with TRI reporting requirements. In Reporting Year 2014, the following five chemicals associated with ordnance use were reported by the Combat Center on the TRI Form R report: copper, dinitrotoluene, lead compounds, nitroglycerin, and phosphorus (yellow or white) (Combat Center 2015d).

Fuel storage aboard the Combat Center is managed according to procedures described in the ICOP to prevent/minimize the accidental release of POLs. There are two 180,000-gallon (681,374-liter) capacity F-24 bulk fuel capacity aboveground storage tanks (ASTs) at Building 5741 at Camp Wilson (Marine Wing Support Squadron) and two 50,000-gallon (189,271-liter) capacity fuel storage bladders at the SELF runway. The two 180,000-gallon (681,374-liter) ASTs are surrounded by a concrete berm that provides secondary containment. The two 50,000 gallon (189,271 liter) fuel bladders are inside high-density polyethylene lined pits within concrete and earth-covered berms (Combat Center 2015e). The Combat Center also has a number of smaller-volume fuel storage sites.

No fuel is stored permanently at the range training sites. Units bring fuel with them and carry out what they do not use. During a training exercise, fuel is kept in containers known as SIXCONs, FTRs, and fuel bladders. The number of any of these field storage devices varies depending on the requirements of the training exercise. SIXCONs are stainless steel modules that each have a 900-gallon (3,407-liter) capacity, and can be attached inside a steel rack. SIXCONs have thick HDPE pop up secondary containment berms that contain the transport vehicle (Logistics Vehicle System or Medium Tactical Replacement Vehicle) and the SIXCON modules (Combat Center 2015d; USMC 2015).

The FTR is a steel wall tank replacing the SIXCON. The FTR is like a stationary 2,500-gallon (9,464-liter) tank but it is portable. Flat Rack Capability Tank System is ISO-mounted on a flat rack base (Logistics Vehicle System Replacement, so warfighters can rapidly place, operate, maintain and recover without any construction or material handling equipment at any location. The Logistics Vehicle System Replacement can carry one FTR and tow one FTR. It has pop up secondary containment berms (Combat Center 2015d).

In addition, 10,000-gallon (37,854-liter), 20,000-gallon (75,708-liter), and 50,000-gallon (189,271-liter) fuel bladders are used in the field. The units take the empty bladder(s) they will need, fill them from SIXCONS and FTRs, and then consume the fuel during the exercise. Any unused fuel is pumped from the bladders back into the SIXCONs or FTRs and returned to Camp Wilson. The empty bladders are rolled up and taken back to Camp Wilson (Combat Center 2015d). Helicopters and tactical vehicle refueling may also be done at a FARP in one of the designated PRTSSs, on an MSR or adjacent to an MSR anywhere within the Combat Center Range Training Areas, except for the Sand Hill Restricted Area. To prevent/minimize the potential for accidental releases of POLs during training operations and exercises, training units adhere to the provisions of CCO 3500.4K. These provisions include:

- Monitoring tank operation and security before, during, and after filling and dispensing operation.
- Weekly visual inspections of the new product (as opposed to used/waste) underground storage tank (UST)/AST systems including tanks, leak detection, containment systems, and fill and dispensing apparatus.
- Checking hoses, nozzles, and connections frequently to avoid fuel leaks.
- Placing an impermeable liner beneath nozzles and connections.
- Refueling operators stay with vehicles during refueling.
- All refueling vehicles, any vehicles with known leaks, and vehicles being fueled must be parked over a leak-proof tarp to catch leaks that may occur.
- Fuel tanker vehicles must be parked so that spilled fuel does cannot flow into natural or man-made drainage systems.
- All generators, lighting systems, and other equipment with internal or external fuel tanks must have containment berms and liners beneath them.

In the event of a spill in training areas, units contact Range Control, who in turn contact NREA (Combat Center 2012). Units are responsible for working parties, drums, trash bags, shovels and equipment (tractors and dump trucks) to abate spill sites. NREA personnel oversee the unit responsible for the spill and ensure proper and adequate cleanup in accordance with Marine Corps and federal regulations.

In 2014, a total of 18 accidental releases of hazardous substances occurred throughout the Combat Center's training areas and ranges resulting in the release 430 gallons (1,628 liters) of POLs. A total of 192,461 pounds (87,300 kg) of contaminated soil was dug up and taken to the Combat Center's Contaminated Soil Storage Area where it was bio-remediated and then used for Alternative Daily Cover at the Combat Center Landfill (Combat Center 2015d). In the event of an accidental release of a hazardous substance and in accordance with the ICOP, the affected training units take immediate action by notifying Range Control

and stopping the release of material. Abatement actions commence immediately after release and include soil removal and disposal, and cleanup validation. The NREA Abatement Section responds to accidental releases of hazardous materials that occur throughout the installation. The following steps are taken when there is a hazardous materials spill on the Combat Center.

- Completely excavate all contaminated soil and then backfill with clean soil. Have excavated contaminated soil taken to an on-base bioremediation lot, where it is treated following procedures summarized below;
- Shipped off-site and properly disposed per applicable federal and state regulations through the NREA Hazardous Waste Contract; or
- Alternately, and only in very rare circumstances (such as spills that occur on mountain sides or on very steep rocky terrain) hazardous materials spills will be remediated in place. In-place remediation must first be approved by NREA and the CUPA (i.e., the Hazardous Materials Division of the San Bernardino County Fire Department).

Soils contaminated with jet fuel, diesel fuel, or POLs are treated at the MAGTF Training Command bioremediation facility. The contaminated soil is placed on a pad and atmospheric air is pulled through the soil pile by using blowers. Pulling air through the soil increases the soil oxygen level, allowing existing, native microorganisms in the soil to use the fuel and oil as a food source. The soil is sampled after several months and, if the fuel and oil are reduced to regulatory compliance levels, then the soil can be used in the Combat Center landfill to cover solid waste being deposited there on a daily basis. This biopile treatment process saves the Combat Center the cost of transporting soil to a landfill that can accept this material (the Combat Center landfill cannot accept soil with fuel or oil contaminants above regulatory limits) (Combat Center 2012).

Hazardous Wastes

Hazardous wastes are products characterized by their ignitability, corrosiveness, reactivity, and toxicity. Hazardous wastes include any waste which, due to its quantity, concentration, or physical, chemical, or infectious characteristics may either: (1) cause or significantly contribute to an increase in mortality, serious irreversible illness, or incapacitating reversible illness; or (2) pose a substantial threat to human health or the environment. A variety of hazardous waste was generated, including alkaline batteries, fuels, used oil, oily rags, POLs, and cleaning fluids are used during an ITX. A typical ITX generates approximately 19,000 pounds (8,618 kilograms) of hazardous waste (Combat Center 2015d).

Toxic substances such as asbestos-containing materials, lead-based paint, polychlorinated biphenyls, and radon gas are regulated by the federal Toxic Substances Control Act (USEPA 2015). No buildings are to be demolished or relocated as part of the Proposed Action; therefore, asbestos-containing materials, lead-based paint, polychlorinated biphenyls and radon gas are not addressed.

Management and control of hazardous materials and wastes at the Combat Center is guided by the ICOP (DoN 2004). Table 3.5-3 provides a summary of the content and purpose of the management action plans and policies contained within the ICOP.

Table 3.5-3. Summary of Contingency and Operations Plans for the Combat Center

Plan Name	*Plan Summary Content*
Oil and Hazardous Substance SCP	The SCP describes the actions facility personnel must take in response to fires, explosions, or any unplanned sudden or non-sudden release of hazardous waste or hazardous waste constituents to air, soil, or surface water at a hazardous waste facility. The purpose of the SCP is to prevent or minimize personnel exposure to hazardous substances, personnel injuries, and environmental impact through advance planning for potential hazardous waste releases.
SPCC Plan	The SPCC details oil (and oil products) storage and handling procedures, compliance with storage requirements, and response and mitigation procedures for oil releases. The purpose of the SPCC is to minimize environmental impact from improper storage or accidental release of oil. Storage and handling details and procedures are provided in Annex 9 in the ICOP, storage tank locations are shown on maps in Annex 1 in the ICOP, and response and mitigation procedures are integrated into Section II.
BECP	The BECP is a public information document that details hazardous materials and hazardous waste quantities and locations, facility information, and emergency response procedures. The purpose of the BECP is to provide readily available information regarding the location, type, and health risks of hazardous materials to emergency response personnel, authorized government officials, and the public. The information is also used to help safeguard the public health through disclosure of the potential risks of a hazardous material release.
Hazardous Waste Management Plan	The Hazardous Waste Management Plan is required by Marine Corps regulation to provide installation and tenant personnel with procedures and responsibilities to properly manage hazardous waste and recyclable waste. The purpose of the Hazardous Waste Management Plan is to detail requirements and procedures to prevent improper storage and handling of hazardous waste and recyclable waste to minimize potential accidental hazardous substance release, personnel exposure, or violation of hazardous waste storage time and quantity limitations.
Hazardous Waste Minimization Plan	Elements included in the ICOP include a Hazardous Waste Minimization Report, a Hazardous Waste Minimization Plan, and a Summary Progress Report that document progress achieved and plans for further waste minimization at the Combat Center. The Summary Progress Report summarizes hazardous waste source reductions for the 1998 through 2002 time periods and plans for further reductions in the 2003 through 2006 time period. The source reduction plan and reports have been included in Annex 11 of the ICOP.
Clean Air Act Risk Management Plan	The Risk Management Plan addresses facility information and procedures developed to meet requirements of the California Accidental Release Prevention program for aqua ammonia storage at the Cogeneration facility. The purposes of the Risk Management Plan are to document the program implemented to reduce risks associated with the handling of regulated substances and to provide personnel with standard material handling safety and response procedures. A copy of the Risk Management Plan submitted to the San Bernardino County Fire Department Hazardous Materials Division and the USEPA is included as Annex 12 to the ICOP.

Sources: DoN 2004; Combat Center 2012.

Hazardous wastes are temporarily stored in Satellite Accumulation Areas, which are inspected weekly by NREA personnel. There are 53 Accumulation Areas in Mainside and 177 at Camp Wilson. Waste from these Accumulation Areas are collected every 72 working hours and taken to the 90-day hazardous waste storage facility operated by the NREA Hazardous Materials Branch-Hazardous Waste Section. Used lead-acid batteries must be submitted immediately to the 90-day hazardous waste accumulation area for disposal.

All hazardous waste is removed from the Combat Center within 90 days of the first date of accumulation, properly manifested, by a licensed waste hauler, and disposed or recycled at an approved facility per federal RCRA regulations. The collection and disposal of hazardous waste generated at the Combat Center is arranged by the NREA Hazardous Waste Manager through the Defense Reutilization Marketing Office under Defense Logistics Agency/the Defense Reutilization Marketing Service Hazardous Waste Disposal Contract Number SP4500-12-D-1004 (Combat Center 2015d). The Combat Center generated the following amounts of hazardous wastes in 2012-2014 (Combat Center 2015d):

- 2012: 325 tons (295 metric tons)
- 2013: 311 tons (282 metric tons)
- 2014: 202 tons (183 metric tons)

3.5.3.5 Solid Waste

A wide variety of non-hazardous solid waste is generated during training events. During a past ITX, a total of 123,133 pounds (55,852 kilograms) of non-hazardous solid waste was generated (DoN 2003b). These wastes included small arms brass, artillery shells and casings, ammunition cans, wood, cardboard, scrap metal, paper products, and food wrappers. Management and control responsibilities and procedures associated with these types of wastes are defined in CCO 3500.4K. Waste generated during training exercises is collected by each unit at the conclusion of training and is taken to the Range Sustainment Branch, a state-of-the-art facility that is responsible for safely managing, inspecting, processing, and certifying all ordnance-derived materials and range residue generated at the Combat Center. Large amounts of brass, copper, aluminum, and other materials collected from the training areas are processed and recycled. The facility certifies that all materials posing a potential explosive hazard coming from the range and/or being turned in by the Marines are safe for further processing (Combat Center 2012). The Range Sustainment Branch staff of qualified personnel having EOD, range operation and maintenance, or ordnance experience is required to visually inspect and/or mechanically process and certify all scrap. A summary of amounts processed in FY 2004-2009 are shown in Table 3.5-4.

Table 3.5-4. Materials Processed at the MAGTF Training Command Combat Center Range Sustainment Branch, Fiscal Years 2004 through 2009 (in pounds)*

Material	*2004*	*2005*	*2006*	*2007*	*2008*	*2009*
Aluminum	80,029	150,035	200,673	139,112	65,634	154,229
Brass	100,210	214,136	311,166	314,908	356,750	371,287
Steel (Various Types)	1,586,480	1,729,835	1,386,440	1,181,900	1,410,295	1,763,987
HDPE Plastic	N/A	N/A	92,791	34,090	63,870	93,705

Notes: *Most current data available; HDPE = high-density polyethylene; N/A= not available.
Source: Combat Center 2012.

Once the process of certifying the material is completed, the Range Sustainment Branch offers those materials to the Qualified Recycling Program or the Defense Reutilization and Marketing Office for sale. All solid waste, including metal (links, clips, ammunition boxes) and non-metal (fiberglass firing tubes, cardboard, stryrofoam, cardboard and wood) and Meals Ready to Eat trash is taken to the Range Sustainment Branch. There the waste is inspected before landfilling. Recyclable materials are not landfilled. The installation landfill accepts only non-hazardous wastes (MAGTF Training Command 2011).

3.5.3.6 Contaminated Sites

To facilitate the investigation and cleanup of contaminated sites on military installations, the DoD has developed the IRP. The IRP is the process through which contaminated sites and facilities are identified and characterized and existing contamination is contained, removed, and disposed, to allow for future beneficial use of the property. State regulatory agencies designate a site as "closed" when investigation and/or cleanup actions prove that the site does not pose a risk to human health, wildlife, or the environment.

There have been 55 Installation Restoration (IR), 2 Munitions Response Program (MRP), and 10 UST sites identified on the Combat Center through the IRP (NAVFAC Southwest 2016). Of that total, 48 IR Sites are considered closed with no environmental land use restrictions and two IR sites are considered closed with land use restrictions to industrial use (NAVFAC Southwest 2016). There are two IR sites (17A and

18) at Camp Wilson within the Proposed Action area that have requests for regulatory closure with no land use restrictions. The two MRP sites are open and regulatory closure with no land use controls has been requested for MRP Site 2, which is a former small arms rifle range. All of the UST sites are closed with no land use controls except UST Sites 8 and 10. UST Site 8 is closed with a land use control prohibiting the use of groundwater for domestic purposes. UST Site 10 is open and being further investigated (NAVFAC Southwest 2016).

Research conducted during the preparation of the 2012 Land Acquisition EIS of environmental databases provided by USEPA Region 9 did not identify any other contaminated sites at the Combat Center (Science Applications International Corporation 2010).

3.5.3.7 Other Safety Issues

Fire Response

The Combat Center has a staff of firefighters working out of two stations, and is responsible for fire suppression, fire code enforcement, public education, hazardous materials response (Level A), life safety code enforcement, technical rescue, heavy rescue, safety inspections, and basic life support ambulance service. The first station is located at Building 1516 in Mainside, and the second station is located at Camp Wilson approximately 6 miles (10 km) northwest of Mainside. A military crash crew located at Camp Wilson provides primary coverage for the airfield only and responds to fires at Mainside upon request from the installation fire department (DoN 2009b). The installation's fire department has reciprocal aid agreements with the other agencies and responds to community calls as needed. In addition, other agencies will respond to fires on installation property if requested to do so by the Marine Corps.

MEDEVAC Support

MEDEVAC procedures are described in CCO 3500.4K. The Combat Center has contracted dedicated civilian air ambulance services to support training and provide MEDEVAC services if needed. The civilian air ambulance company is stationed on the Combat Center during all training operations. The civilian air ambulance company provides advanced life support for Marines and other service members training on the installation. The civilian air ambulance company maintains communications with Range Control at all times; and is normally positioned on the installation when not airborne. The civilian air ambulance company augments the capabilities of the Combat Center Fire Department, which also provides advanced life support MEDEVAC response via ground ambulance, including response to training accidents within the training areas. The Robert E. Bush Naval Hospital located at 1145 Sturgis Road in Mainside has an Emergency Medical Department and four operating rooms to attend to potential injuries (DoN 2015).

CHAPTER 4
ENVIRONMENTAL CONSEQUENCES

This chapter describes potential environmental consequences associated with implementation of the No-Action Alternative or Proposed Action. CEQ regulations implementing NEPA state that the environmental consequences discussion shall include direct and indirect impacts as well as their significance. This discussion addresses all resource areas described in Chapter 3.

4.1 BIOLOGICAL RESOURCES

The significance of potential impacts to biological resources is based on:

1) the importance (i.e., legal, commercial, recreational, ecological, or scientific) of the resource
2) the proportion of the resource that would be affected relative to its occurrence in the region
3) the sensitivity of the resource to proposed activities
4) the duration or ecological ramifications of the impact(s)

Impacts to biological resources would be significant if species or habitats of concern were adversely affected over relatively large areas or if disturbances caused reductions in population size or distribution of a special-status species. This section analyzes the potential for impacts to biological resources from implementation of the No-Action Alternative or the Proposed Action. This analysis focuses on how additional LZs in existing training areas may affect biological resources. Potential impacts to biological resources includes downdraft (dust and soil erosion) from aircraft LTOs; fire; an increase in BASH potential; aircraft landing on slow-moving wildlife (e.g., desert tortoise); and disturbance to wildlife from noise and visual effects from aircraft overflights.

4.1.1 No-Action Alternative

Currently, aircraft LZs at the Combat Center are used by rotary-wing and tilt-rotor aircraft (refer to Figure 2-1). Collectively, these LZs are located in all training areas except for Acorn, Range, Noble Pass, Rainbow Canyon, and Sunshine Peak. Before landing, units must determine that the selected site will support the safe landing of the aircraft. Such a determination is based on a combination of factors, including but not limited to the area's size, topography (e.g., MV-22 aircraft must land on surfaces that do not exceed a 16% slope), vegetation (which can obscure landing surfaces), soil types, geology (e.g., no large boulders), and presence or absence of open water. Under the No-Action Alternative, the Combat Center would continue the practice of designating new LZs at the Combat Center as needed. Presently, this involves conducting surveys for sensitive resources (e.g., desert tortoises, cultural sites) within existing training areas on a site-specific basis and designating new LZs where these sensitive resources are absent.

4.1.1.1 Vegetation Alliances

Surface disturbance from current aircraft operations is localized and unlikely to permanently affect vegetation alliances or associated habitats and the likelihood of fire is low. Direct impacts to vegetation would not change under existing conditions and practices. Therefore, no significant impacts to vegetation would occur under the No-Action Alternative.

4.1.1.2 Wildlife

Wildlife would not be expected to react or modify their behavior as a result of the No-Action Alternative (i.e., continuing current training operations and designating LZs in accordance to current procedures where sensitive biological resources are avoided). Sensitive areas where biological productivity is high are

inherently avoided as LZs are commonly designated on relatively open, flat and bare landscapes void of water resources and vegetation. The overall impacts would not change under the existing conditions and practices. Therefore, no significant impacts to wildlife would occur under the No-Action Alternative.

4.1.1.3 Special-Status Species

Current practice for designating new LZs at the Combat Center involves conducting surveys for desert tortoises. If no tortoise sign (i.e., scat, burrows, carcasses, live tortoises) is found within 328 ft (100 m) of the proposed LZ (or the proposed LZ is moved such that it is at least 328 ft [100 m] from the nearest sign), the LZ is determined to have "no effect" on desert tortoises.

Under the No-Action Alternative, existing LZs would continue to be used and existing practices to designate new LZs would continue to be conducted subject to site-specific environmental reviews (e.g., surveys for sensitive resources such as desert tortoises). Therefore, no significant impacts to special-status species would occur with implementation of the No-Action Alternative.

4.1.2 Proposed Action

The Proposed Action would approve rotary and tilt-rotor aircraft to land wherever suitable terrain exists in areas of low environmental sensitivity (proposed Go aircraft landing areas). The Proposed Action would also identify areas where landings may be allowed subject to prior environmental review (proposed Slow-Go aircraft landing areas). Under the Proposed Action areas would be identified where landings would not occur due to high biological sensitivity (proposed No-Go areas). The Combat Center anticipates continuing biological and cultural resource surveys as funds are available. Over time, as new or updated information becomes available, the Combat Center would re-designate landing areas according to the criteria described in Section 2.3, *Description of the Proposed Action*. For example, areas designated as Slow-Go due to a lack of natural or cultural resources survey data could become Go or No-Go areas as those data are developed. To avoid and minimize impacts to sensitive biological resources in proposed expanded LZs, the Proposed Action includes the continued implementation of SCMs already in place for training at the Combat Center.

4.1.2.1 Vegetation Alliances

Implementation of the Proposed Action would approve rotary-wing and tilt-rotor aircraft to land on suitable terrain anywhere within the proposed Go aircraft landing areas, resulting in localized disturbances. As shown in Table 4.1-1, this would increase the existing LZ area of 2,967 acres (1,201 ha) by 112,287 acres (45,441 ha). Figure 4.1-1 depicts the vegetation alliances that would be subjected to these localized disturbances. Use of these areas would result in loose debris and fine sediment being removed and blown laterally by downdraft and outwash (collectively known as downwash) in the vicinity of LTOs (refer to Figure 3.2-2 for typical wind erodibility patterns). Downwash from the MV-22 could reach 90 knots directly below the aircraft when hovering within 100 ft (30 m) above ground level (DoN 2009b). This impact is unlikely to affect established perennial vegetation, which would be sparse on the proposed Go landing areas, especially with implementation of avoidance and minimization measure BR-3 (that would require pilots to avoid landing sites with vegetation or other vertical obstacles to reduce risk to personnel and equipment) and GR-1 (encouraging military units to utilize previously disturbed areas). The redistribution of loose materials and fine sediments would alter local microhabitat conditions, possibly affecting the distribution of annual species and recruitment of perennial species on a small scale. However, substantial changes in vegetation alliances on the sites would not be expected. The same processes occur as a result of natural wind and water (in washes), as well as by other types of aircraft training activities. The proposed landing areas are located in training areas that have a history of similar training activities,

and incorporation of additional LZs would represent a negligible change in the overall training environment within these areas. Therefore, there would be no significant impacts to vegetation associated with LTOs with implementation of the Proposed Action.

Table 4.1-1. Proposed Landing Designation Areas by Vegetation Community

Classification	***Existing LZs[1,2]***	***Existing Built Environment[1,3]***	***Proposed Landing Designation (acres)***			***Total (acres)[5]***
			Go	***Slow-Go[4]***	***No-Go***	
Vegetation Association						
Larrea tridentata-Ambrosia dumosa - Creosote Bush Scrub-White Bursage	787.8	0	48,361.5	139,003.6	55,704.3	**243,857.2**
Larrea tridentata - Creosote Bush Scrub	1,443.2	0	44,085.3	149,643.0	26,358.4	**221,530.0**
Larrea tridentata-Encelia farinosa - Creosote Bush Scrub-Brittlebush	17.7	0	2,718.2	54,673.9	5,187.0	**62,596.8**
Psorothamnus spinosus - Smoketree	131.2	0	2,417.2	6,258.9	1,145.8	**9,953.0**
Atriplex polycarpa - Allscale Saltbush	162.9	0	2,324.9	4,779.3	1,856.5	**9,123.7**
Encelia farinosa - Brittlebush	0	0	762.7	4,212.6	88.0	**5,063.2**
Acacia greggii - Catclaw Acacia	31.6	0	849.2	3,554.9	390.5	**4,826.2**
Ambrosia salsola - Burrobrush	85.7	0	1,184.6	2,946.5	375.7	**4,592.5**
Pleuraphis rigida - Big Galleta	8.6	0	290.5	2,172.6	226.9	**2,698.7**
Yucca schidigera - Mojave Yucca	0	0	11.1	1,801.9	287.7	**2,100.7**
Hyptis emoryi - Desert Lavender	9.6	0	441.1	1,583.4	56.6	**2,090.7**
Atriplex canescens - Hoary Saltbush	26.8	0	240.8	1,344.3	66.2	**1,678.1**
Chilopsis linearis - Desert Willow	59.8	0	186.2	626.7	158.0	**1,030.6**
Ambrosia dumosa - White Bursage	0	0	0	23.5	446.9	**470.3**
Prosopis glandulosa - Honey Mesquite	0	0	0	56.7	269.7	**326.4**
Scutellaria mexicana - Desert Chicory	0	0	0	72.0	128.4	**200.3**
Atriplex hymenelytra - Desertholly Saltbush	0	0	17.6	172.3	0	**189.9**
Ephedra californica - Desert Tea	0	0	72.5	37.7	24.1	**134.3**
Subtotal	2,764.9	0	103,963.5	372,963.8	92,770.5	**572,462.7**

Table 4.1-1. Proposed Landing Designation Areas by Vegetation Community

Classification	*Existing LZs[1,2]*	*Existing Built Environment[1,3]*	*Proposed Landing Designation (acres)*			*Total (acres)[5]*
			Go	*Slow-Go[4]*	*No-Go*	
Other Land Cover						
Playa	102.1	0	1052.6	5,443.7	1,522.7	**8,121.2**
Sparsely Vegetated Desert Pavement	0	0	319.3	7,553.8	9.3	**7,882.4**
Developed	49.4	6,718.7	226.2	192.0	40.4	**7,226.7**
Disturbed	50.9	0	0.5	883.0	597.4	**1,531.9**
Mud Hills	0	0	5.9	133.3	7.0	**146.2**
Total[5]	**2,967.3**	**6,718.7**	**105,568.1**	**387,169.6**	**94,947.3**	**597,371.1**

Notes:
[1]Existing LZs and the existing built environment are also designated Go regardless of any other site characteristics.
[2]As shown on Figure 2-1.
[3]As shown on Figure 3.1-1.
[4]Aircraft landing areas could later be re-designated as new or updated information becomes available (see Section 2.3).
[5]Any apparent summation errors in the total values provided are due to rounding.

