

# Integrated Natural Resources Management Plan



Marine Air Ground Task Force Training Command  
Marine Corps Air Ground Combat Center  
Twentynine Palms, California

2024

Marine Air Ground Task Force Training Command  
Marine Corps Air Ground Combat Center

Twentynine Palms, California

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

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**Approval**

This Integrated Natural Resources Management Plan meets the requirements of the Sikes Act (16 USC 670a *et seq.*) as amended.

Date

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**Commanding General**  
**Marine Air Ground Task Force Training Command**  
**Marine Corps Air Ground Combat Center**

Marine Air Ground Task Force Training Command  
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**Endorsement**

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Date

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**Rollie White**  
**Assistant Field Supervisor, Palm Springs Fish and Wildlife Office**  
**United States Fish and Wildlife Service**

Marine Air Ground Task Force Training Command  
Marine Corps Air Ground Combat Center

Twentynine Palms, California

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

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**Endorsement**

This Integrated Natural Resources Management Plan meets the requirements of the Sikes Act (16 USC 670a *et seq.*) as amended.

Date

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**Heidi Calvert**  
**Regional Manager, Inland Desert Regions**  
**California Department of Fish and Wildlife**

# EXECUTIVE SUMMARY

## **Purpose**

The purpose of this Integrated Natural Resources Management Plan (INRMP) is to prescribe natural resources management strategies that sustain military mission readiness by the Marine Air Ground Task Force Training Command (MAGTFTC or Training Command) and Marine Corps Air Ground Combat Center (MCAGCC, Combat Center or 'installation'). The INRMP provides a strategy for Natural Resources Management across the Combat Center for Fiscal Years 2024 – 2028. Implementation of this INRMP enhances military mission readiness by complying with all applicable natural resource laws, sustaining the quality of training lands over time, and facilitating natural resource management in a manner that is consistent with Marine Corps federal stewardship requirements. Use of this INRMP fulfills statutory requirements under the Sikes Act Improvement Act (SAIA), Public Law 105-85, Div. B Title XXIX, Nov. 18, 1997, 111 Stat 2017-2019, 2020-2033, which requires the Secretaries of the Army, Air Force, and Navy to prepare and implement an INRMP for each military installation. This INRMP also meets requirements under Marine Corps Order (MCO)5090.2A and Combat Center Order (CCO) 5090.1F to maintain installation compliance with environmental law.

The SAIA requires wildlife regulators, sovereign Native American Nations, and the public be engaged in the development of this INRMP. The MAGTFTC has cooperated with the U.S. Fish and Wildlife Service (USFWS) and the California Department of Fish and Wildlife (CDFW) throughout the development of this Plan and agency signatures reflect the mutual agreement of these parties that the identified actions fulfill requirements concerning the conservation, protection, and management of natural resources on the Combat Center. As a public document, the INRMP provides an opportunity to foster goodwill for the Combat Center, the U.S. Marine Corps, and the Department of Defense (DoD) throughout the Mojave Desert.

## **Goals and Management Initiatives**

This INRMP presents a streamlined version of the goal-driven framework of the Natural Resources (NR) Program, integrating management initiatives under the programmatic Elements and Objectives and updating ongoing and planned activities to meet current priorities. Programmatic Goals and initiatives are summarized below, described in Chapter 4, and scheduled in the 5-Year Workplan (Appendix A).

### **Goals**

1. Strengthen the MAGTFTC's operational capabilities.
2. Support natural systems on the landscape.
3. Manage federally protected species.
4. Support other uses and engagement.

### **Initiatives**

- Protect sensitive natural resources areas.
- Manage and monitor desert tortoises to ensure compliance with the Endangered Species Act.

- Manage and monitor Migratory Birds to ensure compliance with the Migratory Bird Treaty Act.
- Manage and monitor for Golden Eagles to ensure compliance with the Bald and Golden Eagle Act.
- Manage and monitor special status California and regionally important species.
- Use science-based monitoring to inform the management of floral and faunal resources.
- Incorporate climate change adaptation into the management of the Combat Center's natural resources and plans for future operations.
- Inform Marines and others in the Combat Center's community about the value of natural resources and the various means to conserve them.
- Support Mojave Desert regional initiatives.
- Use remote sensing and Geographic Information Systems to facilitate natural resources management.
- Implement an ecosystem management philosophy that conserves biodiversity.
- Assess the need for a Wildland Fire Management Plan.
- Evaluate and manage invasive species.
- Use National Environmental Policy Act (NEPA) to inform conservation decisions pertaining to natural resources.
- Protect cultural resources while managing natural resources.

### **Document Organization**

The INRMP is organized as follows:

- Chapter 1 describes the purpose and need for the INRMP, lists compliance requirements, details the management philosophy, describes regional programs, details the interagency and public review and endorsement process, and summarizes the program structure and reporting process.
- Chapter 2 details area land use, the formation and growth of the installation, the military mission, and key relationships between the military mission and the NR Program.
- Chapter 3 describes the physical environment of the installation and natural features that may be impacted by the military mission.
- Chapter 4 reviews the NR Program including specific goals, elements, and objectives, and the resources available to implement the program.
- Appendix A presents a 5 Year Workplan summarizing all actions necessary to implement fully the NR Program mission. The workplan assigns priority levels to tasks, identifies implementation leads, and presents a tentative implementation schedule. Since not all the actions require funding, a separate summary of anticipated budget requests is also included.
- Appendix B lists all plant species documented aboard the installation.
- Appendix C lists all wildlife species documented aboard the installation.
- Appendix D presents Desert Tortoise Contact Flowcharts that outline how Marines, Range Control and other Combat Center staff respond when a tortoise is encountered in the field.
- Appendix E presents the Bird Nest Response Matrix that outlines how authorized staff respond to bird nest sitings on buildings and vehicles.
- Appendix F presents the MAGTFTC's Letter of Instruction on Depredation of Predators.

### Implementation Monitoring

INRMP implementation will be evaluated in five ways:

- Annual progress reporting to Headquarters Marine Corps (HQMC), USFWS, and CDFW.
- Annual updates to the 5 Year Workplan in coordination with USFWS and CDFW.
- Annual Environmental Compliance Evaluations (ECE) by the MAGTFTC.
- Formal ECE by HQMC every three years.
- Formal INRMP revisions every 5 years.

### Costs and Benefits

The cost to implement this INRMP is estimated at \$34,297,341 for Fiscal Years (FY) 2024 to 2028. Funding will be primarily from Operations and Maintenance Marine Corps Funds. Budgets will be adjusted annually, as needed. Not included in the estimate are costs specific to water and air quality management, pest management, pollution prevention, range maintenance activities, and in-house salaries. The NR Program instructs compliance with environmental law, provides prudent stewardship of natural resources, and is unlikely to be a significant financial burden on the military mission.

<b>Table 4-4. Budget Request for Natural Resources, FYs 2024 through 2028. *</b>					
	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
COLS* 3 Totals	\$ 7,463,689	\$ 7,192,188	\$ 5,740,376	\$ 6,559,427	\$ 7,025,595
COLS 2 Totals	\$ 52,616	\$ 53,642	\$ 96,116	\$ 56,316	\$ 57,376
COLS 1 Totals	\$ -	\$ -	\$ -	\$ -	\$ -
Total	\$ 7,516,305	\$ 7,245,830	\$ 5,836,492	\$ 6,615,743	\$ 7,082,971

\*Common Output Level of Service (COLS) are prioritized 3>2>1. Given funding limitations, the budget request emphasizes COLS 3 and 2 priorities.

### Military Mission Benefits

Implementation of this INRMP will maintain quality training lands, enhancing mission realism. The prescribed planning process used to develop the strategy presented for natural resources conservation will further reduce maintenance costs, improve the capability for long-range planning, and reduce or avoid encroachment on the military mission from potential natural resources conflicts.

### Environmental Benefits

This INRMP provides the basis for the conservation of natural resources through various tasks that help reduce vegetation loss and soil erosion caused by military activities. Projects will conserve biodiversity and reduce the potential for environmental pollution. Plan implementation will increase overall knowledge of the environment of the Combat Center as well as the regional ecosystem through surveys, monitoring, and research.

**Other Benefits**

The MAGTFTC and Combat Center's environmental image, both internal and external to the Department of Defense (DoD), will be enhanced. Individual Marine's environmental awareness will be increased while at the Combat Center. With violations of the Bald and Golden Eagle Protection Act resulting in fines of up to \$200,000, and Endangered Species and Migratory Bird Treaty Act violations up to \$100,000 and \$50,000 per individual animal impacted, respectively, INRMP implementation will reduce personal and installation liabilities from environmental noncompliance. The MAGTFTC will also benefit from decreased long-term environmental costs caused by degradation of the environment where the Marines train and their families live.



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# LIST OF ACRONYMS

This document uses these acronyms.

AAV	Amphibious Assault Vehicle
ACEC	Area of Critical Environmental Concern
AC/S	Assistant Chief of Staff
AF	Acre Feet
BASH	Bird Aircraft Strike Hazard
BCC	Bird of Conservation Concern
BGEPA	Bald and Golden Eagle Protection Act of 1940
bgs	Below Ground Surface
BLM	Bureau of Land Management
BO	Biological Opinion
BZO	Battle Site Zero
CAMOUT	Combined Arms Military Operations in Urban Terrain
CATEX	Categorical Exclusion
CCB	Combat Center Bulletin
CCO	Combat Center Order
CDFW	California Department of Fish and Wildlife
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CLEO	Conservation Law Enforcement Officer
Combat Center	Marine Corps Air Ground Combat Center
CRPR	California Rare Plant Ranks
CSSC	California Species of Special Concern
CVOT	Combat Vehicle Operator Training Course
CY	Calendar Year
DoD	Department of Defense
DMG	Desert Managers Group
DTRP	Desert Tortoise Recovery Partnership
EA	Environmental Affairs
EIS	Environmental Impact Statement
ECE	Environmental Compliance Evaluation
EAF	Expeditionary Airfield
EIRB	Environmental Impact Review Board
EIS	Environmental Impact Statement
ELCC	Exercise Logistical Coordination Center
EO	Executive Order
EOD	Explosive Ordnance Device
ELISA	Enzyme-Linked Immunosorbent Assay
EMUA	Exclusive Military Use Area
ESA	Endangered Species Act
EPA	Environmental Protection Agency
F	Fahrenheit

FAA	Federal Aviation Administration
FE	Federally Endangered
FEAD	Facilities Engineering & Acquisition Division
FT	Federally Threatened
FINEX	Final Exercise
FONSI	Finding of No Significant Impact
FP	Fully Protected
FPA	Free Production Allowance
FSCEX	Fire Support Coordination Exercise
Ft	Feet
FY	Fiscal Year
GIS	Geographical Information System
HQMC	Headquarters, U.S. Marine Corps
HIMARS	High Mobility Artillery Rocket System
ICRMP	Integrated Cultural Resources Management Plan
IED	Improvised Explosive Device
INRMP	Integrated Natural Resources Management Plan
ISD	Installation Support Directorate
ITX	Integrated Training Exercise
Km	Kilometer
LAA EIS (BO)	Land Acquisition and Airspace Establishment EIS (BO)
LAV	Light Armored Vehicles
m	Meter
MAGTF	Marine Air Ground Task Force
MAGTFTC	Marine Air Ground Task Force Training Command
MBTA	Migratory Bird Treaty Act
MCAGCC	Marine Corps Air Ground Combat Center
MCO	Marine Corps Order
MDAQMD	Mojave Desert Air Quality Management District
MEB	Marine Expeditionary Brigade
mi	Mile
ML	Megaliters
MLRS	Multiple Launch Rocket System
MOUT	Military Operations in Urban Terrain
MPH	Miles Per Hour
MRAP	Mine Resistant Ambush Protected
MSR	Main Supply Route
MTD	MAGTF Training Directorate
NAVFAC	Naval Facilities Engineering Command
NCRB	Natural and Cultural Resources Branch
NECO	Northern and Eastern Colorado Desert Coordinated Management Plant
NEMO	Northern and Eastern Mojave Planning Effort
NEPA	National Environmental Policy Act
NGO	Non-Governmental Organization
NHPA	National Historic Preservation Act

NR	Natural Resources
NTC	National Training Center
OHV	Off Highway Vehicles
OMMC	Operations and Maintenance Marine Corps
PA	Programmatic Agreement
PLO	Public Land Order
PRTSS	Pre-designated Range Training Support Site
PWD	Public Works Division
PWO	Public Works Officer
qPCR	Quantitative Polymerase Chain Reaction
REIR	Request for an Environmental Impact Review
RTAA	Range Training Area and Airspace
SAIA	Sikes Act Improvement Act
SE	State Endangered
SELF	Strategic Expeditionary Landing Field
SOP	Standard Operating Procedures
ST	State Threatened
SUA	Special Use Area
SWAP	State Wildlife Action Plan
T1	Tribal Species of Special Concern
TA	Training Area
TACP	Tactical Air Control Party
TDS	Total Dissolved Solids
TTECG	Tactical Training Exercise Control Group
TRACRS	Tortoise Research and Captive Rearing Site
TRED	Tortoise Regional Estimate of Density
UAE	United Arab Emirates
UAV	Unmanned Aerial Vehicle
UCLA	University of California, Los Angeles
UCR	University of California, Riverside
URTD	Upper Respiratory Tract Disease
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
USMC	United States Marine Corps
UTM	Universal Transverse Mercator
WEA	Western Expansion Area

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# 1.0 OVERVIEW

## 1.1 Purpose and Need

The purpose of this INRMP is to prescribe natural resource management strategies that sustain military mission readiness at the MAGTFTC MCAGCC, in Twentynine Palms, California. This INRMP is a statutory requirement under the SAIA, Public Law 105-85, Div. B Title XXIX, Nov. 18, 1997, 111 Stat 2017-2019, 2020-2033.

This INRMP guides implementation of the MAGTFTC's Natural Resource Program across federal fiscal years 2024 to 2028. The program:

- 1) Conserves Combat Center land and natural resources.
- 2) Plans compliance with applicable federal and state environmental laws and regulations.
- 3) Sustains quality training lands necessary to accomplish the MAGTFTC's critical military mission.
- 4) Integrates natural resources conservation measures and Marine Corps activities to be consistent with federal stewardship requirements.

This INRMP also serves as a Species Management Plan for the desert tortoise (*Gopherus agassizii*; threatened under the Endangered Species Act [ESA]), avian species protected by the Migratory Bird Treaty Act (MBTA), and bald (*Haliaeetus leucocephalus*) and golden (*Aquila chrysaetos*) eagles protected under the Bald and Golden Eagle Protection Act (BGEPA). Preparation and implementation of this INRMP are required by the SAIA, DoD Instruction 4715.3 (*Environmental Conservation Program*), and MCO P50902.A (*Environmental Compliance and Protection Manual*).

Under the SAIA, wildlife regulators, sovereign Native American Nations and the public must be engaged in the development of this INRMP. The MAGTFTC has cooperated with the USFWS and the CDFW on the development of this plan; agency signatures reflect the mutual agreement of these parties that the identified actions fulfill requirements concerning the conservation, protection, and management of natural resources on the Combat Center. The MAGTFTC consulted with eleven federally recognized Native American Tribes. As a public document, this INRMP also presents an opportunity to foster goodwill for the MAGTFTC, the U.S. Marine Corps, and the DoD in the Mojave Desert.

## 1.2 Scope

This INRMP applies to all lands associated with the Combat Center. The Combat Center is the Marine Corps' largest combined-arms, live-fire training facility of 1,102 square miles. The Combat Center is divided into 27 training areas, each of which may contain training areas, landing fields, targetry, main supply routes, fixed ranges, support areas, expeditionary areas, and safety buffer zones. Armed Forces use the Combat Center to train and test equipment to practice and optimize the principles of engagement for future armed conflicts. Annually the MAGTFTC trains approximately one-third of the Fleet Marine Force and Reserve units through Marine Air Ground Task Force (MAGTF) Exercises and other training exercises. The MAGTFTC training mission is expected to evolve with the development of new weapons systems and tactics. Consequently, the impacts to natural resources are likely to change over time. This INRMP

reviews anticipated impacts of training activities on natural resources aboard the installation during federal fiscal years 2024 to 2028 and discusses natural resource management solutions to offset anticipated impacts to protect and preserve the Mojave Desert ecosystem aboard the Combat Center. This plan does not evaluate the military mission, nor does it replace any requirement for environmental documentation of the military mission at the Combat Center.

The Combat Center’s INRMP applies to organizations internal and external to the Combat Center that are involved with, or interested in, the management or use of the installation’s natural resources and lands. This includes active-duty units, reserve components and directorates; state, county, and local governments; non-governmental organizations, tribal groups, private groups, and individuals. This INRMP also defines the level of management and vehicles by which the MAGTFTC participates in regional planning efforts with entities such as the Desert Tortoise Management Oversight Group (DT MOG), and Desert Tortoise Recovery and Sustainment Partnership (RASP), Desert Managers Group (DMG) and the Bureau of Land Management's West Mojave Habitat Conservation Plan (formerly West Mojave Coordinated Management Plan). The INRMP is also an important asset for the Combat Center Master Plan and coordinates with the Integrated Pest Management Plan, Wildland Fire Management Plan, and Invasive Species Management Plan. The INRMP is also consistent with Integrated Cultural Resources Management Plan (ICRMP) and together they serve as the cornerstones of the MAGTFTC’s natural and cultural resource management program.

### 1.3 Authority

The SAIA, as amended, was enacted to “promote effectual planning, development, maintenance, and coordination of wildlife, fish, and game conservation and rehabilitation in military reservations.” It requires the Secretaries of the military departments to prepare and implement an INRMP for each military installation unless exempted due to the absence of significant natural resources. This INRMP includes all elements of natural resource management applicable to the installation and fulfills the statutory requirements under the SAIA, as amended. MCO P5090.2 also describes United States Marine Corps (USMC) policies on environmental protection and identifies relevant federal environmental statutes, regulations, executive orders (EOs), and military mandates required for environmental compliance. There are more than thirty laws and regulations applicable to natural resource management aboard the Combat Center (Table 1-1). The Combat Center monitors updates of these laws and regulations to sustain compliance.

<b>Table 1-1 Natural Resources Management Laws and Regulations</b>	
7 USC 136-136y	Federal Insecticide, Fungicide, and Rodenticide Act
16 USC 668 <i>et. seq.</i>	Bald and Golden Eagle Protection Act of 1940, as amended
Public Law 93-452	Conservation and Rehabilitation Program on Military and Public Lands
16 USC 1531-1544	Endangered Species Act of 1973, as amended
43 USC 1701 <i>et. seq.</i>	Federal Land Policy and Management Act of 1976
7 USC 2801 <i>et. seq.</i>	Federal Noxious Weed Act of 1973
33 USC 1251 <i>et. seq.</i>	Federal Water Pollution Control Act Amendments of 1972

**Table 1-1 Natural Resources Management Laws and Regulations**

16 USC 670a-670o	Fish and Wildlife Conservation and Natural Resources Management Program on Military Reservations: Amends Public Law 86-797 (Sikes Act)
16 USC 2901-2911	Fish and Wildlife Conservation Act
16 USC 661-667	Fish and Wildlife Coordination Act
Title 10 USC2667	Leased, non-excess Property
42 USC 4321-4347	National Environmental Policy Act of 1969
42 USC 6901-6992k	Resource Conservation and Recovery Act
43 USC 4901 <i>et. seq.</i>	Noxious Plant Control Act
43 USC 9601-9675	Comprehensive Environmental Response, Compensation, and Liability Act
16 USC 703-712	Migratory Bird Treaty Act
10 USC 2671	Military Reservations and Facilities
16 USC 5901 <i>et. seq.</i>	Soil Conservation Act of 1935
EO 11989	Off-Road Vehicles on Public Lands
EO 11991	Protection and Enhancement of Environmental Quality: amends EO 11514.
EO 12608	Protection of Wetlands: amends EO 11990
EO 13045	Protection of Children from Environmental Health Risks and Safety Risks
EO 13751	Safeguarding the Nation from the Impacts of Invasive Species
EO 13186	Responsibilities of Federal Agencies to Protect Migratory Birds
EO 13834	Efficient Federal Operations
EO 13783	Promoting Energy Independence and Promoting Economic Growth
EO 14008	Tackling the Climate Crisis at Home and Abroad
EO 14072	Strengthening the Nation’s Forests, Communities, and Local Economies
DoD Instruction 4715.03	Natural Resources Conservation Program
DoD Manual 4715.03	Integrated Natural Resources Management Plan (INRMP) Implementation Manual
DoD Directive 6050.2	Use of Off-Road Vehicles on DoD Lands
MCO P5090.2A	Environmental Compliance and Protection Manual
CCO 5090.1D	Environmental Protection
CCO 5090.4B	National Environmental Policy Act Compliance
USC=U.S. Code, Department of Defense = DoD	

**1.4 Responsibilities**

Numerous internal and external stakeholders support various aspects of natural resource management, ensuring the military training mission and environmental management at the Combat Center are compatible and mutually supportive. In this section, internal and external stakeholders are identified, and their roles and responsibilities briefly discussed. The term stakeholder is used to describe only parties that are directly involved with implementing the

Natural Resource Program, including planning, operation, and implementation monitoring of INRMP tasks. Non-mandatory, mutually beneficial partnerships are not identified.