Operation of the MV-22, has not been identified as a cause of frequent fires. According to a DoN review, as of 2009, only one documented fire (caused by an engine which had inoperative exhaust deflectors) occurred after 44,000 MV-22 flight hours at bases and ranges across the United States (DoN 2009b). Upon landing, temperatures at the ground surface immediately below properly operating exhaust vents would be 150°F above ambient air temperatures (DoN 2009b). Studies involving auto-ignition temperatures have shown that dry grasses spontaneously ignite between temperatures of 342°F and 428°F (Grotkjaer et al. 2003). Under normal operations, the exhaust of the MV-22 would not create ground temperatures high enough to support combustion of plant-based materials.

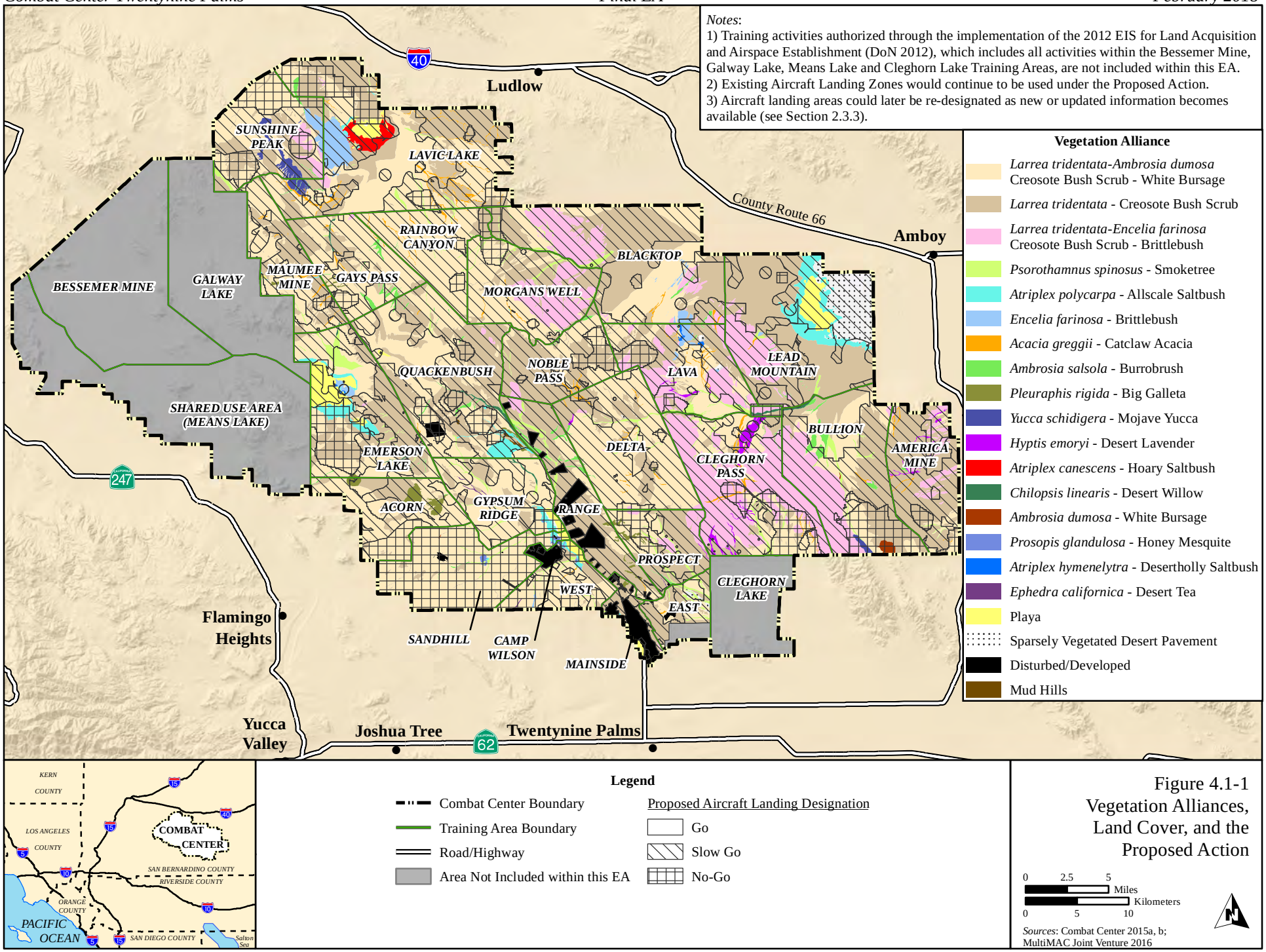
Although the potential to start fires exists with MV-22 and rotary-wing aircraft operations, the likelihood appears to be very low. Fire potential would be highest in areas with an abundance of fine fuels. Under natural conditions, it is likely that the dominant creosote scrub vegetation at the Combat Center is too sparse to carry fire due to wide plant spacing and the scarcity of native grasses. However, the recent spread of non-native species through Mojave Desert habitats, as discussed in Section 3.1.3.1, could result in sufficiently dense vegetation after high rainfall years to carry a small, low-intensity fire.

MAGTF Training Command has programs for managing invasive species on the Combat Center and has developed a Wildland Fire Management Plan in recognition of the fire hazard posed by many non-native species and the long-term adverse ecological consequences of fire in desert scrub vegetation (DoN 2009b). This management plan was prepared to coincide with the training mission and the use of LZs. As part of the management plan, many of the non-native species that occur on the Combat Center and are capable of carrying a fire are being targeted for removal and/or control. Because of the low likelihood of wildland fires related to use of MV-22 and rotary-wing aircraft, implementation of existing plans for invasive species and fire management, the proposed use of additional rotary-wing and tilt-rotor landing areas under the Proposed Action is not likely to increase the frequency and/or extent of wildland fires; therefore, no significant impacts to vegetation would occur under the Proposed Action.

4.1.2.2 Wildlife

The use of any aircraft near undeveloped areas has the potential to add noise and visual stressors to the natural environment and cause a response by wildlife. Impacts to wildlife due to aircraft audio and visual stressors include: “startle reflex” induced running or flight, increased expenditure of energy during critical periods, decreased time and energy spent on life functions such as seeking food or mates, increased susceptibility to predation, and interruption of breeding or nursing (Larkin 1996; Efroymson et al. 2000).

Notes:
1) Training activities authorized through the implementation of the 2012 EIS for Land Acquisition and Airspace Establishment (DoN 2012), which includes all activities within the Bessemer Mine, Galway Lake, Means Lake and Cleghorn Lake Training Areas, are not included within this EA.
2) Existing Aircraft Landing Zones would continue to be used under the Proposed Action.
3) Aircraft landing areas could later be re-designated as new or updated information becomes available (see Section 2.3.3).



Sources: Combat Center 2015a, b; MultiMAC Joint Venture 2016

Figure 4.1-1
Vegetation Alliances, Land Cover, and the Proposed Action

The type of noise that can stimulate the startle reflex tends to vary among animal species. Studies have indicated that sudden, loud noises associated with visual stimuli produce the most intense reactions (Efroymson et al. 2000). Rotary-wing aircraft such as helicopters are believed to generally induce the startle reflex more frequently than fixed-wing aircraft (DoN 2009b). In the case of the MV-22, the aircraft would function more like a fixed-wing aircraft while in transit, with onset of sound building up relatively gradually and the rotating blades forming a blur rather than being seen as rotating parts, reducing the potential for a startle effect (DoN 2009b).

Effects related to downwash and noise would diminish with distance from the aircraft. Exposure to elevated noise levels would generally be localized around the actual LTOs at the LZs, diminishing with distance from the aircraft. The Proposed Action is to establish new LZs throughout the Combat Center for a variety of aircraft; however, wildlife would not be expected to react or modify their behavior as a result of the Proposed Action as compared to existing training activities on the Combat Center. Therefore, no significant impacts to wildlife would occur under the Proposed Action.

Surface disturbance by downwash may affect microhabitat conditions for wildlife through effects on cover, foraging, or burrowing conditions for individuals, particularly small mammals and reptiles. These small-scale shifts in microhabitats would be localized, intermittent, and no different than those caused by the downwash of existing helicopter training on the Combat Center. Therefore, they would be unlikely to affect the abundance or distribution of wildlife populations and, hence, would not be significant.

A BASH plan for the Combat Center was completed in 2003. In general, it determined that the Combat Center and the SELF have a low risk of airstrikes due to the remoteness of the airfield from any source of permanent water (Combat Center 2007). Therefore, no significant impacts to wildlife, including migratory birds, from bird/animal-aircraft strikes would occur under the Proposed Action.

4.1.2.3 Special-Status Species

Plants

There are no federally or state-listed plant species known to occur at the Combat Center. As shown on Figure 4.1-3 (below), the vast majority of known occurrences of crucifixion thorn would be located in proposed Slow-Go landing areas; some occurrences are located in proposed No-Go landing areas, and an even smaller number are located in proposed Go landing areas (e.g., within central Acorn, southern Lava, and north-central Lavic Lake). Given the large extent of proposed Go and Slow-Go landing areas and the small extent of crucifixion within the Combat Center, it is possible but unlikely that a landing aircraft would affect crucifixion thorn within proposed Go or Slow-Go landing areas. The Combat Center would minimize these impacts, however, through implementation of the proposed SCMs (Table 2-7) which indicate that pilots would avoid landing sites with vegetation or other vertical obstacles for safety purposes and by encouraging military units to use previously disturbed areas. Therefore, no significant impacts to special-status plant species would occur under the Proposed Action.

Wildlife

ESA-listed Species

BIRDS. Certain subspecies/populations of snowy plover, willow flycatcher, and Bell's vireo are federally and/or state-listed, and it is not known whether the listed subspecies/populations occur at the Combat Center. These species are not residents and have only been observed seasonally in developed areas of the Combat Center (e.g., golf course, landscaped areas, and water and sewage treatment ponds). They are not known to occur within the training areas and, given their association with wetlands and water courses,

would be extremely unlikely to occur within the training areas. Impacts from training activity in developed areas of the Combat Center would be similar to those associated with ongoing training activities under the No-Action Alternative. Therefore, no significant impacts to ESA-listed bird species would occur under the Proposed Action.

DESERT TORTOISE. The desert tortoise is the only federally listed resident animal species at the Combat Center. Figure 4.1-2 shows the biological resource sensitivity (i.e., desert tortoise density and occupied burrowing owl habitat occurrence) of the action area overlain with the proposed rotary-wing and tilt-rotor aircraft landing designations. The Combat Center has used a spatial analysis of the raw data from desert tortoise surveys to categorize and map desert tortoise densities. The biological resources sensitivity was determined during 2001 analysis of field data collected from 1997-1999 (Woodman et al. 2001) and has since been updated in response to various projects at the Combat Center (e.g., the 2012 Land Acquisition EIS and the Combat Center's INRMP) as well as desert tortoise surveys performed in 2011 (LaRue 2013) (see discussion in Section 3.1.3.3, *Special-status Species*, for additional information).

As described in Section 2.3, the proposed Go aircraft landing areas depict areas where landings would be allowed without further environmental review; additional, site-specific environmental review would continue to be required before landing in the proposed Slow-Go aircraft landing areas; and landings would be fully restricted within No-Go areas. Areas where desert tortoise density data are unavailable are designated Slow-Go. In some cases, areas with low or moderate biological resources sensitivity are depicted as Slow-Go or No-Go because of cultural resource sensitivity.

Implementation of the Proposed Action would increase the existing LZ area of 2,967 acres (1,201 ha) by 112,287 acres (45,441 ha). Table 4.1-2 provides the area of each desert tortoise density category and the area of each density category in each proposed landing designation.

Table 4.1-2. Proposed Landing Designation Areas by Desert Tortoise Density Category

Desert Tortoise Density Category[1] (tortoises per square mile)	*Existing LZs[2,3]*	*Existing Built Environment[2,4]*	*Proposed Landing Designation (acres)*			*Total (acres)[6]*
			Go	*Slow-Go[5]*	*No-Go*	
0-5	2,387.1	527.1	104,653.9	124,272.3	4,911.3	**236,751.8**
Desert tortoise density may be greater than 0-5	36.1	189.4	0	33,843.8	537.9	**34,607.3**
6-20	329.5	187.9	0	121,674.3	8,402.8	**130,594.5**
21-50	78.5	103.6	0	2.5	65,887.7	**66,072.3**
51-100	0	0	0	0	13,065.7	**13,065.7**
Bedrock Outcrop, Lava Flow, or Dry Lake	121.4	241.3	914.1	78,461.2	1,796.7	**81,534.7**
No Data	14.8	5,469.4	0	28,915.5	345.2	**34,744.9**
Total[6]	**2,967.3**	**6,718.7**	**105,568.1**	**387,169.6**	**94,947.3**	**597,371.1**

Notes: Some of the areas with 0-5 desert tortoises per square mile may be designated as Slow-Go due to sensitive cultural resources and some of the areas with 6-20 desert tortoises per square mile may be designated as No-Go due to sensitive cultural resources (refer to Section 4.3).
[1]As shown on Figure 3.1-2.
[2]Existing LZs and the existing built environment are also designated Go regardless of any other site characteristics.
[3]As shown on Figure 2-1.
[4]As shown on Figure 3.1-1.
[5]Aircraft landing areas could later be re-designated as new or updated information becomes available (see Section 2.3).
[6]Any apparent summation errors in the total values provided are due to rounding.

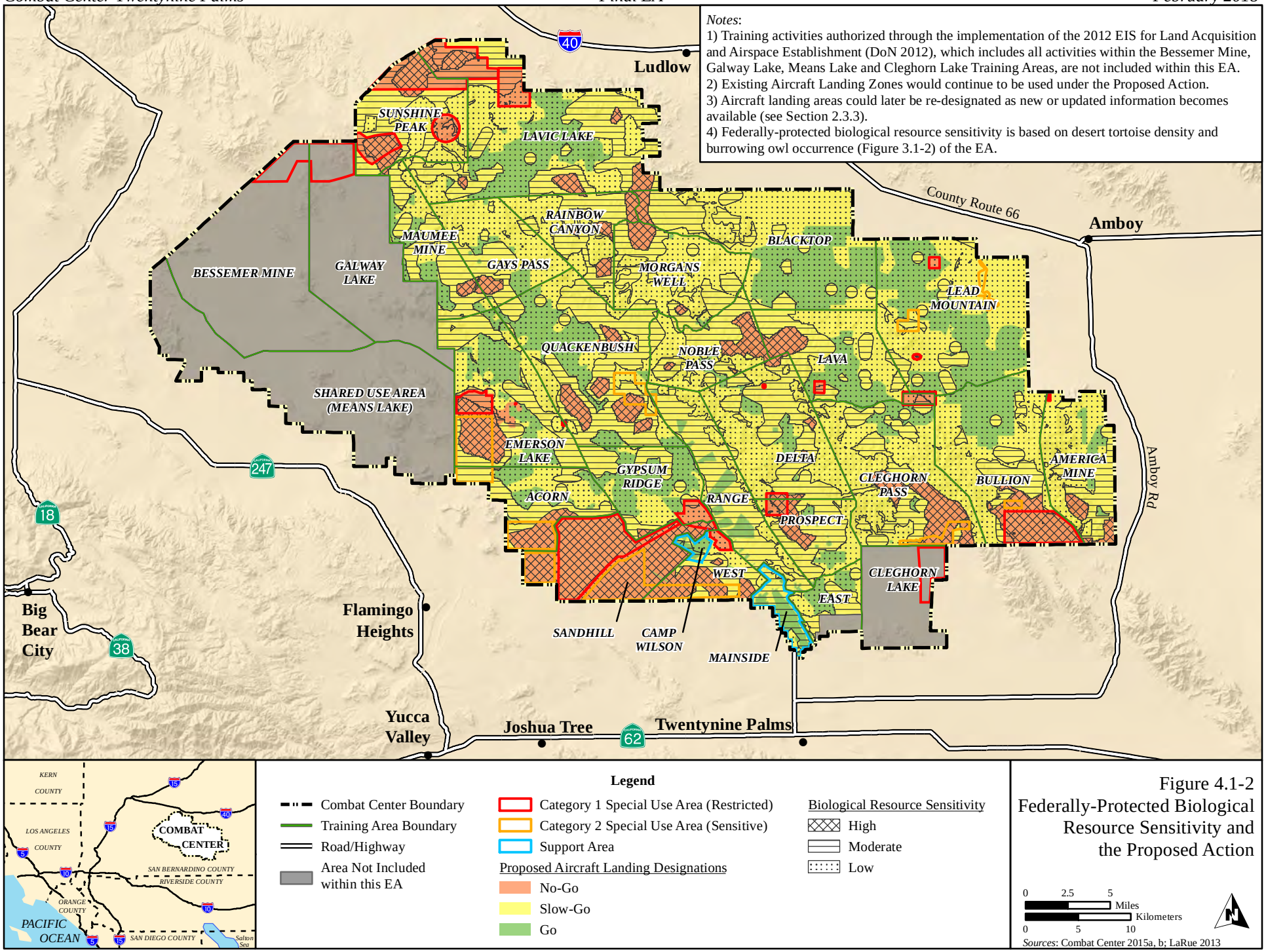


Figure 4.1-2
Federally-Protected Biological Resource Sensitivity and the Proposed Action

Under current practice (i.e., No-Action Alternative) as well as under the Proposed Action, no LZs would be designated within areas estimated to contain 21 or more desert tortoises per square mile (No-Go). If an LZ is proposed in an area where the estimated tortoise density is 6-20 per square mile, a survey would be performed per the standard protocol, and if no sign is found within 328 ft (100 m), the LZ would be authorized for one landing event. Under the Proposed Action, future proposed LZs in areas with an estimated 0-5 desert tortoises per square mile (as determined by existing or future desert tortoise density surveys) would be authorized without need for a new survey.

The Proposed Action does not include any construction and would not change the current levels of on-going training activities. However, shifting aircraft landings into areas of low tortoise density would result in minor effects to undisturbed habitat with low densities of desert tortoises. This would result in an incremental increase in the amount of habitat disturbed during training activities (discussed above in Section 4.1.2.1) and could also result in occasional tortoise injury or mortality. However, all of the desert tortoises in the proposed Go rotary-wing and tilt-rotor aircraft landing areas are already exposed to disturbance caused by ongoing training activities. This small level of additional impact would not be significant, and continued implementation of SCMs established by the 2002 and 2017 BOs (USFWS 2002, 2017) would continue to minimize the likelihood of training-related impacts to desert tortoise within and in the vicinity of rotary-wing and tilt-rotor aircraft landing sites. Implementation of the SCMs included in this EA (refer to Table 2-7) would further minimize training-related impacts.

Most of the action area has previously been used for maneuver and/or live-fire training activities, and although the Proposed Action would increase noise levels associated with rotary-wing and tilt-rotor aircraft to occur in new areas, there is little potential for noise or visual stimuli to impact tortoises for the vast majority of the year for the following reasons:

1) Only 5% of a desert tortoise's life is spent aboveground (Nagy and Medica 1986).
2) Tortoises do not appear to be heavily affected by noise (Bowles et al. 1999).
3) The proposed activities would not be continuous as they would occur sporadically throughout the year.
4) Disturbance would cease upon training event completion.
5) Tortoises temporarily affected by noise and other disturbances (e.g., downwash) would be able to resume normal behaviors and to utilize areas from which they have been deterred by the activity upon completion of the training event.

As such, any effect that noise associated with the proposed training activities might have on desert tortoises is expected to be minimal.

For the reasons described above, the Proposed Action would result in an incremental but not significant increase in the effects of training and operations to the desert tortoise that were contemplated in the 2002 and 2017 BOs. Section 7 of the ESA requires federal agencies ensure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any federally threatened or endangered species or result in the destruction or adverse modification of critical habitat. In accordance with section 7 of the ESA, the DoD consulted with the USFWS. A Biological Assessment (USMC 2017) was prepared to analyze the potential effects of the Proposed Action on the ESA-listed threatened desert tortoise and support section 7 consultation, and the USFWS determined that the proposed activities are adequately covered under the 2002 and 2017 BOs (see Appendix B). Therefore, with implementation of the proposed avoidance and impact minimization measures/SCMs listed above, and having received concurrence from the U.S. Fish and Wildlife Service (see Appendix B), there would be no significant impact to the desert tortoise.

MBTA-listed Species

In 2007, the USFWS finalized a rule authorizing the DoD to "take" migratory birds in the course of military readiness activities, as directed by the 2003 National Defense Authorization Act. Congress defined military readiness activities as all training and operations of the armed forces that relate to combat and the adequate and realistic testing of military equipment, vehicles, weapons, and sensors for proper operation and suitability for combat use. Military readiness activities do not include: (A) routine operation of installation support functions such as administrative offices, military exchanges, water treatment facilities, schools, housing, storage facilities, and morale, welfare, and recreation activities; (B) the operation of industrial activities; and (C) the construction or demolition of facilities used for a purpose described in A or B.

For the purposes of this EA, the operations with Combat Center training areas are considered a military readiness activity. The final rule authorizing the DoD to take migratory birds during military readiness activities was published in the Federal Register on 28 February 2007. The regulation can be found at 50 CFR Part 21. The regulation provides that the Armed Forces must confer and cooperate with the USFWS on the development and implementation of conservation measures to minimize or mitigate adverse effects of a military readiness activity if it determines that such activity may have a significant adverse effect on a population of a migratory bird species.

The requirement to confer with the USFWS is triggered by a determination that the military readiness activity in question will have a significant adverse effect on a population of migratory bird species. An activity has a significant adverse effect if, over a reasonable period of time, it diminishes the capacity of a population of a migratory bird species to maintain genetic diversity, to reproduce, and to function effectively in its native ecosystem. A population is defined as "a group of distinct, coexisting, same species, whose breeding site fidelity, migration routes, and wintering areas are temporally and spatially stable, sufficiently distinct geographically (at some point of the year), and adequately described so that the population can be effectively monitored to discern changes in its status." Assessment of impacts should take into account yearly variations and migratory movements of the impacted species.

The proposed Go landing areas that contain potential future LZs are not known or expected to support large numbers of migratory birds because they are fairly level, sparsely vegetated, and subject to ongoing Marine Corps training activities. Areas most likely to support breeding (e.g., cliffs, washes or other areas of dense vegetation, or wetlands) would not be affected.

Since areas known to contain occupied burrowing habitat are designated Slow-Go (if not already designated No-Go due to other environmental resource concerns), a survey would be required before aircraft could be authorized to land; if the survey detects active nesting activity, aircraft would not be authorized to land.

Golden eagle surveys conducted in 2012 and 2013 found that golden eagle nesting activity was concentrated in the west-northwest area of the Combat Center; no nesting was documented in the eastern portions (MAGTF Training Command 2014). Given this, the fact that MV-22 and rotary-wing aircraft operations would not be substantially different than operations associated with current training exercises, and the future airspace tempo will be lower than baseline conditions (Table 2-2), there would be no significant impacts to the golden eagle.

Therefore, implementation of the Proposed Action would not result in significant adverse effects on a population of a migratory bird species, including burrowing owls and golden eagles. As a result, no significant impacts to migratory bird populations would occur.

Species of Concern

MOJAVE FRINGE-TOED LIZARD. As shown on Figure 4.1-3, virtually all of the Mojave fringe-toed lizard occurrences occur within proposed Go or Slow-Go aircraft landing areas and could result in the injury or mortality of this species, as well as habitat loss, degradation, and fragmentation. However, landing aircraft would generally be expected to avoid landing in the loose sand dunes where Mojave fringe-toed lizards are found. Therefore, no significant impacts to the Mojave fringe-toed lizard would occur under the Proposed Action.

DESERT BIGHORN SHEEP. Although desert bighorn sheep population counts have not taken place since 1997, the population is believed to be stable. The Combat Center and CDFW currently have plans to jointly monitor the status, distribution, and abundance of the installation's bighorn sheep population (Combat Center 2012). The Proposed Action is to establish new LZs throughout the Combat Center for a variety of aircraft; however, wildlife would not be expected to react or modify their behavior as a result of the Proposed Action as compared to existing training activities on the Combat Center, and it is unlikely that aircraft would land near one of the three guzzlers located in proposed Slow-Go landing areas (Figure 4.1-3). Therefore, no significant impacts to desert bighorn sheep would occur under the Proposed Action.

4.2 GEOLOGICAL RESOURCES

This section evaluates potential impacts to geological resources associated with implementation of the No-Action Alternative or Proposed Action. The analysis focuses primarily on soil disturbance resulting from training activities and the potential for soil compaction to increase susceptibility of soil to wind and water erosion. While the potential also exists for training activities to damage unique geological or topographical features (e.g., mountainous locations) that may be considered unique at the Combat Center, these types of areas are generally avoided during training because of an equal potential for damage to vehicles.

The following analysis of potential impacts from training-induced soil disturbance is qualitative in nature, and based largely on the INRMP (Combat Center 2012) and the results of a Land Condition Trend Analysis developed as part of an ongoing Land Condition Trend Monitoring Program conducted by MAGTF Training Command. In addition, previous NEPA analyses have been prepared by the Combat Center, including the: 2003 Programmatic EA for Ongoing and Proposed Training Activities; 2010 EA for AMZs for MV-22 and Rotary-Wing Training; and 2012 Land Acquisition EIS. These documents describe in detail the ways in which existing training operations disturb different types of soils at the Combat Center, and information provided by these documents is summarized below.

4.2.1 No-Action Alternative

4.2.1.1 Topography

The effects of ordnance delivery would continue to be limited to surficial and near-surface soils; therefore, the No-Action Alternative would not be expected to have an impact on topography within the ROI or in the Twentynine Palms region. Little or no training activity at the Combat Center takes place in steeper, mountainous areas with unsuitable topography that would be potentially damaging to vehicles, or other locations that might be considered to have unique geological features, such as lava flows. These areas would continue to be avoided during training activities. Therefore, there would be no significant impacts to topography under the No-Action Alternative.

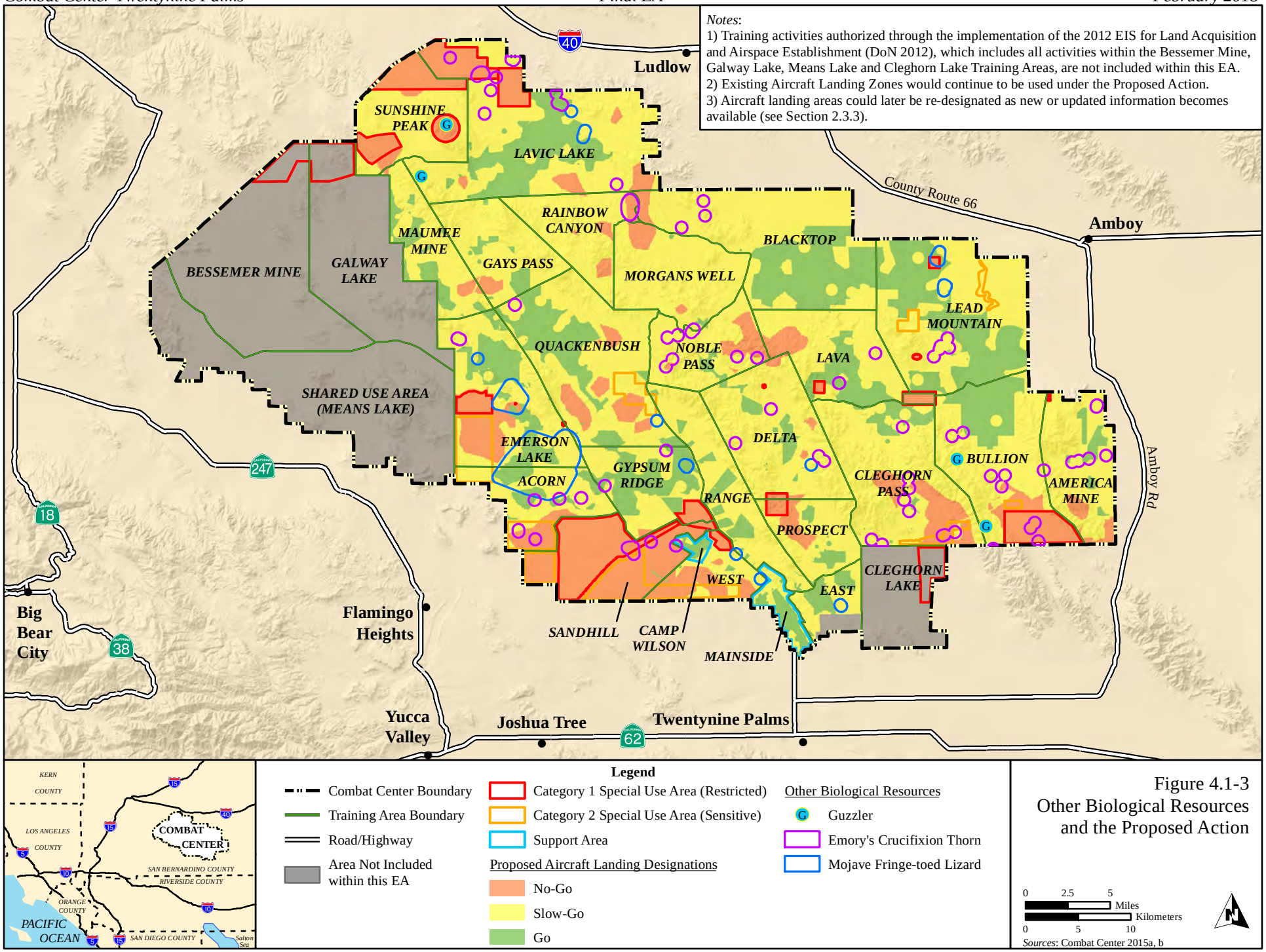


Figure 4.1-3
Other Biological Resources and the Proposed Action

4.2.1.2 Geology

Mineral Resources

The portion of the Combat Center covered by this EA is closed to mineral claims, and mineral production would not occur under the No-Action Alternative. Therefore, there would be no significant impacts to mineral resources under the No-Action Alternative.

Paleontological Resources

Potential impacts to paleontological resources under the No-Action Alternative include damage and/or destruction to fossils from ordnance explosions, vehicle traffic, and digging-in infantry fighting positions. Paleontological resources that might be present in the existing Combat Center training areas are subject to ongoing management and conservation. Therefore, there would be no significant impacts to paleontological resources under the No-Action Alternative.

4.2.1.3 Soils

All categories of training at the Combat Center (e.g., infantry dismounted maneuvers, vehicle maneuvers, defensive operations, engineer operations, aircraft operations, and ordnance delivery) are recognized sources of soil disturbance. As described in the Land Acquisition EIS, the impacts of military vehicle operations under the No-Action Alternative would continue to include disturbance of soil crusts and soil compaction, and excavations to conceal vehicles or construct tank traps. Playa lakebed soils would become compacted in some places and windborne in others as a result of vehicle movements. Though vehicle maneuvers cause direct disturbance to soils, the impacts are largely confined to previously disturbed Go and Slow-Go areas and are not widespread throughout the Combat Center (DoN 2003).

Hovering and landing by rotary-wing and tilt-rotor aircraft would continue as it currently does, displacing surface soil in the immediate operating area. Under the No-Action Alternative, the areas used for hovering/landing are limited to 92 existing aircraft LZs at the Combat Center. Air- and land-based ordnance would continue to create craters, soil compaction at the point of impact, shear soil profiles, loose and bermed soil around the point of impact, and disperse soil particles as dust via explosive contact. There would be localized minor excavations to install target arrays. Foot traffic and bivouacking associated with infantry training would disrupt soil crusts in previously undisturbed areas and disturb and mix soil profiles in already disturbed areas. There would also be impacts from digging infantry fighting positions. All digging must be approved by Combat Center NREA Office personnel, or take place in pre-designated Range Training Support Sites (Combat Center 2012).

Natural resources, including soils, at the Combat Center are managed according to the installation INRMP. The INRMP includes measures to offset adverse impacts of training and to sustain natural resources at the installation (Combat Center 2012). One way this is accomplished is by encouraging military units to use previously disturbed areas, especially for off-road maneuvers, digging, or berming. For example, each MAGTF or Mojave Viper evolution trains a different unit within the same geographic area. This allows reuse of the same training corridor during each exercise while still providing realistic training to the unit. This training doctrine has contributed to reducing land disturbance, with minimal areas on the Combat Center receiving heavy use, some areas receiving moderate use, and most areas receiving no use at all. Other avoidance and impact minimization measures/SCMs that would continue to be implemented to offset the impacts of training as specified in the INRMP are listed in Table 2-7.

Therefore, with continued application of installation procedures to avoid and minimize impacts to soils from training, there would be no significant impacts to soils under the No-Action Alternative.

4.2.1.4 Geologic Hazards

The No-Action Alternative does not involve the construction of new facilities, so compliance with the Alquist-Priolo Act is not required. Earthquakes are caused by movement of the earth's crust, and typically originate at distances of tens to hundreds of miles underground. To date, there is no evidence linking earthquake activity with the use of explosives (USGS 2015c) such as ordnance used under the No-Action Alternative. Therefore, there would be no significant impacts to regional geologic hazards under the No-Action Alternative.

4.2.2 Proposed Action

4.2.2.1 Topography

Under the Proposed Action, expanding the area allowed for landings would have no impacts on topography. Extreme topographic features such as the steeper mountainous areas, or other locations that might be considered to have unique topography, such as lava flows, would continue to be avoided during training activities. Therefore, there would be no significant impacts to topography under the Proposed Action.

4.2.2.2 Geology

Potential impacts to paleontological resources under the Proposed Action include damage and/or destruction to fossils from ordnance explosions, vehicle traffic, and digging-in infantry fighting positions. Paleontological resources that might be present in the proposed Go and Slow-Go areas are subject to ongoing management and conservation. Therefore, there would be no significant impacts to paleontological resources under the Proposed Action.

4.2.2.3 Soils

Under the Proposed Action, expanding the area allowed for landings would increase the area of potential soil disturbance. The susceptibility to wind erosion of soils in the project area is shown in Figure 3.2-2.

Downwash wind velocities from the MV-22 could reach 90 knots (167 km per hour) directly below the MV-22 when hovering at 100 ft (30 m) above ground level (DoN 2009b). In extreme cases, soil can be scoured to the extent that small shrubs may be uprooted. Dust cloud development from the displacement of soil and loose vegetation is another common effect from downwash. However, these effects would continue to be localized and would diminish with distance from landing/take-off sites.

The same avoidance and impact minimization measures/SCMs implemented under the No-Action Alternative (Section 4.2.1.3 and Table 2-7) would continue to be implemented under the Proposed Action, including erosion control projects, monitoring programs; and use of existing Combat Center environmental plans and resource databases. These programs and procedures limit adverse impacts to soils associated with ongoing training activities at the Combat Center. Therefore, with continued application of installation procedures to avoid and minimize impacts to soil from training, there would be no significant impacts to soils under the Proposed Action.

4.2.2.4 Geologic Hazards

Under the Proposed Action, expanding the area allowed for landings would have no changes on seismic activity. Therefore, there would be no significant impacts to geologic hazards under the Proposed Action.

4.3 CULTURAL RESOURCES

Under Section 106 of the NHPA, federal agencies are required to consider the effects of their undertakings on cultural resources listed in or eligible for listing in the NRHP (known as "historic properties") and afford

the Advisory Council on Historic Preservation the opportunity to comment on the undertaking. Additionally, the agency must also consult with the SHPO to determine the effect of the action on eligible properties. If there would be an adverse effect, the agency must consult to consider methods to mitigate the impact. In accordance with 36 CFR Part 800.5a (2), there may be adverse effects upon a historic property when there is:

1) Destruction or alteration of all or part of a property;
2) Isolation from or alteration of the property's surrounding environment;
3) Introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting;
4) Neglect of a property resulting in its deterioration or destruction; or
5) Transfer or sale of a property without adequate conditions or restrictions regarding preservation, maintenance, or use.

Adverse effects, as defined by the Section 106 process, are considered to be significant impacts under NEPA. Direct impacts under NEPA may also include damage or destruction to unevaluated sites.

Because no site preparation, construction activities, or building renovations are associated with the Proposed Action or No-Action Alternative, the following impact analysis focuses on ground-disturbing activities associated with training activities that could affect NRHP-eligible resources (known and unknown) and other cultural resources (i.e., traditional cultural properties).

The information used to assess direct and indirect impacts at the Combat Center is largely derived from the ICRMP (MAGTF Training Command 2011), the 2003 Programmatic EA for Ongoing and Proposed Training Activities (DoN 2003), and the AMZ EA (USMC 2010).

4.3.1 No-Action Alternative

Under the No-Action Alternative, current training activities at the Combat Center would continue. All training activities can be grouped into five general categories: infantry dismounted maneuvers, vehicle maneuvers, defensive operations/engineer operations, aircraft operations, and ordnance delivery. Impacts to cultural resources are assessed according to the type and location of training activity.

4.3.1.1 Infantry Dismounted Maneuvers

Infantry dismounted maneuvers are done on foot, typically for extensive distances. Unless otherwise restricted, these operations occur in all training areas, including those that are geographically restricted to vehicles. These ground training exercises can last for extended periods of time and may require bivouacking. Digging activities associated with the training activities (for sanitation and force protection reasons) could lead to the inadvertent discovery of buried cultural resources. In this case, digging activities would cease and the Combat Center's Cultural Resources Manager would be notified before such activities could continue.

Activities associated with infantry dismounted maneuvers would not impact cultural resources as they result in little ground disturbance and tend to be sporadic and intermittent. Therefore, there would be no significant impacts to historic properties and unevaluated sites from infantry dismounted maneuvers under the No-Action Alternative.

4.3.1.2 Vehicle Maneuvers

Vehicle maneuvers occur on both established roads and off-road in all areas of the Combat Center. Three types of vehicles are utilized: tracked vehicles, heavy-wheeled vehicles, and light-wheeled vehicles. All

vehicles have the potential to impact cultural resources in the Combat Center when travelling off-road. Vehicle mobility is restricted on the Combat Center due to terrain. The majority of cultural resource surveys have been conducted in low-lying areas of the Combat Center. These areas have been designated clear of cultural resource concerns and are designated as areas of low environmental sensitivity (refer to Figure 3.3-1). Additionally, NRHP-eligible sites are monitored to ensure that these sites are not impacted by training operations. Therefore, there would be no significant impacts to historic properties and unevaluated sites from vehicle maneuvers under the No-Action Alternative.

4.3.1.3 Defensive Operations/Engineer Operations

Defensive and engineer operations aboard the Combat Center occur seven times per year. These operations include a multitude of digging activities. Vehicles occasionally need to be protected and removed from sight by "digging in." Digging in involves digging M1A1 tanks below the surface of the ground. Constructing anti-tank ditches and defensive berms require digging a 10-ft (3-m) wide and 6-ft (2-m) deep tank ditch, with an associated 10-ft (3-m) tall berm. Establishing crew-served weapon positions involves using a backhoe to dig fighting holes approximately 4-ft (1-m) deep. Building patrol bases requires the construction of 10-ft (3-m) tall berms and digging anti-tank ditches. Establishing FARPs requires digging holes large enough to position 1,000-gallon (3,800-liter) fuel bladders into the ground. Entry Control Point construction requires a foundation of HESCO barriers, which are filled with local soil. Bridging operations consist of digging a 20-ft (6-m) by 40-ft (12-m) canal. To prevent the washing out of main roads and MSRs, culverts are placed across washes, which requires digging.

Defensive and engineering operations are prohibited in all Category 1 Special Use Areas (Figure 4.3-1). Many of these Special Use Areas contain archaeological sites that are eligible for listing in the NRHP. These NRHP-eligible sites are monitored to ensure that these sites are not impacted by training operations. Additionally, defensive and engineering operations are conducted in areas that are heavily disturbed. If digging activities resulted in the inadvertent discovery of buried cultural resources, they would cease and the Combat Center's Cultural Resources Manager would be notified before training could continue. Therefore, there would be no significant impacts to historic properties or unevaluated sites from defensive operations under the No-Action Alternative.

4.3.1.4 Aircraft Operations

Most aircraft operations at the Combat Center originate or terminate at the SELF in Camp Wilson. Currently, 92 aircraft LZs are located in all training areas except Acorn, Range, Rainbow Canyon, and Sunshine Peak. These LZs are located in areas that have either been confirmed to have no cultural resource concerns or are unlikely to contain intact cultural resources. Additionally, NRHP-eligible sites are monitored to ensure that these sites are not impacted by training operations. Therefore, there would be no significant impacts to historic properties or unevaluated sites from aircraft operations under the No-Action Alternative.

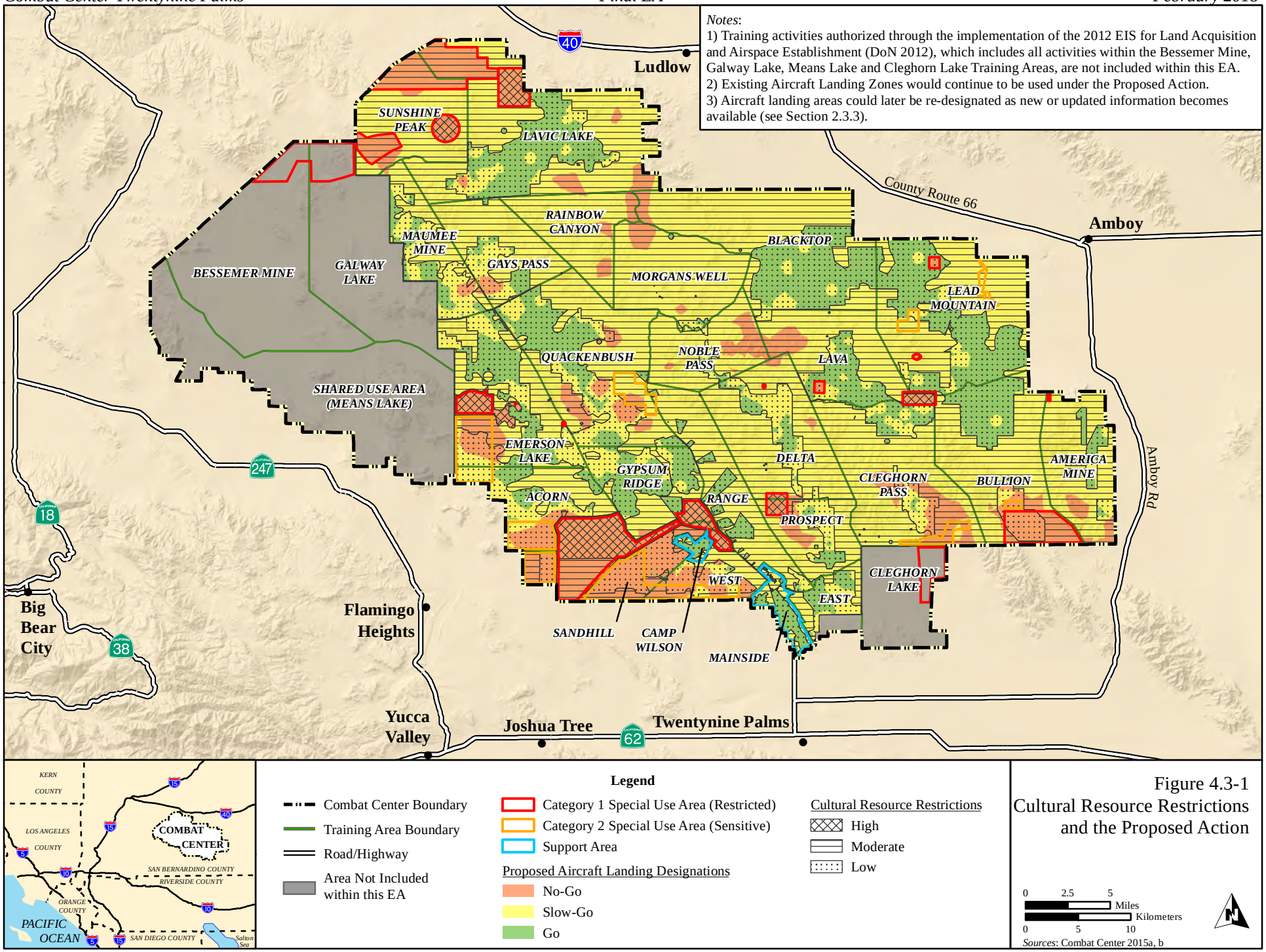


Figure 4.3-1
Cultural Resource Restrictions and the Proposed Action

4.3.1.5 Ordnance Delivery

Ordnance deliveries at the Combat Center currently occur in areas that have either been confirmed to have no cultural resource concerns or are unlikely to contain intact cultural resources. Ordnance deliveries are off limits in Category 1 Special Use Areas (refer to Figure 4.3-1). Many of these areas contain archaeological sites that are eligible for listing or are listed on the NRHP. These NRHP-eligible sites are monitored to ensure that these sites are not impacted by training operations. Therefore, there would be no significant impacts to historic properties or unevaluated sites from delivered ordnance under the No-Action Alternative.

4.3.2 Proposed Action

Under the Proposed Action, additional LZs within existing training areas would be allowed in areas that are confirmed to have no cultural resource concerns (i.e., Go landing areas) (refer to Figure 4.3-1). In some cases, areas with low cultural resource sensitivity are depicted as Slow-Go or No-Go because of biological resource sensitivity. The Combat Center anticipates continuing biological and cultural resource surveys as funds are available. Over time, as new or updated information becomes available, the Combat Center would re-designate landing areas according to the criteria described in Section 2.3, *Description of the Proposed Action*. For example, areas designated as Slow-Go due to a lack of natural or cultural resources survey data could become Go or No-Go areas as those data are developed. While proposed Go landing areas occur adjacent to restricted areas, no impacts (including those from downwash) would occur to highly sensitive cultural resources because the Category 1 (i.e., restricted) Special Use Areas already include a protective buffer for these resources. Since proposed Slow-Go landing areas, which have not yet been confirmed to have no cultural resource concerns, occur adjacent to proposed Go landing areas, it is possible that a rotary-wing aircraft could land in a Go landing area immediately adjacent to an undiscovered cultural resource in a Slow-Go landing area. The likelihood of this occurring, however, is small enough to be discountable given the large size of the proposed Go landing areas and the highly localized area of disturbance associated with an aircraft landing. Additionally, NRHP-eligible sites and unevaluated sites are monitored to ensure that these sites are not impacted by training operations. Furthermore, the use of these new LZs would occur concurrently with the training activities described under the No-Action Alternative and would therefore likely occur in previously-disturbed areas, especially with implementation of the proposed SCMs. Moreover, the future airspace tempo will be lower than baseline conditions (Table 2-2), and the measures that are in place to avoid impacts to cultural resources would continue to be implemented under the Proposed Action. Therefore, there would be no significant impacts to historic properties or unevaluated sites under the Proposed Action. The California SHPO, the San Manuel Band of Mission Indians, and the Twenty-nine Palms Band of Mission Indians have concurred with the U.S. Marine Corps' finding of No Historic Properties Affected (refer to Appendix B).

4.4 WATER RESOURCES

This section evaluates potential impacts to water resources associated with implementation of the No-Action Alternative or Proposed Action. The analysis focuses only on impacts to surface water resources, as area groundwater resources are too deep to be affected by ongoing training operations. The Combat Center's potable water is obtained from the Surprise Spring Sub-basin which mostly contains fossil water or water obtained through recharge from the San Bernardino Mountains located to the west of the installation. Seeps and springs on the Combat Center are generally located in remote locations, away from training activity. The man-made water bodies near or within Mainside are also unlikely to be affected because there is little or no training in that area.

4.4.1 No-Action Alternative

Under the No-Action Alternative, the Marine Corps' REVA program would continue as described in the 2012 Land Acquisition EIS and Section 3.4.3 of this EA. As noted in Section 3.4.3, the REVA concluded that MC can migrate from the range training areas via dissolution and transport in periodic surface water flows and eventually deposit and accumulate within the playas. Predicted concentrations of MC were below REVA trigger levels at the edge of the loading areas and/or at the playas and were substantially below toxicity thresholds for sensitive indicator species. The low precipitation rate, long distance between ranges, intermittent nature of the surface water bodies, and deep groundwater limit the migration of MC residues and thus the potential impacts from munitions use (MCIC 2012).

Vehicle maneuvers, especially in previously undisturbed areas, have the potential to negatively affect run-off and water quality. Similarly, infantry maneuvers, particularly those involving any type of soil disturbance or excavation (e.g., for purposes of bivouacking or construction of fox holes), may also contribute to soil erosion, which can then impact playas and dry washes in ways similar to vehicle maneuvers. Aircraft operations would have the potential to result in water resources impacts due to soil disturbing events such as rotor-wash, and various types of drops (e.g., personnel, equipment, and cargo). However, the majority of such operations occur in pre-designated, hardened DZs and LZs, thereby limiting disturbance to water-impacting soils. Ordnance delivery can impact playas and dry washes by disturbing soil crusts and causing compaction of the soil. However, ordnance delivery at the Combat Center takes place primarily in Fixed Ranges or in areas that are already disturbed. These operations are also limited in the vicinity of playas.

Under the No-Action Alternative, existing resource protection measures used to control impacts to intermittent water-containing playas and washes include avoiding use of playas to the maximum extent possible when surfaces are wet, and restricting use to a limited number of crossing sites on playas (especially on Deadman Lake) and washes to minimize vehicle crossing damage. Other impacts are reduced by requirements to design tank traps to allow the natural water surface flow during runoff events. Impacts to water resources are further minimized by MAGTF Training Command requirements that troops use existing, well defined roads when not in conflict with training objectives. The application of existing monitoring, conservation, and environmental awareness programs directed at the protection of water resources, including playas and washes (as described in the INRMP) and implementation of avoidance and impact minimization measures/SCMs as listed in Table 2-7 would continue under the No-Action Alternative. Therefore, given the lack of surface water resources, very low precipitation rate, and existing Combat Center policies and programs designed to manage and protect playas and dry washes, there would be no significant impacts to water resources under the No-Action Alternative.

4.4.2 Proposed Action

Because the Proposed Action involves the same categories of training as the No-Action Alternative, impacts to water resources resulting from implementation of the Proposed Action would be similar to impacts associated with ongoing training activities under the No-Action Alternative. Under the Proposed Action, training operations with the potential to release MC to the environment would be similar to those under the No-Action Alternative. Assessments of operational ranges under the REVA program (refer to Section 3.4.3) would continue to be conducted every 5 years to determine if any release or substantial threat of a release of MC to off-range areas would create an unacceptable risk to human health and/or the environment. This continued implementation of the REVA program would help minimize or avoid the potential impacts associated with MC. Therefore, with continued application of monitoring, conservation, and environmental

awareness programs and avoidance and impact minimization measures/SCMs as listed in Table 2-7, there would be no significant impacts to water resources under the Proposed Action.

4.5 HEALTH AND SAFETY

Impacts to health and safety were assessed by evaluating the relative scope and location of proposed training activities associated with the No-Action Alternative or Proposed Action (as described in Chapter 2) and their potential to alter the existing conditions for health and safety (Section 3.5). The impact analysis considered the potential for aircraft, vehicle, and ordnance-related accidents to occur under the No-Action Alternative or Proposed Action within the context of existing SOPs for avoidance of such accidents. Similarly, the potential for uncontrolled releases of hazardous materials were evaluated within the context of existing spill prevention plans and hazardous materials management procedures that would continue to be implemented. Process knowledge or other available data were used to predict the type and quantity of wastes that would likely be generated, and these estimates were compared with current generation rates, waste types, capability for managing hazardous wastes, and regional landfill capacities (in the case of solid wastes).

The analyses identified existing contamination sites and compared the location of these sites with the location of proposed activities and the existing and proposed avoidance procedures. Health and safety risks to military personnel are an inherent and unavoidable aspect of military training, due largely to the nature of military missions and the need to train under realistic conditions. To reduce such risks to the extent possible during training, all Marine Corps training operations and exercises are designed and conducted in accordance with comprehensive safety procedures, rules and regulations, all of which would be followed under the Proposed Action.