#### **1.4.1 Internal Stakeholders**

In accordance with MCO P5090.2A (USMC 2018a), all USMC personnel at the Combat Center must be informed of and comply with the environmental rules and regulations that apply to their duties, and shall:

- (a) Comply with all applicable federal, state, and local, DoD, DON and Marine Corps environmental requirements and Presidential Executive Orders.
  
- (b) Maintain general awareness of all applicable Marine Corps environmental policies and goals. Participate in training to understand applicable requirements.
  
- (c) Integrate environmentally safe and compliant procedures into all daily operational practices to minimize risk of adverse health, environmental and mission impacts.
  
- (d) Know who is assigned as the unit's ECC and attend unit/installation-specific environmental training.
  
- (e) Promptly elevate and report environmental issues and concerns to the appropriate authority."

Roles and responsibilities of Department of Defense (DoD) administrators for natural resource protection are also identified and discussed below.

#### **Headquarters Marine Corps**

The HQMC, located in Washington, D.C., is responsible for developing general policy and providing MCOs as well as funding to implement the Natural Resource Program at the Combat Center. HQMC conducts onsite Environmental Compliance Evaluations of the MAGTFTC's Natural Resource Program at least once every three years.

#### **MAGTFTC, Twentynine Palms**

##### ***Commanding General***

The MAGTFTC Commanding General is responsible for accomplishing the MAGTFTC mission, including the administration and conduct of military training programs, and is also responsible for the property, facilities, and assigned personnel aboard the Combat Center. The commanding general also has the overall responsibility for ensuring that installation land management and law enforcement policies, regulations, and activities are consistent and compliant with the federal environmental laws, policies, and standards, and that natural resource quality is sustained for the continued benefit of the military mission (USMC 2018a). The Commanding General is personally responsible for complying with all environmental laws and regulations and executes these responsibilities through a combination of operational and administrative controls and technical direction.

### ***Marine Air Ground Task Force Training Directorate***

The MAGTF Training Directorate (MTD), maintains administrative and operational control of the training ranges, manages the MAGTFTC training program, conducts service-level MAGTF combined-arms training to enhance combat readiness of the operating forces, and supports the Commandant of the Marine Corps' responsibilities to national security.

**Range Management Division (RMD)** is within the MTD and responsible for all range operations excluding rifle and pistol ranges. The Director of the Range Management Division runs the division and is ultimately responsible for all range training functions, including day-to-day operations, scheduling, safety validation, and real-time management of unit and service level readiness training. This section also maintains data on actual range use, maintains Range Training Area and Airspace (RTAA) control of all communications, enforces safety and inspection standards and regulations throughout the RTAA, provides all safety briefs, has the authority to halt all training and direct any required corrective action before the resumption of live fire, supervises exercise-police cleanup of the training areas, provides target construction and emplacement, and coordinates and designs new ranges and enhancements to current ranges and processes, including all necessary NEPA documentation in conjunction with Environmental Affairs (EA). The RMD is also responsible for the preparation, administration, and coordination of the MAGTFTC 5-year Range Management Plan, ensuring its compatibility with the Combat Center's 5-year INRMP.

### ***Installation Support Directorate***

The Installation Support Directorate (ISD) is overseen by the Assistant Chief of Staff (AC/S) and is responsible for planning, controlling, and coordinating the essential MAGTFTC functions of supply, motor transport, billeting, food services, purchasing, contracting, public works, facilities management, construction of new facilities, major repairs to existing facilities, and support of the MAGTF Training and operational exercises. The directorate has several subdivisions, including two, EA Division and Public Works Division (PWD), which are particularly involved with INRMP implementation.

The Environmental Affairs (EA) Division is responsible for the installation's natural and cultural resource management; conservation law enforcement; pollution prevention; installation and environmental restoration; environmental compliance; management of solid waste, hazardous wastes, and range related waste; monitoring ground water and air quality; and encroachment issues. For these matters, the EA Division liaises with HQMC; other DoD agencies; federal, state, and local regulatory agencies; non-governmental agencies; and scientific and academic communities.

The Natural and Cultural Resource Branch (NCRB), under the direction of the Natural and Cultural Resources Officer, is the EA branch responsible for the day-to-day operations and long-term management of natural and cultural resources within the Combat Center. Specific focuses of NCRB management include soils, vegetation, wildlife, paleontological, archaeological, and historic properties. The Natural and Cultural Resources Branch provides a liaison between the MAGTFTC and other federal landholders and consults with state and federal regulatory agencies regarding natural and cultural resource management, including threatened, endangered, and sensitive species, and historic properties, respectively. This branch also holds the primary

responsibility for the planning and implementation of the INRMP, monitoring Combat Center land use, and using the best scientific practices for resources management to sustain the Marine Corps training mission.

The Conservation Law Enforcement Program (CLEP) is staffed by Conservation Law Enforcement Officers (CLEOs). These federally uniformed officers are mandated to enforce federal environmental laws and regulations pertaining to the ESA, MBTA, Antiquities Act of 1906, Archeological Resources Protection Act and the Lacy Act. They are deputized with the USFWS to enforce federal conservation law with the full authority granted to the USFWS, although they are DoD employees. The MAGTF/TC staffs six CLEOs who perform a wide range of law enforcement activities, including arrest and detention, to protect the installation's plant and animal species, habitat, and abundant cultural resources. CLEOs provide direct and indirect benefits to the installation, they discourage environmental lawlessness, such as illegal trespassing and scrapping, and facilitate the sustained use of the military lands for readiness activities.

The Public Works Division (PWD) is managed by the Public Works Officer (PWO), who is the head of PWD and the principal staff assistant to the AC/S at ISD. The PWO controls all planning, coordination, and supervision of facilities acquisition management, sustainment, restoration, and modernization, and provision of all utility services to facilities. All space planning, construction, repair, alterations, site approvals and dig permits must be approved by PWD prior to the start of work. PWD has five distinct branches:

- The Asset Management Branch, which is comprised of Planning, Geospatial Information and Services, and Requirements.
- The Facilities Maintenance Branch, which is comprised of Roads and Grounds, Facilities Services, HVAC, and Electrical Shop.
- Utilities, which are comprised of Utilities/Energy Management, heat plant, cogeneration plant, potable and non-potable water wells, natural gas, and water and wastewater treatment plants.
- The Facilities Engineering and Acquisition Division (FEAD) sections include the Project Management and Engineering, Facilities Support Contracts, and Acquisition.
- The Resource Management Branch includes PWD's fund management programs, the Supply Officer, and allocation and obligation plans.

PWD's purview is broad and complexly interwoven with the Natural Resource (NR) Program. Planning sections are responsible for siting facilities in accordance with land use and general construction, maintenance, repairs, alterations, site approvals, dig permits, and all work that affects land, buildings, utilities, and infrastructure can significantly impact natural resources. Geospatial databases support the planning and coordination of NR Program activities. PWD planning sections responsible for maintaining real property records indirectly assist NCRB by tracking ownership, easements, and historical information often of value to Natural Resources planning. Once work begins on government funded construction and facilities maintenance projects, FEAD provides quality control and ensures compliance with prescribed biological avoidance, minimization, and monitoring measures and special conservation measures required by the NR Program. Facilities sustainment, restoration, and modernization is performed by PWD or by contract, and the planning section incorporates conservation initiatives of the NR

Program while developing broader planning documents such as the installation facilities and operations (e.g., the Pest Control Program and Base Exterior Architectural Plan). Utilities and energy related services support installation demands for power, potable water, non-potable water, natural gas, wastewater services, and hot and cold water, by operating and maintaining infrastructure for the generation, acquisition, treatment, storage, and distribution of these resources across large areas of the Combat Center.

The Mission Assurance (MA) Division provides programs for the protection of life and property and restoration of resources affecting the MAGTFTC mission. They provide emergency services, an active security posture, and mission assurance programs that are designed to deter, detect, delay, defend, and mitigate natural or man-made crises. Protection of this installation and supporting infrastructure preserves our capability to generate, project, and sustain combat power essential to execute the National Military Strategy. Some branches within this division are directly involved with higher-priority or emergency management aspects of INRMP implementation, such as the development of a Wildland Fire Management Plan and a Predator Management Plan.

#### **1.4.2 External Stakeholders**

##### ***U.S. Army Corps of Engineers***

The U.S. Army Corps of Engineers infrequently assists the MAGTFTC with contracting activities and the preparation of natural resources studies. Past publications have included Identification and Characterization of Waters of the United States, Delineation of Deadman Dry Lake and Mesquite Dry Lake at the Marine Corps Air Ground Combat Center, Twentynine Palms, California, and the 1996 Biodiversity and Wildlife Management Plan.

##### ***Other Military Installations***

The MAGTFTC coordinates and cooperates with other military installations within the Mojave Desert. Participating installations include Marine Corps Air Station Yuma (including Chocolate Mountain Aerial Gunnery Range), Marine Corps Logistics Base Barstow, Edwards Air Force Base, National Training Center (NTC) at Fort Irwin, and Naval Air Weapons Station China Lake. The California DMG is comprised of representatives from these installations along with agency representatives from the Department of Interior (DoI); Department of Agriculture (USDA); and state, county, and local government agencies. On a case-by-case basis, the MAGTFTC also advises the Marine Corps Mountain Warfare Training Center near Bridgeport, California.

##### ***U.S. Fish and Wildlife Service***

The USFWS is responsible for administering the ESA and related components of the act, such as compliance, permitting, and consultation. USFWS endangered species permitting operations are conducted under the authority of the regional office in Sacramento, California, except for Section 10 (recovery) Permits. The University of California, Los Angeles (UCLA) holds a Section 10 permit to operate the tortoise headstart program for MCAGCC.



The only resident, ESA-protected species aboard the Combat Center is the desert tortoise. The USFWS-MAGTFTC partnership in the management of the desert tortoise will continue to be critical during FY 2024 to 2028, in part due to the 2018 DoD-DoI RASP Memorandum of Understanding (DoD-DoI 2018), under which the Desert Tortoise RASP is implementing recovery actions per the Desert Tortoise Recovery Implementation Plan (National Fish and Wildlife Foundation 2022). The MAGTFTC continues to implement tortoise conservation measures stemming from Biological Opinions for the desert tortoise (USFWS 2012, 2017 and 2023).

The USFWS is also responsible for administering MBTA and BGEPA, and they occasionally review candidate species for future ESA listing. The USFWS Migratory Bird Permit Office is located at the Sacramento regional office and the MAGTFTC coordinates directly with the Region 8 Sacramento USFWS office for issues involving the MBTA and BGEPA. The MAGTFTC also coordinates closely with the USFWS when species that reside on base are identified as candidates for ESA listing.

The USFWS, Pacific Southwest region (Region 8), field office at Palm Springs, California, provides technical advice and regulatory guidance for the management of endangered and threatened species aboard the Combat Center. This office is a suboffice of the field office in Carlsbad, California. The USFWS is a signatory in implementing this INRMP, in accordance with the SAIA. This INRMP contains specific items of agreement among the USFWS, CDFW, and the MAGTFTC. The USFWS is also a partner in regional initiatives and cooperative ventures with the MAGTFTC.

### ***National Park Service***

Joshua Tree National Park (JTNP) is in the Morongo Basin and has many of the same natural and cultural resources issues as the Combat Center. The park and EA personnel share information when possible and serve together on similar management groups such as the Mojave Weed Management Area, DMG, and DTMOG.

### ***Bureau of Land Management***

The Bureau of Land Management (BLM) administers much of the land surrounding the Combat Center. The agency is an important partner in the management of natural resources. BLM has the lead responsibility for the West Mojave Plan and is a partner of other regional initiatives (e.g., Desert Tortoise RASP) and cooperative ventures with the MAGTFTC.

The management of BLM lands adjacent to the Combat Center falls under two separate BLM offices. The Barstow Field Office manages land along the northwestern, western, and southern boundaries. The Needles Field Office manages land along the northeastern and eastern boundaries. Military units occasionally need to cross these lands to access the training ranges.

### ***California Department of Fish and Wildlife***

The CDFW is the primary state agency responsible for the management of fish and wildlife in the state of California. In 1992, CDFW and the MAGTFTC collaborated to relocate a herd of 20 bighorn sheep (*Ovis canadensis nelsoni*) to the Combat Center. The sheep were relocated to the Bullion Mountains as a part of a reintroduction program. CDFW, the Society for the

Conservation of Bighorn Sheep, and the MAGTFTC have partnered in monitoring bighorn sheep and the maintenance of water guzzlers on the Combat Center. The role of the CDFW in this project has evolved from the primary action agency to a collaborative partner. The CDFW also maintains a list of state-sensitive species and a California Natural Diversity Database, both of which are useful for management of bighorn sheep and other natural resources at the Combat Center.

CDFW is a signatory in implementing this INRMP. This INRMP contains specific items of agreement among the CDFW, USFWS, and the MAGTFTC, as required by the SAIA. UCLA holds USFWS and CDFW permits (TE-085050-8 and SC-001954, respectively) to research desert tortoise headstarting.

### ***Native American Tribes***

The United States has a unique legal relationship with Indian tribal governments as set forth in the Constitution of the United States, statutes, Eos, and court decisions. Since the formation of the Union, the United States has recognized Indian tribes as domestic dependent nations under its protection (*Cherokee Nation v. Georgia*, 30 U.S. (5 Pet.) 1 (1831)). DoDI 4710.02: DOD Interactions with Federally recognized Tribes, SECNAVINST 11010.14: Department of the Navy Policy for Consultation with Federally Recognized Indian Tribes, and EO 13175, American Indian and Alaska Native Policy require regular and meaningful consultation and collaboration with Indian Tribal governments.

The MAGTFTC follows a process established by DoD policy, pursuant to Section 106 of the National Historic Preservation Act (NHPA), that permits elected officials and other representatives of Indian tribal governments to provide meaningful and timely input on actions or policies that might be of tribal interest. In addition, tribes consult as necessary under NEPA, the Native American Graves Protection and Repatriation Act, and other laws and situations implicating concerns of the Native American community. Our consulting Tribes have expressed interest in surveys that may identify plant species that are of religious and cultural significance to the Tribes, and that they receive access to sample these plants.

The MAGTFTC has consulted these federally recognized Tribes for their input on past Combat Center INRMPs:

- Agua Caliente Band of Cahuilla Indians, Palm Springs, CA.
- Augustine Band of Cahuilla Indians, Coachella, CA.
- Cabazon Band of Mission Indians, Indio, CA.
- Cahuilla Band of Mission Indians of the Cahuilla Reservation, Anza, CA.
- Chemehuevi Indian Tribe, Havasu Lake, CA.
- Colorado River Indian Tribes, Parker, AZ.
- Fort Mojave Indian Tribe, Needles, CA.
- Morongo Band of Mission Indians, Banning, CA.
- Torres Martinez Desert Cahuilla Indians, Indio, CA.
- Twenty-Nine Palms Band of Mission Indians, Coachella, CA.
- Yuhaaviatam of San Manuel Nation (formerly the San Manuel Band of Mission Indians), Highland, CA.

### ***Universities and Cooperative Agreements***

The MAGTFTC commissions or otherwise supports the research projects of numerous universities focusing on desert flora and fauna via contracts and agreements, and these studies frequently inform and otherwise guide INRMP implementation. The (UCLA) operates, and holds the permit for, headstarting Desert Tortoises at the Combat Center's Tortoise Research and Captive Rearing Site (TRACRS). Universities and partners are involved in other Combat Center projects, including:

- The University of California, Riverside (UCR), facilitated species niche modeling for the Combat Center's desert tortoises, common chuckwallas, Mojave fringe-toed lizards, and burrowing owls. The tortoise results indicate the need to conserve habitat refugia in the face of climate change. This conservation will attend to associated ecosystem processes and other indicator species. UCR is also updating land condition trend assessments for the installation and analyzing tortoise movements and assimilation within habitat and human-induced activities involved in the tortoise translocation program.
- The University of Montana provides a wildlife biologist for responding to human wildlife conflicts at the cantonment.
- The University of Ontario and Royal Ontario Museum have helped sequence the tortoise genome, execute landscape genomics and headstart tortoise diversity, and are part of tortoise genetic assimilation analyses for the translocation project.
- The University of Florida (UF) tests tortoise plasma, for tortoises on installation and translocation tortoises, for the antibodies indicating exposure to *Mycoplasma* spp., the agent causing Upper Respiratory Tract Disease (URTD). UF also leads genetic assimilation analyses for the tortoise translocation project.
- The Oregon State University is analyzing the size, diversity, and connectivity of the Combat Center's population of desert bighorn sheep.
- The Texas Tech University is assessing coyote (*Canis latrans*) population size and diet using scat DNA analyses and gastric content analyses, respectively, on the Combat Center and associated tortoise translocation sites.
- The Sonoma State University supports the curation and outreach functions of the Combat Center's Archaeological and Paleontological Curation Center.
- The San Diego Natural History Museum is surveying the number and productivity of golden eagle nests aboard the Combat Center.
- The National Fish and Wildlife Foundation assists MAGTFTC's implementation of the Desert Tortoise RASP, including developing the Implementation Plan, coordinating funding, and executing associated conservation projects.
- Preservation Ranch is a cooperator on the translocation and RASP projects for desert tortoises, with local knowledge and staff implementation of conservation tasks.

The use of universities and cooperative agreements to assist the MAGTFTC in researching and managing natural resources will continue under this INRMP.

### ***Other Interested Parties***

Some Non-Governmental Organizations (NGO) that participate in natural resource management aboard the Combat Center include: the California Native Plant Society, Society for the

Conservation of Bighorn Sheep, Desert Protection Council, Desert Tortoise Council, and Bat Conservation International. NGOs provide valuable insight on resource management, especially during public comment period for major INRMP revisions, including the 2019-2024 revision.

### **1.5 Management Strategy**

The management strategy employed in this INRMP prioritizes biological diversity using ecosystem management principles and an adaptive management framework to target responsive, natural resources management efforts that sustain or improve the capability of military lands to support military readiness.

Biological diversity (biodiversity) is the variety of life and the processes that occur to sustain it. Biodiversity includes the variety of living organisms, their genetic differences, the communities, and ecosystems in which they occur, and the ecological and evolutionary processes that allow them to continue functioning (DoD Instruction 4715.03).

Biodiversity is found at all levels of organization, from landscapes, ecosystem processes, and community assemblages of species, to genetic variability within species' populations. The DOD Conserving Biodiversity on Military Lands: A Guide for Natural Resource Managers 3<sup>rd</sup> Edition (Stein 2021) identifies five reasons to conserve biodiversity on military lands:

- 1) Sustain natural landscapes required for the training and testing necessary to maintain military readiness.
- 2) Provide the greatest return on the defense investment to preserve and protect the environment.
- 3) Expedite the compliance process and help avoid conflicts.
- 4) Encourage public support for the military mission.
- 5) Improve the quality of life for military personnel.

INRMPs are fundamental vehicles to sustain and improve military readiness while preserving and enhancing ecosystem integrity (DoDI 4715.03) via ecosystem-based management. The principles for these guidelines include:

- Maintain and improve the sustainability and native biodiversity of ecosystems.
- Consider ecological units and timeframes.
- Support sustainable human activities.
- Develop a vision of ecosystem health.
- Develop priorities and reconcile conflicts with stakeholders.
- Develop coordinated approaches that involve the military in managing ecosystem health.
- Use the best science and data available.
- Use goals and objectives to monitor and evaluate outcomes.
- Work through established, and adaptive, military plans and programs.
- Use adaptive management.

Ecosystem management is goal-driven, natural resource management that considers the environment as a complex system functioning, not as a collection of parts. Ecosystem management recognizes that people and their social and economic needs are a part of that whole.

Ecosystem management on military lands is an important means to support present and future training and testing requirements while preserving, improving, and enhancing ecosystem integrity (DoD 2013). Over the long term, this approach maintains or improves the sustainability and biological diversity of ecosystems while supporting sustainable economies, human use, and the environments required for realistic military training operation.

This INRMP employs ecosystem management principles and an adaptive management framework to guide the NR Program. Adaptive management is interactive and iterative. It evaluates the success and limitations of current management, develops initiatives for improving management, incorporates these initiatives in new management plans and implements them, for subsequent iterations of review and improvement. The adaptive feedback loop enables flexible and responsive natural resource management that can integrate new information for evolving military needs.

### **1.6 Stewardship and Compliance**

Environmental stewardship is the management of natural resources to protect the intrinsic value of those resources to meet the needs of present and future generations. Environmental stewardship is critical for range sustainability because when properly implemented, it provides a means to meet ongoing training requirements through the sustainment of environmental quality over time. DoD Instruction 4715.03 and MCO P5090.2A require an environmental stewardship ethic be incorporated into natural resource management plans by integrating environmental considerations with DoD decision-making processes. Conducting required training operations while meeting regulatory requirements and effecting good stewardship was an underlying theme in developing this INRMP.

Environmental compliance is the management of installation operations to meet all applicable federal and state environmental laws, most notably those associated with environmental documentation, water quality, endangered species, and general management of wildlife. The INRMP maintains environmental compliance of the MAGTFTC and is required by the SAIA, DoD Instruction 4715.03 (Natural Resources Conservation Program, March 2011), and MCO P5090.2A (Environmental Compliance and Protection Manual, July 1998 revised August 2018).

### **1.7 Integration of Internal and External Plans**

Effective planning for the sustainable management of natural resources on any property must involve a variety of considerations to be effective. These include considerations such as the landowner's purpose for the land (including past, present, and future uses), impacts these uses may have on the resources base, the historical and current conditions and notable trends of the resources base, conditions on lands adjacent to the property, applicable laws and legal agreements, future opportunities and concerns stemming from proposed neighboring land uses, regional- or watershed-scale factors interconnected with conditions on the property, and the support available to affect the desired endpoint (such as levels of funding, staff, and potential partnerships). This INRMP accounts for many of these planning considerations via direct coordination with a variety of internal and regional partners, and by aligning with internal and external plans to select the most practical and effective strategies for implementation. Here we identify planning documents that have helped shape this INRMP update:

### **1.7.1 Combat Center Master Plan**

This master plan was last updated in 2009 and provides the MAGTFTC with a framework for facility and infrastructure planning for a five to ten-year period. The master plan charts the course of appropriate reuse and responsible new construction within Mainside and Camp Wilson, to ensure the installation can accomplish its mission well into the future. In Fiscal Year 2023, the MAGTFTC began updating the master plan.

### **1.7.2 Combat Center Order 3500.4K - Range, Training Area, and Airspace Programs**

This order provides instruction and procedures for all agencies and units operating within the Combat Center RTAA Programs, including descriptions of available training ranges, scheduling of ranges, safety regulations, consequences for violations, and environmental procedures that require adherence when in a training area.

### **1.7.3 Programmatic Agreement and Integrated Cultural Resources Management Plan**

The Programmatic Agreement (PA) is a formal, legal agreement between the MAGTFTC, the California State Historic Preservation Officer, and the Advisory Council on Historic Preservation. The PA is a consultation, review, and compliance alternative to Standard Section 106 of the NHPA and applies to all entities that could affect historic properties aboard the Combat Center. The ICRMP establishes procedures for compliance with federal laws, regulations, and EOs that require the protection or management of cultural resources with the least possible effect on military training and mission support activities.

The ICRMP primarily contains Standard Operating Procedures (SOPs) for cultural resource management activities on the Combat Center and outlines the legal foundation and methods to implement the plan, ensuring compliance with cultural resource laws. The NCRB maintains the PA and ICRMP documents.

### **1.7.4 Desert Tortoise Recovery Plan**

The desert tortoise was federally listed as a threatened species in April 1990. An interagency team led by USFWS and land managers from the Mojave Desert prepared a plan that outlined actions needed to recover and protect the species. This plan (USFWS 1994) was developed with input from the CDFW, BLM, National Park Service (NPS), and DoD personnel from NTC at Fort Irwin and Naval Air Weapons Station China Lake. Following a 2004 assessment (Tracy et al. 2004), a Revised Recovery Plan was released in 2011 (USFWS 2011).

### **1.7.5 California Desert Conservation Area Plan**

Section 601 of the Federal Land Policy and Management Act of 1976 required the BLM to develop the California Desert Conservation Area Plan for long-term protection and administration of public lands in the California desert. The California Desert Conservation Plan was finalized in 1980 and established general guidelines for management of all BLM-administered lands in the California desert (BLM 1997). This plan is important because BLM manages much of the Mojave Desert, including lands bordering approximately 75% of the Combat Center, co-manages the Shared Use Area with the MAGTFTC, and co-manages routes adjacent to and on the Combat Center for specific activities.

### **1.7.6 Northern and Eastern Mojave Planning Effort**

The Northern and Eastern Mojave Planning Effort (NEMO) provides a regional perspective for the management of federal lands. It also updates agency-specific management plans to reflect changes made by the California Desert Protection Act of 1994. The planning areas southwestern boundary follows old Route 66, which is close to and of interest to the Combat Center. The Northern and Eastern Mojave interagency planning team consists of representatives from the NPS, BLM, and USFWS. Cooperating federal agencies include the Bureau of Indian Affairs (BIA), Army Corps of Engineers, Environmental Protection Agency, United States Army (NTC at Fort Irwin), and Department of Navy (DoN; Naval Air Weapons Station China Lake). State agencies include CDFW; California State Parks; California Department of Transportation; California and Nevada State Historic Preservation Offices; San Bernardino, Inyo, and Mono counties in California; and Clark, Nye, and Esmeralda counties in Nevada.

### **1.7.7 Northern and Eastern Colorado Desert Coordinated Management Plan**

The Northern and Eastern Colorado Desert Coordinated Management Plan (NECO) is a regional landscape-scale planning effort for most of the California portion of the Sonoran Desert. The planning area encompasses over five million acres. The major driving force of the NECO is to promote desert tortoise conservation and recovery. The planning area includes two desert tortoise recovery units. The plan includes the same agencies as the NEMO. The area covered by NECO is near the Combat Center's eastern boundary along Amboy Road.

### **1.7.8 West Mojave Plan**

The purpose of the West Mojave Plan is to develop management strategies for the desert tortoise, Mohave ground squirrel, and more than 100 other sensitive plants and animals, that warrant conservation throughout the western Mojave Desert. Simultaneously, it would establish a streamlined program for compliance with the regulatory requirements of the Federal ESA and the California ESA. Agencies, local jurisdictions, and others with a stake in the future of the western Mojave Desert collaborated in the development of the West Mojave Plan.

### **1.7.9 California State Wildlife Action Plan**

The State Wildlife Action Plan (SWAP) examines the health of wildlife and prescribes actions to conserve wildlife and vital habitat before their rarity increases and they become costlier to protect. The plan also promotes wildlife conservation while furthering responsible development and addressing the needs of a growing human population. The SWAP may influence natural resources that the Combat Center manages.

### **1.7.10 Desert Managers Group**

The Desert Managers Group (DMG) was established to provide a forum for government agencies to collaborate to conserve and enhance the California desert. The DMG originated as a DoI initiative to implement the 1994 California Desert Protection Act. The DoD coordinator is the co-chair and a voting member of the group. The Governmental and External Affairs (GEA) participates in DMG meetings, and the EA Division Head has contributed often.

### **1.7.11 Desert Tortoise Management Oversight Group**

The Desert Tortoise Management Oversight Group (DTMOG) is a USFWS-coordinated, information sharing collaboration among multiple federal, state, county, and local agencies; NGOs; and interested stakeholders motivated towards the recovery of Agassiz's Desert Tortoise (*Gopherus agassizii*). Common contributors are lead agency managers from federal (e.g., DoD, DoI, USDA, BIA), state offices (e.g., Wildlife, and Transportation for Arizona, California, Nevada, and Utah), and county offices. The supervisor of MAGTFTC EA's NCRB is the representative for the MAGTFTC. Topics include major recovery actions, priorities, methodological advances, funding opportunities, and legislative issues applicable to Agassiz's Desert Tortoise.

### **1.8 Program Summary**

Military installations are entrusted by the federal government to provide good stewardship of their natural lands, and sound natural resource management directly benefits the military mission by providing and sustaining high-quality realistic training conditions. However, managing for natural resources opens installations to potential spatial, temporal, residual or indirect conflicts with military needs. The mission of the NR Program MAGTFTC is:

*“To ensure the Combat Center mission and support activities are compliant with environmental regulatory requirements and all training lands are effectively managed to meet existing and future training demands.”*

Sound planning is critical to identifying and offsetting conflicts between resources and military management needs and realizing this mission. As described in section 2.4 History of the NR Program, the MAGTFTC employed a comprehensive planning process and produced the first INRMP in the late 1990s; the INRMP is now formally updated on a 5-year cycle. INRMPs review how soil, air, water, plant, and animal resources are managed in concert with the military mission for the mutual benefit of both interests, as feasible.

#### **1.8.1 Program Drivers**

Military training generates most impacts to natural resources at the Combat Center, although support facilities and infrastructure contribute also. Program "drivers" present the fundamental needs which must be satisfied for the military mission to continue without disruption. Drivers are defined by the military mission, land use requirements, and natural resource impacts (USMC 1999), and provide the guidance from which management goals can be developed. The following drivers were identified for the MAGTFTC's NR Program:

- Maintain compliance with federal laws, such as the SAIA, ESA, Clean Water Act, and Clean Air Act, in such a fashion as to not impede mission activities.
- Maintain ability of the Combat Center to support its military mission (SAIA) and ensure that lands are continuously available for military training.
- Manage the Combat Center natural resources consistent with DoD and MAGTFTC policies.
- Participate in regional ecosystem initiatives.
- Provide stewardship of public lands



These drivers were used to develop the goals, supporting elements, objectives, and tasks identified in the 5 Year Workplan (Appendix A).

### **1.8.2 Program Organization**

Four overarching goals are used to group critical program elements required to manage natural resources at the Combat Center. Elements were retained from the 2019 INRMP, and a few new elements were created.

The elements of the NR Program are the pillars under which the program operates. The elements address critical aspects of the program operations, and they include things such as minimizing and containing degradation of training lands, landscape level planning, supporting grounds maintenance, having a desert tortoise management plan, managing habitat and non-listed wildlife, and having a conservation law enforcement program. Under each element, one or more objectives are presented to address all aspects of each element. These objectives also serve to guide the development of projects and tasks. The new framework may be summarized with the following outline:

- Goal 1
- Element 1.1
- Objective 1.1.1
- Task 1.1.1-A
- Objective 1.1.2
- Task 1.1.2-A

Future adjustments are anticipated in coming years to improve program flexibility, project justifications, and reduce burdens associated with budgeting and reporting. This INRMP identifies compliance requirements mandated by federal laws, regulations, and policies, and some projects and programs within it are used to mitigate various military activities. The 1997 Sikes Act requires implementation of INRMPs, and therefore INRMPs are a priority for funding. Biological Opinion (BO) implementation and sustainment funds are critical to support BO and conservation of the desert tortoise. Environmental Management Funds are important for the implementation of INRMPs.

### **1.8.3 Project Prioritization**

Budget development and INRMP implementation are continuing, interrelated processes. Natural resource funding requests should support INRMP planned actions and vice versa. While not all-natural resource-related expenditures are identified within the INRMP, all planned actions within the INRMP that require funding should be incorporated into budget planning documentation such as the Program Objectives Memorandum (POM) and annual budgets. As budgets are re-evaluated and funding allocations change, INRMP planned actions, prioritization, and implementation years must be adjusted, re-evaluated, and possibly reprioritized. The 5 Year Workplan will be informally revised annually in consultation with USFWS, CDFW, and HQMC to ensure accurate tracking, progress monitoring, application of adaptive management strategies, and corresponding budget request updates.

Not all projects under this INRMP require funding. When funding is required, a project is classified into COLS 1, 2 or 3 funding priorities. These budget classes, and their priorities, may be described as follows:

**COLS 3:** Recurring natural resource conservation management requirement activities needed to cover the recurring administrative, personnel, and other costs associated with managing DoD conservation programs that are necessary to meet compliance requirements (federal and state laws, regulations, Presidential EO, and DoD policies) or that are in direct support of the military mission.

**COLS 2:** Current compliance projects and activities needed, because an installation is currently out of compliance and has received an enforcement action from a federal or state agency. COLS 2 also includes projects and activities needed that are not currently out of compliance.

**COLS 1:** Maintenance requirements projects and activities needed that are not currently out of compliance, and deadlines have not passed, or requirements are not in force, but will be out of compliance if projects or activities are not implemented in time to meet established deadlines.

The MAGTFTC will seek appropriate levels of project funding and will set final priorities based on the amount of funds received. COLS 3 projects within this INRMP are those actions that the MAGTFTC commits to implementing within the duration of the plan. COLS 3 projects must be funded in the current fiscal year to maintain compliance with compliance agreements or put the installation back into a compliance status after becoming noncompliant. Only a portion of all natural resource funding requests are funded each year. Therefore, in addition to the COLS classification, an additional ranking scheme is also applied at the beginning of each fiscal year by each branch within EA. Annually, the branch heads rank their projects by individual priority (in ordinal priority), from COLS 3 to COLS 2 and then COLS 1. Annual funding received is then applied to the project list in descending order of priority.

The Marine Corps budgetary process projects funding for a seven-year period. Consequently, the MAGTFTC budget requests for natural resources management through 2024 to 2028 are already in the system. However, budget requests are periodically updated and often flexible enough to meet emergent requirements. Under the 5 Year Workplan of this INRMP, projects are currently funded with prior year budgets, and ongoing activities are identified in the workplan.

### **1.9 Review and Revision Process**

The preparation of this INRMP was guided by the *Handbook for Preparing, Revising, and Implementing Integrated Natural Resources Management Plans for Marine Corps Installations* (October 2007) and the Department of Defense Manual 4715.03 (*Integrated Natural Resources Management Plan (INRMP) Implementation Manual, November 2013*). This INRMP is intended to replace the 2018 to 2022 INRMP (signed in 2019) and fulfills the minimum 5-year review requirement for INRMP documents, identified in Section 101(b)(2) of the Sikes Act.

The revisions process involves the DoD components, USFWS, and appropriate state fish and wildlife agencies. This INRMP is a relatively minor update, with most goals, elements, and objectives retained nearly verbatim from the prior INRMP, so new NEPA is not required. The

MAGTFTC consulted on a new Biological Opinion for the Desert Tortoise, with the proposed action focused on incremental changes in training, and tortoise mitigation focused on sustain contributions to the Desert Tortoise RASP. The MAGTFTC has already been a lead in the development and implementation of this RASP. The October 2022 INRMP review with the USFWS and CDFW outlined the emphasis (i.e., minor update) and schedule (agency signatures by late 2023) for this update to the INRMP. The MAGTFTC anticipates providing a draft update for USFWS and CDFW review in summer 2023. USFWS and CDFW feedback will be addressed for INRMP finalization in autumn 2023.

### **1.9.1 INRMP and NEPA Integration**

The MAGTFTC implements NEPA, a federal law mandating federal agencies consider the environmental consequences of their actions before committing to those actions that potentially affect the human and natural environment. Environmental Quality Implementing Guidelines for NEPA (40 Code of Federal Regulations [CFR] Parts 1500-1508) require environmental analyses and documentation be integrated as much as practicable with other environmental reviews, laws, and EOs. Two earlier INRMP had associated NEPA (FY 2002 and 2019), in accordance with the Council on Environmental Quality regulations, MCO P5090.2A, and CCO 5090.4, Environmental Impact Review Procedures, to address the significant scale of managing natural resources of the base expansion and tortoise translocation (MAGTFTC 2012, 2017, respectively). The FY 2007 and 2012 updates to the INRMP were very limited in scope and did not warrant NEPA.

This INRMP integrates with the most recent Biological Opinion (June 2023; USFWS 2023), which addresses incremental changes to training and commits to the RASP Initiative for desert tortoises. This INRMP also integrates recent NEPA (MAGTFTC 2022a, b and 2023), which includes the Supplemental EA for Ongoing Training and is a minor, incremental update compared to the FY 2018 to 2022 INRMP. The installation's mission, operations, and natural resources have not changed appreciably since the previous INRMP. Consequently, it does not require separate NEPA.

### **1.9.2 Tribal Consultation and Collaboration**

All eleven federally recognized Indian Tribes identified in the external stakeholder section have traditional interests in the lands managed by the MAGTFTC. These Tribes have a government-to-government relationship with the MAGTFTC and consult formally on this level (SECNACINST 4000.35A). The MAGTFTC consulted the eleven tribes for this INRMP and received substantive comments from TBD tribes. These comments expressed interests in TBD.

### **1.10 Tracking and Reporting**

Implementation of this INRMP shall be monitored annually, with a progress report delivered to the USFWS and CDFW by January 1<sup>st</sup> of every calendar year. The progress report will be in pdf format and shall include information about the previous year's activities and work proposed for the upcoming year. The progress report shall be developed in coordination with USFWS and CDFW. Coordination with USFWS and CDFW is intended to include face-to-face meetings and discussions of activities, lessons learned, and provide opportunities for questions and input towards the upcoming year's work. Progress Reports were not submitted to USFWS and CDFW prior to the 2018-2022 INRMP. Consequently, the MAGTFTC EA NCRB, CDFW and USFWS

agreed, beginning with fiscal year 2018, the Progress Report would include the following general information:

- 1) An overview of the MAGTFTC's ability to work towards each of the goals outlined in the Work Plan.
- 2) A one to three sentence summary of each task that was performed during the previous year. The summary shall include the task's costs and timeframe for implementation, and the task results and benefits if completed.
- 3) A one to three sentence discussion of any tasks scheduled but not performed during the previous year, including a review of why the task was not accomplished, and recommendations on how to direct further effort (e.g., Should the task be removed from the workplan? Should a new strategy be pursued?).
- 4) A discussion of any necessary changes to management and monitoring priorities resulting from information learned during the previous year, or from changing installation priorities.
- 5) An annual workplan revision with any modifications to the work proposed for the upcoming fiscal year. This revision shall include an update to the summary table from the 5 Year Workplan presented in Appendix A and a summary of each of the tasks proposed for the year.
- 6) An appendix (or appendices) summarizing all final survey reports if the information was not submitted to the agency points of contact during the year.

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## **2.0 LAND USE AND THE MILITARY MISSION**

### **2.1 Installation Location and Neighboring Land Use**

The Combat Center is in the Mojave Desert of San Bernardino County, California. The base is approximately five miles north of the city of Twentynine Palms, 54 miles northeast of Palm Springs, and 150 miles east of Los Angeles. Surrounding the installation are large extents of undeveloped public land, several unincorporated rural communities, small towns, and commercial mining operations. Communities are mostly heavily focused in the Morongo Basin which lays south and west of the base and include Twentynine Palms, Joshua Tree, Yucca Valley, Morongo Valley, and Landers. The Combat Center's northern boundary lies three miles south of Interstate 40; the southern boundary is six miles north of Highway 62 (Figure 2-1).

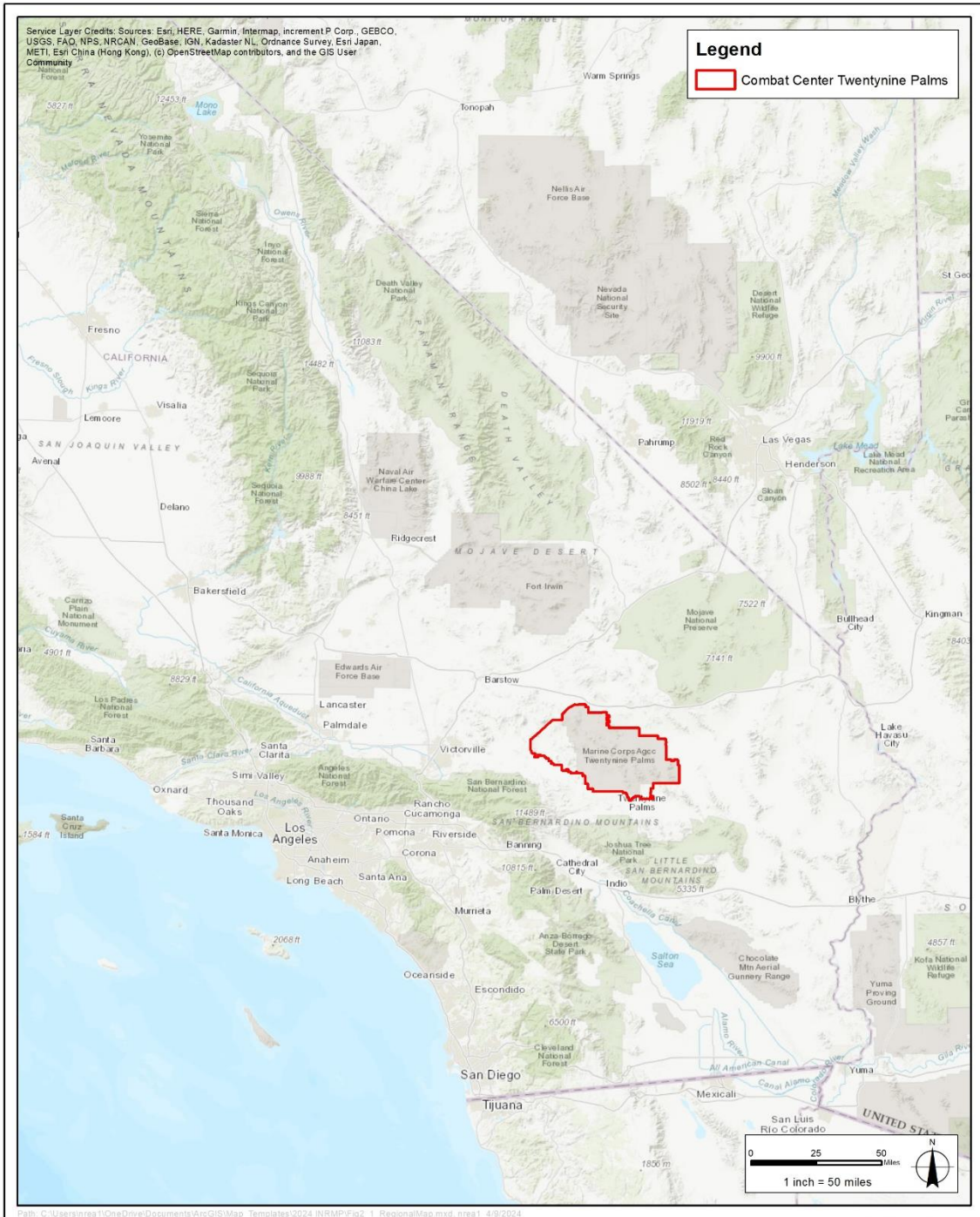
### **2.2 Land Use Before Military Use**

The Combat Center's land has a long history of human presence dating 13,000 years BP (Byerly and Roberson 2015; Rondeau 2016). This environment was once lush with vegetation, playas were filled with water, and fauna supported hunting by the ancestral peoples of the Serrano, the Cahuilla, the Chemehuevi, and the Mojave cultures. For thousands of years, these Uto-Aztecan - Takic and Numic language speaking peoples hunted and foraged in this region. The Cultural Resources section of EA's NCRB monitors, studies, and archives these materials, including a Clovis projectile point found in 2013 (Byerly and Roberson 2015).