Impacts to health and safety were evaluated for the following:

- Risk and frequency of aircraft mishaps.
- Emergency service demand changes (e.g., interference with an adopted emergency response plan or emergency evacuation plan).
- Likelihood of an uncontrolled release of hazardous materials that could contaminate soil, water, or air.
- Generation of hazardous/solid waste types or quantities that could not be accommodated by the current management system.
- Disturbance of any existing contamination sites from proposed activities resulting in exposure or remediation equipment damage.

4.5.1 No-Action Alternative

4.5.1.1 Aircraft Operations

The potential risk of aircraft-related accidents with implementation of the No-Action Alternative would not change from baseline conditions. This is based on the following considerations:

- Aircraft operations at the Combat Center would not increase compared to current levels.
- The southwestern-most corner of the Combat Center is currently designated as a restricted or sensitive area for aircraft landings, which is the only part of the Combat Center that abuts privately owned residential land (DoN 2012). Therefore, the likelihood of aircraft mishaps involving anyone not involved with the specific training action would continue to be very low.
- Flight activity under the No-Action Alternative would continue to be consistent with established APZs. Aircraft would continue to follow established local approach and departure patterns, and no new flight

tracks would be established (Combat Center 2010). The MV-22 has been operating at the Combat Center since 2010 and under the No-Action Alternative, this would not change. Therefore, flight activity and subsequent operations within the Combat Center airspace would not result in increased safety risk, and no significant impact related to APZs would occur.

- Under the No-Action Alternative, the rigorous aircraft maintenance procedures, flight safety protocols, and airspace management (which is coordinated with the FAA) would remain unchanged, and would continue to be in effect at all times.

4.5.1.2 BASH

As noted in Section 3.5.3.1, while BASH can be a serious threat to aircraft in many operating environments, BASH incidents at the Combat Center are very infrequent (Naval Safety Center 2016). Under the No-Action Alternative, there would be no change in flight operations at the Combat Center and therefore, there would be no impact to health and safety relative to BASH under the No-Action Alternative.

4.5.1.3 Aircraft-Delivered Ordnance.

MV-22 flight crews operate the rear-ramp machine gun at the Combat Center in accordance with existing safety procedures. Under the No-Action Alternative, there would be no increase in the frequency of aerial gunnery training operations. Therefore, there would be no significant impact to health and safety relative to aircraft-delivered ordnance under the No-Action Alternative.

4.5.1.4 Ground Training Operations

Under the No-Action Alternative, ground training operations at the Combat Center would continue to follow existing safety procedures in accordance with CCO 3500.4K, and routinely clear ranges to neutralize UXO and reduce safety risks, as described in Section 3.5.3.2. Munitions debris and other range debris would continue to be processed through the NREA Range Residue Processing Section. Therefore, there would be no significant impacts to health and safety from ground training operations under the No-Action Alternative.

4.5.1.5 Ground-delivered Ordnance Use

Under the No-Action Alternative, there would be no change in the amount of ground-delivered ordnance used, where it is used, the manner in which it is stored, and how it is cleared from the training areas by following existing procedures and protocols. Therefore, there would be no significant impact to health and safety relative to ground-delivered ordnance under the No-Action Alternative.

4.5.1.6 Unauthorized Entry

Under the No-Action Alternative, there would be no change to unauthorized entry. As described in Section 3.5.3.3, unauthorized public access occurs by scrappers, off-highway vehicle users, and recreational users. Scrappers are of particular concern, as they are civilians who are illegally on the Combat Center removing salvageable materials (aluminum, brass, copper, etc.) from the training areas. The Combat Center provides signage on, around, and near the installation property, road crossings, and likely access points to ensure the public are informed that the area they are entering is an exclusive military use area with active military exercises. The Marine Corps procedures are employed when someone is seen or suspected of scrapping in the training areas (CCO 3500.4K). No aspect of the No-Action Alternative would affect unauthorized entry. Therefore, there would be no significant impact to health and safety relative to unauthorized entry under the No-Action Alternative.

4.5.1.7 Training Areas and Fixed Ranges

Under the No-Action Alternative, there would be no change to fixed ranges. As described in Section 3.5.3.2, *Ground Training Operations* the artillery and aviation firing and target points on the training areas are generally exercise-dependent and would continue to be so. The five training areas located in the southwest corner of the installation (Acorn, East, Gypsum Ridge, Sand Hill, and West) and for the other restricted or environmentally sensitive areas listed in Section 3.5.3.2, the restrictions or use-limitations would remain intact. The 3,280-ft (1,000-m) buffer established along the interior of the installation boundary to prevent military munitions from being fired beyond the installation borders would continue to be enforced. Therefore, there would be no significant impact to health and safety relative to training areas and fixed ranges under the No-Action Alternative.

4.5.1.8 Hazardous Materials and Hazardous/Solid Waste

Hazardous Materials

Hazardous materials associated with the No-Action Alternative would consist primarily of jet fuel, hydraulic fluids, engine oil, and solvents associated with aircraft maintenance. All these materials are currently present at the Combat Center and stored/handled/managed by the NREA according to the ICOP (DoN 2004) and CCO 3500.4K. Refueling would continue to occur at the SELF, Camp Wilson, and FARPS in the existing PRTSSs, or on or adjacent to MSRs in the Combat Center training areas. Maintenance would occur at established maintenance facilities on the Combat Center or at other installations, where infrastructure such as berms and oil/water separators and proper procedures are in place to prevent or contain potential releases of hazardous materials/wastes.

Units involved with training operations would continue to adhere to the provisions of CCO 3500.4K to prevent and minimize potential releases of fuel and other hazardous materials as described in Section 3.5.3.4, *Hazardous Materials and Hazardous Waste.* Should an accidental release of fuel and hazardous materials occur as part of the No-Action Alternative, it would be managed by the NREA per existing procedures. In the event of an accidental release of fuel that contaminates soil, that soil would be either remediated as described in Section 3.5.3.4, or used as daily cover in the installation landfill once it meets regulatory compliance standards without remediation. Therefore, there would be no significant impact to health and safety relative to hazardous materials under the No-Action Alternative.

Hazardous Wastes

Hazardous wastes associated with the No-Action Alternative would be primarily used engine oil, used solvents, used hydraulic fluids, spent batteries, and oily/solvent soaked rags (e.g., wastes associated with aircraft and vehicle maintenance). These wastes are already present at the Combat Center and managed according to federal and state regulations, and Marine Corps requirements, by the NREA per the guidance of the ICOP. Under the No-Action Alternative, hazardous wastes would continue to be managed by the NREA. Therefore, there would be no significant impact to health and safety relative to hazardous wastes under the No-Action Alternative.

Solid Waste

As described in Section 3.5.3.5, non-hazardous wastes generated during training events are managed according to the procedures defined in CCO 3500.4K. Range residue such as aluminum, brass, and plastic is recycled (MAGTF Training Command 2011). Under the No-Action Alternative, there would be no increase in training activities, thus no increase in solid waste is anticipated. Solid waste generated under the No-Action Alternative would continue to be managed according to the procedures defined in CCO

3500.4K. Range residue and other recyclable materials would continue to be recycled as appropriate. There would be no impact on the capacity of the Combat Center landfill or other area landfills as a result of the No-Action Alternative. There would be no increase in other types of solid waste associated with the No-Action Alternative. Therefore, there would be no significant impact to health and safety relative to solid waste under the No-Action Alternative.

Contaminated Sites

In the No-Action Alternative area there are two IR sites 17A and 18 at Camp Wilson with requests for regulatory closure with no land use restrictions (NAVFAC Southwest 2016). Therefore, there would be no significant impact to health and safety relative to contaminated sites under the No-Action Alternative.

4.5.1.9 Other Safety Issues

Fire Response and MEDEVAC Support

There would be no change to fire response or MEDEVAC procedures as described in Section 3.5.3.7, and the existing fire response MEDEVAC infrastructure would continue to have capacity to support the No-Action Alternative. Therefore, there would be no significant impact to health and safety relative to fire response and MEDEVAC under the No-Action Alternative.

The Combat Center has numerous plans, policies, and procedures in place to prevent aircraft and vehicle mishaps, to minimize hazards associated with munitions and explosives, to prevent or address accidental releases of hazardous materials and wastes, and to respond to emergency, fire, security, and medical incidents. These procedures are described in Section 3.5, and would continue to be followed under the No-Action Alternative. Therefore, there would be no significant impacts to health and safety under the No-Action Alternative.

4.5.2 Proposed Action

Under the Proposed Action, additional LZs within existing training areas would be allowed in areas that are cleared of sensitive resource concerns. The Combat Center has numerous plans, policies, and procedures in place to prevent aircraft and vehicle mishaps, to minimize hazards associated with munitions and explosives, to prevent or address accidental releases of hazardous materials and wastes, and to respond to emergency, fire, security, and medical incidents. These procedures are described in Section 3.5, and would continue to be followed under the Proposed Action.

4.5.2.1 Aircraft Operations

Although additional LZs within existing training areas would be allowed in areas cleared of sensitive resource concerns, the potential risk of aircraft-related accidents with implementation of the Proposed Action would not change appreciably from baseline conditions. This is based on the following considerations:

- Aircraft operations at the Combat Center would not increase compared to current levels.
- The southwestern-most corner of the Combat Center would be designated as a No-Go area for aircraft landings, which is the only part of the Combat Center that abuts privately owned residential land (DoN 2012). Therefore, the likelihood of aircraft mishaps involving anyone not involved with the specific training action is very low.
- Flight activity under the Proposed Action would be consistent with established APZs. Aircraft would follow established local approach and departure patterns, and no new flight tracks would be established (Combat Center 2010). The MV-22 has been operating at the Combat Center since 2010 and the

Proposed Action would not represent a change from existing conditions. Therefore, flight activity and subsequent operations within the Combat Center airspace would not result in increased safety risk, and no significant impact related to APZs would occur.

- Under the Proposed Action, the rigorous aircraft maintenance procedures, flight safety protocols, and airspace management (which is coordinated with the FAA) would remain unchanged, and would continue to be in effect at all times.
- Although the MV-22 would perform off-airfield LTOs over a much wider area with more varied terrain, it would still operate in an airfield environment at the SELF that is similar to the current operational environment. Additionally, as described in Section 2.2.1.7, *Aircraft LZs*, the MV-22 and rotary-wing aircraft would only land in areas that are determined in advance to be safe for landing.

BASH. As noted in Section 3.5.3.1, while BASH can be a serious threat to aircraft in many operating environments, BASH incidents at the Combat Center are very infrequent (Naval Safety Center 2016). Under the Proposed Action, no significant increases in flight operations would occur at the Combat Center. However, helicopter flights and LTOs would occur over a much more extensive area, where strikes from large species other than waterbirds (e.g. turkey vultures, ravens) may pose a hazard. Before implementation of the Proposed Action, NREA biologists would evaluate the potential presence of such bird species in the proposed new LZs, and the BASH plan would be revised accordingly. Pilots would be advised of identified areas of increased BASH potential and the areas would be avoided during training activities. Marine Corps pilots are trained and experienced in procedures for maintaining control of their aircraft and carrying out an emergency landing with an inoperative engine if necessary. Therefore, there would be no significant change in BASH potential and impacts to health and safety under the Proposed Action would not be significant.

Aircraft-Delivered Ordnance. MV-22 flight crews are already operating the rear-ramp machine gun at the Combat Center in accordance with existing safety procedures. Under the Proposed Action, there would be no increase in the frequency of aerial gunnery training operations. Therefore, there would be no significant impact to health and safety relative to aircraft-delivered ordnance under the Proposed Action.

In conclusion, under the Proposed Action, establishment and utilization of additional LZs within existing training areas would be conducted in accordance with the same comprehensive safety procedures, rules and regulations, as the No-Action Alternative. Therefore, there would be no significant impact to health and safety under the Proposed Action.

CHAPTER 5
CUMULATIVE IMPACT ANALYSIS

The analysis of cumulative impacts (or cumulative effects) follows the objectives of NEPA and CEQ regulations (40 CFR Parts 1500-1508) that provide the implementing procedures for NEPA. The CEQ regulations define cumulative impacts as:

> "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." (40 CFR § 1508.7)

The CEQ also provides guidance on cumulative impacts analysis in Considering Cumulative Effects under NEPA (CEQ 1997). Noting that environmental impacts result from a diversity of sources and processes, the CEQ guidance observes that "no universally accepted framework for cumulative effects analysis exists," while noting that certain general principles have gained acceptance. One such principle provides that "cumulative effects analysis should be conducted within the context of resource, ecosystem, and community thresholds—levels of stress beyond which the desired condition degrades." Thus, "each resource, ecosystem, and human community must be analyzed in terms of its ability to accommodate additional effects, based on its own time and space parameters." Therefore, cumulative effects analysis normally would encompass geographic boundaries beyond the immediate area of the Proposed Action, and a time frame including past actions and foreseeable actions, to capture these additional effects. Bounding the cumulative effects analysis is a complex undertaking, appropriately limited by practical considerations. Thus, CEQ guidelines observe, "[i]t is not practical to analyze cumulative effects of an action on the universe; the list of environmental effects must focus on those that are truly meaningful."

Boundaries, or the ROI, for analyses of cumulative impacts in this EA vary. Delineation of the ROI is based upon proximity to the Proposed Action and which resources are affected. The cumulative impacts analysis focuses on projects that directly overlap with the proposed alternatives (i.e., occur in similar locations and potentially impact similar resources). Section 5.1 identifies the projects considered in the cumulative analysis. Section 5.2 provides an analysis of potential cumulative impacts for each of the environmental resources discussed in this EA.

5.1 PAST, PRESENT, AND REASONABLY FORESEEABLE PROJECTS

Identifiable effects of other past, present, and reasonably foreseeable future actions are analyzed and evaluated to the extent they may be additive to impacts of the Proposed Action. As part of the evaluation of cumulative impacts, a review of other projects in the vicinity of the action alternatives was conducted. Projects that are older than 5 years have been considered within the baseline of this analysis (refer to Chapter 3) and are not considered below. Projects that are considered reasonably foreseeable future actions are projects that would occur by or in 2022. Projects that would occur after 2022 are highly uncertain and thus do not meet the criteria of being reasonably foreseeable. The geographic distribution, intensity, duration, and historical effects of similar activities were considered when determining whether a particular activity may contribute cumulatively to the impacts of the Proposed Action on the resources identified in this EA. The following discussion lists the past, present, and reasonably foreseeable future projects assessed in this section, along with any NEPA or environmental analysis that has been prepared or is anticipated to occur.

Other activities at the Combat Center that do not have the potential to cumulatively interact with the Proposed Action are not addressed in this EA.

5.1.1 Past Projects

5.1.1.1 Desert Tortoise Captive Rearing Facility ("Head Start") at the Combat Center

An EA was prepared in September 2005 to evaluate the environmental impacts associated with the construction and operation of a desert tortoise captive rearing ("head start") facility at the Combat Center. The facility would aid in the recovery and eventual delisting of the desert tortoise. The proposed action would allow the protection of hatchling and juvenile desert tortoises from predation, and allow for their release and natural reproduction in the wild. Resources that were analyzed for impact included biological resources, air quality, water resources, cultural resources and public health and safety. Based on the results of the analysis, it was determined that there would be no significant environmental impacts with implementation of the action. A Finding of No Significant Impact (FONSI) was signed on 12 October 2005.

5.1.1.2 AMZs for MV-22 and Rotary-Wing Training

An EA was prepared to evaluate the potential environmental impacts associated with the use of AMZs by MV-22 aircraft and rotary-wing aircraft at the Combat Center (USMC 2010). Specifically, the proposed action would use five different types of AMZs to integrate the MV-22 aircraft into the existing rotary-wing tactical and ground training exercises. The EA identified the environmental consequences of establishing 48 LZs (Alternative 1) and 73 LZs (Alternative 2) at various locations within the Combat Center. These LZs are distributed throughout the Combat Center and are included in the discussion of existing training activities in this EA (see Section 2.2.1.7, *Aircraft LZs*). Based on the results of the analysis, it was determined that there would be no significant impacts to the environment with implementation of the proposed action. A FONSI was signed for the EA on 21 May 2010 (USMC 2010).

5.1.1.3 Permanent Facilities Bed-Down of Increased End-Strength

An EA was prepared in September 2009 to evaluate the environmental impacts associated with construction of permanent facilities and infrastructure and the addition of 300 Marines at the Combat Center to support the Marine Corps' Grow the Force Initiative. All construction was expected to be completed by 2016. Resources that were evaluated for impact included geological resources, biological resources, cultural resources, air quality, socioeconomics, utilities and community services, transportation and circulation, and public health and safety. Based on the results of the analysis, it was determined that there would be no significant impacts to the environment with implementation of the action. A FONSI was signed on 29 September 2009.

5.1.1.4 West Coast Basing of the F-35B

An EIS was prepared to evaluate the potential impacts from the west coast basing of the F-35B aircraft (DoN 2010a). The F-35B would replace legacy F/A-18A/B/C/D Hornet and AV-8B Harrier aircraft in the Third and Fourth Marine Air Wings. The proposed action addressed in the EIS included:

- Basing of 11 operational F-35B Joint Strike Fighter squadrons (176 aircraft), and 1 F-35B Operational Test and Evaluation squadron (8 aircraft) on the West Coast of the U.S.;
- Construction and/or renovation of airfield facilities and infrastructure necessary to accommodate and maintain the F-35B squadrons;

- Changes to personnel to accommodate squadron staffing; and
- Conducting F-35B readiness and training operations to attain and maintain proficiency in the operational employment of the F-35B and special exercise operations.

This EIS addressed six basing alternatives, none of which are at the Combat Center. However, the proposed action includes occasional use of airspace overlaying the Combat Center: Restricted Area 2501 North, South, East, and West; Bristol Air Traffic Controlled Assigned Airspace and Military Operations Area; and Sundance Military Operations Area. The frequency of airspace use would be equivalent to or less than current use by the aircraft that the F-35B is replacing. The ROD for the EIS was signed on 10 December 2010 (DoN 2010b).

5.1.1.5 West Coast Basing of the MV-22

West Coast Basing of the MV-22 tilt-rotor aircraft would require construction of expanded apron space and hangar upgrades at Marine Corps Air Station Miramar and Marine Corps Air Station Pendleton. The Marine Corps estimates these MV-22s would fly about 3,900 operations annually at the Twentynine Palms Expeditionary Airfield and in the associated airspaces, replacing transient helicopter traffic. Transition from the helicopters to the MV-22 is scheduled to occur between 2010 and 2020. A Final EIS was prepared for this action with a ROD signed on 19 November 2009 (DoN 2009b).

5.1.1.6 Aerial Maneuver Zones for MV-22 and Rotary-Wing Training

An EA was completed to analyze the impacts associated with the use of aerial maneuver zones by MV-22 aircraft and rotary-wing aircraft at the Combat Center (USMC 2010). Under the proposed action, up to eight MV-22 aircraft squadrons (12 aircraft per squadron) would be integrated into the existing/on-going tactical and ground training activities. Established Special Use Airspace would not be expanded or modified with implementation of the proposed action. The EA addressed two action alternatives and the No-Action Alternative. Resources evaluated for impact include biological resources, cultural resources, air quality, and noise. The FONSI for this project was signed in May 2010 (USMC 2010).

5.1.1.7 Electrical System Upgrade at the Combat Center

An EA was prepared to evaluate the potential environmental impacts associated with P-128, Electrical Infrastructure Upgrades, to construct and extend utilities to the new substation constructed by P-127 in support of planned facilities in the North Mainside build-out area. The project constructed the Leatherneck substation and upgrades to the Hi-Desert and Carodean substations off the installation. The new transmission substation has three regulated transmission substation transformers (115-kilovolt & 34.5-kilovolt). Also, 115-kilovolt and 38-kilovolt switching and protective devices were constructed at Building 3083J in the vicinity of the existing Ocotillo switching station. Existing substation upgrades included upgrading the existing Southern California Edison dedicated 34.5-kilovolt medium voltage distribution system to a 115-kilovolt high voltage transmission system and adding a new 115-kilovolt high voltage transmission loop. In addition, a new 3-phase, 3-wire, 34.5-kilovolt medium voltage distribution line on 60 ft (18 m) class I poles was extended. Supporting facilities included utility easements for the new utility corridor off-installation. Based on the results of the analysis, it was determined that there would be no significant impacts to the environment with implementation of the proposed action. A FONSI for the P-128 Electrical Infrastructure Upgrades was signed on 24 March 2011.

5.1.1.8 Ocotillo Marine Mart

An EA was prepared in 2012 to evaluate the potential environmental impacts associated with construction of a new exchange, gas station, and ancillary improvements. The development footprint for this project is

located within the Ocotillo Heights area of Mainside. Based on the results of the analysis, it was determined that there would be no significant impacts to the environment with implementation of the proposed action. A FONSI for the EA was signed on 19 March 2012 (DoN and USMC 2012).

5.1.1.9 Adult Medical Care Clinic Replacement

An EA was prepared to evaluate the potential environmental impacts associated with the proposed construction and operation of a replacement Adult Medical Care Clinic at the Combat Center. The proposed action involved the construction and operation of a replacement Adult Medical Care Clinic after the demolition of the existing Adult Medical Care Clinic buildings as well as the relocation of all personnel associated with the Adult Medical Care Clinic. Based on the results of the analysis, it was determined that there would be no significant impacts to the environment with implementation of the proposed action. A FONSI was signed for the EA on 22 February 2013 (DoN 2013b).

5.1.1.10 Proposed Changes to the Permanent Facilities Bed-down and Infrastructure Project

A Supplemental EA was completed in August 2014 to evaluate the potential environmental impacts associated with changes to the footprint and scope of some of the projects within the 2009 EA (P-221, P-504, and P-159) as well as the addition of two new projects (P-930 and P-558) (DoN 2014a). The proposed action would occur primarily in Mainside and the Camp Wilson/SELF, which are two areas within the Combat Center. Based on the results of the analysis, it was determined that there would be no significant impacts to the environment with implementation of the proposed action. A FONSI was signed for the EA on 22 August 2014 (DoN 2014b).

5.1.2 Present Projects

5.1.2.1 Land Acquisition/Airspace Establishment to Support Large-Scale Marine Air Ground Task Force Live-Fire and Maneuver Training

An EIS was prepared to evaluate the impacts from the proposed extension of existing installation operating areas through acquisition of additional training lands, modification and establishment of military special use airspace, and implementation of Marine Expeditionary Brigade-level sustained, combined-arms, live-fire, and maneuver training exercises within current and proposed operating areas at the Combat Center. Proposed training activities would occur within existing training areas and within proposed land acquisition areas located along the border of the Combat Center. The expansion areas are located to the west, south, and east of the Combat Center. Major resource areas of concern included biological resources, cultural resources, air quality, socioeconomics, recreation, land use, health and safety, and airspace management. A Final EIS was published in July 2012 (DoN 2012). The ROD concluded that there would be a significant, unmitigable impacts to land use (as a result of incompatibility with the Johnson Valley Off Highway Vehicle Area Management Plan), recreation (as a result of loss of access to and the use of 57% of the Johnson Valley Off Highway Vehicle Area), airspace management (as a result of the adverse effects of the proposed new and modified Special Use Airspace on Victor airway and jet route instrument flight rules air traffic within or adjacent to the airspace), and air quality (as a result of nitrous oxide emissions). The Proposed Action would also result in significant and unmitigable impacts to biological resources as a result of the potential adverse effects of training activities on desert tortoises including total potential take of between 154 and 714 federally threatened desert tortoises over the life of the project (between 121 and 189 in the acquisition study areas); however, it would not result in jeopardy of the species (DoN 2013a). Upon completion of ESA section 7 consultations, the USFWS concluded in the BO that take would occur due to military operations and concentrated off-highway vehicle usage in the Johnson Valley area (USFWS 2012).

5.1.2.2 241-acre Solar Photovoltaic (PV) System

An EA was prepared in 2015 to evaluate the potential environmental impacts associated with the construction, operation, maintenance, and eventual decommissioning of a 241-acre (98-ha) solar PV system at Mainside, west of Adobe Road and a transmission line to transmit the energy to the civilian grid (Combat Center 2015f). The PV site consists of disturbed vacant land that was previously used as an airfield. Depending on the type of PV panel selected by the operator/lessee, the proposed project could produce 25-57 megawatts of power. Based on the results of the analysis, it was determined that there would be no significant impacts to the environment with implementation of the proposed action. A FONSI was signed for the EA on 16 November 2015.

5.1.2.3 Desert Tortoise Translocation Required for Land Acquisition/Airspace Establishment to Support Large-Scale Marine Air Ground Task Force Live-Fire and Maneuver Training

Since the 2012 Final EIS and 2013 ROD (DoN 2013a) for Land Acquisition/Airspace Establishment to Support Large-Scale Marine Air Ground Task Force Live-Fire and Maneuver Training (see Section 5.1.2.1), the USMC conducted detailed studies and coordinated with USFWS, CDFW, and the BLM on alternative translocation plans for the desert tortoise, as required in the 2017 Biological Opinion (USFWS 2017). In light of new information gained from these efforts, the DoN elected to prepare a Supplemental EIS (SEIS) focusing on the evaluation of potential impacts of alternative tortoise translocation plans (DoN 2017). The SEIS analyzed the potential environmental impacts of two action alternatives (Alternative 1 and Alternative 2) addressing different methodologies and locations for implementing a Desert Tortoise Translocation Program in support of large-scale Marine Air Ground Task Force live-fire and maneuver training. Potential impacts were analyzed for biological resources, land use (including recreation), air quality, and cultural resources. With the implementation of proposed SCMs, neither action alternative would result in significant impacts to any resource on a project-level basis. However, the past, present, and reasonably foreseeable future actions would result in potentially significant cumulative impacts to biological resources (i.e., vegetation (including rare plants), wildlife, the desert tortoise), Land Use (i.e., recreation and off-highway vehicle use, grazing), and Cultural Resources (i.e., cultural and spiritual landscape).