Post-western contact, the Morongo Basin was relatively unexplored by the Spanish colonials as the California Mission System was established mainly along the coast (1769-1823). In 1776 the Spanish established the "Old Spanish Trail" or the "Mojave Road" through the Mojave Desert, which explorers used to cross country to California in the early 1800's.

By the time of the California Gold Rush (1848-1852), an influx of newcomers into the state demanded a greater food supply. As a result, cattle and other livestock were driven into California from the east. Some ranching is evidenced through material culture and historical records in the area the Combat Center occupies today, including the Surprise Springs and Sunshine Peak areas. However, most ranching activities in the region were located at Warren's Ranch in what is now Morongo Valley.

The California Gold Rush indirectly bolstered ranching activity in California, and it triggered a significant migration of miners to this region. These miners looked primarily for silver. By the 1880's, mining exploration and production in the Mojave Desert intensified and expanded after the construction of the Southern Pacific Railroad-Mojave to Needles rail line. The earliest mining around the Combat Center began in November 1882, with the most productive mining in the Lava Bed Mountains and the Bullion Mountains between 1884 and 1901. The Combat Center's earliest mining district was the Lava Beds Mining District, organized in 1884. Mining peaked and lulled in the region over the decades but operations closed in 1952 after the establishment of the Marine base.



**Regional Map  
 Combat Center Twentynine Palms INRMP**

**FIGURE**

**2-1**

**Figure 2-1: Combat Center Location**

### **2.3 Installation History**

The Combat Center has grown to approximately 761,247 acres, or 1,102 square miles. Major acquisition and growth events included:

- Public Land Order (PLO) No. 985, 26 July 1954, withdrew 200 acres of public land for the Department of Navy to use as "an artillery and anti-aircraft weapons training area" (thought to be the area now occupied by Mainside).
- PLO No. 1860, 25 May 1959, withdrew more land (PLO and subsequent documents disagree at either 443,000 or 472,000 acres) for use as "an artillery range and Fleet Marine force support training area in connection with the Marine Corps Training Center at Twentynine Palms."
- 112,970 acres were acquired from the Southern Pacific Railroad.
- 10,633 acres were acquired from other private landowners.
- The Navy tried to annex the America Mine Training Area (approximately 8,000 acres) back to BLM, but they refused to take possession due to clean-up costs and safety hazards posed by range residue.
- 1,920 acres were acquired from Catellus Corporation to become part of the Lavic Lake Training Area.
- The National Defense Authorization Act of Fiscal Year 2014 established 107,489 acres acquired west and south of the traditional boundary, comprised of 88,130 acres west and 19,359 acres south of the previous boundary. The acreage was acquired from BLM, private property owners, and State of California.

The U.S. Army first used the lands now associated with the Combat Center in 1941 as a glider training base known as Condor Field. Over the next 10 years, control and use of the facility was transferred several times and included a seven-year period of no use. However, by the early 1950s, the development and production of larger and more sophisticated weaponry warranted the reactivation of the military facility as Headquarters Detachment. The installation was named Camp Detachment Marine Corps Training Center, and 120 Marines were stationed there by early 1953.

The installation became the world's largest Marine Corps base on 1 February 1957, which is a distinction it still maintains, and since it has grown in capacity and size. The Communications-Electronic School was relocated from San Diego in September 1967, and renamed the Marine Corps Communications-Electronics School (MCCES) three years later. The Training Center was redesignated as the Marine Corps Air Ground Combat Training Center on 1 October 1978, and formally renamed as the Marine Corps Air Ground Combat Center on 16 February 1979. In April 1980, the Combined Arms Command was activated, in 1990 the 7th Marine Regiment moved their Regimental Colors from Camp Pendleton to the Combat Center, and in October 2000, the Combat Center was designated home of the Marine Air Ground Task Force Training Command. In 2013, the installation expanded its boundary further to support the increased need for training lands.

### **2.4 Natural Resources Program History**

The Marine Corps commitment to natural resource management is long and steadfast. Land management planning is referenced back to 1956 at the Combat Center, although the oldest hardcopy plan is the 1962 Land Management Plan for Marine Corps Base Twentynine Palms,



California. This 1962 plan was prepared by the Soil Conservation Service (Natural Resources Conservation Service), in cooperation with Naval Facilities Engineering Command Southwest Division. Subsequently, there has always been installation coverage and guidance from a Natural Resources Management Plan. Over time, these plans evolved with the addition of new authorities, responsibilities, and internal and external stakeholders. Wildlife agency participation and concurrence became a standard requirement, internal environmental oversight committees and boards were formed, and partnerships with neighboring federal, state, and local agencies were formalized to better implement sustainable natural resource management to best support the military mission.

In 2000, the Marine Corps Installations Campaign Plan (USMC 2000) formally reaffirmed its commitment to natural resource management, promising the continuance of a NR Program, by stating "*We will enhance our environmental and encroachment prevention programs because these programs serve as tools for installation and operating force commanders to meet federal, state and local laws and preclude downgrading or loss of training or operational opportunities. We will enhance our 'good neighbor' policy with surrounding communities to ensure mutual support of both our needs and concerns.*"

## **2.5 Military Mission**

'The Combat Center's primary mission is to conduct realistic, live-fire combined-arms training, urban operations, and Joint/Coalition-level integration training that promotes the readiness of operational forces' (MCAGCC 2019).

The commanding general of the Combat Center commands oversight of the installation and training operations, via the MAGTFTC. Both command responsibilities effect training exercises and operations to support the battle-readiness of United States Marines.

### **2.5.1 Military Population**

Active-duty military personnel currently assigned to the Combat Center include approximately 11,400 Marines supported by 2,100 civilian personnel. Over 50,000 DoD military personnel train annually during integrated training, MAGTF Training, and other exercises at the Combat Center. The MAGTFTC has both Fleet Marine Forces and tenant units. Additional transient units that schedule training at the Combat Center include Marine Corps, Air Force, Army, and Navy units (Snover and Kellogg 1999).

### **2.5.2 Land Management Units**

Land use on the Combat Center includes infrastructure in support of Marine Corps live fire training, is presented in Figure 2-2, and is described below.

#### **Mainside**

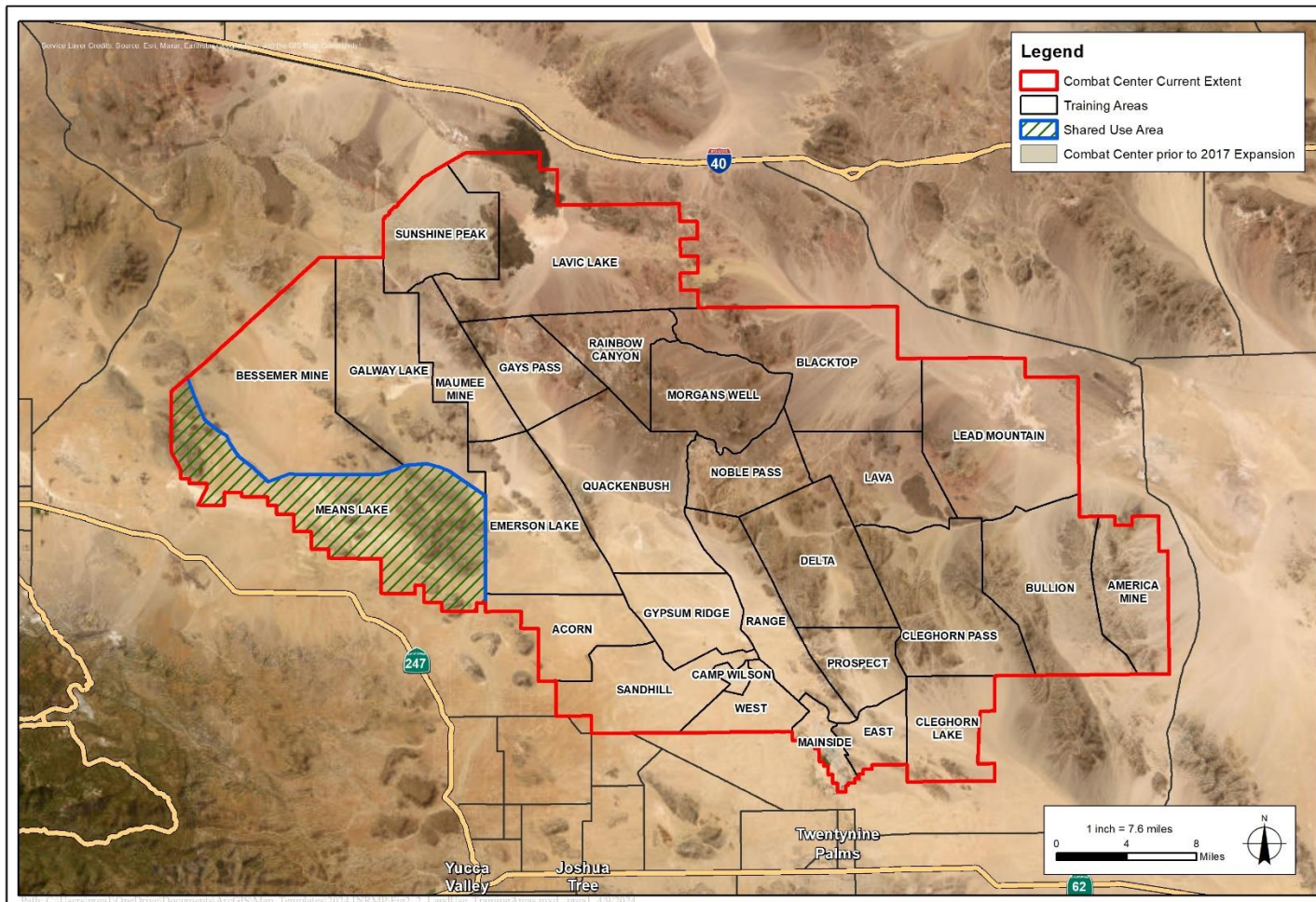
Mainside, encompassing 5,090 acres, is in the southernmost part of the Combat Center. It is the developed portion of the base that houses administrative, maintenance, housing areas, and community support facilities.

## **Training Areas**

The Combat Center has 28 training areas (TA; Appendix B) plus Mainside. In 1998, training areas were realigned to alleviate scheduling problems, with 23 training areas used up until 2017, when four ranges were added because of the 2013 expansion of the Combat Center. In most cases, training area boundaries are defined by natural topographic features, which reduce the risk of stray fire. Each training area varies by size, use, terrain type (Figure 2-2) and training restrictions (Appendix B). Seven TA's typically experience no live fire: Acorn, Backyard, Cleghorn Lake, East, Gypsum Ridge, Sandhill, and West TA.

## **Special Use Areas**

The MAGTFTC designates Special Use Areas (SUAs) in training lands to meet a variety of military or conservation objectives. All SUA designations are made within the military training area system to avoid the need for military personnel to use a dual set of land units. Within SUAs, military training activities are either completely restricted or specific limitations are prescribed, depending on the resource(s) present and site-specific conditions. SUAs designated primarily for the protection of natural resources are sometimes referred to unofficially as Natural Resources Management Areas but typically Natural Resources Management Areas are grouped together and presented with those SUAs established for cultural resources protection, since the disciplines are closely interconnected with one resource almost always benefitting from the protection of the other. CCO 3500.4K and CCO 5090.1F distinguished two levels of natural - cultural SUAs, Restricted Use Areas and Limited Use Areas. However, ground disturbing activities were not limited in Limited Use Areas, so the MAGTFTC removed the "Limited Use Area" label in 2023 (MCAGCC 2023).



Land Use and Training Areas  
 Combat Center Twentynine Palms INRMP

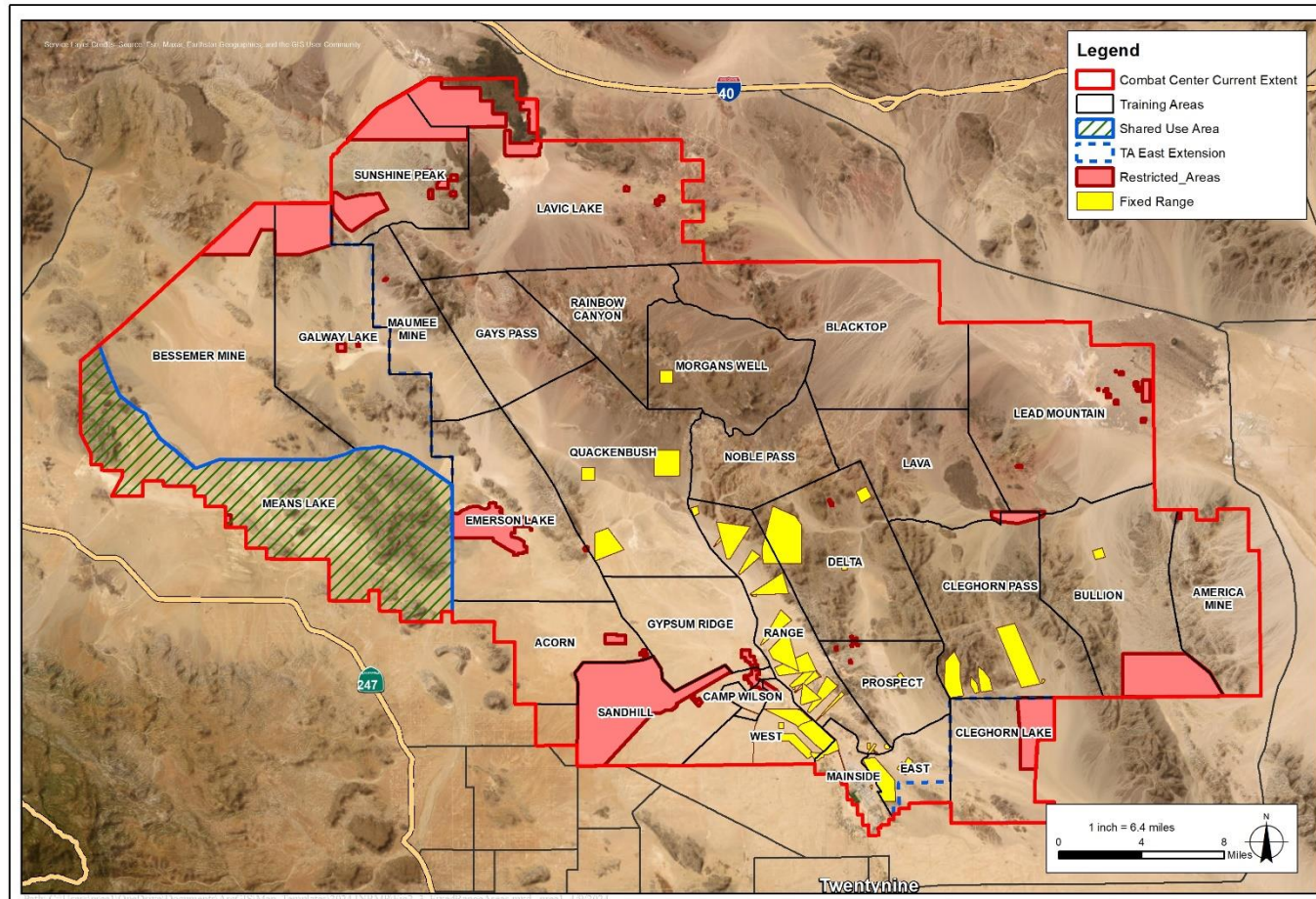
FIGURE  
 2-2

Figure 2-2. Combat Center Training Areas

### ***Restricted Use Areas***

Restricted Use Areas or Restricted Areas (RA) are no impact zones where mechanized maneuvers, bivouacs, off-road vehicles, and training involving vehicle activity is always prohibited. Transit on authorized MSRs is authorized, so long as established speed limits are followed. The oldest and most well-recognized RA established for natural resource protection encompasses 11,801 acres in the Sandhill TA, and protects the installation's water supply, archeological resources, and the desert tortoise, where tortoise densities are predominately 21-50 animals per square mile (as per Woodman *et al.* 2001). A full list of Restricted Areas established for conservation purposes is provided below and may be viewed in Figure 2-3:

- Delta/Prospect (1,022.3 acres)
- Lavic Lake (2,319.3 acres)
- Delta (18.4 acres)
- Emerson/Quackenbush (23.4 acres)
- War Eagle (75.1 acres)
- Sunshine Peak (1,314.6 acres)
- Lead Mountain (249.7 acres)
- America Mine (37.8 acres)
- Lavic/Sunshine (8,901.5 acres)
- Emerson Lake (2,049.2 acres)
- Lava (265.3 acres)
- Foxtrot (965.9 acres)
- Bessemer/Galway (6,983.9 acres)
- Deadman (2,830.2 acres)
- Crystal (2.1 acres)
- Sunshine Peak (1,987.0 acres)
- Sandhill (11,801.2 acres)
- Cleghorn Lake (2,934.9 acres)
- Bullion (5,516.0 acres)



**Fixed Range Areas  
Combat Center Twentynine Palms INRMP**

**FIGURE**

**2-3**

Figure 2-3. Combat Center Restricted Areas and Fixed Ranges (red and yellow polygons, respectively).

### **2.5.3 Training Lands Management**

This section is intended to help identify the impacts of training and operations on natural resources by reviewing the aspects of military training and support functions necessary to achieve the military mission at the Combat Center. Training activities are defined as individual physical actions conducted by Marines or machines. An operation consists of a combination of individual physical actions and activities. Activities common to many operations and training exercises at the Combat Center include vehicular, dismounted, and aircraft activities, and use ordnance, earthmoving, weaponry, targetry, and permanent and expeditionary facilities to achieve their objectives. The primary military training exercises conducted at the Combat Center are listed below and discussed in detail later in this section. These exercises do not necessarily occur each year, but their typical frequencies are identified.

- Integrated Training Exercise (5 annually)
- MAGTFTC level Training (up to 10 annually)
- Fire Support Coordination Application Course (annually)
- Steel Knight Exercise (annually)
- Desert Fire Exercise (twice annually)
- Desert Scimitar (as required)
- Tactical Air Control Party training (10 annually)
- Fallbrook and Barstow shoot.
- Independent air support training flights by Marine, Navy, Army, and Air Force aircraft.
- Low altitude, air defense firing exercises.
- Air school proficiency training.
- Joint airborne-air transportability training and aerial delivery missions.
- Additional training needs and requirements of Marine Expeditionary Force tenant units located aboard the base.
- Large Scale Exercise is executed several times annually.

Prior to discussing specific functions of each exercise, here we review the basic components of training exercises. Note that while the Marine Corps ceased tank operations in 2021, the MAGTFTC plans to retain tank training capabilities should future tank need arise.

#### **Vehicular Activities**

Vehicle use is crucial in training and operations. Discussions of military training exercises will focus only on vehicles that are used off primary and secondary paved roads, and off designated tracked vehicle crossings. All vehicles can produce noise and dust and alternative soil structure. Consequently, vehicular use impacts natural resources at the Combat Center. The type and level of impacts are dependent on many factors including location, time of year, and frequency of use. The types of vehicles using training ranges include:

- Tracked vehicles, which have non-rubber wheels (e.g., tanks, amphibious assault vehicles [AAVs], expeditionary fighting vehicles, multiple launch rocket systems [MLRSs], and self-propelled artillery).
- Heavy-wheeled vehicles, which have multiple axles and more than four rubber tires (e.g., light armored vehicles [LAVs], amphibious combat vehicles, 5- and 7-ton trucks and personnel carriers, and the entire series of Mine Resistant Ambush Protected vehicles).

- Light-wheeled vehicles, which have four rubber tires (e.g., utility vehicles, high mobility multi-purpose wheeled vehicles, joint light tactical vehicles, and small trucks).

### Dismounted Activities

Dismounted activities are classified into two categories: *individual*, with seven or fewer people on foot, and *group*, with eight or more people on foot. Movement associated with a group of people generally creates greater noise levels and has more physical impacts (trampling effects) on the land than movement of individuals. Movement is often extensive in combat training situations, and training exercises typically involve access by foot and by vehicle.

### Aircraft Activities

The Combat Center’s aircraft activities are executed in Restricted Airspace R2501 (Table 2-1), with fixed wing, rotary wing, tilt rotor and various UAV (Table 2-2).

<b>Table 2-1 Aircraft Activities (USMC 2022)</b>	
Close Air Support	Simulated Close Air Support
MEDEVACs	Resupply
FAC(A)	Escort
Assault Support	Aerial Door Gunnery
Troop Lift	External Lift
Air Delivered Ordnance	Command and Control
Reconnaissance	Transit
TERF	Aerial Refueling
Para Ops and Aerial Delivery	Intelligence Surveillance and Reconnaissance

<b>Table 2-2 List of Aircraft (USMC 2022)</b>		
Designation	Name	Aircraft Type
Boeing 707	n/a	Fixed Wing
A-10	Warthog	Fixed Wing
Alpha Jet	Alpha Jet	Fixed Wing
AV-8	Harrier II	Fixed Wing
B-1	Lancer	Fixed Wing
Cessna - various	n/a	Fixed Wing
C-12	Huron	Fixed Wing
C-130 (KC-130)	Hercules	Fixed Wing
F-5E	Tiger 2	Fixed Wing
F-15	Eagle	Fixed Wing
F-16	Falcon	Fixed Wing
F/A-18	Hornet	Fixed Wing
F-22	Raptor	Fixed Wing
F35	JSF	Fixed Wing

KC-135	Stratotanker	Fixed Wing
P-3	Orion	Fixed Wing
AH-1	Cobra	Rotor Wing
AH-64	Apache	Rotor Wing
Bell 222/412	n/a	Rotor Wing
CH-46	Sea Knight	Rotor Wing
CH-53	Sea Stallion	Rotor Wing
EC-135/145	n/a	Rotor Wing
UH-1	Iroquois	Rotor Wing
UH-60	Black Hawk	Rotor Wing
MV-22	Osprey	Tilt Rotor
UAV - various	n/a	n/a

Aircraft over-flights generally have little direct impact on natural resources. Air ordnance delivery operations are conducted by both fixed- and rotary-wing aircraft. Some aircraft flights originate, terminate, or originate and terminate, at the Combat Center's Strategic Expeditionary Landing Field (SELF). UAVs operate from a facility near Assault Landing Zone Sandhill. Parachute drops of personnel and cargo may occur in all training areas if coordinated beforehand.

### **Ordnance Use**

Ordnance use is prohibited within 1,000 meters of the Combat Center boundary. The use of air-to-ground ordnance (bombing and strafing) is a characteristic and integral part of training at the Combat Center. The manner of aerial ordnance delivery varies due to differences in aircraft, weapons systems, and missions. Live-fire is strictly prohibited in Mainside, Camp Wilson, and the seven designated non-live-fire TA's.

### **Digging and Earthmoving**

When in a stationary position for an extended period, such as in defense or in preparation for an enemy attack or ambush, vehicles must be dug into the ground. "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 uses engineering equipment or other heavy machinery to prepare the fighting positions. 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 occurs in numerous training areas. Digging in also involves building obstacles to channelize, slow, 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 feet (1,000 meters) to 11,480 feet (3,500 meters) long; the size and placement is based on the commander's current tactical situation.



## **Targetry**

There are three types of targets used for military training exercises aboard the Combat Center. These include permanent targets, laser targets, and small arms remote target systems, as discussed below.

**Permanent Targets** include non-automated and automated systems. Non-automated targets consist of either stationary plywood (presenting a tank or other military target silhouette), stacks of tires, or old military vehicles. Two types of automated target systems include the Infantry Remote Engagement Target System (pop-up Stationary Infantry Targets and pop-up Moving Infantry Targets attached to aluminum rails), and the MAGTF Target System, located throughout training areas.

The MAGTFTC Target Systems are automated target systems consisting of stationary pop-up armor targets (Target Holding Mechanism-Tank Gunnery). There are 172 stationary pop-up armor targets throughout the training areas and at three ranges. The MAGTFTC Target Systems are designed to support training of tank gunnery personnel and anti-tank Marines in identifying and firing on hostile targets. The MAGTFTC Target Systems are expected to increase substantially, by approximately 243 new Target Holding Mechanisms in seven training areas.

**Laser Targets** are used in 15 training areas and consist of the Simulated Laser Target and the Mobile Independent Target System. The Simulated Laser Target provides a laser splash when aimed at an object or point on the ground; aircraft and other instruments capable of identifying laser targets register the splash to complete their warfare exercises. The Mobile Independent Target System uses a strobe light system to determine hits and misses on vehicular targets and is used for laser ground-to-ground and air-to-ground firing.

**Small Arms Remote Target Systems** are portable, remote, radio-controlled marksmanship trainers designed for outdoor, live-fire ranges. Their main purpose is for honing battle skills, reaction times, and small arms firing techniques in all weather, day, and night exercises.

## **Permanent and Expeditionary Facilities**

The following reviews temporary and permanent training facilities, and fixed and laser ranges, that are used in Marine Corps training aboard the installation. Most of the Combat Center training facilities are expeditionary and temporary in nature, to realistically replicate combat situations.

The **SELF** is a temporary support base for the aviation combat element of Marine units engaged in MTD Training. The SELF is approximately eight miles northwest of Mainside. It has an 8,000-foot aluminum matting runway, aircraft parking area, tactical airfield dispensing system, expeditionary control tower, weather facilities, and crash and rescue services.

The **Exercise Logistical Coordination Center (ELCC)** supports deployed units during MAGTF training operations. The Exercise Support Base is northeast of the ELCC and lies partially within Sandhill and West training areas. Permanent facilities include a fire station, a field kitchen, an all-ranks club, an exchange, shower facilities, a fitness center, a telephone center,

laundry, and chapel. K-Spans are on-site fabricated metal buildings constructed by military engineers as part of their training performance standards. The K-Spans are used for berthing, administration, maintenance, and warehousing. There is typically a high level of foot and vehicle traffic within Camp Wilson.

The ***Field Ammunition Supply Point*** is near Camp Wilson. It is used by individual units to stage ammunition for field exercises.

***Pre-Designated Range Training Support Sites (PRTSS)*** are permanent combat support sites permanently authorized for uses such as bivouacking, berm construction, trenching, field mess, field showers, Forward Ammunition Resupply Point and Forward Logistics Base. PRTSSs were established to reduce the environmental burden on training units, ensure environmental compliance, and extend the use of valuable training land. PRTSSs range from 3 to 595 acres and encourage military units to concentrate ground-disturbing activities to the same area. Fourteen PRTSSs currently exist in the following training areas:

- Cleghorn Pass (1)
- Camp Wilson (1)
- East (1)
- Emerson (1)
- Gypsum Ridge (2)
- Lavic Lake (1)
- Noble Pass (1)
- Lead Mountain (2)
- Prospect (1)
- Quackenbush (2)
- West (1)

The ***Assault Landing Zone***, an unimproved dirt airfield, is in the Sandhill Training Area. The airfield runway length is 5,000 feet and qualifies for Air Force C-130 aircraft.

***Drop Zone Sandhill***, approximately one kilometer southeast of Assault Landing Zone Sandhill, is a designated drop zone for personnel and cargo parachute drops. Parachute drops are permitted in other parts of the training areas.

***Helicopter Landing Pads***, exist at 18 locations across the Combat Center. Fourteen landing zones are scattered throughout the Training Range with four at Mainside. Four Landing Zones in the Lavic Lake and Lead Mountain Training Areas were constructed and covered with road base. Aircraft can land in all parts of the training areas, except in the RA, based on current NEPA and Interagency Consultation via ESA (MAGTFTC 2023, USFWS 2023; respectively).

***Observation Posts*** are located on strategic high points throughout the training areas. There are 15 observation posts, which are used by Tactical Training Exercise Control Group (TTECG), communication units, and command units during training exercises. These areas are designated as no fire and no maneuver areas.

**Range Control** is a building for personnel and antennas and a control tower at Mainside. The Range Control Unit, also known as Range Control and via call sign BEARTMAT, has a mission to monitor radio frequencies for communications, and maintain positive control and management of the Combat Center RTAA. This airspace includes R-2501 and two Military Operation Areas, which are Special Use Airspace under Federal Aviation Administration control that the MAGTFTC may activate for military use. Range Control is responsible for preventing maneuvering units from being in another unit's impact area. It coordinates with the Federal Aviation Administration and the Expeditionary Airfield (EAF) Control Tower; advises all unit activities, monitors activities, notifies appropriate authorities in case of a medical evacuation, and authorizes clearance of aircraft operating within the MCAGCC's ground and air space.

**Repeater Towers** support radio communications and there are seven located on mountaintops throughout the training areas. These repeater towers are built within fiberglass shelters and are powered by solar and battery energy.

**Fixed Ranges** are numbered, permanent ranges covering approximately 16,000 acres (Figure 2-3). There are 45 fixed ranges in the Combat Center, with some overlap between boundaries. Their use varies from navigation, vehicle operator training, or small arms sighting to large MOUT facilities or a multi-purpose complex supporting armored live fire, maneuver and supporting facilities (Appendix B).

**Laser Ranges**, seventeen 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.

There are various **Training, Low Power Laser Systems**. A few examples include the Multiple Integrated Laser Engagement System, Air-to-Ground Engagement System / Air Defense, and the Near Infrared Pointers and Signaling Devices. A brief description of each system is described below:

- The **Multiple Integrated Laser Engagement System** is a scoring system for tactical exercises that emits infrared beams from each weapon that are then detected by target sensors fixed on a person or a vehicle. These devices do not present a hazard at normal operational (engagement) distances.
- **Air to Ground Engagement System / Air Defense** emits an infrared laser beam to simulate various air defense and airborne weapons systems to increase realism during training. Air-to-ground laser firing also uses land features as its backstop.

The **Laser Evaluator System** is used by air or ground units. When illuminated by laser beams, the system emits a low power signal back to the pilot or unit, verifying that it was struck by a laser.

#### **2.5.4 Primary Training Activities**

Training exercises combine individual and group training activities into events that test unit capabilities under real-world scenarios. Various live-fire exercises are conducted at the Combat Center each year, including Service Level Training Exercises (SLTE), Adversary Force Exercises (AFXs) Integrated Training Exercises (ITXs), MAGTF Training, MEB Training, Steel

Knight, Desert Fire Exercise (DESFIREX), and Desert Scimitar. Major exercises occur for approximately 90 percent of the year. Many other types of smaller exercises are also scheduled, separately and sometimes simultaneously, throughout the year. This section reviews the typical training exercises aboard the installation.

### **Service Level Training Exercise Program (SLTE-P)**

The current large-scale exercises under the SLTE-P follow a progressive, building block approach with units participating in ‘realistic, stressful training that culminates with various live-fire and force-on-force’ events (USFWS 2023, MCAGCC 2023). The MAGTF Warfighting Exercise (MWX) was added to the Combat Center’s ITX and AFX. Instead of units converging on an objective employing live-fire munitions, units train as opposing forces and converge on specified or intermittent and impromptu objectives (dependent on scope of action) in a “free play” scenario. The changed emphasis is similar training methodology and equipment used in historical exercises, along with non-live fire scenarios; thus, reducing environmental effects. ‘Despite the variety of exercises and changed training emphases, the nature of military training at the Combat Center has not changed. It remains expeditionary and focused on combined arms, live-fire and maneuver training that integrates the MAGTF elements’ (MCAGCC 2023).

### **Integrated Training Exercise**

The primary function of the MAGTFTC is to develop, conduct, administer, and evaluate 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 takes priority over all other types of training exercises. This live-fire training exercise trains units to synchronize air and ground live fire operations in desert and urban environments. Each ITX lasts approximately 30 days and is controlled by the TTECG using a building block approach. Training begins at the unit level and culminates with a Final Exercise (FINEX) in which the entire battalion participates, operating in an urban setting for a 72-hour period.

Here is a general sequence of events for an ITE:

- The ITX Force arrives at the Combat Center and conducts unit level training involving live fire and maneuvers in the “100-series” ranges.
- The ITX Force then receives an orientation including a program overview, general procedures, and briefings on range safety and environmental regulations.
- The battalion (800 marines) commences field training on the Range 400 series. Infantry squads, platoons, and companies practice attacking enemy defenses using organic weapons (*e.g.*, mortars and machine guns); no air or artillery support is provided.
- Fire Support Coordination Exercises are conducted simultaneously with the Range 400 series infantry troop training. During Fire Support Coordination Exercises, Forward Air Controllers and Artillery Forward Observers work together to coordinate aircraft and artillery fire on enemy targets.
- Convoy Operations, Combat Patrolling, Mobile Assault and Helicopter Assault complete the training received during the Combined Arms portion of the ITX. Based on the unit’s proposed mission, the exercise force chooses “packages” of training that will best prepare them for their deployment. Each package combines movement, either mechanized or via helicopter, with live fire in a desert environment. An infantry battalion will receive a

slightly different package from a Service Support unit or a Provisional Military Police battalion, but all units are trained to collective skill sets that are tailored to individual battalion needs.

- The unit next conducts Urban Warfare Training. Located primarily in Range 200, 205, 210, 215 and 220 in the Training Areas. This package is a ten-day evolution that encompasses Cordon and Knock, Vehicle Checkpoint, Urban Patrol and Urban Assault training. A FINEX is conducted during the last three days, during which time the entire battalion participates in a free-flowing series of events that are predicated and driven by a presiding intelligence picture. Three hundred role players, many of them foreign speakers, provide credence to the exercise by interacting directly with the Marines during the FINEX.

### **MAGTF Level Training**

This exercise includes live-fire training that combines ground, air, and support elements of a MAGTF, referred to as the exercise force. The MAGTF exercise force involved in ITX includes a Command Element, Ground Combat Element, Aviation Combat Element, and a Logistical Command Element:

- The Command Element is normally comprised of an Infantry Regiment.
- The Ground Combat Element normally consists of two infantry battalions (approximately 2,000 Marines) reinforced by a tank - LAR platoon (14 M1A1/15 LAVs and 2 M-88 tanks) and an artillery battalion (12 to 18 howitzers and support trucks). With the cessation of tank use by USMC in 2021, the tank - LAR platoon may be replaced with another infantry brigade.
- The Air Combat Element consists of a fixed-wing squadron (approximately 12 F/A-18s, 18 AV-8Bs or F-35 JSF), an attack helicopter squadron (6-8 AH-1 Cobras), and a composite helicopter-tilt rotor squadron (CH-46s/CH-53s/MV-22s) for transportation and heavy lift.
- The Logistical Command Element includes approximately 320 Marines and provides supplies and repair services to the Ground and Air Combat Elements.

The TTECG, based at the Combat Center, coordinates all ITX Combined Arms Live Fire Training. The TTECG sets up various situations that require an exercise force to effectively coordinate a combined arms response. The MAGTF Level Training can last approximately 30 days and is controlled by the TTECG using a building block approach. An additional ITX program is also conducted each year for reserve units that lasts 15 days. Training begins at the staff and unit level and culminates with a FINEX in which the entire MAGTF participates, operating in the field for a 72-hour period.

A general sequence of events for MAGTF Training is presented below:

- The Exercise Force receives an orientation including a program overview, general procedures, and briefings on range safety and environmental regulations.
- The Ground Combat Element commences field training on the Range 400 series. Infantry squads, platoons, and companies practice attacking enemy defenses using their organic weapons (*e.g.*, mortars and machine guns); there is no air or artillery support provided at this time.

- Air Support Coordination Exercises are conducted simultaneously with the Range 400 series infantry troop training. During Air Support Coordination Exercises, Forward Air Controllers and Artillery Forward Observers coordinate aircraft and artillery fire on enemy targets.
- Maneuver complexity increases during Mobile Assault Course exercises, during which a company-level attack and defense is performed using infantry Marines and mechanized equipment. Armor, artillery, mortars, fixed-wing aircraft, and attack helicopters support the attack. The Mobile Assault Course incorporates movement under fire, with battle drills including breaching an anti-armor obstacle, mounted and dismounted attacks through an objective, synchronized planning, and employment of all assets (infantry, armor, artillery, and air fire).
- Before conducting the final exercise, the exercise staff rehearses operations and refines tactical plans in the Combined Arms Staff Trainer, an indoor, electronic system that includes three-dimensional terrain boards of the various Combat Center exercise areas, a laser light system to simulate impacts on the boards, and communications and electronic warfare systems simulators.
- The Fire Support Coordination Exercises (FSCEXs) involve maneuver commanders using Forward Air Controllers and mortar and artillery Forward Observers for live air and artillery fire. FSCEX-1 is a company-level tactical exercise. The team attacks an enemy defense utilizing artillery, fixed-wing aircraft, and attack helicopter support. FSCEX-2 is a battalion movement-to-contact, live-fire tactical exercise. FSCEX-3 is a battalion delay-and-defend live-fire exercise that emphasizes continuous fire support during rearward movements. FSCEX-4 and FSCEX-5 are conducted only during Enhanced MAGTF Training when a regiment (two or three battalions) acts as the Ground Combat Element.
- The FINEX is the culmination of the MAGTF Training. It is an exercise that brings together the tactics, techniques, and procedures developed during the previous training period. During the three-day FINEX, the Ground Combat Element, supported by the Air Combat element and the Combat Service Support Element, executes numerous missions (attack, defend, delay) in a live-fire environment.
- Upon completion of the FINEX, the TTECG conducts occupational specialty debriefs and a comprehensive debrief covering all aspects of the exercise force's performance.

### **Marine Expeditionary Brigade Exercise Training Program**

Also known as the "MEB" exercise, this program uses targeting, intelligence, and electronic warfare operations to develop and implement a comprehensive plan to achieve the training objectives. The MEB training exercises use a framework of progressively larger and more challenging training events that build in successive evolutions designed to reinforce learning through assessment of established levels of performance. Training events are driven by mission essential tasks that incorporate the command, ground, aviation, and logistics combat elements.

### **Steel Knight**

The Steel Knight training exercise is a two-week, division-level training event. Steel Knight training scenarios change but exercise events include deliberate attack, counterattack, day / night deliberate defense, withdrawal, battlefield interdiction, direct air support, close air support, and night tactical withdrawal not-under-enemy-fire. Exercises also include aerial reconnaissance /

surveillance and long-range artillery missions. Steel Knight uses most of the Combat Center training areas.

## **DESFIREX**

This primarily artillery training exercise at the regimental level involves 2,000 Marines for 7 to 14 days twice per year. It normally consists of a regimental headquarters, two M777A2 cannon 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 UAV operations. The 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.

## **Desert Scimitar**

Primarily a division-level training exercise (7,000 Marines), Desert Scimitar emphasizes artillery maneuvers with infantry 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 cannon 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 participate 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, two LAR battalions, one AAV battalion, and a logistical command element.

Other Desert Scimitar training scenarios can include helicopter-borne raids and 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.

## **2.5.5 Other Training Activities**

### **Allied Forces**

Forces from various allied nations occasionally train at the Combat Center. Two regularly occurring exercises are provided as examples.

A United Arab Emirates (UAE) exercise occurs four times each year. This training is conducted by 500 personnel from the UAE and is designed to provide them the opportunity to sharpen their

skills in the art of live-fire and maneuvers involving ground infantry and mechanized forces. These exercises typically last 20 days and can occur in any TA.

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 lasts 42 days, can occur in any TA, and involves the employment of air, artillery, mortars, and ground maneuver.

### **Formal Schools**

Many different types of training exercises occur regularly at the Combat Center to support formal school training activities, including:

The *Fire Support Coordination Application Course* occurs four times per year for 12-14 days and involves 100 Marines. This 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.