5.1.2.4 Water Treatment Plant at the Combat Center

An EA is being prepared to evaluate the potential environmental impacts associated with a proposed drinking water treatment plant and installation of three groundwater wells at the Combat Center. The proposed action would: (1) provide drinking water to the Combat Center personnel which meets the federal and State of California standards for drinking water; and (2) allow for the longevity of quality drinking water from drinking water sources within the Combat Center boundary. The EA addresses five action alternatives and the No-Action Alternative. Potential impacts were analyzed for geological resources, biological resources, water resources, cultural resources, aesthetics, air quality, electrical utilities, socioeconomics, and public health and safety. No significant environmental impacts are expected to result from any of the action alternatives, which differ in treatment methods. A FONSI is expected in 2017, and it is expected that the water plant would be constructed in approximately 1 year.

5.1.2.5 Mojave Trails National Monument

The Mojave Trails National Monument was designated by Presidential Proclamation in February 2016 and encompasses approximately 1.6 million acres (647,500 ha) of federal lands currently managed by the BLM between Barstow and Needles, California. The Mojave Trails National Monument is located north and east of the Combat Center and contains approximately 358,000 acres (145,000 ha) of established wilderness

areas and 84,400 acres (34,200 ha) currently managed by the BLM as the Cady Mountains Wilderness Study Area. The monument also protects irreplaceable historic resources including ancient Native American trading routes, World War II-era training camps, and the longest remaining undeveloped stretch of Route 66. The designation preserves and enhances public access, for activities such as hunting and fishing, which continue to be managed by the State of California. Motorized vehicle use is limited to roads existing as of the date of this proclamation. The Presidential Proclamation – Establishment of the Mojave Trails National Monument – notes that "the area contains some of the Mojave Desert's best habitat for the threatened desert tortoise and provides important corridors for the fragile species." Therefore, the desert tortoise is considered by BLM to be one of the values for which the monument was determined. The BLM is currently developing a Mojave Trails National Monument Management Plan.

5.1.2.6 Desert Renewable Energy Conservation Plan

The Desert Renewable Energy Conservation Plan (DRECP) is a collaborative, interagency landscape-scale planning effort covering 22.5 million acres (9.1 million ha) in seven California counties: Imperial, Inyo, Kern, Los Angeles, Riverside, San Bernardino, and San Diego. The plan was conceived and developed through a collaborative effort by the Renewable Energy Action Team Agencies, which consists of the BLM, USFWS, California Energy Commission, and CDFW. Recognizing the diverse values and resources found in the Mojave and Colorado/Sonoran desert regions, the Renewable Energy Action Team Agencies' vision for the DRECP was to:

1) Advance federal and state natural resource conservation goals and other federal land management goals.
2) Meet the requirements of the federal ESA and Federal Land Policy and Management Act.
3) Facilitate the timely and streamlined permitting of renewable energy projects.

The planning effort is focused on the desert regions in the seven California counties identified above. As part of Phase I, the BLM issued a September 2016 ROD approving its Land Use Plan Amendment to the California Desert Conservation Area Plan, and Bishop and Bakersfield Resource Management Plans. The Land Use Plan Amendment represents the public-lands component of the DRECP, identifying areas appropriate for renewable energy development, as well as areas important for biological, environmental, cultural, recreation, social, and scenic conservation, consistent with the Federal Land Policy and Management Act multiple-use and sustained yield requirements. The amendments have been designed to result in an efficient and effective biological conservation and mitigation program providing renewable energy project developers with permit streamlining and cost containment while at the same time conserving, restoring, and enhancing natural communities and related ecosystems.

Phase II of the DRECP is pending and focuses on better aligning local, state, and federal renewable energy development and conservation plans, policies, and goals. It includes building off of the Renewable Energy Conservation Planning Grants that were awarded by the California Energy Commission to counties in the plan area.

The BLM released the Final EIS for the Land Use Plan Amendment in November of 2015 (BLM 2015a) and the public comment period ended on 9 May 2016; the related ROD was signed 14 September 2016 (BLM 2016a).

5.1.2.7 West Mojave Plan and West Mojave Route Network Project and Plan Amendment

In February 2015, the BLM published the Draft Supplemental EIS for the West Mojave Route Network Project and Plan Amendment (BLM 2015b). The West Mojave Route Network Project is a travel management planning effort covering 9.24 million acres (3.74 million ha) in the West Mojave area of the

California desert that supplements the 2006 West Mojave Plan (BLM 2006). The public comment period for the Draft EIS closed in January 2016 (BLM 2016b). The BLM has requested an extension of the planning schedule to include the publication of a new Draft SEIS to conform with the DRECP land use amendment with the ROD expected in October 2019.

5.1.3 Reasonably Foreseeable Projects

5.1.3.1 General Military Construction (MILCON) Projects

The remaining projects listed in Table 5-1 are construction projects that are programmed for the Mainside area of the Combat Center between the 2012 and 2022 timeframe (*Note*: projects listed from 2012 to 2016 have not yet been funded). These projects are not well-defined at this time, and very little information is available to characterize the potential effects of each project.

Table 5-1. Construction Projects at the Combat Center

Project Number	*Project Title*	*Date (FY)*
P177	MULTI-USE OPERATIONAL FITNESS AREA	2012[1]
P105	TRACKED VEHICLE MAINTENANCE COVER	2012[1]
P184	ADULT MEDICAL CARE CLINIC	2013[1]
P159	CAMP WILSON INFRASTRUCTURE UPGRADE	2014[1]
P1232	MICROGRID EXPANSION	2016
P192	POTABLE WATER TREATMENT / BLENDING FACILITY	2018
P1231	WASTEWATER TREATMENT PLANT	2018
P221	MCTOG/MCLOG/INTEL COMPLEX	2018
P1233	CENTER MAGAZINE AREA SAFETY UPGRADES	2018
P924	BATTLE SIMULATION TRAINING CENTER	2018
P988	COMBAT CENTER GATE RECONFIGURATION	2018
P680	WEST GYM ADDITION	2019
P558	SUBSISTENCE STORAGE FACILITY	2019
P900	MCCES CLASSROOM	2019
P182	BATTALION OPERATIONS CENTER	2019
P990	RANGE CONTROL FACILITY	2019
P926B	LIBRARY / LIFELONG LEARNING CENTER, PHASE II	2019
P216	CAMP WILSON TRAINING OPS FUELING FACILITY	2019
P930	CONSTRUCT PWD AND ROICC FACILITY	2020
P504	CONSOLIDATED COMMUNITY SUPP.	2020
P160	EXPEDITIONARY TRAINING SUPPORT	2020
P581	COMBAT CENTER HQ BUILDING	2020
P989	AT/FP PERIMETER FENCE	2020
P954	MAGTFTC OPERATIONS CENTER	2021
P194	CONVERT BUILDING 2025 TO WHEELED VEHICLE MAINTENANCE FACILITY	2021
P193	MTU/RTAMS MULTI-PURPOSE CLASSROOM	2021
P617	WASTE HANDLING AND RECOV FACILITY	2021
P226	COMBAT CENTER LEAR ROAD GATE	2021
P618	MULTI-PURPOSE ADMINISTRATION BUILDING	2021
P109	GROW THE FORCE - TACTICAL VEHICLE WASH RACK	2022
P191	ADDITION TO CAMP WILSON GYM	2022
P602	TRAINING INTEGRATION CENTER	2022

Table 5-1. Construction Projects at the Combat Center

Project Number	*Project Title*	*Date (FY)*
P927	MCCES CLASSROOM	2022
P902	MCCES VEHICLE MAINTENANCE & SUPPLY FACILITY	2022
P928	MCCES CLASSROOM	2022
P603	MCCES EQUIPMENT FACILITY	2022
P929	MCCES CLASSROOM	-[2]
P903	MCCES CONSOLIDATED RADAR CLASSROOM	-[2]
P911	MCCES CLASSROOM	-[2]

Legend: AT/FP = Anti-Terrorism/Force Protection; HQ = headquarters; MCCES = Marine Corps Communication and Electronic School; MCLOG = Marine Corps Logistics Operations Group; MTU = Marksmanship Training Unit; PWD = Public Works Division; ROICC = Resident Office in Charge of Construction; RTAMS = Range Training Area Maintenance Section.

Note: [1] These projects have not yet been funded.
[2] Date to be determined, but expected to be 2022 or later.

Source: Combat Center 2016.

5.1.3.2 Development within the City of Twentynine Palms and the Surrounding Area

General community development and growth is expected to occur in all local and regional areas. Therefore, projects such as redevelopment of existing commercial areas, commercial and residential growth, and road maintenance projects are expected to occur in all areas surrounding the Combat Center.

A majority of the future planned or proposed projects for the City of Twentynine Palms are located along Adobe Road. These projects consist primarily of standard commercial development. In addition, there are a number of residential housing projects proposed for development east and southeast of Twentynine Palms. All projects are proposed to occur within the next 5 to 10 years as part of standard planning and community growth. The City of Twentynine Palms is required to implement CEQA for any projects that are determined not to be exempt from CEQA. Therefore, any project that is determined to have significant environmental effects would be required to mitigate these impacts to a level of insignificance (City of Twentynine Palms 2010). The following commercial and residential projects are located in the vicinity of the proposed action and have been approved or are pending:

- **80-acre Commercial Development Project –** Project to develop 80 acres (32 ha) for retail businesses, multi-family housing, and restaurants. Located on the northeast corner of Adobe Road and Valle Vista, just outside of the main gate of the Combat Center. The project was approved by the City of Twentynine Palms, but no construction was initiated and the application expired.
- **35-acre Residential Development Project** – Proposed development of 35 acres (14 ha) for 135 lots. Located on Amboy Road west of Adobe Road and south of the south study area. The tentative tract map was approved 4 October 2005, but the project is currently on hold.
- **10-acre Residential Development Project** – Pulliam Construction proposal to develop 10 acres (4 ha) for four lots. Located on the northwest corner of Utah Trail and Indian Trail, southwest of the south study area. The tentative tract map was approved 15 May 2005; project currently on hold.
- **5-acre Residential Development Project** - Sunwest Development proposal to develop 5 acres (2 ha) for 17 lots. Located on Amboy Road west of Adobe Road, and south of the south study area. Project pending.

5.2 CUMULATIVE IMPACTS

This section addresses potential cumulative impacts of the Proposed Action in conjunction with the aforementioned cumulative projects for each resource discussed in this EA.

5.2.1 Biological Resources

Implementation of either the No-Action Alternative or the Proposed Action would result in localized disturbances to Mojave Desert habitats and associated vegetation alliances and wildlife at any newly-designated LZ. In general, the impacts from such training exercises would be similar to those that have been closely monitored for years within current Combat Center operating areas or current practices allowing landings in low-sensitivity areas. While neither the No-Action Alternative nor the Proposed Action would approve rotary-wing or tilt-rotor aircraft to land in highly sensitive areas, the Proposed Action would allow such aircraft landings to occur in low-sensitivity areas without further environmental review. Impacts at the affected areas would be limited to noise, wind (downwash), and light ground disturbance from landings and dismounted training. There would be no new construction activities or removal of vegetation or geologic features, and the affected areas already experience considerable use for Marine Corps training activities.

The Combat Center INRMP (Combat Center 2012), the Combat Center's Head Start program (see Section 5.1.1.1), and regional conservation plans, in particular the West Mojave Plan (BLM 2005) and the DRECP (BLM 2015a), would continue to be implemented to minimize potential cumulative impacts to regional natural resources. Consultation with USFWS under section 7 of the ESA regarding the threatened desert tortoise may include the implementation of additional measures to lessen impacts. The full consideration of alternatives, and implementation of SCMs similar to those described in this EA, have been and would continue to be a component of projects affecting Mojave Desert biota.

While individual plants and animals including special-status species may be affected by any particular project, the use of lower sensitivity habitats for training at the Combat Center coupled with the conservation of higher sensitivity habitats, assures that project alternatives would not contribute to cumulative effects on the overall distribution or abundance of populations, habitats, and ecosystem functions and values. The environmental consequences of past projects are reflected in existing biological conditions, including the identification of special-status species by the USFWS and CDFW, the requirements identified in the 2002, 2012, and 2017 BOs (USFWS 2002, 2012, 2017), and baseline conditions identified in the INRMP (Combat Center 2012) and other regional conservation plans such as the Desert Tortoise Recovery Plan (USFWS 2011) and the DRECP (BLM 2015a).

Cumulative species-wide impacts are taken into account during NEPA analyses and ESA section 7 consultations, and appropriate mitigation measures are applied to avoid, minimize, or compensate for any potential impacts to biological resources (particularly special-status species). The 2017 BO (USFWS 2017) accounted for species-wide impacts. The 2017 BO supersedes the 2002 BO (USFWS 2002) except that the 2017 BO retains the 150-acre (61-ha) annual allotment of new ground disturbance for "construction and maintenance of infrastructure." Reasonably foreseeable projects that have not yet undergone environmental reviews under NEPA and ESA section 7 consultation would continue to follow required procedures to ensure that significant biological resource impacts are avoided, minimized, and/or compensated to the extent practicable. Therefore, neither the No-Action Alternative nor the Proposed Action would significantly add to cumulative impacts to biological resources.

5.2.2 Geological Resources

Implementation of the either the No-Action Alternative or Proposed Action, in conjunction with identified cumulative projects, would not result in significant cumulative impacts to geological resources. None of the cumulative projects would impact soils in the same manner or in the same areas as ongoing or proposed training operations. Appropriate design measures, erosion control plans, and standard construction practices would be implemented for all projects involving new construction to reduce the potential for cumulative impacts. Therefore, in conjunction with other past, present, or reasonably foreseeable projects, the No-Action Alternative and the Proposed Action would not result in significant cumulative impacts to geological resources.

5.2.3 Cultural Resources

Implementation of the No-Action Alternative or the Proposed Action would not result in significant impacts to historic properties. Projects that include ground disturbance from aircraft operations (e.g., downwash at landing areas) have the potential to impact prehistoric archaeological resources. However, measures have been designated to minimize and avoid impacts to historic properties, sites that require further evaluation, and/or sites that are of concern to the Native American community.

Future projects have the potential to impact cultural resources. Federal projects with potential for significant impacts to cultural resources would undergo Section 106 review under the NHPA and any potentially significant impacts would be mitigated, usually through avoidance when possible, or data recovery. However, archaeological sites are a limited resource; therefore, any impact on an archaeological site that is eligible or potentially eligible for listing on the NRHP and/or is of concern to the Native American community may contribute to a cumulative impact. In such cases, government to government coordination would ensure tribal concerns are addressed.

Under the Proposed Action, there would be no significant direct or indirect impacts to historic properties or unevaluated sites. The Proposed Action includes measures to reduce the potential for impacts to cultural resources. Therefore, in conjunction with other past, present, or reasonably foreseeable projects, the No-Action Alternative and the Proposed Action would not result in significant cumulative impacts to cultural resources.

5.2.4 Water Resources

Implementation of the either the No-Action Alternative or Proposed Action, in conjunction with identified cumulative projects, would not result in significant cumulative impacts to water resources. Many of the cumulative projects that involve training are included in analysis of the No-Action Alternative and the Proposed Action presented in Section 4.4. None of the cumulative projects involving construction (primarily at Mainside) would impact surface water resources in the same manner or in the same areas as ongoing or proposed training operations. Appropriate design measures, erosion control plans, and standard construction practices would be implemented for all projects involving new construction to reduce the potential for water resource impacts. Therefore, in conjunction with other past, present, or reasonably foreseeable projects, the No-Action Alternative and the Proposed Action would not result in significant cumulative impacts to water resources.

5.2.5 Health and Safety

None of the projects described in Section 5.1-5.2 would be expected to generate significant cumulative impacts with either the Proposed Action or the No-Action alternatives as described in this EA. The Combat Center has policies, plans, and procedures in place for protecting military personnel and the public during training operations, which would continue to be followed with implementation of the No-Action Alternative or the Proposed Action. Ongoing and proposed training activities in conjunction with identified cumulative projects would not result in significant cumulative impacts with respect to health and safety. Therefore, in conjunction with other past, present, or reasonably foreseeable projects, the No-Action Alternative and the Proposed Action would not result in significant cumulative impacts to health and safety.

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CHAPTER 6
LIST OF AGENCIES CONTACTED

California State Historic Preservation Officer

United States Fish and Wildlife Service

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CHAPTER 7
LIST OF PREPARERS AND CONTRIBUTORS

7.1 LIST OF PREPARERS

The following Cardno personnel prepared this EA under the direction of NAVFAC Southwest.

Stella Acuna, Project Manager, 29 years' experience
B.A., Environmental Design and Planning

Selena Buoni, Air Quality, 11 years' experience
MPL, Master of Planning (Sustainable Land Use)

Margaret Bach, Health and Safety, 23 years' experience
B.A., Geology

Shannon Brown, GIS/Graphics, 8 years' experience
B.S., Environmental and Resource Science

Jackie Clark, Graphics, 9 years' experience
B.S., Business Administration

Blake Claypool, Biological Resources, 16 years' experience
B.S., Biology

J. Scott Coombs, Geological Resources, Water Resources, 18 years' experience
M.S., Marine Science

Christine Davis, Air Quality, 17 years' experience
M.S., Environmental Management

Jessica Dougherty, Cultural Resources, 8 years' experience
M.S., Anthropology

Mike Dungan, Biological Resources, 35 years' experience
Ph.D., Ecology and Evolutionary Biology

Kelly Gunn, Air Quality, 14 years' experience
B.A., Environmental Geology

Chris Noddings, Deputy Project Manager, 11 years' experience
M.S., Environmental Science and Management

Clint Scheuerman, Biological Resources, 12 years' experience
M.A., Biological Sciences

Rick Spaulding, Quality Control/Quality Assurance Lead, 33 years' experience
M.S., Wildlife and Fisheries Science

Richard Stolpe, Geological Resources, Water Resources, Health and Safety, 16 years' experience
M.A., Geography (Physical Science)

Claudia Tan, Document Production Manager, 13 years' experience
A.A., Liberal Arts and Sciences

7.2 LIST OF CONTRIBUTORS

Department of the Navy

Ryan Maynard
NEPA Planner, USMC Integrated Products Team

Gretchen Ward
NEPA Planner, USMC Integrated Products Team

Combat Center

Erin Adams, G-5 Community Plans
Encroachment Specialist

Leon Bowling, G-4 Public Works Division, Asset Management Branch
Facilities Planner/Environmental Affairs Supervisor

Walter Christensen, G-4 NREA Division, Natural & Cultural Resources Branch
Branch Head

Thomas Connors, NREA Pollution Prevention Branch
Abatement Chief

Chris Elliott, NREA Division, Pollution Prevention Branch
Water Resources Manager

Plessie 'Mike' Ellitt, III, NREA Division, Pollution Prevention Branch
Branch Head

Tim Gelinas, Range Management Division,
Range Development Officer

Leslie Glover, NREA Division, Natural & Cultural Resources Branch
Cultural Resource Specialist

John Hale, Ph.D., NREA Division, Natural & Cultural Resources Branch
Archaeologist

Brian Henen, Ph.D., NREA Division, Natural & Cultural Resources Branch
Ecologist

Brent Husung, NREA Division
Natural Resources Specialist

Scott Kerr, NREA Division
NEPA Program Manager

Sandra Merlan, Public Works Division, Planning Branch
Facilities Manager

Lt. Colonel Tim Pochop, NREA Division
Director

Maggie Sheatzley, NREA Division
EPCRA, IR, and UXO Manager

Norman Troy, NREA Division
Munitions IR Manager, Environmental Compliance Coordinator

Marcella Waggoner, NREA Division, Natural and Cultural Resources Branch
Natural Resources Specialist (Contractor)

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Appendix A

Public Involvement

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APPENDIX A
PUBLIC INVOLVEMENT PROCESS

1.1 INTRODUCTION

The United States (U.S.) Marine Corps (USMC) conducted a public involvement process to provide the public the opportunity to participate in the project by submitting comments on the adequacy and accuracy of the Draft Environmental Assessment (EA). The purpose of the public involvement process is to notify and inform interested and potentially affected stakeholders and the general public about the Proposed Action and solicit their input on the environmental analysis. The National Environmental Policy Act (NEPA), and regulations for implementing NEPA as set forth by the Council on Environmental Quality (CEQ), requires federal agencies to make diligent efforts to involve stakeholders and tribes in the development of environmental documents and stipulates public involvement during various stages of the environmental review process (42 U.S. Code § 4321, as amended; CEQ Regulations for Implementing NEPA [40 Code of Federal Regulations Part 1500, as amended]).

1.1.1 Public Involvement Overview

The public participation process commenced with publication of a Notice of Availability (NOA) of the Public Draft EA in two local newspapers (the *Hi-Desert Star* and the *Desert Trail*); the NOA of the Draft EA was published once per week per newspaper for 2 weeks for a total of four publications and was not be published during a holiday. The Draft EA was made available at two local libraries (the Twentynine Palms Branch Library and the Yucca Valley Branch Library, which are both branches of the San Bernardino County Library) and online on the Marine Corps Air Ground Combat Center's (MCAGCC) website. No public meetings were held.

1.1.2 Timing and Methods of Comment Submittal

A 30-day public comment period provided an opportunity for government agencies, interest groups, and the general public to comment on the Draft EA. The Marine Corps advertised that comments should be provided to the Twentynine Palms Ongoing Training EA Project Manager at NAVFAC Southwest. Two comment letters were received. The public comment period began on 21 April 2016 and concluded on 20 May 2016.

This Appendix contains all comments received during the public comment period. All received comments were assessed and considered both individually and collectively during development of this Final EA. Written responses were prepared for all comments and are also included in this Appendix. Certain substantive comments prompted additional data collection, impact analysis, and text changes or additions that were incorporated into this Final EA.

1.2 OVERVIEW OF COMMENTS AND RESPONSES

1.2.1 Comment Response Process

The USMC implemented the following process for reviewing and responding to all comments received during the public comment period for the Draft EA:

- The USMC carefully reviewed the comment letters and assigned a unique number to each. Comment letters for which distinct or separable points could be identified and addressed were

delineated using a red vertical line in the margin to subdivide the letter into numbered "sub-comments."

- Appropriate resource specialists and USMC authorities considered all comments (and sub-comments) and prepared and approved appropriate written responses.
- As appropriate, based on substantive comments about the Draft EA analysis and findings, the USMC modified the Final EA to make corrections and improve or clarify the analysis from the Draft EA.

1.2.2 Summary of Comments Received During the Draft SEIS Public Comment Period

A total of two comment letters (which included 27 sub-comments) were received and accepted in response to the Draft EA.

1.2.3 Comment Directory

The directory below (see Table A-1) provides a listing of commenters by last name or organization. The third column in Table A-1 provides the comment number for each comment letter, which is also found in the upper left-hand corner of the comment letter, below. The fourth column Table A-1 provides the page number in this appendix where the comment and associated response appears in this appendix.

Table A-1. Index of Commenters

Commenter	Organization	Comment Number	Page Number
Email and Regular Mail			
Anderson, Ileene Belenky, Lisa	Center for Biological Diversity	1	A-3
Email			
Palmer, Bruce	Desert Tortoise Council	2	A-7

1.2.4 Responses to Public Comments on the Draft EA

Comments and associated responses are provided on the following pages.

Comment 1 **Received: May 19, 2016**

CENTER *for* BIOLOGICAL DIVERSITY

protecting and restoring natural ecosystems and imperiled species through science, education, policy, and environmental law

Submitted via Electronic Mail and USPS

5/19/2016

Department of the Navy
Naval Facilities Engineering Command Southwest
Attn: Ryan Maynard, Project Manager
1220 Pacific Highway
San Diego, California 92132-5190
E-mail: ryan.maynard1@navy.mil

RE: Comments on the Environmental Assessment for Ongoing Training Marine Corps Air Ground Combat Center, Twentynine Palms, California - April 2016

Dear Project Manager Maynard,

Thank you for the opportunity to provide comments to the Navy on the Public Draft Environmental Assessment (DEA) for Ongoing Training Marine Corps Air Ground Combat Center, Twentynine Palms, California dated April 2016 and prepared by the United States Department of the Navy and United States Marine Corps. These comments are submitted on behalf of the Center for Biological Diversity's more than one million staff, members and supporters in California and throughout the western states.

The DEA was prepared to evaluate the potential environmental impacts associated with Ongoing Training at the Marine Air Ground Task Force Training Command, Marine Corps Air Ground Combat Center at Twentynine Palms, California, but the proposed action (Alternative 2) actually seeks to vastly expand the landing areas used by rotary-wing and tilt-rotor aircraft. Currently, the ongoing training makes use of 92 designated Landing Zones (LZs) used by rotary-wing and tilt-rotor aircraft, ranging in size from 0.23 acre (0.1 ha) to 596 acres (241 ha) and totaling 2,974 acres (1,204 ha) (DEA at 2-8). The proposed action would vastly increase rotary-wing and tilt-rotor aircraft landing areas called "Go" aircraft landing areas to approximately 128,100 acres (51,900 ha) – over a 4,000% increase (DEA at 2-25). In addition, the proposed action also proposes to increase rotary-wing and tilt-rotor aircraft landing areas into "Go-Slow" aircraft landing areas as well which would include an addition approximately 374,500 acres (151,600 ha) once site-specific environmental review is performed (DEA at 2-25) – an over 10,000% increase over current use if most all of the lands are ultimately included. 1

I. Flawed Purpose and Need

The Purpose and Need paragraph in the DEA does not justify why maintaining the 92 currently designated LZs compromise the training mission. It also does not justify why site specific environmental reviews to identify additional LZs is not being done. Instead it relies on vague 2

Arizona • California • Nevada • New Mexico • Alaska • Oregon • Washington • Illinois • Minnesota • Vermont • Washington, DC

Ileene Anderson, Senior Scientist
8033 Sunset Boulevard, #447 • Los Angeles, CA 90046-2401
tel: (323) 654.5943 *fax:* (323) 660.4620 *email:* ianderson@biologicaldiversity.org
www.BiologicalDiversity.org

Response to Comment

Thank you for your comments.