The *Tactical Air Control Party* (TACP) live-fire evolutions are the primary means by which the Marine Corps can provide Marines the requisite qualifications to be a Forward Air Controller (FAC). TACP training occurs over a 4-to-5-day period, is held 10 times per year, and involves 150 Marines. TACP training involves an 81mm mortar platoon, an artillery battery, and one section of aircraft support. This training normally occurs in 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 occurs in these Training Areas: America Mine, Bullion, Lead Mountain, Delta, Prospect, and Quackenbush. In addition, building block training also occurs on the following fixed ranges: R400/401 series, R220, and R104 –R113.

### **Weapons/Equipment Testing**

The *Fallbrook Shoot* is a highly valuable exercise, typically involving 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 the lots are capable of meeting manufacturer'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 Quackenbush or Lead Mountain Training Areas.

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



## **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 occurs in all Training Areas throughout the year. Battalion-level exercises combine various units and attachments, normally occur four times per year, and involve anywhere from 1,500 to 2,000 Marines. Unit level training events can occur in any TA but typically occur in: 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 occur on the following fixed ranges: R103 to R113, R400 and 401 series, R210, R230, R220, R215, and the East and West Training Areas.

## **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.

## **2.6 Natural Resources Management and the Military Mission**

### **2.6.1 Impact Minimization Strategies**

The MAGTFTC is committed to managing natural resources for the benefit of both the installation and regional resources and communities. Krzysik and Trumbull (1996) discussed military training impacts on natural resources, identifying several key mechanisms of impact from military training operations on the environment, including direct disturbance to soils, vegetation, and wildlife, as well as secondary disturbances caused by noise and vibration, smoke and obscurants, and habitat fragmentation. They concluded that the military mission has potential to cause disturbance to natural resources aboard the Combat Center. Additional discussion of potential impacts from military training was provided in subsequent environmental analyses (USMC 2003; USMC 2012).

The MAGTFTC also recognizes military training aboard the installation precludes potential impacts to natural resources from other land uses. See, for example, discussion MCAGCC (2012) regarding expansion of the installation.

### **Live-Fire and Maneuvers**

Military training activities that employ live-fire and ground maneuvers represent two major sources of natural resource disturbance at the Combat Center. These activities could injure or kill wildlife, disturb, or damage soil structure and vegetation, and generate considerable dust. Most of the measured disturbance at the Combat Center occurs in valley floors. Potential effects of the military mission on the desert vegetation of the Combat Center include a reduction in shrub densities; impaired growth, leaf, and root injury; reduction in annual and perennial species, and increased mortality. Potential effects of the military mission on wildlife include possible death or injury from direct contact with vehicles or munitions.

Air-to-ground and ground-to-ground live-fire training and maneuvers will continue to cause most of the disturbance to natural resources on the Combat Center in those areas that are heavily disturbed. This disturbance is cumulative and is intensified with repeated long-term use. To manage for heavy, sustained impacts over time, the MAGTFTC employs a strict ground disturbance minimization strategy.

### **Ground Disturbance**

The MAGTFTC significantly limits ground impacts from military training. Most training operations occur within the same sites and corridors, even between different visiting units. Fixed ranges and Pre-Designated Range Training Support Sites provide for recurring, high-intensity activities, allowing other areas to remain relatively undisturbed or untouched. Sensitive high-value natural resource sites are also formally recognized, signed, and maintained as training-free zones, further protecting natural resources in those locations. Generally, valley floors and wide flat areas are used more often for wheeled and tracked vehicular travel and maneuvers. More rugged areas may sometimes be disturbed by direct shell and bomb impacts. Areas minimally affected by military activities are usually inaccessible to vehicular traffic, are isolated, or are not critical to current training scenarios. These areas include most of the mountain ranges on the Combat Center, particularly in their higher reaches, the one-kilometer (km) buffer zone around the perimeter of the installation, and the Sunshine Peak Training Area which is off-limits to all personnel as it is used as a hung-ordnance delivery area.

### **Ordnance Residue and Range Maintenance**

At the conclusion of all major training exercises, EOD personnel sweep ranges to neutralize unexploded ordnance and reduce safety risks. Residual wastes from training activities are also removed from the landscape and brought back to Mainside for recycling or disposal. Regular maintenance, repair and replacement of targets is done throughout the year, and typical maintenance activities include the upkeep of firing berms on Fixed Range 500, tank trap maintenance, and repair of other berms and trenches as required.

### **2.6.2 Benefits from the Military Mission**

Military management of natural resources can have positive effects. The presence of the military excludes other land uses that could impact natural resources. Land designated for military training is rendered unavailable for development, and military impacts are finite and contained within repetitive events, which establishes maximum disturbance levels to the landscape. Poaching and other illegal activities that potentially affect wildlife resources are relatively insignificant due to military training and military conservation law enforcement. Perhaps most significant, however, is that lands under military management retain most of the vast desert ecosystem as open space. By focusing disturbances, military management gives wildlife greater ranges across large tracts of land, especially when installations are adjacent to one another in undeveloped areas.

### **2.7 Anticipated Changes to Military Tempo**

The MAGTFTC revises training exercise scenarios to better prepare Marines for changing world conditions and threats. Such changes in training scenarios can alter the impact of training on the environment. The most recent evolution of MAGTFTC training is an incremental shift towards smaller units, lighter vehicles, and less scripted training (MCAGCC 2023, USFWS 2023). Less

scripted training emphasizes thought and decision-making in training, combined with typical and new increments in technology (e.g., longer-range rockets). The Combat Center will continue to evolve and may increase in scope to meet increasingly complex, worldwide commitments of USMC forces.

## **2.8 Support Facilities and the Built Environment**

The cantonment, Mainside, is built to contain a full range of facilities, infrastructure and services that support an almost completely self-reliant human development, with industrial, utility, housing, and commercial elements. Both utilities and roads have been expanded since the base's initial development. Utilities include distribution systems for non-potable water, potable water, sanitary sewer, sewer disposal, electricity, high temperature water, and natural gas. As new buildings are being constructed, sidewalks and xeriscaping are being incorporated. Recently completed construction in the "North Mainside" area included new Bachelor Enlisted Quarters, chow halls, range management facilities, administrative buildings, warehouses, maintenance facilities, communications and electronic support facilities, parking areas, training and simulation facilities, new utilities, and infrastructure (sewer, water, power, high-temperature hot water, chilled water, natural gas, communications, roads, and storm water management systems). No further construction is planned for "North Mainside", except for possible road or sidewalk projects. The USMC's current facilities utilization climate is one of infrastructure reset, leaning on Maximum Utilization and Demolition projects for existing facilities.

### **2.8.1 Transportation**

**Regional Access** - Regional access to the Twentynine Palms area is provided by State Route 62 (Twentynine Palms Highway), a four-lane highway that connects to Interstate 10 and State Highway 177, at the western and eastern ends, respectively. The Main Gate at Adobe Road is the busiest access point. In addition to the Main Gate, there are two auxiliary gates, with limited access times, near the housing areas.

**Main Supply Routes** - The road system through the Training Areas is made up of MSRs and smaller unimproved roads, or jeep trails. MSRs average 32 feet wide and are maintained by grading and laying down gravel. There are approximately 354 miles of MSRs. Improvements are on-going to minimize erosion and maintain the MSRs.

**Secondary Roads** - There are about 665 miles of secondary unimproved roads on the Combat Center; they average 16 feet in width and cover about 0.2% of the total land area. The secondary road system developed over time to meet the needs of the evolving military mission (Snover and Kellogg 1999). Jeep trails are generally not graded or repaired after flooding and are only maintained through use by military units. Remnants of old jeep trails that are no longer used can be seen throughout the Combat Center. New trails are occasionally made if training objectives are changed. For the most part, the MSR and jeep trail system adequately serve training needs and military units tend to limit travel to these routes.

### **2.8.2 Potable, Storm, and Wastewater Management**

**Potable water** for the Combat Center is supplied via 11 wells in the Deadman Valley-Surprise Spring Basin, located in the southwestern part of the Combat Center. The Deadman Valley-Surprise Spring Basin 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 Valley-Deadman Lake Basin. Most groundwater found in the basins underneath the Combat Center are fossil water (i.e., from previous geologic times) and very little recharge occurs within the Deadman Valley-Surprise Spring Basin. The only recharge source for this basin is the San Bernardino Mountains, located to the west of the Combat Center. Depth to groundwater in the Deadman Valley-Surprise Spring Basin ranges from 200 to over 400 feet (60-120 meters) below the surface (U.S. Geological Survey [USGS] 2003). Depths to groundwater typically range from 125 to 200 feet (38 to 61 m), although perched zones exist near Bristol Dry Lake and Dry Lake, where water levels range from 14 to 89 feet (4 to 27 meters) below surface. Recharge occurs via percolation of surface runoff through stream beds and washes.

Three other groundwater subbasins are known to exist beneath the southwestern part of the Combat Center. In the Ames Valley Basin, located west of the Deadman Valley-Surprise Spring Basin, groundwater is found at depths of 175 feet (53 meters) and greater. In the Deadman Valley-Deadman Lake Subbasin, located east of the Deadman Valley-Surprise Spring Basin, groundwater has been measured at depths of 30 feet (9 meters) to 280 feet (85 meters). In the Twentynine Palms Basin, located to the east of the Mesquite Subbasin beneath Mainside, groundwater has been encountered at 75 feet (23 meters) in one well but is more commonly found at more than 200 feet (60 meters) below ground surface (bgs) (USGS 2003). The Environmental Assessment to construct a new water treatment facility designed to blend groundwater from Surprise Spring and Deadman Lake Subbasins was completed in 2018, with an additional supplemental Environmental Assessment completed in 2019 to expand the facility footprint. Construction on the blended water treatment plant was completed in 2022.

**Stormwater** management is vital for maintaining and lowering risks to human life, especially in desert regions which are prone to flash flood events. Although annual precipitation at the Combat Center averages approximately 4.1 inches (10 centimeter) a year, much of the rain falls during summer and early fall thunderstorms (Lato *et al.* 1999 and USMC 2001); statistically, about half of the rain falls from October to March. Surface drainage systems at the Combat Center are internal, channeling runoff flows inward from all directions into natural dry lakebed playas (Lato *et al.* 1999). No naturally occurring, permanent water bodies exist at the Combat Center (USMC 2001) and runoff collected in these lake beds is slowly lost to evaporation and limited infiltration into the soil. However, since 1996 the MAGTFTC has been implementing a program to eliminate all industrial stormwater discharges to desert playas. This program uses a series of stormwater conveyance and retention systems that preclude the entry of potentially polluted stormwater to the environment by seeping into the ground. A natural clay barrier precludes contaminants from entering the aquifer (USMC 1997). All stormwater runoff, including industrial, goes into retention ponds. A primary storm-water retention pond contains civilian industrial runoff (*e.g.*, gas station, automobile hobby shop), and offers landscaping with native vegetation, a wildlife viewing area, and educational signage. Three other industrial stormwater retention ponds also exist for military-related runoff and are generally dry except after significant precipitation events.

**Domestic wastewater** generated at the Combat Center is required by the Regional Water Quality Control Board to be disposed of within the boundaries of the installation. Wastewater must therefore be disposed of through solar evaporation or irrigation. Wastewater from treatment

facilities is collected in two specific retention pond systems. Two ponds service the Golf Course by storing recycled water (up to 12-million-gallon capacity) that is used primarily to irrigate the golf course. The Mainside Wastewater Treatment Plant uses three active retention ponds for receiving effluent; any overflow from these three ponds enters four storage ponds that retain water during the winter for summer use. The size of the seven ponds supporting the Wastewater Treatment Plant is approximately 135 acres. Retention ponds generally contribute to biodiversity of wildlife species at the Combat Center (Section 3.3.1) and are heavily used by migratory birds.

### **2.8.3 Projected Changes in Facilities and the Built Environment**

Mainside is continually changing to meet the needs of the Combat Center. Many buildings are approaching 50 years old and are slated to be modernized or replaced with new buildings consistent with the facilities Master Plan. Facility changes are accomplished using a master planning process through PWD. The current Master Plan projects out approximately 10 years and the master planning process identifies existing land use compatibilities and conflicts and establishes a framework for future facility siting and land development. The proposed land use plan is a synthesis of existing conditions, proposed projects, probable land area needs based on increased loading projections, and efficient, functional interrelationships between uses. All projects and activities identified in the Master Plan are required to undergo a NEPA review process at the time of their initiation. The Master Plan renewal began in FY 2023.

## 3.0 PHYSICAL ENVIRONMENT

### 3.1 Topography and Geology

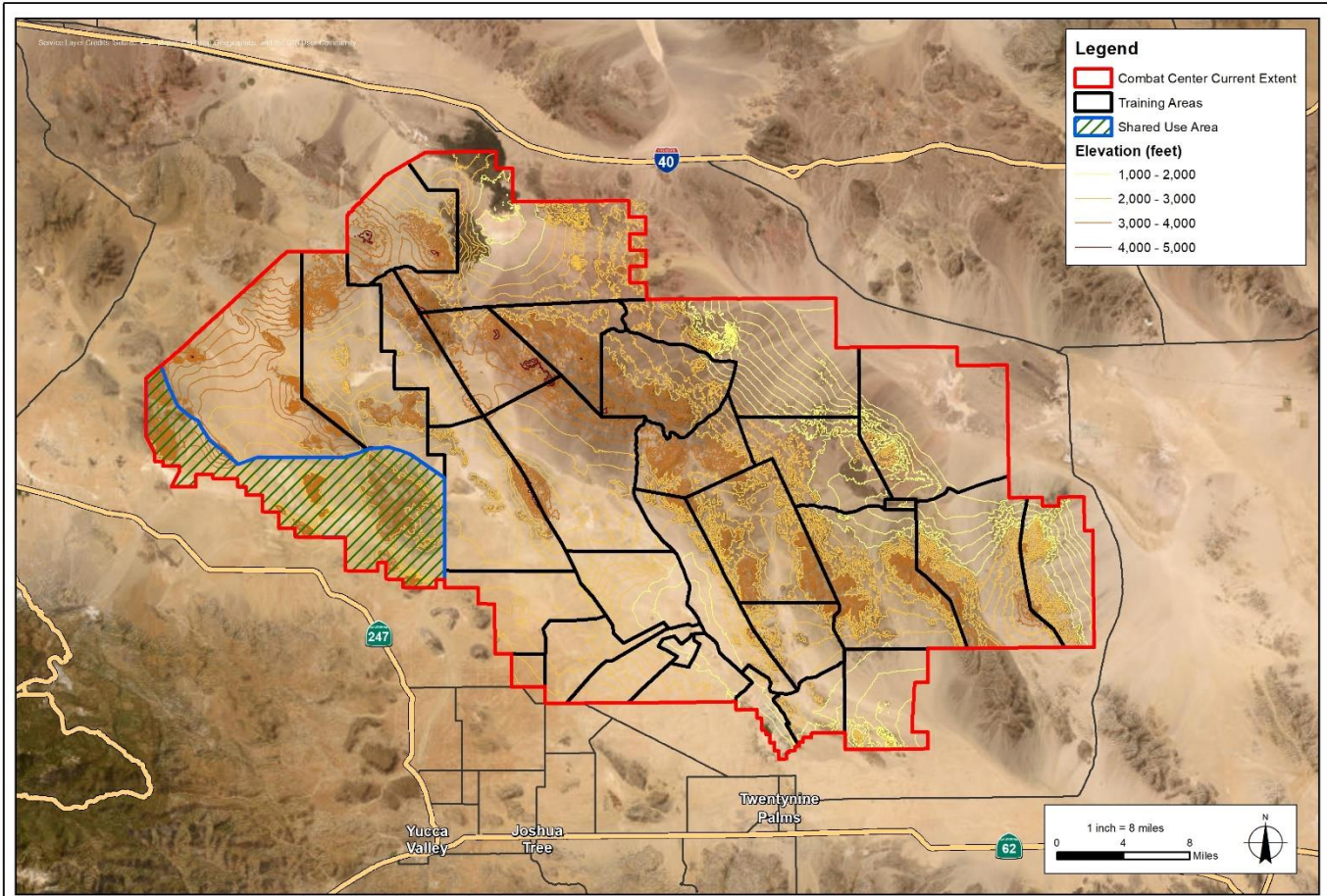
The Combat Center is in the Mojave Desert, a part of the larger Basin and Range Physiographic Province. Terrain is characterized by alternating rocky uplands with slopes up to 90 percent, and low valleys with broad alluvial plains, washes, and dry lakebeds. Mountain ranges and valleys run mostly parallel along a northwest to southeast trending axis and most of the terrain lies on the intermountain basin between 1,500 and 3,000 feet above mean sea level (Figure 3-1).

Ancient lava fields are significant features in some training areas. Several volcanic craters are in the general proximity of the Combat Center; Amboy Crater and Pisgah Crater, just outside of the Combat Center, are the most evident. Sunshine Peak Crater lies within the Sunshine Peak Training Area. The highest elevation in the Combat Center is 4,699 feet at OP Round in the Bullion Mountains, at the boundary of Gays Pass and Quackenbush TA, and the lowest is 604 feet at Dry Lake in the Lead Mountain TA.

Area geology is classified as Mojave Bedrock, and the oldest geological elements are the Bullion Mountains, which consist primarily of quartz monzonite and granite. Layers of blown sand, called sand ramps, contribute to lower elevation soils of mountains adjacent to Mainside. The Combat Center geological make-up consists of tertiary basement rock with overlying quaternary alluvial deposits. The basement rock is nearly impermeable except where it has been fractured or weathered.

**Seismicity** - The Combat Center is in a highly active seismic region. The San Andreas Fault is near the southwest, the Pinto Mountains Fault lays to the south, the Garlock Fault to the north, and approximately 50 named and unnamed faults run within the Combat Center boundary. The most prominent active fault system is the Calico-Mesquite Lake Fault System. Mainside is situated between the Mesquite Lake and Bullion Mountain fault, which is certified as potentially active by the USGS. Numerous small earthquakes have been recorded across the installation, and several larger ones, including the Lander's Earthquake (registering 7.5) and Hector Mine Earthquake (registering 7.1). Open fissures and surface ruptures from previous seismic events are evident on the landscape.

**Petroleum and Minerals** - There is a rich history of mining activity both on and adjacent to the Combat Center. Mineral deposits include lead, zinc, copper, silver, and gold and abandoned mines are present in Emerson Lake, Bullion, Delta, Prospect, Maumee Mine, Sunshine Peak, Lavic Lake, and Lead Mountain Training Areas. The DoN has the authority to reject mining claims except for "certain hardrock minerals known as locatables" (DoD Directive 4700.3). "Locatables" include gold and silver. However, military reservations have historically not been open to any type of mining, and mining activities are very unlikely as they greatly exacerbate the possibility of having to suspend or curtail the MAGTFTC training exercises. In recent years, military installations have been open to mining of certain minerals, most notably oil and gas, but given the geology of the area, the possibility of oil and gas mining is extremely remote.



**Topography**  
**Combat Center Twentynine Palms INRMP**

**FIGURE**  
**3-1**

**Figure 3-1: Combat Center Topography**

**Geothermal Resources** - The USGS and Katzenstein and Whelan (1987) investigated the geothermal potential of steam trapped underground at the Combat Center and concluded that temperatures were not high enough to make development economically feasible. In 2009-2010 the US Navy Geothermal Program Office sampled the Sandhill and West Training Areas. The conclusion was that hydrothermal alteration suggests the resource temperature is not high enough for commercial grade power generation (DoN Geothermal Program Office 2011).

## **3.2 Soils**

### **3.2.1 Formation**

Soils are formed through the chemical and mechanical weathering of parent rock materials and from biological processes. Soil materials originate from parent rock substrates often found on the strong to very steep upland slopes at the higher elevations of the Combat Center, where conditions are excessively drained, stony, or rocky. Weathering generates cobbles, gravels, sands, and sandy loams which are slowly flushed downslope and across the landscape during aeolian and alluvial events. Bajadas typically consist of coarse gravels grading into loamy sands, sandy loams, to finer loamy materials. Playas located at the bottom of the basins accumulate silts and clays and generally develop salt pans. Plant root systems, lichens, and fungi also break rocky substrates. Plants and associated wildlife deposit biomatter in the form of plant leaves and branches, and plants often attract animals which deposit animal waste, all of which facilitates the production of detritus and ultimately creates “islands” of enriched soil nutrients (e.g., Schlesinger and Pilmanis 1998), improved water holding capacity, and amplified ecological functioning (productivity).

Compared to soils found in other climates, desert soils are more fragile and form slowly, thus they are vulnerable to erosion from wind and water and compaction, disruption, and displacement from vehicles. The ecology of desert soils is also more sensitive to changes in bioavailable nutrient levels, which can be influenced by indirect anthropogenic activities. The time required for desert soils to develop is not well understood. Webb *et. al.* (1986) estimated it takes a minimum of 50 years for vegetation to recover from impacts of a vehicle pass, but 100 years for soil, and over 1,000 years for total recovery.