1. The proposed action is characterized correctly, with one exception. Under current practice, new Landing Zones may be designated in areas outside of Category 1 and Category 2 Special Use Areas after completing site-specific environmental review. This is similar to the Proposed Slow-Go landing areas. The main difference between current practice and the Proposed Slow-Go landing areas is that, if the Proposed Action is implemented, proposed Slow-Go areas could be re-designated to Go or Go-No areas when the requisite biological or cultural resource surveys and associated consultation (as necessary) have been performed in proposed Slow-Go areas.

2. Section 1.3 (Purpose and Need) has been revised to better explain the need to expand opportunities to land rotary-wing and tilt-rotor aircraft at the Combat Center to allow realistic, combined arms live-fire, integrated training to meet the Combat Center's mission. The Proposed Action would expand the areas within which rotary-wing and tilt-rotor aircraft could land by adding areas of low environmental sensitivity; no other restrictions would be lifted, and site-specific environmental review would continue to be performed in any area that might contain sensitive resources. Most of the proposed Go landing acreage is in disturbed areas subject to ongoing training activities. This EA has been prepared in compliance with NEPA and other applicable laws.

Comment 1 **Received: May 19, 2016**

statements such as, "the Combat Center has become increasingly constrained in terms of training capacity and opportunities, in part due to increasing levels of training combined with *restrictions on where training may occur, particularly with respect to aircraft landings*" (at DEA. 1-3 – emphasis added). The DEA does not explain the basis for the current restrictions which are likely there for various reasons including to protect environmental resources. Lifting those restrictions requires site specific environmental review, and the sweeping changes proposed in the DEA cannot be implemented without full compliance with NEPA and other laws. 2

II. Important Data Sets Not Included

The DEA tries to justify having no environmental review for the new Go aircraft landing areas by citing the following criteria:

> (1) low densities (0-5 per square mile) of desert tortoises (Woodman et al. 2001),
> (2) are not known to contain any other special-status species (refer to Section 3.1, *Biological Resources*, for additional discussion),
> (3) have been surveyed and cleared of cultural resource concerns, and
> (4) do not contain any Category 1 (Restricted) or Category 2 (Sensitive) Special Use Areas (Table 2-6).

DEA at 2-25. 3

However, the DEA relies on survey results from Woodman et al. 2001 as a basis for evaluating desert tortoise densities on the base and presence of other special status species, not up to date survey information. It is our understanding that more recent desert tortoise surveys, using the same methodologies as the Woodman report, have been performed base-wide for tortoise in 2011 and formalized in a report[1] (as referenced in the Desert Tortoise Council's comments which are incorporated herein). The Woodman et al (2001) report and the LaRue (2012) report provide comparable data for a comprehensive analysis of the impacts from existing operations on the desert tortoise (see below for further discussion) and the LaRue (2012) data also provides a more accurate picture of the likely tortoise densities now in various areas of the base. A revised NEPA document needs to include all of the up to date information and an analysis of how desert tortoise densities may have been impacted training activities in the LZ and other training areas over the intervening years.

Other sensitive species are included in the DEA (at Table 3.1-3), but recent reports on those species, including LaRue (2012) and others[2] are not referenced in the DEA and those data are not

1 LaRue, E.L. 2012. Vertebrate inventory, human impacts analysis, and management recommendations for the Marine Corps Air Ground Combat Center, Twentynine Palms, San Bernardino County, California. United States Department of the Navy Contract N62473-09-D-2603, PTO X047. Wrightwood, CA.
2 Stepek, M. A., S. B. Tremor, L. Hargrove, D. C. Stokes, B. D. Hollingsworth. 2013. Vertebrate Inventory of Marine Corps Air Ground Combat Center, Twentynine Palms, San Bernardino

2

Response to Comment

3. The Final EA has been updated to incorporate both sets of data (LaRue 2013 and Stepek et al. 2013) into the revised landing designation analysis (i.e., the Proposed Action), and into the Biological Resources baseline and impact analysis.

   One revision to the landing designation analysis in the Final EA was to remove the Slow-Go protection provided to the Mojave fringe-toed lizard, Emory's crucifixion thorn, and guzzlers. As noted above, the associated impact analysis has been revised accordingly (see Section 4.1.2.3, Special-Status Species).

Comment 1 **Received: May 19, 2016**

included. For example, as the Desert Tortoise Council comments note: there are three more locations of Mojave fringe-toed lizard occurrences than the single location identified on Figure 3.1-2 of the DEA. All of the most up to date sensitive species data needs to be included in a revised NEPA document and considered before this proposal can go forward.

III. Analyses and Designation of Go, Go-Slow and No-Go Areas Is Inadequate

The DEA proposes sweeping increases of landing areas in training areas for rotary-wing and tilt-rotor aircraft without adequate analysis of impacts. The DEA fails to use current data from recent biological resources surveys and fails to actually analyze how the current training has affected desert tortoise between Woodman et al. (2001) surveys and LaRue (2012) surveys. Therefore, the proposed designation of Go Areas, Go-Slow Areas and No-Go areas are premature and not based on the best available science. 4

Because the proposed action would significantly impact a federally threatened species – the desert tortoise –an Environmental Impact Statement is necessary to fully evaluate the impacts to the tortoise as well as other special status species. The desert tortoise population in the West Mojave Recovery Unit is in decline, sadly and ironically, the base has in the past been one of the strongholds for this population. The proposed wide-scale impacts to habitat on the base which would be fragmented and degraded, is a significant impact that could threaten the viability of this recovery unit and the species as a whole. Part of those analyses should also include ways to avoid impacts, and to minimize and mitigate impacts that cannot be avoided. After adequate environmental analysis, designation of Go, Go-Slow and No-Go zones, based on the most recent comprehensive survey data and analyses, may be appropriate in some areas along with adoption of mitigation measures to minimize and compensate for any impacts to desert tortoise or special status species. 5

IV. Inadequate Alternatives

The DEA only provides two alternatives – the No-Action (Existing Activities) and the Proposed Action. The revised NEPA analysis, preferably in an EIS, needs to include additional alternatives based existing data and the analysis of impacts from existing training and the actual specific detailed need for more LZs. For example, an alternative that would include a small number of the newly proposed LZs where impacts to desert tortoise and special status species are fully avoided, with additional areas identified for more study later, in a subsequent tiered environmental review, if more LZs are needed in the future. 6

V. Conclusion

The DEA fails to justify the need for the sweeping inclusion of most all training area lands for LZs, fails to use the best available science, fails to provide adequate analysis of Go, Go-Slow and No-Go areas, and fails to provide any analysis of a reasonable range of alternatives. In

County, California. United States Department of the Navy Contract N62473-09-D-2603, PTO X047. San Diego Natural History Museum. San Diego, CA.

3

Response to Comment

4. As noted in response to Comment 3, data from LaRue (2013) and Stepek et al. (2013) have been incorporated into the Final EA, and have resulted in appropriate reconsideration and revision to the Proposed Action's landing designations.

5. As analyzed in the EA, the implementation of the Proposed Action would allow more dispersed landing activity in areas of low environmental sensitivity. It would not fragment or degrade the desert scrub habitat that supports the desert tortoise population and other sensitive species on the Combat Center. It would not impede the species' recovery. The Proposed Action is designed to avoid and minimize impacts while meeting the project's purpose and need. The U.S. Marine Corps is engaged in section 7 consultation with the U.S. Fish and Wildlife Service, which may result in further measures if determined necessary to ensure that the action does not jeopardize the continuing existence and recovery of the desert tortoise. No decision will be made regarding the Proposed Action until consultation is complete. Based on the EA analysis, significant impacts would not occur, and an Environmental Impact Statement is not required.

   As described in the EA, much of the area that would be impacted has been previously disturbed by ongoing training activities, additional surface disturbance caused by proposed landing activities would be localized and unlikely to affect the sparse, established perennial vegetation. While the redistribution of loose materials and fine sediments would alter local microhabitat conditions, possibly affecting the distribution of annual species and recruitment of perennial species on a small scale, substantial changes in vegetation communities on the sites would not be expected. Furthermore, impacts to vegetation would be localized, and avoidance and mitigation measure BR-3 (i.e., pilots would avoid landing sites with vegetation or other vertical obstacles as much as possible) has been added. As such, habitat would not be significantly fragmented or degraded would not threaten the viability of the recovery unit or the species as a whole.

6. Multiple alternatives in addition to the Proposed Action were considered but eliminated from detailed analysis as they would not meet the Purpose and Need of the Proposed Action (Section 2.4). This discussion has been expanded in the Final EA to consider site-specific review of a small number of newly proposed LZs; as described in the revised Section 2.4, the analysis in this EA is intended to be programmatic to avoid

Comment 1 **Received: May 19, 2016**

addition, because the Proposed Action will significantly affect the federally threatened desert tortoise, an Environmental Impact Statement is necessary.

For these reasons and others identified above, the Marines will need to remedy these issues in a revised NEPA document, preferably a comprehensive DEIS, which should be provided for public review. Please feel free to contact us with any questions 7

Sincerely,

Ileene Anderson, Senior Scientist
Center for Biological Diversity
ianderson@biologicaldiversity.org
323-654-5943

Lisa T. Belenky, *Senior Attorney*
Center for Biological Diversity
1212 Broadway, Suite 800
Oakland, CA 94612
(415) 632-5307
lbelenky@biologicaldiversity.org

cc:
Brian Croft, USFWS, Brian_Croft@fws.gov
Kevin Hunting, CDFW, Kevin.Hunting@wildlife.ca.gov

4

incrementally designating and segmenting the analysis of Landing Zones. Such an alternative would not meet the purpose and need of the proposed project (e.g., to allow training opportunities to require rapid planning in-air). Please also refer to response to Comment 2, above.

7. Comments on the DEA have contributed to a more robust analysis of the Proposed Action in the FEA using best available science. A reasonable range of alternatives has been analyzed. The analysis does not indicate the likelihood of a significant impact to the desert tortoise or other resources. Accordingly, an Environmental Impact Statement is not required.

Comment 2 **Received: May 19, 2016**

DESERT TORTOISE COUNCIL
4654 East Avenue S #257B
Palmdale, California 93552
www.deserttortoise.org
ed.larue@verizon.net

19 May 2016 **Via email only**

Ryan Maynard, Ongoing Training EA Project Manager
Naval Facilities Engineering Command (NAVFAC) Southwest
Central IPT, Building 1, 3rd Floor
1220 Pacific Highway
San Diego, California 92132
E-mail: ryan.maynard1@navy.mil

RE: Public Draft Environmental Assessment for Ongoing Training Marine Corps Air Ground Combat Center (MCAGCC), Twentynine Palms, California

Dear Mr. Maynard,

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

We appreciate the opportunity to provide the following comments, which reference pertinent pages of the Draft Environmental Assessment (Draft EA) that was prepared by United States Department of the Navy and United States Marine Corps (Department).

1. As per Section 2.3, page 2-25 "**Go aircraft landing areas** would allow rotary-wing and tilt-rotor aircraft to land without further environmental review. These areas include all existing aircraft LZs as well as areas that have the following characteristics that have a relatively low sensitivity to environmental impacts: (1) low densities (0-5 per square mile) of desert tortoises (Woodman et al. 2001)." LaRue (2012a) repeated the same methodologies used by Woodman et al. (2001) in 1997 and 1999, and identified tortoise distribution throughout MCAGCC in 2011. Whereas Woodman's surveys documented tortoise occurrence in 1997 and 1999, LaRue's surveys documented tortoise occurrence in 2011. Given this information, the Draft EA is relying on older studies without any reference to recent, existing data. As such, we ask that the Final EA must address what we consider to be the following deficiencies in the Draft EA: 1a

Response to Comment

Thank you for your comments.

1a. The Final EA has been updated to incorporate data provided in LaRue (2013) as well as Stepek et al. (2013) into the landing designation analysis (i.e., the Proposed Action) and into the Biological Resources baseline and impact analysis. The data were only used conservatively, to provide Slow-Go protection to areas that would otherwise be designated Go landing areas; areas designated Slow-Go were not modified to Go as a result of incorporating the data.

Comment 2 **Received: May 19, 2016**

a. The Department should use the latest available scientific information. Referring to the LaRue (2012a) study in an email dated 10/4/2012, Meghan Dinkins of NAVFAC SW wrote: "Personally, the report has already been a useful resource for me to understand 29 Palms wildlife. It is the best wildlife report I've seen."

b. The Draft EA should be supplemented with an analysis of how tortoise densities and distributions have changed between the Woodman and LaRue reports. The Final EA should address the following questions: Are tortoises persisting in heavily versus lightly impacted maneuver areas? Have tortoise concentration areas changed? Were any new concentration areas identified in 2011 by LaRue that were not identified in 1997-1999 by Woodman? 1b

c. Both LaRue and Woodman mapped military maneuver impact areas. The Final EA should show how these impact areas have changed between the late 1990's and 2011, and how tortoise densities may have responded to continued use of maneuver impact areas. 1c

d. The Proposed Action should identify new landing areas based on tortoise densities determined by LaRue (2011) rather than the older surveys completed by Woodman in 1997 and 1999. Given that Woodman and LaRue used the same survey methodologies, we feel that the latest data should be used to determine low impact areas, not data that are 13 years older than the latest available data. As such, areas between 0 and 5 tortoises per square mile identified in 2011 must be identified in the Final EA, which may result in changes to approved landing areas, which should also be reported in the Final EA. 1d

e. It is imperative that the Final EA use the data given in LaRue (2012a), including the locations of 45 live tortoises depicted in Figure B1 and 841 tortoise signs depicted in Figure B2, when delineating the expanded landing areas shown Figure 2-3 of the Draft EA. In particular, there needs to be a reassessment of the "Slow-Go" areas shown in Figure 2-3 of the Draft EA using the desert tortoise data depicted in Figures B1 and B2 of LaRue (2012a), which shows tortoise sign in much of the area depicted as 0-5 tortoises per square mile in the Draft EA. 1e

2. Both the current Draft EA (see Chapter 7 on page 7-1) and LaRue (2012a) were prepared under direction of Cardno TEC, Inc. A third project, completed on the Chocolate Mountains Gunnery Range in 2012, was also overseen by Cardno TEC, Inc. (LaRue 2012b). Three of the five biologists surveying MCAGCC in 2011 and Chocolate Mountains in 2012 were the same, so if tortoise sign counts collected at MCAGCC need to be converted to densities, that can be readily accomplished using the data collected on the gunnery range (LaRue 2012b). 2

3. As per Section 2.3, page 2-25 "**Slow-Go aircraft landing areas** would allow rotary-wing and tilt-rotor aircraft to land only after additional, site-specific environmental review is performed. These areas have at least one of the following characteristics that have a moderate sensitivity to environmental impacts: (1) moderately low densities (6-20 per square mile) of desert tortoises, (2) other species that warrant concern (i.e., at-risk species or other special-status species as described in Section 3.1, *Biological Resources*)." Table 3.1-3 on page 3-11 then lists special status species that would trigger Slow-Go areas. LaRue (2012a) identified many of these species on MCAGCC in 2011. The following table includes the Department's list of identified special status species. The numbers of 2011 occurrences are given in the third column and associated figures in Appendix B of LaRue (2012a) are given in the fourth column. 3

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Response to Comment

1b. Discussion in Section 3.1.3.3 (Special-Status Species) has been updated to provide a comparison of the results reported by Woodman et al. (2001) and LaRue (2013). As noted in the discussion, the data collected by LaRue (2013) cannot be analyzed to determine tortoise densities, but regional patterns of tortoises and their sign can be (and have been) compared. Additionally, Figure 3.1-2 has been revised based on analysis of the LaRue (2013) data.

1c. NEPA only requires that the impacts of the Proposed Action, as well as the No-Action Alternative, be analyzed; performing the requested analysis is not required. In addition, see response to Comment 1d below.

1d. The updated discussion in Section 3.1.3.3 (Special-Status Species) states that it is not possible to use the data provided by LaRue (2013) to determine desert tortoise densities because calibration transects were not performed. However, data provided by LaRue (2013) were rigorously analyzed to identify areas that may contain more than 0-5 desert tortoises per square mile (see Section 3.1.3.3 of the Final EA), and this analysis was incorporated into the landing designation analysis (i.e., the Proposed Action) as described in Section 2.3. In addition, see response to Comment 2 below.

1e. The Final EA has been revised to indicate that only the total corrected scat and burrows detected during surveys performed by LaRue (2013) were incorporated into the landing designation analysis, consistent with the survey protocol employed by Woodman et al. (2001). Woodman et al. (2001) is only partially consistent with current Tortoise Regional Estimate of Density (TRED) protocols, which only utilize the number of burrows detected to determine desert tortoise density. Therefore, the live desert tortoises and other sign (e.g., eggshells, tracks) reported by LaRue (2013) were not included in the analysis described in response to Comment 1d above.

2. TRED survey protocols require that calibration surveys be performed near to, or within, the area where the TRED transect surveys are being performed. The Chocolate Mountain Aerial Gunnery Range (CMAGR) is too far removed from the Combat Center to allow the calibration data collected in 2012 at CMAGR to be applied to the data collected at the Combat Center in 2011. In addition, and as noted by LaRue (2013:3), although TRED survey protocols require that sign detected more than 5 meters from the transect be excluded, the surveys performed in 2011 included all vertebrate sign detected, including those more than 5 meters removed from the transect line. See also responses to comments 1a and 1b, above.

3. Section 2.3 has been revised; "Slow-Go" protection is now only afforded to

Comment 2 **Received: May 19, 2016**

Common Name	*Scientific Name*	# Occurrences in 2011	Appendix B figure in LaRue (2012a)
Mojave fringe-toed lizard(1)	*Uma scoparia*	92 occurrences	B3
Agassiz's desert tortoise(1)	*Gopherus agassizii*	886	B1 & B2
Loggerhead shrike(1)	*Lanius ludovicianus*	322	B7
Le Conte's thrasher(1)	*Toxostoma lecontei*	57	B6
Northern harrier(1)	*Circus cyaneus*	25	B5
Golden eagle(1)	*Aquila chrysaetos*	11	B5
Prairie falcon(1)	*Falco mexicanus*	32	B5
Burrowing owl(1)	*Athene cunicularia*	76	B4
Pocketed free-tailed bat	*Nyctinomops femorosaccus*	See below	N/A
Pallid bat	*Antrozous pallidus*	See below	N/A
Desert bighorn sheep	*Ovis canadensis nelsoni*	32	B9
Short-eared owl(1)	*Asio flammeus*	1	B5
Vaux's swift	*Chaetura vauxi*	7	B5

4. The omission of these data has significantly impaired much of the Draft EA that should be remedied in the Final EA. For example, Figure B3 in LaRue (2012a) shows Mohave fringe-toed lizard occurring in four portions of MCAGCC, whereas Figure 3.1-2 in the Draft EA shows only one of these four locations. 4

5. LaRue (2012a) identified four special status species that are not included in Table 3.1-3. Since these animals are also listed by U.S. Fish and Wildlife Service (USFWS) and/or California Department of Fish and Wildlife (CDFW) the same as those included in the table, the Council believes that these species should be added to the table as triggers to designate areas for "Slow-Go aircraft landing areas." LaRue (2012a) identified 4 Cooper's hawks (Figure B5), 2 ospreys (Figure B5), 29 Swainson's hawks (Figure B5), 4 Ferruginous hawks (Figure B5), and 990 American badger digs (Figure B8). Again, to be consistent, the distributions of these species should be used to modify the locations of the "Go" and "Slow-Go" areas in Figure 2-3 of the Draft EA. 5

6. Since Swainson's hawk is listed as a CDFW-threatened species, the second paragraph on page 3-13 in the Draft EA needs to be expanded in the Final EA to include this prevalent, migratory species at MCAGCC. In fact, all paragraphs on pages 3-11 through 3-14 and any pertinent figures or other discussions in the Draft EA need to be supplemented and modified in the Final EA. 6

7. The Department contracted San Diego Natural History Museum (SDNHM) to perform focused surveys for reptiles, small mammals, and bats throughout MCAGCC in 2011 and 2012. The reference for this document is Stepek et al (2013), which is included in the list at the end of this comment letter. Similar to LaRue (2012a), there is no mention of these very extensive surveys performed in 2011 and 2012 throughout the base. There are pertinent data for to Pallid San Diego pocket mouse, which was not found during focused trapping surveys; pallid bat, which was found on seven of 21 Range Training Areas (RTAs); and pocketed free-tailed bat, which was found on five RTAs. Given the mobility of these bats, it may be necessarily to require additional restrictions to expanded aircraft landing areas in the RTAs where these animals occur. 7

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federally-protected species (i.e., the desert tortoise and the burrowing owl). In addition, and as discussed in Section 2.3:

- Any area lacking desert tortoise density data in GIS from Woodman et al. (2001) has been designated as Slow Go.
- As mentioned in response to Comment 1a above, data provided by LaRue (2013) and Stepek et al. (2013) have been incorporated into the analysis.
- The existing built environment within Mainside, Camp Wilson, and the Range Training Area have also been designated Go regardless of any other site characteristics.

Impact analysis provided in the Final EA has also been revised based on the revised Proposed Action and incorporation of the data provided by LaRue (2013) and Stepek et al. (2013).

4. See response to Comment 3.

5. These species have been added to Table 3.1-3, and Section 3.1.3.3 has been updated to indicate that "LaRue (2013) also noted that Cooper's hawks (Accipiter cooperii) may nest at the Combat Center but are more likely to do so at Mainside than within Training Areas and that ferruginous hawk (Buteo regalis), northern harrier (Circus cyaneus), osprey (Pandion haliaetus), and Swainson's hawk (Buteo swainsoni) are not expected to nest at the Combat Center."

   NEPA requires that the impact analysis in an EA be commensurate with the level of impact associated with each alternative and does not need to be exhaustive. Given the low level of impact associated with the No-Action Alternative and the Proposed Action, and the revisions to the analysis described herein, the analysis provided in the Final EA complies with NEPA and other applicable laws.

   Additionally, see response to Comment 3.

6. Please see the response to Comments 1a and 5, above. Please also refer to the second paragraph of page 3-13 of the Draft EA, which stated that "Congress has not waived sovereign immunity under the Federal ESA; therefore, MAGTF Training Command is not legally required to comply with California endangered species laws." The following statement has been added to this section in the Final EA: "A description of many of these species can be found above, below, or in the 2012 Land Acquisition EIS (DoN 2012)."

7. Please see response to Comments 1a, 3, and 5, above.

Comment 2 **Received: May 19, 2016**

8. The Final EA should re-evaluate "Go" and "Slow-Go" aircraft areas based on the information previously contracted by the Department (LaRue 2011 and Stepek et al 2013) and described herein, which was not used to formulate the Draft EA. This re-evaluation should result in modifying these areas to be consistent with other portions of the Draft EA. 8

9. With regards to the following statement, "Crucifixion thorn was not observed in more recent focused surveys of 81 AMZs (CMBC 2010)," several locations were found and are reported in LaRue (2012a). All parts of Sections 3.1.3.2 and 3.1.3.3 would benefit from similar discussions given in LaRue (2012a). 9

10. It's counterintuitive to expand landing areas from approximately 2,974 acres (page 2-25 of the Draft EA) to 128,100 acres of unrestricted and unsurveyed "Go" areas (page 2-26) and conclude there would be a "…small level of impact, however, [that] would not be significant" (top of page 4-6). How does the Department plan to monitor take to validate this statement? We note that there is no discussion as to how take has been monitored under current management in Section 3.5.3. The Final EA must summarize data that show how current management (i.e., landing in a restricted number of sites) has been monitored and how many tortoises have been impacted. In the absence of those data, the Draft EA cannot adequately quantify what the existing and anticipated levels of take have been and will be. Similarly, the Final EA must include detailed proposals of how new impacts would be monitored, which is absent from the Draft EA. 10

11. With regards to the following statement on page 4-6 of the Draft EA, "A Biological Assessment [BA] is being prepared to analyze the potential effects of the Proposed Action on the ESA-listed threatened desert tortoise and support section 7 consultation," please be sure that the BA considers range-wide distance sampling efforts that show a 50% reduction between 2004 and 2014 (USFWS 2014). This is also missing from the cumulative effects analysis in the Draft EA. If available, there are also studies being completed in April and May 2016, the results of which should be summarized in the BA. 11

12. With regards to the following statement on page 4-6, "Although desert bighorn sheep population counts have not taken place since 1997, the population is believed to be stable," LaRue (2012a) found bighorn sheep in areas where they were not expected in central and northwestern areas of MCAGCC. Whereas this does not constitute data from which stability can be inferred, it does mean that bighorn may be more widespread than believed prior to the 2011 surveys. This unanalyzed data should be included in the Final EA, and may result in modifying boundaries of "Slow-Go" areas. 12

13. With regards to the statement on page 4-6 of the Draft EA and iterated herein, "The biological resources sensitivity was determined during 2001 analysis of field data collected from 1997-1999 (Woodman et al. 2001) and has since been updated in response to various projects (e.g., the 2012 Land Acquisition EIS and the INRMP) at the Combat Center," the sensitivity analysis needs to be re-evaluated using tortoise distribution data from LaRue (2012a). We expect this re-evaluation will result in an expanded "Slow-Go" area than in the current Proposed Action, and that pre-landing surveys will continue to be warranted in much of the area currently identified as "Go" areas. 13

Desert Tortoise Council/Comments/29 Palms Ongoing Training Public Draft EA Comments.5-19-2016 4

Response to Comment

8. Please see response to Comments 1a and 3, above.

9. Consistent with response to Comment 1a, the two Crucifixion thorn detections provided by LaRue (2013) have been incorporated into the Biological Resources baseline and analysis in the Final EA.

10. Desert tortoise take is, and would continue to be, monitored in accordance with the 2002 and 2017 Biological Opinions. Section 3.1.3.3 has been revised to state that "from 2007 through 2015, 17 desert tortoises had been reported to the USFWS as taken by training-related activities," and that "As of 7 July 2016, two additional tortoises were taken in 2016."

    Under a worst-case scenario, annual take can be estimated by multiplying the area affected by each landing by the total number of landings per year, then multiplying the result by the desert tortoise density in proposed landing areas (i.e., an average of 2.5 for Go landing areas).

11. Discussion of the range-wide desert tortoise population decline has been added to Section 3.1.3.3 of the Final EA and has also been included in the Biological Assessment.

12. Please see response to Comments 1a and 3, above.

13. Please see response to Comments 1a and 3, above. The revised analysis reduced the proposed Go Areas by approximately 12,400 acres (nearly 2.1% of the project area).

Comment 2 **Received: May 19, 2016**

14. With regards to the following statement on page 4-6 of the Draft EA, "Under the Proposed Action, in addition to existing LZs that require no environmental review (and some areas where no data is available), future proposed LZs in areas with an estimated 0-5 desert tortoises per square mile would be utilized without surveys," how does the Department propose to determine to monitor impacts to tortoises where densities are expected to be 0-5 tortoises, based on 1997-1999 data (Woodman et al 2001)? Also, we ask that the Final EA include a summary of mortality take that has been officially reported to the USFWS since the implementation of the 2002 biological opinion. 14

The Council is concerned that the Department's Proposed Action would significantly reduce detection and subsequent protection of sensitive resources found on MCAGCC. For example, when Circle Mountain Biological Consultants, Inc. (CMBC 2010) surveyed 81 potential landing areas, 27 of them were abandoned because tortoise sign was found. Under the Proposed Action, most of these sites and adjacent areas would no longer require protocol surveys to see if tortoises and other species would be impacted. This will likely mean a significant reduction in determining the level of impact associated with expanded landing activities authorized by the Proposed Action. For example, when one considers Table 3.1-3 in the Draft EA, 9 of the 25 special status species listed, were found during CMBC's (2010) protocol surveys. 15

With regards to the following statement, "the Combat Center would ensure that the combination of the training activities described in this Proposed Action, the training activities described in the 2012 Land Acquisition EIS, and other ongoing training activities does not result in a net increase in the overall level of training activities at the Combat Center (page 2-26 in the Draft EA)," if those activities are not conscientiously planned as they were for previous landing activities (Department of the Navy 2009), less restrictive, wide-ranging landing activities in areas that would be unavailable under the No Action Alternative will result in more impacts at MCAGCC. 16

Regards,

Bruce Palmer
Desert Tortoise Council, Chairperson

Literature Cited

CMBC. 2010. Final Biological Resources Survey Report: 81 Aerial Maneuver Zone (AMZ) Sites at the Marine Air Ground Task Force Training Command, Marine Corps Air Ground Combat Center (MAGTFTC, MCAGCC), Twentynine Palms, California, San Bernardino County, California. March.

Department of the Navy. 2009. Environmental Assessment for Permanent Facility Bed-Down of Increased End-Strength at Marine Corps Air Ground Combat Center Twentynine Palms, CA. Prepared by TEC for NAVFAC Southwest. September.

Response to Comment

14. Please see response to Comment 10, above. New text provided in Section 3.1.3.3 acknowledges that the Woodman et al. (2001) and LaRue (2013) survey results are generally similar.

15. The impact analysis provided in the EA acknowledges that implementing the Proposed Action would have minor and less than significant impacts to sensitive resources.

16. Text on page 4-8 of the Draft EA acknowledged the less-restrictive, wide-ranging impacts that landing activities would have under the Proposed Action:

    > The Proposed Action does not include any construction and would not change the current levels of on-going training activities. However, shifting aircraft landings into areas of low tortoise density would result in minor effects to undisturbed habitat with low densities of desert tortoises. This could result in occasional tortoise injury or mortality, as well as an incremental increase in the amount of habitat disturbed during training activities. This small level of impact, however, would not be significant, and continued implementation of SCMs established by the 2002 and 2012 BOs (USFWS 2002, 2012) would reduce the likelihood of training-related impacts to desert tortoise within and in the vicinity of new LZs.

    This discussion has been expanded and updated in the Final EA.

Comment 2 **Received: May 19, 2016**

LaRue, E.L. 2012a. Vertebrate inventory, human impacts analysis, and management recommendations for the Marine Corps Air Ground Combat Center, Twentynine Palms, San Bernardino County, California. United States Department of the Navy Contract N62473-09-D-2603, PTO X047. Wrightwood, CA.

LaRue, E.L. 2012b. Focused survey and habitat assessment for Agassiz's desert tortoise on Special Warfare Training Area Ranges 4 & 5 of Chocolate Mountain Aerial Gunnery Range in Riverside and Imperial Counties, California. Unpublished report prepared for the U.S. Department of the Navy and United States Marine Corps. Wrightwood, CA.

Stepek, M. A., S. B. Tremor, L. Hargrove, D. C. Stokes, B. D. Hollingsworth. 2013. Vertebrate Inventory of Marine Corps Air Ground Combat Center, Twentynine Palms, San Bernardino County, California. United States Department of the Navy Contract N62473-09-D-2603, PTO X047. San Diego Natural History Museum. San Diego, CA.

U.S. Fish and Wildlife Service. 2014. Status of the desert tortoise and critical habitat. Unpublished report available on the Desert Tortoise Recovery Office's website: "02/10/2014 Status of the Desert Tortoise and Critical Habitat (.704MB PDF)." Reno, NV.

Woodman, P., G. O. Goodlett, and J. Westermeier. Technical synthesis report for desert tortoise surveys at Marine Corps Air Ground Combat Center, Twentynine Palms, California. Submitted to MCAGCC, NREA, Twentynine Palms, CA. 68 pp plus appendices.

Response to Comment

PROOF OF PUBLICATION
(2015.5 C.C.P)

STATE OF CALIFORNIA
County of San Bernardino

I am a citizen of the United States and a resident of the County aforesaid; I am over the age of eighteen years, and not a party to or interested in the above-entitled matter. I am the principal clerk of the printer of the:

DESERT TRAIL

a newspaper of general circulation, printed and published **WEEKLY** in the City of **TWENTYNINE PALMS** County of San Bernardino, and which newspaper has been adjudged a newspaper of general circulation by the Superior Court of the County of San Bernardino, State of California,

under the date of **November 11, 1938**.

Case Number 43099: that the notice, of which the annexed is printed copy (set in type not smaller than nonpareil), has been published in each regular and entire issue of sad newspaper and not in supplement thereof on the following date(s), to-wit:

04/21, 04/28
all in the year **2016**

I certify (or declare) under penalty of perjury that the foregoing is true and correct.

Date at: **TWENTYNINE PALMS**, California, this **28TH** day of **APRIL, 2016.**

Signature
JANET GARCIA

This space is for the County Clerk's Filing Stamp

Proof of Publication
NOTICE OF AVAILABILITY OF PUBLIC DRAFT ENVIRONMENTAL ASSESSMENT FOR ONGOING TRAINING AT THE MARINE AIR GROUND TASK FORCE TRAINING COMMAND MARINE CORPS AIR GROUND COMBAT CENTER TWENTYNINE PALMS, CALIFORNIA

NOTICE OF AVAILABILITY
OF PUBLIC DRAFT ENVIRONMENTAL ASSESSMENT FOR
ONGOING TRAINING
AT THE MARINE AIR GROUND TASK FORCE TRAINING COMMAND
MARINE CORPS AIR GROUND COMBAT CENTER
TWENTYNINE PALMS, CALIFORNIA

Pursuant to the Council on Environmental Quality regulations (40 Code of Federal Regulations Parts 1500-1508) implementing the National Environmental Policy Act (NEPA) and Marine Corps Order P5090.2A Change 3, the U.S. Marine Corps gives notice that a Draft Environmental Assessment (EA) has been prepared for the proposed Ongoing Training at the Marine Air Ground Task Force Training Command, Marine Corps Air Ground Combat Center located at Twentynine Palms, California (hereafter referred to as the Combat Center).

The purpose of the Proposed Action is to enhance the Combat Center's ability to accommodate the U.S. Department of Defense's need for combined arms live-fire, integrated training while simultaneously allowing for less encumbered access within training areas without significantly impacting sensitive resources. The Proposed Action is needed to enhance training and flexibility to ensure that Marines can conduct the training necessary for mission and battlefield readiness. Training at the Combat Center has become increasingly constrained in terms of training capacity and opportunities, in part due to increasing levels of training combined with restrictions on where training may occur, particularly with respect to aircraft landings.

The Public Draft EA evaluates additional landing zones within existing training areas. The Public Draft EA analyzes the impacts of operations and training across the entire Combat Center and determines areas where rotary-wing and tilt-rotor aircraft landing operations can occur without the need for additional environmental review as well as where this type of training may be restricted or limited due to presence of sensitive resources or potential for such resources. (The Proposed Action is limited to the approximately 600,000 acres of training areas that existed before the 2012 Land Acquisition and Airspace Establishment Environmental Impact Statement; the areas that have been added as a result of the implementation of the Military Land Withdrawals Act of 2013 are excluded from this Proposed Action.)

The Public Draft EA evaluates the potential environmental impacts associated with implementing the Proposed Action and the No Action Alternative:

- Proposed Action: The Proposed Action would allow for additional aircraft landing areas within existing training areas that contain low densities (0-5 per square mile) of desert tortoises (Gopherus agassizii), are not known to contain any other special-status species, have been surveyed and cleared of cultural resource concerns, and are not Category 1 (i.e., restricted areas) or Category 2 (i.e., sensitive areas) Special Use Areas. Under the Proposed Action, no increase in the number of flight operations would occur at the Combat Center.

- No-Action Alternative: Under the No-Action Alternative, the Proposed Action would not be implemented. Flight operations would continue to be conducted at the Combat Center at current locations. The Combat Center would continue to use existing landing zones (LZs) and the Combat Center could designate additional LZs subject to a case-by-case environmental review of each proposed LZ.

The Public Draft EA evaluates the potential environmental effects of each alternative on the following resource areas: biological resources, geological resources, cultural resources, water resources, and health and safety.

The public is invited and encouraged to participate in the NEPA process by reviewing and commenting on the Public Draft EA during the 30-day public comment period from April 21, 2016 to May 20, 2016. Comments on the Public Draft EA must be received by May 20, 2016 to be considered in the Final EA.

The Public Draft EA is available for public comment and may be reviewed by interested parties at the Twentynine Palms Branch Library, 6078 Adobe Road, Twentynine Palms, CA, and the Yucca Valley Branch Library, 57098 29 Palms Highway, Yucca Valley, CA, as well as on the Combat Center website: http://www.29palms.marines.mil/Staff/G4InstallationsandLogistics/EnvironmentAffairs.aspx

Written comments may be submitted to:
Naval Facilities Engineering Command Southwest
Attn: Ryan Maynard, Code RAE20.RM
1220 Pacific Highway
San Diego, California 92132
Ryan.Maynard1@navy.mil

(PUB: T. 4/21, 4/28/2016)

PROOF OF PUBLICATION
(2015.5 C.C.P)

This space is for the County Clerk's Filing Stamp

STATE OF CALIFORNIA
County of San Bernardino

I am a citizen of the United States and a resident of the County aforesaid; I am over the age of eighteen years, and not a party to or interested in the above-entitled matter. I am the principal clerk of the printer of the:

HI-DESERT STAR

a newspaper of general circulation, printed and published **BI-WEEKLY** in the City of **YUCCA VALLEY** County of San Bernardino, and which newspaper has been adjudged a newspaper of general circulation by the Superior Court of the County of San Bernardino, State of California,

under the date of **November 27, 1961**.

Case Number 107762: that the notice, of which the annexed is printed copy (set in type not smaller than nonpareil), has been published in each regular and entire issue of sad newspaper and not in supplement thereof on the following dates, to-wit:

04/21, 04/23, 04/28, 04/30
all in the year **2016**

I certify (or declare) under penalty of perjury that the foregoing is true and correct.

Dated at: **YUCCA VALLEY**, California,
this **30TH** day of **APRIL, 2016**.

Signature
JANET GARCIA

Proof of Publication

NOTICE OF AVAILABILITY OF PUBLIC DRAFT ENVIRONMENTAL ASSESSMENT FOR ONGOING TRAINING AT THE MARINE AIR GROUND TASK FORCE TRAINING COMMAND
MARINE CORPS AIR GROUND COMBAT CENTER
TWENTYNINE PALMS, CALIFORNIA

NOTICE OF AVAILABILITY
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TWENTYNINE PALMS, CALIFORNIA

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The purpose of the Proposed Action is to enhance the Combat Center's ability to accommodate the U.S. Department of Defense's need for combined arms live-fire, integrated training while simultaneously allowing for less encumbered access within training areas without significantly impacting sensitive resources. The Proposed Action is needed to enhance training and flexibility to ensure that Marines can conduct the training necessary for mission and battlefield readiness. Training at the Combat Center has become increasingly constrained in terms of training capacity and opportunities, in part due to increasing levels of training combined with restrictions on where training may occur, particularly with respect to aircraft landings.

The Public Draft EA evaluates additional landing zones within existing training areas. The Public Draft EA analyzes the impacts of operations and training across the entire Combat Center and determines areas where rotary-wing and tilt-rotor aircraft landing operations can occur without the need for additional environmental review as well as where this type of training may be restricted or limited due to presence of sensitive resources or potential for such resources. (The Proposed Action is limited to the approximately 600,000 acres of training areas that existed before the 2012 Land Acquisition and Airspace Establishment Environmental Impact Statement; the areas that have been added as a result of the implementation of the Military Land Withdrawals Act of 2013 are excluded from this Proposed Action.)

The Public Draft EA evaluates the potential environmental impacts associated with implementing the Proposed Action and the No Action Alternative:

- Proposed Action: The Proposed Action would allow for additional aircraft landing areas within existing training areas that contain low densities (0-5 per square mile) of desert tortoises (Gopherus agassizii), are not known to contain any other special-status species, have been surveyed and cleared of cultural resource concerns, and are not Category 1 (i.e., restricted areas) or Category 2 (i.e., sensitive areas) Special Use Areas. Under the Proposed Action, no increase in the number of flight operations would occur at the Combat Center.

- No-Action Alternative: Under the No-Action Alternative, the Proposed Action would not be implemented. Flight operations would continue to be conducted at the Combat Center at current locations. The Combat Center would continue to use existing landing zones (LZs) and the Combat Center could designate additional LZs subject to a case-by-case environmental review of each proposed LZ.

The Public Draft EA evaluates the potential environmental effects of each alternative on the following resource areas: biological resources, geological resources, cultural resources, water resources, and health and safety.

The public is invited and encouraged to participate in the NEPA process by reviewing and commenting on the Public Draft EA during the 30-day public comment period from April 21, 2016 to May 20, 2016. Comments on the Public Draft EA must be received by May 20, 2016 to be considered in the Final EA.

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Written comments may be submitted to:
Naval Facilities Engineering Command Southwest
Attn: Ryan Maynard, Code RAE20.RM
1220 Pacific Highway
San Diego, California 92132
Ryan.Maynard1@navy.mil

(PUB: S. 4/21, 4/23, 4/28, 4/30/2016)

Appendix B

Agency Correspondence

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Palm Springs Fish and Wildlife Office
777 East Tahquitz Canyon Way, Suite 208
Palm Springs, California 92262

In Reply Refer To:
FWS-SB-14B0343-18TA0301

January 11, 2018
Sent by Email

Walter Christensen
Head, Conservation Branch
MAGTFTC, MCAGCC
G-4, NREA
Building 1418, Box 788110
Twentynine Palms, California 92278

Subject: Ongoing Training at the United States Marine Corps Air Ground Combat Center, Twentynine Palms, San Bernardino County, California (1-8-99-F-41)

Dear Mr. Christensen:

By email dated August 8, 2017, you notified us of changes in ongoing training activities at the U.S. Marine Corps Air Ground Combat Center (Combat Center) and requested guidance from the U.S. Fish and Wildlife Service (Service) on the need for additional consultation pursuant to section 7(a)(2) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*), regarding the federally threatened desert tortoise (Mojave population DPS) (*Gopherus agassizii*; desert tortoise). Your proposed action would change ongoing training activities at the Combat Center by designating all areas within the Combat Center as "Go", "Slow-Go", or "No-Go" areas for rotary-wing and tilt-rotor aircraft landing, as determined by a programmatic assessment of desert tortoise densities. To evaluate the proposed changes, the Service considered information in the biological opinions that cover training and operations at the Combat Center (1-8-99-F-41; 8-8-F-65R) and information contained in the Final Biological Assessment for Ongoing Training (Marine Corps 2017). Your requests and our response are made pursuant to section 7(a)(2) of the Act.

Currently, 92 aircraft landing zones at the Combat Center are used by rotary-wing and tilt-rotor aircraft. These landing zones range in size from 0.23 acre to 596 acres, with a median size of 7.8 acres and a total of 2,973 acres. The proposed action would allow rotary-wing and tilt-rotor aircraft to continue to land in existing landing zones and would designate additional landing areas within existing training areas. Under the proposed action, areas within the Combat Center would be designated as "Go", "Slow-Go", or "No-Go" for rotary-wing and tilt-rotor aircraft landing. Designation of landing zones as "Go", "Slow-Go", or "No-Go" for rotary-wing and tilt-rotor aircraft landing would be determined by a programmatic assessment of desert tortoise densities, and may be updated over time.

Proposed "Go" landing areas would allow for rotary-wing and tilt-rotor aircraft to land on suitable terrain without further environmental review. These areas include all existing aircraft

landing zones, the built environment within Mainside, Camp Wilson, and the Range areas, and other areas that have relatively low sensitivity to environmental impacts. “Go” landing areas would contain low adult (midline carapace length greater than or equal to 180 millimeters) desert tortoise densities (0 to 5 individuals per square mile) and are not Category 1 (i.e., restricted) or Category 2 (i.e., sensitive) Special Use Areas. Implementation of the Proposed Action would expand the potential area open for landing on the Combat Center from 2,973 acres to 115,283 acres (which includes 6,732 acres of the existing built environment), but it would not change the manner, intensity, number, or frequency of rotary or tilt-wing aircraft use or landings on the installation.

Proposed “Slow-Go” landing areas would permit rotary-wing and tilt-rotor aircraft to land on suitable terrain only after additional, site-specific environmental review is performed. These areas contain moderate adult desert tortoise densities (6 to 20 individuals per square mile, as indicated by the most recent survey data). “Slow-Go” areas may include Category 2 Special Use Areas. Rotary-wing and tilt-rotor aircraft could land in designated “Slow-Go” landing areas when the requisite environmental review has been performed prior to landing. If a landing zone is proposed in an area where the estimated adult tortoise density is 6-20 individuals per square mile, a survey would be performed per standard protocol, and if no sign is found within 328 feet (100 meters) of the proposed landing zone, a single landing event would be authorized.

Within the “Go” and “Slow-Go” areas, some of the acreage potentially available would be unsuitable for landings and would not be used based on constraints such as the presence of vegetation or other vertical obstacles. Additionally, existing avoidance and minimization measures specified in the Combat Center’s Integrated Natural Resources Management Plan, prior biological opinions, and newly proposed Special Conservation Measures (SCMs) would be implemented that would further reduce the area available for landing.

Proposed “No Go” landing areas would prohibit the landing of rotary-wing and tilt-rotor aircraft due to the presence of high adult desert tortoise densities (21 to 100 individuals per square mile).

Implementation of the proposed action would not modify any other ongoing training activities at the Combat Center. When combined with existing landing zones and the built environment at the Mainside, Camp Wilson, and Range areas, the proposed area open to landings in “Go” areas includes approximately 115,283 acres (19 percent of the project area), proposed “Slow-Go” aircraft landing areas include approximately 387,141 acres (65 percent of the project area), and proposed “No-Go” areas include approximately 94,947 acres (16 percent of the project area).

The Combat Center would continue to implement existing general conservation measures and Terms and Conditions contained in its biological opinions, and would implement additional SCMs designed specifically for the proposed action, as follows:

1. The Combat Center would continue to implement general conservation measures and the Terms and Conditions contained in the 2002 biological opinion to avoid or minimize potential impacts to biological resources, particularly the threatened desert tortoise. This includes measures such as (a) requiring all personnel at the Combat

Center to remove or contain foodstuffs, trash, or other wastes that may attract predators; (b) ensuring that all personnel immediately report to a Combat Center approved desert tortoise biologist (i.e., a biologist approved by the Service) any desert tortoises if they are within or immediately adjacent to training exercises or construction projects that may injure or kill them; and (c) concentrating training activities within previously disturbed areas;

2. Proposed landing zones within designated "Slow-Go" areas would continue to be assessed through a case-by-case environmental review. This involves conducting surveys for sensitive resources (e.g., desert tortoise, cultural resources) within existing training areas and allowing temporary authorization of landing operations within areas devoid of sensitive resources. This will ensure landing operations are not authorized when desert tortoises or sensitive cultural resources are present;

3. Pilots would avoid landing sites with vegetation or other vertical obstacles to reduce risk to personnel and equipment. This would have the effect of reducing impacts to native vegetation, and focusing operations in more barren areas less likely to have desert tortoises present;

4. A representative sample of landing zones within designated "Go" areas would be surveyed using a protocol approved by the Service during the first year of training under the Proposed Action, immediately following landing by rotary-wing and tilt-rotor aircraft, to ensure that no desert tortoises are injured or killed; and

5. The Combat Center would conduct additional surveys for biological resources (e.g., desert tortoise density surveys) as funds are available.

Rotary-wing and tilt-rotor aircraft training can degrade desert tortoise habitat due to strong winds in localized areas that damage shrubs, erode soils, and increase the prevalence of non-native annual plants. It can also result in direct and indirect effects to individuals due to exposure to increased amounts of strong, gusty winds, particulate matter, fugitive dust, ground vibrations, and noise that can injure or kill desert tortoises and affect their behavioral patterns. The intensity of these effects are proportional to the amount of time a landing area is exposed to downwash, and the amount of habitat and number of individuals that occurs within a given landing area.

In general, the identified effects should be limited for several reasons: (1) pilots are required to avoid landing sites with vegetation, and military training units are encouraged to use previously disturbed areas; (2) effects at landing sites would be localized, sporadic, and be of short duration; (3) desert tortoises generally spend short periods of time above ground; (4) desert tortoises are less likely to occur in sparsely vegetated habitat; (5) the proposed "Go" landing areas are limited to those with low densities of adult desert tortoises; (6) "Slow-Go" areas would require case-by-case environmental reviews prior to use; (7) desert tortoises are regularly exposed to dust and sand due to the environment in which they live; and (8) use of exhaust deflectors reduces fire ignition potential.

The 2002 and 2017 biological opinions addressed the combined effects of the Marine Corps' training and operations activities on desert tortoises and their critical habitat within the Combat Center. The effects of the Marine Corps' training activities identified in these biological opinions included loss and degradation of desert tortoise habitat, crushing of desert tortoises by vehicles, tanks, cargo drops, and use of heavy machinery, and injury and mortality of individuals from ordinance expended during live fire training. Although these activities are generally concentrated in certain areas, both biological opinions recognized that these effects could occur anywhere on the installation except within certain special use areas that restrict training.

With respect to aircraft operations, the project description in the 2002 biological opinion indicated that the Marine Corps would use fixed airfields, drop zones, and landing zones to support training exercises and the 2017 biological opinion did not define how rotary and tilt-rotor aircraft would be used within the action area. Neither biological opinion provided a specific analysis of the type or magnitude of effects on desert tortoises, but both biological opinions concluded that the Marine Corps' proposed training and operations, which included use of aircraft, was not likely to jeopardize the continued existence of the species or adversely modify its critical habitat.

Although, the proposed action would change the way the Marine Corps currently operates rotary and tilt-wing aircraft at the Combat Center, the effects of the modified action would be limited for the reasons discussed above, and they would all occur within areas that are already open to heavy military training that has the same or greater effects to those anticipated for the proposed action. This would result in an incremental but not significant increase in the effects of training and operations that were contemplated in the 2002 and 2017 biological opinions. Continued implementation of general conservation measures established by the 2002 and 2017 biological opinion, along with the SCMs identified above, would continue to minimize the likelihood of training-related effects to desert tortoises within and in the vicinity of landing sites.

As provided in 50 CFR 402.16, re-initiation of formal consultation is required and will be requested by the Federal agency or by the Service, where discretionary Federal involvement or control over the action has been retained or is authorized by law and if: (1) the amount or extent of taking specified in the take statement is exceeded; (2) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (3) the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion; or (4) a new species is listed or critical habitat is designated that may be affected by the identified action.

Based on our review of the effects of the changes in rotary and tilt-wing aircraft use on the Combat Center, we have determined that these activities are adequately covered under the 2002 and 2017 biological opinions, and we find that further consultation or re-initiation of consultation pursuant to section 7(a)(2) of the Act is not necessary. We have made this determination for the following reasons: (1) the Marine Corps has not exceeded the take limit provided for in the incidental take statement for the 2002 or 2017 biological opinion; (2) we conclude that the proposed changes will result in an incremental and insignificant increase in effects to desert

tortoises within the action area and will not result in take that is not already adequately accounted for in the 2002 and 2017 biological opinions; (3) although the proposed action will change the use of rotary and tilt-wing aircraft on the Combat Center, the type of effects (e.g. habitat degradation, crushing of individuals, etc.), location of effects (i.e., landing zones are within the military training areas covered in the 2002 and 2017 biological opinions), and intensity of effects are adequately addressed in the 2002 and 2017 biological opinions; (4) we have no new information since the development of the 2002 and 2017 biological opinions that would reveal effects that we did not already adequately analyze; and (5) the Service has not listed any new species or designated critical habitat in areas that would affect the action area for the 2002 or 2017 biological opinions.

If you have any questions, please contact Scott Hoffmann of my staff at (760) 322-2070, extension 413, or at scott_hoffmann@fws.gov.