### **3.2.2 Composition**

Soil data from the Natural Resources Conservation Service (NRCS 2018) was used to map soils occurring on the Combat Center, including the legacy lands as well as expansion areas of the installation, as available. Soils data is currently not available for the entire Combat Center, including Cleghorn Lake Training Area, among a few other smaller areas. Major soil types identified include primarily alluvium and colluvium materials with some lacustrine deposits and residuum; Figure 3-2 shows the distribution of various soil types in the final Soils Map.

Arizo soils are very deep, sandy-skeletal soils formed in mixed alluvium. They occur in the northwestern, central, and southeastern parts of the Combat Center on recent fan piedmonts and occupy about 20% of the Combat Center.



Carrizo soils are very deep, sandy-skeletal soils formed in mixed alluvium. They are found in the northeast on recent fan piedmonts and occupy about 16% of the Combat Center (NRCS 2018).



Cajon-Blueprint soils are very deep and formed in sandy materials. They occupy about 9% of the Combat Center and are found in the southwestern portion smooth granitic fan piedmonts.

Dalvord-Goldroad-Rock-Outcrop soils are very shallow to shallow, loamy-skeletal soils formed in residuum and colluvium from granitic and metamorphic sources. They are found mostly in the southeastern part of the Combat Center on granitic mountains and cover about 18% of the total area.

Eastrange-Owlshead-Gayspass soils are very shallow to very deep soils formed in alluvium from mixed sources. These soils are found throughout the Combat Center on older fan piedmonts and occupy about 6% of the area.

Edalph-Narea-Calico soils are very deep, sandy soils formed in granitic alluvium. They are found in the southwestern portion of the Combat Center and occupy about 9% of the total land.

Haleburu soils are very shallow to shallow, loamy-skeletal soils formed in residuum and colluvium from mainly volcanic sources. They occur in the northwestern part of the Combat Center on volcanic mountains and comprise about 13% of the total land.

Playa soils are very deep, salt-affected soils formed in lacustrine deposits. These soils occur on basin floors and occupy about 3% of the Combat Center.

Sunrock-Haleburu-Lava Flows are very shallow to shallow, loamy-skeletal soils formed in residuum and colluvium from mainly volcanic sources. They are found in the northern areas and occupy about 6% of the Combat Center

***Cryptogamic soil crusts*** are a feature of some desert soils. They form when moisture is retained by soils long enough to foster bacteria, algae, and lichen growth. These organisms, through their presence or through their exudates, hold soil particles together in a crust form. Cryptogamic crusts stabilize the soil surface and improve resistance to wind and water erosion. Biologic activity associated with cryptogamic crust converts inorganic atmospheric nitrogen into biologically available forms, increasing nitrogen pools available to the ecosystem. Patches of cryptogamic crust occur in certain areas of the Combat Center and may include many different soil associations. However, they are usually visually characterized by a surface crust, with pebbles and rocks, often rendered dark and shiny. The distribution of cryptogamic soil crusts across MCAGCC is unknown.

### **3.3 Water Resources**

#### **3.3.1 Surface Water**

The Combat Center has 17 watersheds ranging in size from 2,819 acres to 52,178 acres. Quackenbush Lake and Upper Emerson watershed are the only units that lay entirely within the Combat Center boundary (traditional boundary and Exclusive Military Use Area [EMUA]). Combat Center watersheds contain playas, dry washes, seeps, springs, and man-made water

bodies. There are no naturally occurring, permanent surface water resources on the Combat Center (Lato *et al.* 1999); all permanent water sources are man-made ponds.

Most surface drainage is internal; flowing inward from all directions, with water soon percolating into the sandy soil of dry washes and/or collecting on playas (Lato *et al.* 1999). All streams are intermittent, and all naturally occurring, standing water is ephemeral, occurring only during and after heavy rains or thunderstorms. When shallow ephemeral lakes have surface waters, they are eventually lost through ground water percolation or evaporation. Evaporation results in precipitation of alkali salts at or near the surface of the playa soils.

There are 14 playas throughout the Combat Center traditional boundary, five playas within EMUA West, and no playas within EMUA South. Two prominent (and the most heavily impacted) playas are Mesquite Lake (located near Mainside) and Deadman Lake (located in Sandhill, Gypsum Ridge, and West Training Areas). Both lakes' source of water is seasonal precipitation and runoff from the surrounding watershed. Unlike Mesquite Lake, Deadman Lake does not have any appearance of uplifted and tufted soils, suggesting the water table is near the surface.

There are 289 dry washes totaling 50,471 acres in the Combat Center, but only 12 washes are considered major washes. The largest dry washes are in the three largest watersheds (Deadman Lake, Bristol Lake, and Dry Lake). Approximately 25 percent of all dry washes occur in the Bristol Lake watershed (U.S. Army Corps of Engineers 1994).

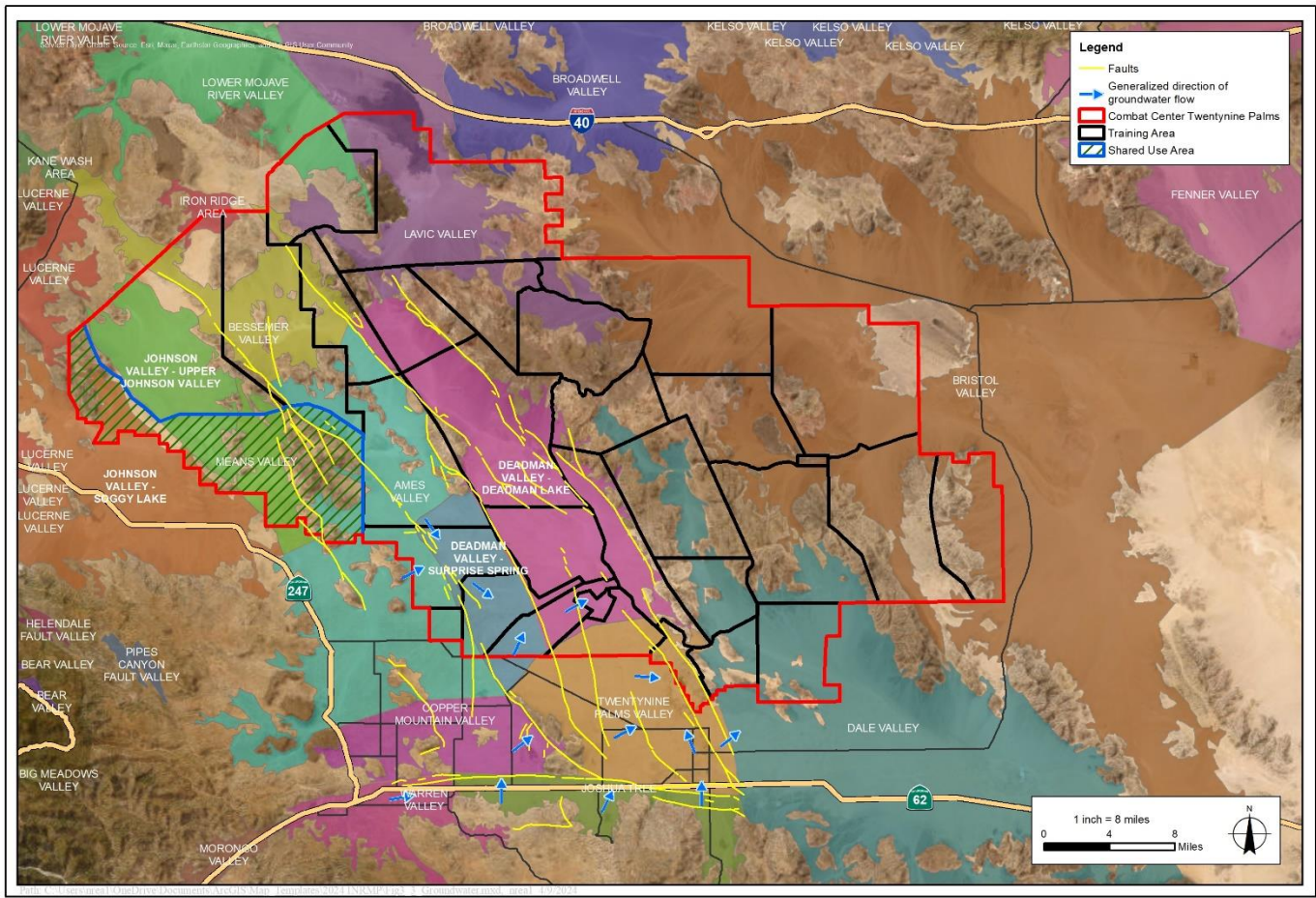
Seeps and springs are a valuable biological resource, particularly when standing or flowing water is available for wildlife. The U.S. Army Corps of Engineers (1994) found four wells and two springs recorded from USGS topography maps of the Combat Center. Seasonal seeps are in the Imperial Lode mining area, Lead Mountain area, and several mine shafts. The study also indicated a potential for other seeps to exist seasonally, depending on precipitation and exposed bedrock in the wash.

Man-made water bodies at the Combat Center include stormwater retention ponds to the northeast of Mesquite Lake, golf course ponds, and several sewage lagoons located near Deadman and Mesquite Lake, along with recycled water ponds near the golf course. None of these waters are regulated under Section 404 of the Clean Water Act. Manmade water bodies are utilized by wildlife, most often migrating birds. In addition, a study by the U.S. Army of Corps Engineers (1994) noted that settling basins trap sediment that would otherwise flow into Mesquite Lake.

### **3.3.2 Ground Water**

The groundwater basins within or partially within the Combat Center's legacy (pre-expansion) boundary include Deadman Valley (Surprise Spring and Deadman Lake subbasins), Twentynine Palms Valley, Bristol Valley, Ames Valley, Lavic Valley, and Dale Valley (Figure 3-3). The groundwater basins in the EMUA West are the Johnson Valley Basin, Means Valley Basin, Ames Valley Basin, Bessemer Valley Basin, and the Este Subarea of the Adjudicated Mojave Basin Area. The groundwater basins in EMUA South are part of the Dale Valley Basin. The

principal source of recharge to these basins is infiltration of run-off from the surrounding mountains in the washes and alluvial fans.



**Groundwater Basins and Fault Lines  
Combat Center Twentynine Palms INRMP**

**FIGURE  
3-3**

Figure 3-3: Combat Center Groundwater Basins and Fault Lines

The Mojave Water Agency and Bighorn Desert View Water Agency are responsible for managing the region's water resources to ensure a sustainable supply of water for present and future use. In addition, the Mojave Water Agency is the court appointed Watermaster for the Mojave River Basin adjudication. Both provide domestic and retail water service and are cooperating to develop a water recharge plan for the groundwater basin.

### **Ames Valley Basin**

The eastern portion of the Ames Valley Basin is within the Combat Center boundary, and a small portion of the northern part of the Ames Valley Basin is within EMUA West. Groundwater in this basin flows eastward from the San Bernardino Mountains to the Emerson Fault and the Surprise Spring subbasin, and northeast toward Emerson (dry) Lake (Mendez and Christensen 1997). Groundwater quality is good, with total dissolved solids (TDS) levels generally below 500 milligrams per liter (mg/L) and no elevated concentrations of other constituents of concern. Ames Valley basin is a source of potable water for 8,300 individuals living in the Johnson and Ames Valley, southwest of the Combat Center (Kennedy, Jenks, Todd LLC 2007).

### **Bessemer Valley Basin**

EMUA West contains most of the Bessemer Valley Basin. This basin is bounded by nonwater-bearing rocks of the Iron Ridge Mountains on the north, bedrock highlands on the south, West Calico Fault on the east, and Emerson Fault on the west (DWR 2004). Water quality of the basin is unknown (DWR 2004).

### **Bristol Valley Basin West of Bristol Lake**

The Bristol Valley Basin west of Bristol Lake is located northeast of the Bullion Mountains within the Combat Center boundary. Groundwater exists in unconsolidated, upper, and lower alluvial deposits. The upper and lower aquifers are separated by a discontinuous layer of silt and clay (DWR 2004). Depths to groundwater typically range from 125 to 200 ft (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. Groundwater moves towards Bristol Lake, where groundwater elevations are close to the ground surface.

Koehler (1983) estimated that 640,000 acre-feet (AF) (789,000 megaliters [ML]) of water is stored in the alluvium west of the Ludlow fault, which runs diagonally through the Bristol Valley Basin west of Bristol Lake. An AF is a unit of volume equal to an area of 1 acre with a depth of 1 foot and is equivalent to 325,851 gallons. As a rule of thumb, 1 AF is considered a typical annual water consumption rate for a suburban family household, whereas a household in an arid desert region may use 0.25 AF annually. However, 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 TDS, chloride, and arsenic concentrations.

### **Dale Valley Basin**

The Combat Center includes the northern portions of the Dale Valley Groundwater Basin. This basin is bounded by nonwater-bearing rocks of the Bullion Mountains to the north, Pinto Mountains to the south, Sheephole Mountains to the east, and the Mesquite fault to the west. Groundwater moves toward Dale Lake in the southeastern part of the valley. Analyses of water

from 11 wells in the basin show an average TDS content of 53,457 mg/L with a range of 1,218 to 332,000 mg/L. 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 (DWR 2004).

In EMUA South, the groundwater conditions are expected to be similar to those in the Bristol Valley and Twentynine Palms Valley Basins, with the general exceptions that the water-bearing deposits may be comparatively thinner in proximity to bedrock deposits and average groundwater elevations may be shallower (HQMC 2008). Groundwater recharge is primarily from infiltration of runoff from the slopes of the surrounding mountains and subsurface flow of groundwater past the Mesquite fault to the west. Groundwater moves toward Dale Lake in the southeastern part of the valley.

#### **Deadman Valley Basin – Deadman Lake Subbasin**

The Deadman Lake subbasin groundwater within the Combat Center boundary is not potable and does not meet drinking water standards due to high concentrations of fluorides, sulfates, and boron. However, groundwater from this subbasin can be utilized for landscaping and other non-consumptive uses. Measurements of the water level in wells indicated a southward flow from the Deadman Lake area into Twentynine Palms Valley basin (DWR 2004).

#### **Deadman Valley Basin – Surprise Spring Subbasin**

Groundwater in the Surprise Spring subbasin within the Combat Center boundary flows from recharge areas near the end of Pipes Wash towards discharge areas at Surprise Spring near the Surprise Spring Fault (Londquist and Martin 1991). The Surprise Spring Fault is a barrier to groundwater flow and, under predevelopment conditions, water discharges at the land surface in this area. The depth to groundwater in the Surprise Spring subbasin ranges from 200 ft to over 400 ft (60 m to 120 m) bgs (USGS 2003). Groundwater levels have declined more than 190 ft (58 m) because of pumping since the 1950s and groundwater no longer discharges at the land surface (Li and Martin 2011). The alluvial deposits can be divided into upper and lower aquifers. The upper aquifer is unconfined and consists of unconsolidated sands with moderately high permeability, whereas the lower aquifer is confined and consists of consolidated sediments of low permeability. The groundwater from the Surprise Spring subbasin, which is used for potable water supply, is from the unconfined portions of the upper aquifer (Li and Martin 2011).

Groundwater within the Surprise Spring subbasin is the only source of potable water for the Combat Center. While it does not have a sole source designation, Surprise Spring would meet the criteria of sole source aquifer by providing over 50% of the water to the community (Combat Center). The sole source designation is meant to be used by communities to help prevent contamination of groundwater from federally funded projects, and designations typically come from the local communities. Because only the military pumps from Surprise Spring, it is unlikely a sole source designation would be requested.

The Surprise Spring groundwater wells are in a Restricted Area of the Combat Center where mechanized maneuvers, off-highway vehicles (OHV), and training using vehicles are not permitted. The Surprise Spring subbasin contains fossil water dated to be approximately 5,000 years old (Izbicki and Michel 2004). The primary source of recharge to Surprise Spring subbasin



is subsurface flows from the adjacent Ames Valley Groundwater Basin. 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, has TDS concentrations from 159 to 210 mg/L and meets criteria established under the Safe Drinking Water Act and associated amendments (DWR 2004). However, groundwater from the lower aquifer of the Surprise Spring subbasin contains relatively higher TDS, fluoride, and arsenic concentrations than those of the upper aquifer (Li and Martin 2011).

### **Este Subarea of the Adjudicated Mojave Basin Area**

The western edge of the EMUA West includes part of the Este Subarea of the Mojave Basin Area. This area was adjudicated in 1996 in the Mojave Basin Judgment. The Judgment assigned Base Annual Production quotas to each producer using 10 AF per year (12 ML per year) or more, based on historical production. Users are assigned a variable Free Production Allowance (FPA), which is a uniform percentage of Base Annual Production set for each subarea. This percentage is reduced, or “ramped down” over time until total FPA comes into balance with available supplies. This percentage was set at 70% for most subareas as of June 2003. Any water user that pumps more than their FPA is compelled to purchase replenishment water from Mojave Water Agency equal to the amount of production more than the FPA. Water levels in Este have remained stable for the past several years, indicating a relative balance between recharge and discharge.

### **Lavic Valley Basin**

This groundwater basin underlies Lavic Valley in central San Bernardino County and is within the boundary of the Combat Center. The basin is bounded by nonwater-bearing rocks of the Cady Mountains on the north and east, the Bullion Mountains on the south and east, the Lava Bed Mountains on the southwest, and the Pisgah fault on the west. TDS concentrations in groundwaters range from 278 to 1,721 mg/L. Water at one well in the basin also exceeds drinking water standards for sulfate and chloride content (DWR 2004). The water quality in this basin is generally unsuitable for domestic and agricultural uses.

### **Johnson Valley Basin**

Northwest-trending faults divide this basin into two subbasins referred to by DWR as Upper Johnson and Soggy Lake. The USGS further divides the Soggy Lake subbasin into the Fry and Johnson subbasins. EMUA West includes the Upper Johnson subbasin and small portions of the northern parts of the Soggy Lake subbasin. Groundwater generally flows from southern recharge areas to the north toward the groundwater basin discharge areas at the Means Valley Groundwater Basin and Melville and Soggy dry lakes. Groundwater leaves the basin as subsurface outflow and evaporation beneath the dry lakes. TDS concentrations in the Upper Johnson subbasin within EMUA West are up to 3,000 mg/L (DWR 2004), whereas TDS concentrations in the southern portion of the Johnson Valley basin south of the west study area are less than 500 mg/L (Kennedy/Jenks/Todd LLC 2007).

### **Means Valley Basin**

The Means Valley Basin is located between Johnson Valley and Ames Valley Basins in EMUA West. The alluvial sediments are less than 500 ft (150 m) thick and much thinner in the southern portion of the basin. Natural recharge occurs from runoff from the adjacent mountains, which

percolates in the Means Wash to the groundwater. Recharge from precipitation that falls directly on the basin is considered negligible.

Groundwater generally flows from the southern recharge area to the north where it evaporates from Means Dry Lake. The basin is characterized by relatively poor water quality (Kennedy/Jenks/Todd LLC 2007).

### **Twentynine Palms Valley Basin**

The Twentynine Palms Valley Groundwater Basin (also known as the Mesquite and Mainside subbasins by the USGS [Londquist and Martin 1991]) includes the water-bearing sediments below Mesquite Lake and the City of Twentynine Palms and is within the boundary of the Combat Center. This basin contains water that exceeds federal limits for concentrations of sulfates, fluorides, and TDS. Water quality in this basin, primarily a sodium sulfate type, is inferior to water from both the Surprise Spring and Deadman Lake subbasins. The MAGTFTC uses the non-potable groundwater from the Mainside subbasin to supplement golf course irrigation. South of the Combat Center, the Twentynine Palms Water District pumps groundwater from the Mesquite subbasin. Twentynine Palms Water District increased groundwater pumping and treats the high fluoride levels to reduce the groundwater overdraft in the Joshua Tree Basin, where they currently pump most of their water (Twentynine Palms Water District 2008). The Twentynine Palms Basin groundwater also supports mesquite trees near the ecologically sensitive Mesquite Dry Lake (Li and Martin 2011).

## **3.4 Climate**

### **3.4.1 Climate Patterns**

The Combat Center is situated in the Morongo Basin of the Mojave Desert and has an arid, upland desert climate characterized by hot days and cool nights, with low humidity and low annual rainfall. Summers have especially high temperatures, low humidity, and clear, sunny days. On average, the sun shines 97% of the daytime in the summer, and 65% in winter (Lato *et al.* 1999). Temperature extremes range from an average daily high of 105.4° Fahrenheit (F) in July to an average daily low of 51.6° F in January. The highest and lowest recorded temperatures at Twentynine Palms were 118° and 10° F, respectively (Lato *et al.* 1999).