Sincerely,

KENNON COREY Digitally signed by KENNON COREY Date: 2018.01.11 13:46:56 -08'00'

Kennon A. Corey
Assistant Field Supervisor

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State of California • Natural Resources Agency

Edmund G. Brown Jr., *Governor*

DEPARTMENT OF PARKS AND RECREATION
OFFICE OF HISTORIC PRESERVATION

Lisa Ann L. Mangat, *Director*

Julianne Polanco, State Historic Preservation Officer
1725 23rd Street, Suite 100, Sacramento, CA 95816-7100
Telephone: (916) 445-7000 FAX: (916) 445-7053
calshpo.ohp@parks.ca.gov www.ohp.parks.ca.gov

January 24, 2018

Reply In Reference To: USMC_2017_1109_001

Major D. L. Tran, Director
Environmental Affairs
Marine Corps Air Ground Combat Center
Box 788110
Twentynine Palms, CA 92278-8110

RE: Continuing Consultation under Section 106 (your letter 5090, ISD 12E/17-0268 of December 04, 2017 and e-mail of January 12, 2018)

Dear Major Tran:

The U. S. Marine Corps (USMC) is continuing its consultation with the State Historic Preservation Officer (SHPO) on the above-cited undertaking, in accordance with Section 106 of the *National Historic Preservation Act*, as amended. The USMC proposes to expand its current Landing Zones (LZs) from 2,973 acres to a total of 112,310 acres by designating additional LZs.

The USMC proposes to divide the Marine Corps Air Ground Training Center into two zones – one that would be open for the landing of both rotary-wing and tilt-rotor aircraft and one that would be closed to aircraft landings. The expanded area would constitute the area of potential effect (APE), which was surveyed previously between 1992 and 2016 by ten pedestrian surveys. Those surveys identified 36 cultural resources as being located in the APE, consisting of 33 prehistoric sites (sparse lithic scatters or single lithic reduction stations, and sparse campsites) and 3 historical sites (historic trash scatters resulting from mining or homesteading activities). After reviewing those survey reports, the USMC concluded that the results were still valid for the APE and that another pedestrian survey was not required. The USMC has concluded that none of the 36 cultural resources are eligible for listing on the National Register of Historic Places (NRHP). The trinomial numbers for the 36 cultural resources are listed on Attachment One.

The USMC consulted with seven tribal governments or groups in regards to the proposed undertaking. The USMC received a response from the San Manuel Band of Mission Indians that they concurred with the USMC's finding of No Historic Properties Affected. The USMC has not received any other responses from the other Tribes.

Based on the records review, the pedestrian survey, and the tribal consultations, the USMC has determined that a finding of No Historic Properties Affected is appropriate for this proposed undertaking, and has requested the SHPO's concurrence with that determination, its determination of ineligibility, and its identification of the APE.

The SHPO has reviewed the documentation provided and offers the following comments:

- The SHPO has no objections to identification and delineation of the APE, pursuant to 36 CFR Parts 800.4(a)(1) and 800.16(d);
- The SHPO concurs that none of the sites identified on Attachment One are eligible for listing on the National Register of Historic Places; and
- The SHPO does not object to your finding of No Historic Properties Affected and agree that it is appropriate for this proposed undertaking.

Be advised that under certain circumstances, such as an unanticipated discovery or a change in project description, the USMC may have additional future responsibilities for this undertaking under 36 CFR Part 800. Should you encounter cultural artifacts during ground disturbing activities, please halt all work until a qualified archaeologist can be consulted on the nature and significance of such artifacts.

If you have any questions or concerns, please contact Ed Carroll at (916) 445-7006 or via e-mail at Ed.Carroll@parks.ca.gov.

Sincerely,

Julianne Polanco
State Historic Preservation Officer

List of Trinomial Numbers for the 36 Ineligible Cultural Resources

CA-SBR-6626
CA-SBR-6627
CA-SBR-7770
CA-SBR-7772
CA-SBR-7773
CA-SBR-7774
CA-SBR-7775
CS-SBR-7776
CA-SBR-7777
CA-SBR-7778
CA-SBR-7779
CA-SBR-7780
CA-SBR-7781
CA-SBR-7783
CA-SBR-7784
CA-SBR-7785
CA-SBR-7786
CA-SBR-7787
CA-SBR-7789
CA-SBR-8037
CA-SBR-8287
CA-SBR-9804
CA-SBR-12012/H
CA-SBR-14588
CA-SBR-17187
CA-SBR-17188
CA-SBR-28536/H
CA-SBR-28537/H
CA-SBR-28579
CA-SBR-28580
CA-SBR-28581
CA-SBR-28582
CA-SBR-28583
CA-SBR-28584
CA-SBR-28585
CA-SBR-29379

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Subject: RE: MCAGCC Survey Report for 5 Archaeological Sites located in the Proposed Go Landing Zones

From: JMauck@sanmanuel-nsn.gov
To: janelle_h_99@yahoo.com
Cc: walter.christensen@usmc.mil
Date: Friday, January 12, 2018, 10:01:47 AM PST

Hi Janelle,

Thank you for the attached documents - Mr. Kirwan's efforts are much appreciated. He was very thorough in his descriptions of the initial site record errors, as well as the concerns of SMBMI, and his work addressed each topic. I concur with his findings: not only are these sites not eligible, but they should also be re-designated as isolates. SMBMI has no concerns with these sites being a part of the "Go" areas at MCAGCC.

For your reference, I do have 2 notes for errors within the report, if you choose to update it: 1) SMBMI's cultural office does not hold THPO status – we are simply the Cultural Resources Management Department – and mention of SMBMI's THPO office is incorrect; and 2) My name is spelled "Muack" rather than "Mauck" throughout the document.

Regards,

Jessica Mauck
CULTURAL RESOURCES ANALYST
O: (909) 864-8933 x3249
M: (909) 725-9054
26569 Community Center Drive, Highland California 92346
SAN MANUEL
BAND OF MISSION INDIANS

From: Jessica Mauck
Sent: Wednesday, January 10, 2018 11:57 AM

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Subject: EA for Ongoing Training Associated with Implementation of Landing Zone Changes

From: JMauck@sanmanuel-nsn.gov
To: janelle_h_99@yahoo.com
Date: Thursday, January 25, 2018, 2:16:22 PM PST

Hello Janelle,

Thank you for consulting with the San Manuel Band of Mission Indians (SMBMI) regarding the above referenced project. As a part of this effort, 36 archaeological sites were proposed for the "Go" landing zones given their recommendation as Not Eligible for the NRHP, and the fact that a majority of them, if not all, were incorrectly classified as Sites when they are likely Isolates. Upon review of the site records, SMBMI recommended resurveys for the following sites, due to errors within the records that needed field verification: CA-SBR-7772, -7773, -7786, -8037, and -29379. In early January 2018, you supplied a report generated by Tadhg Kirwan that thoroughly addressed SMBMI's concerns and validated your department's recommendation of Not Eligible for each site. SMBMI concurs with this recommendation, as well as your department's finding of "No Historic Properties Affected" for the proposed project, and no further consultation with respect to this aspect of the project is required. As this project is ongoing, SMBMI will continue to consult on the remainder of the project moving forward.

Regards,

Jessica Mauck
CULTURAL RESOURCES ANALYST
O: (909) 864-8933 x3249
M: (909) 725-9054
26569 Community Center Drive, Highland California 92346
SAN MANUEL
BAND OF MISSION INDIANS

THIS MESSAGE IS INTENDED ONLY FOR THE USE OF THE INDIVIDUAL OR ENTITY TO WHICH IT IS ADDRESSED AND MAY CONTAIN INFORMATION THAT IS PRIVILEGED, CONFIDENTIAL AND EXEMPT FROM DISCLOSURE UNDER APPLICABLE LAW. If the reader of this message is not the intended recipient or agent responsible for delivering the message to the intended recipient, you are hereby notified that any dissemination or copying of this communication is strictly prohibited. If you have received this electronic transmission in error, please delete it from your system without copying it and notify the sender by reply e-mail so that the email address record can be corrected. Thank You

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7016 0910 0001 7391 8010

January 24, 2018

CERTIFIED MAIL # 7016 0910 0001 7391 8010
RETURN RECEIPT REQUESTED

Janelle Harrison
Environmental Affairs
Box 788110, Bldg 1418
Twentynine Palms CA 92278-8110

RE: ENVIRONMENTAL ASSESSMENT FOR ONGOING TRAINING ASSOCIATED WITH IMPLEMENTATION OF LANDING ZONE CHANGES

Dear Ms. Harrison,

This letter is in regards to consultation in compliance with Section 106 of the NHPA (36 CFR 800) for the Landing Zone Changes in the Marine Corps Air Ground Combat Center. This project entails the designation of areas to be Go, Slow-Go, or No-Go areas with rotary-wing and tilt-rotor aircraft landing. After review of the project area, the Tribal Historic Preservation Office (THPO) is aware of two (2) culturally sensitive areas within the landing zones. After review of the Cultural Reports, the project area involves well over 500,000 acres of evaluation and over 2,000 cultural resources. While the "Go" area does not contain any known National Register of Historic Places Eligible sites, some portions may be in a culturally sensitive area. Because of the extensive nature of the project, the THPO requests shapefiles of the Go/No-Go/Slow-Go Landing Zones and the Eligible and Non-Eligible sites that may be affected by this undertaking. Furthermore, we are interested in any future development of this undertaking. If there are inadvertent discoveries of archaeological remains or resources, construction should stop immediately, and the appropriate agency, tribe(s), and the Tribal Historic Preservation Office should be notified.

If you have any questions, please do not hesitate to contact the THPO at (760) 775-3259 or by email: TNPConsultation@29palmsbomi-nsn.gov.

Sincerely,

Anthony Madrigal, Jr.
Tribal Historic Preservation Officer

cc: Darrell Mike, Twenty-Nine Palms Tribal Chairman
Sarah Bliss, Twenty-Nine Palms Tribal Cultural Specialist
Walter Christensen, USMC

Subject: MCAGCC Environmental Assessment for Ongoing Training Associated with Implementation of Landing Zone Changes

From: janelle_h_99@yahoo.com
To: sbliss@spotlight29.com
Cc: walter.christensen@usmc.mil
Date: Wednesday, January 31, 2018, 4:26:11 PM PST

Dear Ms. Bliss,

Thank you for your response. Walter Christensen was out all last week and I was in the field Monday and Tuesday. Walter had to forward this email to me. I do not yet have a usmc.mil email account, thus I did not receive the email. I am still currently using my yahoo email address for correspondence and will update you when I receive my usmc.mil email address.

I understand your concerns regarding the Proposed Landing Zones Changes. In fact, SHPO wanted some clarification on this proposed undertaking as well.

While the entire installation will be designated as one of three types of zones, we are only consulting on, and seeking your concurrence with, the areas considered as "GO" zones. I will explain:

The "NO GO" areas are not within the APE of this proposed undertaking, and no historic properties or archaeological resources will be impacted because these areas are "Off-Limits" to landing.

We are not consulting on the areas considered for "SLOW GO" because these areas are also outside the APE of this proposed undertaking and are "Off-Limits" to any landing until an area within the "SLOW GO" zone is proposed for landing. If an area within the "SLOW GO" zone is proposed for landing, we would conduct all pertinent record search and survey work for that proposed landing area and a 50m buffer zone and consult with SHPO and the Tribes under Section 106 of the NHPA.

To help you ascertain whether there are any culturally sensitive areas within the proposed "GO" zones, I have attached a shapefile of the proposed Go, Slow Go, and No Go areas for you. I have also attached a shapefile containing the location of the 36 archaeological sites within the proposed "GO" zones that we are seeking your concurrence of "No Historic Properties Affected" for this proposed undertaking.

Also, San Manuel had requested that we resurvey 5 sites that are located in the proposed "GO" zone, so I am sending you a copy of our final report and updated DPR Site Forms for those 5 sites.

I will also attach a copy of the revised consultation letter I sent to SHPO to clarify the scope of this undertaking.

As I am relatively new here at MCAGCC, I just started to implement a new archaeological resources geodatabase format. You will see in the shapefile I sent you that a lot of the attribute fields are "Null". This data was not previously recorded in our GIS. As time permits, our in-house archaeologist/GIS Manager or myself, will be updating those fields from the data recorded on the DPR forms.

I have about 5 recent projects (all outside the Proposed "GO" areas) that still need to be added to the Archaeology geodatabase. Once I have loaded that data into the geodatabase, I would like to share the geodatabase with you. I should be able to send it in a zip file.

v/r
Janelle Harrison MA RPA
Cultural Resources Specialist
Environmental Affairs
Installation Support Directorate
Building 1418 Brown Road
Twentynine Palms CA 92278

office: (760) 830-7641
email: janelle_h_99@yahoo.com

Landing_Zones.zip
422.2kB

ABR151.pdf
12.4MB

CA_SBR_7772_Update.pdf
2.1MB

CA_SBR_7773_Update.pdf
2MB

CA_SBR_7786_Update.pdf
2MB

CA_SBR_8037_Update.pdf
1.9MB

CA_SBR_29379_Update.pdf
1.8MB

Sec 106 - SHPO_USMC_2017_1109_001 (Janelle Harrison; 4 Dec 17).pdf
27.3kB

TWENTY-NINE PALMS BAND OF MISSION INDIANS

46-200 Harrison Place . Coachella, California . 92236 . Ph. 760.863.2444 . Fax: 760.863.2449

February 6, 2018

Janelle Harrison
Environmental Affairs
Box 788110, Bldg. 1418
Twentynine Palms, CA 92278-8110

RE: ENVIRONMENTAL ASSESSMENT FOR ONGOING TRAINING ASSOCIATED WITH IMPLEMENTATION OF LANDING ZONE CHANGES

Dear Ms. Harrison,

This letter is in regards to continued consultation in compliance with Section 106 of the NHPA (36 CFR 800) for the Landing Zone Changes in the Marine Corps Air Ground Combat Center. As stated in our letter sent January 24, 2018, the Tribal Historic Preservation Office was aware of two (2) culturally sensitive areas within the landing zones. After review of the GIS Database, one of these areas is within the No-Go Area, where no aircraft landing would occur. The other culturally sensitive area is within the Lead Mountain area. The resources that the THPO is concerned with is in the Slow-Go Area of the Lead Mountain Area. The THPO requests that the eligible sites within this area are avoided as a No-Go Area. Additionally, the THPO requests to be informed of future surveys within this area and to be included in the evaluation of the unevaluated sites that could shift the area into a "Go" Designation. If there are inadvertent discoveries of archaeological remains or resources, construction should stop immediately and the appropriate agency and tribe(s) should be notified.

The Tribe looks forward to continuing working with the United States Marine Corps on this undertaking. If you have any questions, please do not hesitate to contact the THPO at (760) 775-3259 or by email: TNPConsultation@29palmsbomi-nsn.gov.

Sincerely,

Anthony Madrigal, Jr.
Tribal Historic Preservation Officer

cc: Darrell Mike, Twenty-Nine Palms Tribal Chairman
Sarah Bliss, Twenty-Nine Palms Tribal Cultural Specialist
Walter Christensen, Environmental Affairs USMC

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Appendix C

Minimization, Mitigation, and Monitoring Implementation Plan

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Ongoing Training
Marine Air Ground Task Force Training Command, Marine Corps Air Ground Combat Center, Twentynine Palms, CA
Minimization, Mitigation, and Monitoring IMPLEMENTATION PLAN (MMMIP)

Key: SCM = Special Conservation Measure required to be implemented as part of the Proposed Action; NREA = Natural Resources and Environmental Affairs; LZ = Landing Zone; BO = Biological Opinion; BR = Biological Resources; GR = Geological Resources; WR = Water Resources; CR = Cultural Resources; TBD=to be determined.

ID #	***Avoidance and Impact Minimization Measures/Special Conservation Measures***	***EA Section (or Legal Driver)***	***Responsible Organization***	***Funding***	
				Source	***Estimated Cost***
BR-1	The Combat Center would continue to implement SCMs and the Terms and Conditions of the 2002 and 2017 Biological Opinions (BOs) to avoid or minimize potential impacts to biological resources, particularly the threatened desert tortoise. This includes measures such as (1) requiring all personnel at the Combat Center to remove or contain foodstuffs, trash, or other wastes that may attract predators; (2) ensuring that all personnel immediately report to a Combat Center-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; and (3) concentrate training activities within previously disturbed areas.	Table 2-7	G-3 Operations NREA to confirm compliance.	Proposed Action: TBD	Proposed Action: TBD
BR-2	Proposed LZs within designated Slow-Go areas would continue to be assessed through a case-by-case environmental review. This involves conducting surveys for sensitive resources (e.g., desert tortoise, cultural resources) within existing training areas and allowing temporary authorization of landing operations within areas devoid of sensitive resources. This will ensure landing operations are not authorized when desert tortoises or sensitive cultural resources are present.	Table 2-7	G-3 Operations and NREA	Proposed Action: TBD	Proposed Action: TBD
BR-3	Pilots would avoid landing sites with vegetation or other vertical obstacles to reduce risk to personnel and equipment.	Table 2-7; Section 4.1.2.1, Page 4-2; Section 4.1.2.3, Page 4-6	G-3 Operations NREA to confirm compliance.	Proposed Action: TBD	Proposed Action: TBD

Ongoing Training
Marine Air Ground Task Force Training Command, Marine Corps Air Ground Combat Center, Twentynine Palms, CA
Minimization, Mitigation, and Monitoring IMPLEMENTATION PLAN (MMMIP)

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ID #	***Avoidance and Impact Minimization Measures/Special Conservation Measures***	***EA Section (or Legal Driver)***	***Responsible Organization***	***Funding***	
				Source	***Estimated Cost***
BR-4	A representative sample of landing zones within designated "Go" areas would be surveyed using a protocol approved by the Service during the first year of training under the Proposed Action, immediately following landing by rotary-wing and tilt-rotor aircraft, to ensure that no desert tortoises are injured or killed.	Table 2-7	NREA	Proposed Action: TBD	Proposed Action: TBD
BR-5	The Combat Center would conduct additional surveys for biological resources (e.g., desert tortoise density surveys) as funds are available.	Table 2-7; Section 2.3, Page 2-27	NREA	Proposed Action: TBD	Proposed Action: TBD
GR-1	Encourage military units to utilize previously disturbed areas, especially for off-road maneuvers, digging, or berming.	Table 2-7; Section 4.1.2.1, Page 4-2	G-3 Operations NREA to confirm compliance.	Proposed Action: TBD	Proposed Action: TBD
GR-2	Avoid wet areas for vehicular traffic and creating a limited number of authorized crossings for Deadman Lake to minimize impacts to playa soils.	Table 2-7	G-3 Operations NREA to confirm compliance.	Proposed Action: TBD	Proposed Action: TBD
GR-3	Designate tank traps and other modifications to maintain the natural flow of water during run-off events, to maintain the natural alluvial sediment transport processes. This includes filling tank traps, trenches, and other major excavations to original grade (when feasible) when training exercises are completed.	Table 2-7	G-3 Operations NREA to confirm compliance.	Proposed Action: TBD	Proposed Action: TBD
GR-4	Restore disturbed washes to allow for proper functioning in alluvial sediment transport. This includes maintaining natural drainage at the lowest elevation possible and avoiding realignment or blockage of drainages by roads and other construction.	Table 2-7	G-3 Operations NREA to confirm compliance.	Proposed Action: TBD	Proposed Action: TBD

Ongoing Training
Marine Air Ground Task Force Training Command, Marine Corps Air Ground Combat Center, Twentynine Palms, CA
Minimization, Mitigation, and Monitoring IMPLEMENTATION PLAN (MMMIP)

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ID #	***Avoidance and Impact Minimization Measures/Special Conservation Measures***	***EA Section (or Legal Driver)***	***Responsible Organization***	***Funding***	
				Source	***Estimated Cost***
GR-5	Restore training lands to stabilize soils and provide long-term vegetative cover.	Table 2-7	G-3 Operations NREA to confirm compliance.	Proposed Action: TBD	Proposed Action: TBD
GR-6	Adjust some training scenarios and locations of training events to spread out impacts so that broad areas do not become completely compacted.	Table 2-7	G-3 Operations NREA to confirm compliance.	Proposed Action: TBD	Proposed Action: TBD
GR-7	In sandy areas with perennial grasses, keep activity low to moderate, avoid use of ignition sources, and place targets in a cleared area. These fire-prevention measures also reduce impacts to soil by preserving the vegetation that protects against erosion.	Table 2-7	G-3 Operations NREA to confirm compliance.	Proposed Action: TBD	Proposed Action: TBD
GR-8	In areas designated as Go for vehicles at the base of alluvial fans, spread-out low to moderate use training activities as widely as possible to disperse / diffuse the impact over a wide area.	Table 2-7	G-3 Operations NREA to confirm compliance.	Proposed Action: TBD	Proposed Action: TBD
GR-9	Minimize use footprint in areas designated “Sensitive” soil type or Slow-Go for vehicles, or when activity level is high.	Table 2-7	G-3 Operations NREA to confirm compliance.	Proposed Action: TBD	Proposed Action: TBD
GR-10	Areas of unsuitable topography (e.g., steep and/or mountainous areas) or other locations that might be considered to have unique geological features (e.g., lava flows) would continue to be avoided during training activities.	Table 2-7; Section 4.2.1.1, Page 4-11; Section 4.2.1.2, Page 4-13; Section 4.2.2.1, Page 4-14; Section 4.2.2.2, Page 4-14	G-3 Operations NREA to confirm compliance.	Proposed Action: TBD	Proposed Action: TBD

Ongoing Training
Marine Air Ground Task Force Training Command, Marine Corps Air Ground Combat Center, Twentynine Palms, CA
Minimization, Mitigation, and Monitoring IMPLEMENTATION PLAN (MMMIP)

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ID #	***Avoidance and Impact Minimization Measures/Special Conservation Measures***	***EA Section (or Legal Driver)***	***Responsible Organization***	***Funding***	
				Source	***Estimated Cost***
CR-1	The Combat Center is responsible for monitoring NRHP-eligible sites that are avoided during training activities. An annual Historic Preservation Compliance Report summarizes the monitoring activities.	Table 2-7; Section 3.3.3.2, Page 3-29; Section 4.3.1.2, Page 4-16; Section 4.3.1.3, Page 4-16; Section 4.3.1.4, Page 4-16; Section 4.3.1.5, Page 4-18; Section 4.3.2, Page 4-18	G-3 Operations and NREA	Proposed Action: TBD	Proposed Action: TBD
CR-2	LZs will not be designated within 350 feet (107 meters) of protected cultural resources.	Table 2-7	G-3 Operations NREA to confirm compliance.	Proposed Action: TBD	Proposed Action: TBD
CR-3	The Combat Center would conduct surveys for cultural resources and consultations as funds are available.	Section 2.3, Page 2-27; Table 2-7	NREA	Proposed Action: TBD	Proposed Action: TBD
WR-1	Impacts to playas and washes would be minimized by avoiding use of playas to the maximum extent possible when surfaces are wet, and identifying a limited number of crossing sites on playas and washes to minimize vehicle crossing damage.	Table 2-7	G-3 Operations NREA to confirm compliance.	Proposed Action: TBD	Proposed Action: TBD
WR-2	Designing tank traps and other modifications to maintain the natural flow of water during run-off events, to maintain the natural alluvial sediment transport processes.	Table 2-7	G-3 Operations NREA to confirm compliance.	Proposed Action: TBD	Proposed Action: TBD
WR-3	Restoring disturbed washes to allow for proper functioning in alluvial sediment transport.	Table 2-7	G-3 Operations NREA to confirm compliance.	Proposed Action: TBD	Proposed Action: TBD

Ongoing Training
Marine Air Ground Task Force Training Command, Marine Corps Air Ground Combat Center, Twentynine Palms, CA
Minimization, Mitigation, and Monitoring IMPLEMENTATION PLAN (MMMIP)

Key: SCM = Special Conservation Measure required to be implemented as part of the Proposed Action; NREA = Natural Resources and Environmental Affairs; LZ = Landing Zone; BO = Biological Opinion; BR = Biological Resources; GR = Geological Resources; WR = Water Resources; CR = Cultural Resources; TBD=to be determined.

ID #	***Avoidance and Impact Minimization Measures/Special Conservation Measures***	***EA Section (or Legal Driver)***	***Responsible Organization***	***Funding***	
				Source	***Estimated Cost***
WR-4	Continue implementation of the REVA Program.	Table 2-7; Section 4.4.1, Page 4-19; Section 4.4.2, Page 4-19	G-3 Operations NREA to confirm compliance.	Proposed Action: TBD	Proposed Action: TBD
WR-5	LZs are not located in washes and playas.	Table 2-7	G-3 Operations NREA to confirm compliance.	Proposed Action: TBD	Proposed Action: TBD
General-1	Each field commander must ensure that the SDZs are determined and enforced when a training area is in operation.	Section 3.5.3.2, Page 3-41	G-3 Operations	Proposed Action: TBD	Proposed Action: TBD
General-2	Live-fire is not allowed within 3,280 feet (1,000 m) of the installation boundary.	Section 3.5.3.2, Page 3-41 and 3-42	G-3 Operations	Proposed Action: TBD	Proposed Action: TBD
General-3	The NREA is responsible for pollution prevention, installation and environmental restoration, environmental compliance (including hazardous materials management) and managing solid waste, hazardous waste, and range-related waste. The Compliance Support, Hazardous Materials and Pollution Prevention branches of NREA work together very closely in joint efforts to inspect for compliance and to prevent, respond to, and clean up releases of hazardous materials.	Section 3.5.3.4, Page 3-44	NREA	Proposed Action: TBD	Proposed Action: TBD
General-4	In the event of a spill in training areas, units contact Range Control, who in turn contact NREA. Units are responsible for working parties, drums, trash bags, shovels and equipment (tractors and dump trucks) to abate spill sites. NREA personnel oversee the unit responsible for the spill and ensure proper and adequate cleanup in accordance with Marine Corps and federal regulations.	Section 3.5.3.4, Page 3-46	G-3 Operations NREA to confirm compliance.	Proposed Action: TBD	Proposed Action: TBD

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