Average annual precipitation is variable across the installation and was estimated at generally 4.16 inches, with roughly 1.90 inches (46%) falling between November and March, and about 1.80 inches falling between July and September during regular seasonal storm events. Snowfall is uncommon. Winter storms tend to be relatively gentle and may last up to two days. Between July and September, thunderstorms can be violent and discharge large volumes of water in short periods of time, causing flash floods and significant soil erosion.

The direction and strength of prevailing winds vary with the season. Typically, winter months bring mild northwesterly winds that range from 5 - 10 miles per hour (mph). During the summer, winds are generally westerly to southwesterly, reaching speeds of 10 - 15 mph in the afternoons. The strongest winds occur in the fall, with gusts of up to 77 mph from the northwest.

### **3.4.2 Climate Change**

Climate change is a significant concern for the desert ecosystem and the Combat Center. Scientific predictions identify longer periods of hot temperature extremes and reductions in annual precipitation totals, which will amplify water and heat stress experienced by desert life. Some scientific research has been performed aboard the installation to develop models of climate change impacts and best management approaches to conserve biodiversity on the landscape under the changing climate scenario. Preliminary findings have identified areas suitable as wildlife refugia (Barrows et al. 2016), which may persist the longest under new climate scenarios and continue to provide valuable habitat to vulnerable species.

California's desert climate may become more extreme, with high temperatures 8 to 14 °F higher by 2100, and extreme drought and wet events increasing by 2100 (Hopkins 2018). Projections for San Bernardino County (2020) are similar, with the hottest day of the year increasing 8 to 11 °F in the next 75 years, the number of days below freezing decrease 80% in the next 25 years, and extreme heat events may increase 35 to 45 days per year by 2050. A large percentage (ca. 88%) of federally threatened and endangered plants of the southwestern United States were projected to be vulnerable under most climate change scenarios (Wilkening et al. 2021). The consistent patterns indicate prudence in identifying climate change vulnerabilities for Combat Center species, communities, ecosystem processes, and the training environment (Henen et al. 2022).

Climate and landscape conditions vary considerably in the Mojave Desert, with disparate wildfire risk dependent on precipitation, fuels, elevation, storm conditions (e.g., lightning as a source of ignition), and non-native plant invasions influencing fuel loads and coverage. The risk of wildfire at the Combat Center has been and remains very low due to low precipitation, sparse plant cover, and low plant biomass. With these conditions, no wildfires occurred on the installation for the past 17 years, and only small, cool fires occurred nearby in disturbed rural communities with invasive plants as the fuel. Per San Bernardino County (2020) estimates, the increased risk of fire at the Combat Center by 2050 is approximately 200 acres (<0.04% of the Combat Center), which is low. Still, it is prudent for the Combat Center to monitor fire risk as conditions change and models improve. Additionally, larger, and more frequent wildfires anticipated in other parts of the state could release additional fine particulates, exacerbating air pollution in the region (San Bernardino County 2020).

## **3.5 Ecosystems**

### **3.5.1 Ecosystem Classification**

Desert ecosystems, while giving the appearance of a harsh environment, are quite fragile. Desert soils are extremely vulnerable to disruption, and once disturbed, can easily be eroded by wind and water. Most desert plants are long-lived but grow slowly. Plant recovery depends on the amount and frequency of rainfall events and seasonal conditions. Animals that survive and thrive on the landscapes are suited in various ways to the challenging and extremely variable ecosystem conditions. Identification, mapping, and monitoring of ecosystem types provides critical information necessary to develop appropriate strategies to affect ecosystem management and subsequent conservation of biodiversity on the landscape.

Ecosystem classification involves the inventory and association of landforms with plant species assemblages. Plant species are commonly used as surrogates to characterize and define ecological communities, and landforms provide abiotic constraints on the system. Krzysik and Trumbull (1996) described 14 Combat Center ecosystems with species-ecosystem associations. The California Department of Forestry mapped the EMUA West and South in 2003, and the USGS mapped the same area in 2004, and both used ecosystem associations compatible with Krzysik and Trumbull (as cited in USMC 2012). In 2006-2008, Agri-Chemical & Supply remapped vegetation across the old installation boundary with a different system. Below is a summary of the major ecosystems:

### **Creosote / Bursage Scrub Series**

Creosote bush and white bursage are the dominant species in the Creosote / Bursage Series. This series is classified into five ecosystems:

- ***Creosote / Bursage Scrub: Valleys, Gentle Bajadas*** - This ecosystem includes 50% of the Combat Center, in valleys, rolling plains, flats, gentle bajadas and alluvial fans. In undisturbed valleys creosote bush forms mosaics of clones, with each clone consisting of genetically identical individuals. Some of the oldest known clones are near the Combat Center, and their ancestors germinated thousands of years ago.
- ***Creosote / Bursage Scrub: Disturbed*** - This ecosystem was originally the Valleys, Gentle Bajadas Ecosystem, but it has been subjected to extensive military training activities with moderate to high disturbance. This disturbed ecosystem covers 10% of the Combat Center.
- ***Creosote / Bursage Scrub: Mountains*** - This ecosystem typically possesses moderate- to high-diversity of woody perennials. Creosote bush is predominantly found as small individuals, never clones. This ecosystem is found on steep slopes, alluvial fans, or bajadas; boulder fields, talus slopes, or rocky outcrops; steep broken ridges or hills; and canyons or arroyos. This ecosystem occupies 24% of the Combat Center, mostly in the Bullion Mountains.
- ***Creosote / Bursage Scrub: Sand Dunes*** - The Sand Dune Ecosystem is dominated by creosote bush, white bursage, big galleta and Indian ricegrass (*Stipa hymenoides*), and sand dune annuals. It is found on 3% of the Combat Center, predominantly in the southwestern and northern portions.
- ***Creosote / Bursage Scrub: Lava Flows*** - Lava flows, existing as solid basalt pavements, boulders, and rocky and coarse-gravel substrates, are this ecosystem's primary characteristics. This ecosystem is found on 5.4% of the Combat Center, on the northern boundaries.

### **Other Vegetation Series Ecosystems**

- ***Yucca woodlands: Joshua Trees and / or Mojave Yucca*** - This Joshua tree-dominated ecosystem is confined to the southwestern and northwestern corners, Joshua Tree, and Mojave Yucca, respectively, of the Combat Center, covering only 0.4% of total land.
- ***Saltbush Scrub: Playa and Uplands*** - About 6% of the Combat Center (alkaline margins of dry lake beds) includes the saltbush ecosystem.

- ***Blackbrush Scrub*** - Blackbrush ecosystems are widespread on upper bajadas and rocky alluvial mountain slopes in the Mojave Desert, but they only comprise 0.7% of the Combat Center, primarily in the northwestern corner of the installation.

### **Riparian, Wet Areas and Aquatic Ecosystems**

The Mojave Desert's riparian, wet areas, and aquatic ecosystems have ecological significance and biodiversity value for many reasons, including:

1. They include habitats of exceptional biological diversity (Stevens and Meretsky 2008, Fensham et al., 2011, Parker et al., 2021) and ecological processes (Hunter 2017).
2. They are landscape corridors for population dispersal, gene flow, and recolonization routes for local extinctions (Forment 1995, Zaines et al., 2003).
3. They are critical feeding and resting sites for migratory birds and bats (Johnson et al., 1977, Johnson and Haight 1985, Williams et al., 2006).
4. Springs, seeps, or canyon riparian ecosystems are habitat islands for rare, relict, or endemic habitat specialist species (Stevens and Meretsky 2008).
5. Human effects emphasize the import of the remaining, intact ecosystem parcels or fragments to local and regional ecological integrity and diversity (Krueper 1996).

The different types of riparian systems identified aboard the Combat Center are:

- ***Desert Riparian (Xeroriparian)*** - These tree-dominated, desert wash ecosystems with ephemeral surface waters include less than 0.5% of the Combat Center. This biodiversity-rich ecosystem has up to 178 vertebrate species.
- ***Desert Wash with Ephemeral Flows*** - This smaller wash ecosystem can be considered a smaller scale xeroriparian ecosystem, like the Desert Riparian Ecosystem, but dominated by shrubs instead of trees. This system is found on 2 to 4% of the Combat Center and supports 146 species of vertebrate species.
- ***Springs and Seeps*** - This ecosystem is poorly represented at the Combat Center. There are no permanent springs. There is only one intermittent spring with hydrophytic vegetation (Sunshine Peak) and one ephemeral spring without hydrophytic vegetation (north of Lead Mountain). At least three tinajas, or highly ephemeral water pockets are known.
- ***Dry Lake Beds (Playas)*** - Fourteen playas, 1.9% of the Combat Center, comprise this ecosystem. In the western EMUA there are five playas, and in southern EMUA there are no playas. Surface water in playas is ephemeral and highly episodic. Fifty species of birds may use playas, and 5 species of fairy, clam and tadpole shrimp have been found in some of the playas when surface waters are present.
- ***Wet Areas / Ponds / Riparian: Perennial*** - This man-made habitat type covers less than 0.1% of the base, all within and near Mainside. The area is heavily used by migratory birds, and it is critical to many resident and breeding birds and other animals.
- ***Caves, Mines, and Rock Crevices*** - These subterranean habitats are critical for bats and are used by other wildlife species for water, shelter, and protection from the heat. These are found at the Combat Center and in western EMUA. None are known from the southern EMUA.

The Creosote / Bursage Scrub Ecosystem occupies about 90% of the Combat Center. While the Yucca Woodlands, Desert Riparian, and Wet Areas, Ponds, and Riparian represent less than 1% of training land, they support high wildlife biodiversity per unit area.

### 3.5.2 Ecological Sites

For a given ecosystem, an ecological site is a distinctive subset that possesses one or more physical characteristics that differ from the surrounding landscape. They are visually identified by the occurrence of unique amounts and types of vegetation, which are products of the combination of influencing environmental factors including parent material, landscape, climate, soils, biota, hydrology, fire, and time in place (e.g., succession).

The following criteria were used to differentiate ecological sites at the installation (Table 3-1):

- Significant differences in species or species groups in characteristic plant communities
- Significant differences in the relative proportion of species or species groups in characteristic plant communities
- Significant differences in total annual production of characteristic plant communities
- Soil factors that determine plant production and compositions, site hydrology, and functioning of ecological processes of the water cycle, mineral cycles, and energy flow

Alluvial Plain	Lava Flow 3-5" P.Z.	Saline Hill 3-5" P.Z.
Cobbly Wash	Limy 3-5" P.Z.	Sand Hill 3-5" P.Z.
Desert Patina	Limy 5-7" P.Z.	Sandy Plain 3-5"
Dry Wash	Limy Hill 3-5" P.Z.	Shallow Gravelly Loam 5-7" P.Z.
Dune 3-5" P.Z.	Limy Hill 5-7" P.Z.	Sodic Dune 3-5" P.Z.
Granitic Drain 5-7" P.Z.	Loamy Hill 5-7"	Sodic Sand 3-5" P.Z.
Granitic Loam 3-5" P.Z.	Moist Granitic Drain	Steep South Slope
Gravelly Ridge 5-7" P.Z.	Outwash Plain	Valley Wash
Gypsic Flat 3-5" P.Z.	Saline Flat 3-5" P.Z.	

(Note: P.Z. = Precipitation Zone)

### 3.6 Flora

The Mojave Desert has been described as having five floristic regions (Rowlands *et al.* 1982). The Combat Center lies in the South-Central Region of this scheme, having temperature and rainfall patterns approaching conditions more typical of the hotter, drier Sonoran Desert to the south. The Combat Center is also described as on the southern edge of the western Mojave Desert, as the mountains of the JTNP exemplify the floral split between the Mojave Desert (north of the JTNP) and Sonoran Desert (south of JTNP).

#### 3.6.1 Flora Inventory

The vegetation at the Combat Center is predominantly Creosote Bush Scrub and Saltbrush Scrub. A combination of vegetation mapping and monitoring efforts, plus sensitive plant surveys, build and refine plant datasets over time. To date, over 440 native and naturalized vascular plant species have been recorded for the Combat Center (Appendix B). Of these, 391 are native and 52 are non-native.

### 3.6.2 Plant Communities

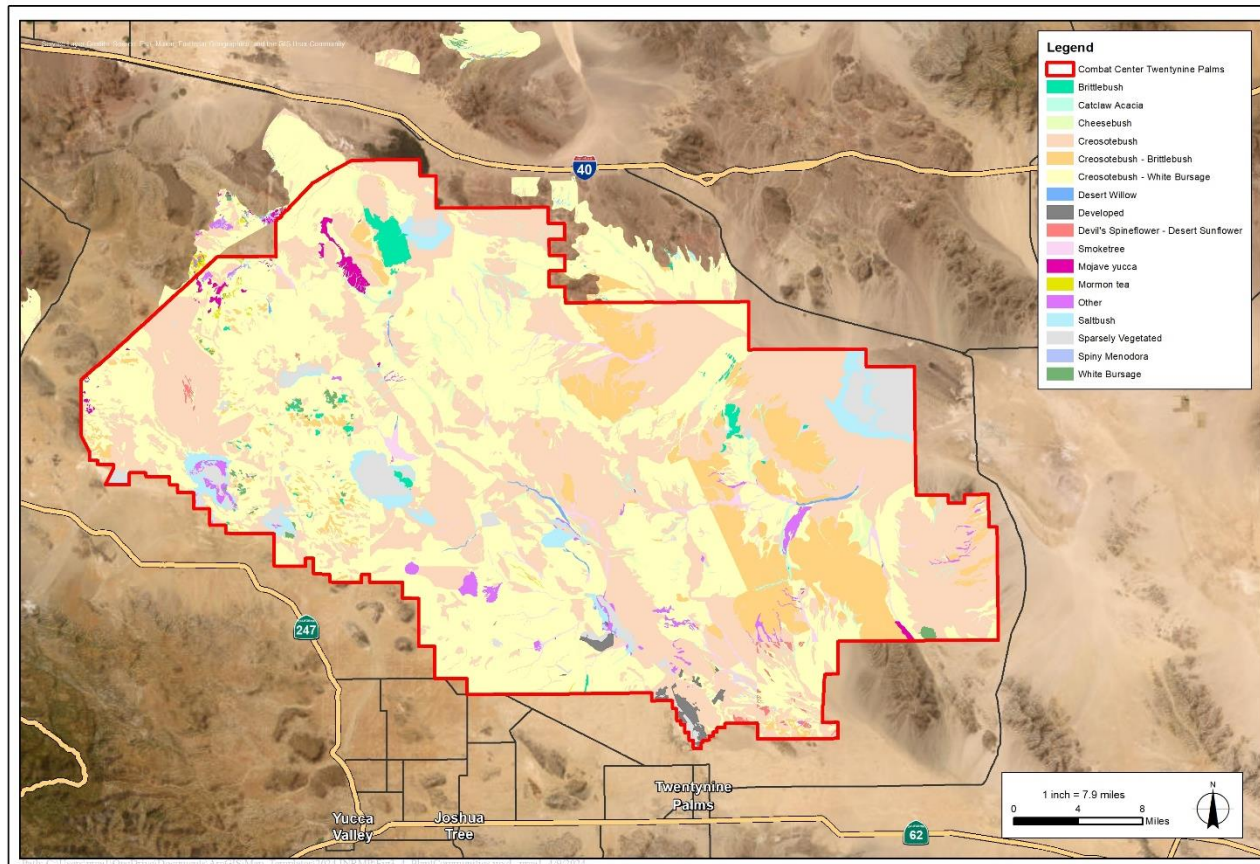
Creosote bush (*Larrea tridentata*) and desert annuals are the predominant vegetative species. Plant density and diversity increases in higher elevations and within desert wash systems. The four most prevalent vegetation types occurring on the Combat Center in the 2006-2008 mapping include: creosote bush, Mohave yucca, saltbush scrub, and big galleta (Agri-Chemical & Supply 2008). There exist variations in the classification and naming of vegetation types (plant communities) on the Combat Center. For example, Mojave creosote bush scrub (Lato *et al.* 1999) was also called creosote bush scrub (Krzysik and Trumbull 1996), which was broken into various groups (UCR 1993), and later the Holland code was used to complete a vegetation community map for the installation.

In 2016, the MAGTFTC used a standardized protocol for mapping vegetation, the California Manual of Vegetation (edition 2; CMV2) and updated the vegetation map for the legacy base. The mapping effort identified 18 plant communities at the alliance level (MultiMac JV 2016). An additional 15 plant communities were identified in Means Lake, Galway Lake, Bessemer Mine, and Cleghorn Lake training areas between 2018 and 2021, after the Combat Center expansion (Vernadero 2022a). Except for *Ambrosia*, of which *A. dumosa* (white bursage) and *A. salsola* (cheesebush) are each the dominant vegetation on over 1,000 acres apiece, the 33 plant communities have been consolidated to 14 groups based on the genera of the dominant vegetation (Table 3-2) so the map is legible (Figure 3-4). Regardless, creosote bush is the dominant vegetation on over 89% of the installation. It is a goal of the vegetation mapping program at the Combat Center to update the vegetation map every 10 years.

<b>Table 3-2 Plant Communities based on dominant vegetation (Vernadero 2022a)</b>		
<b>Dominant Vegetation</b>	<b>Acres</b>	<b>Percent</b>
Brittlebush ( <i>Encelia</i> sp.)	5,927	0.78%
Catclaw acacia ( <i>Acacia greggii</i> )	4,826	0.63%
Cheesebush	5,005	0.66%
Creosote bush	272,906	35.86%
Creosote bush-Brittlebush	69,305	8.98%
Creosote bush-White Bursage ( <i>Ambrosia dumosa</i> )	337,194	44.31%
Desert willow ( <i>Chilopsis linearis</i> )	1,110	0.15%
Devil's Spineflower ( <i>Chorizanthe rigida</i> )- Desert Sunflower ( <i>Geraea canescens</i> ) *	1,249	0.16%
Mojave yucca ( <i>Yucca schidigera</i> )	2,893	0.38%
Mormon tea ( <i>Ephedra</i> sp.)	528	0.07%
Saltbush ( <i>Atriplex</i> sp.)	15,121	1.99%
Smoketree ( <i>Psoralea spinosus</i> )	9,973	1.31%
Spiny menodora ( <i>Menodora spinescens</i> )	127	0.02%
White bursage	1,596	0.21%
Other	6,964	0.92%
Sparsely Vegetated	24,305	3.19%
Developed	3,005	0.39%
<b>Total</b>	<b>762,034</b>	<b>100%</b>

\*Primarily desert pavement





Plant Communities (2016)\*  
 Combat Center Twentynine Palms INRMP

FIGURE  
 3-4

\*Data for Means Lake, Galway Lake, Bessemer Mine, and Cleghorn Lake Training Areas from 2022.

Figure 3-4: Combat Center Plant Communities – 2016 and 2022 data.

### 3.6.3 Special Status Flora

Special status flora includes those species federally- or state-listed as endangered or threatened; proposed or a candidate for such listing; included on List 1, 2, 3, or 4 in the California Rare Plant Ranks (CRPR) (formerly California Native Plant Society; Skinner and Pavlik 1994); or meet criteria to be considered on one of these lists. Congress has not waived sovereign immunity under the Federal ESA; consequently, MAGTFTC 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. In addition, the Marine Corps is considering plants important to the culture of consulting Native American tribes as sensitive.

Forty-two special-status plant species have been detected during surveys on the Combat Center including the western and southern EMUAs (Table 3-3, Appendix C). None of these are listed as endangered or threatened by the federal government, though white-margined beardtongue has been petitioned for listing. This species is known from only a handful of populations in California, Nevada, and Arizona (Calflora 2023). Three individuals were discovered on the northern side of the Lavic Lake training area in 1998 (Elvin 2000), and a follow-up survey in 2005 relocated only two individuals (Agrichemical and Supply 2006). A larger population exists on BLM-administered land just a few miles further north. Should the USFWS list this species, the MAGTFTC would consult USFWS to develop a conservation plan that may include focused surveys, a threat assessment, and management recommendations to protect and recover the species.

Scientific name	Common Name	Special Status*
<i>Allium parishii</i>	Parish's Onion	CRPR 4.3
<i>Androstephium breviflorum</i>	Small-flowered Androstephium	CRPR 2B.2
<i>Castela emoryi</i>	Emory's Crucifixion-thorn	CRPR 2B.2
<i>Chilopsis linearis</i> ssp. <i>arcuata</i>	Desert Willow	T1
<i>Chorizanthe spinose</i>	Mojave Spineflower	CRPR 4.2
<i>Chorizanthe xanti</i> var. <i>leucotheca</i>	Riverside Spineflower	CRPR 1B.2
<i>Coryphantha alversonii</i>	Foxtail Cactus	CPRP 4.3
<i>Cryptantha costata</i>	Ribbed Cryptantha	CRPR 4.3
<i>Cryptantha holoptera</i>	Winged Cryptantha	CRPR 4.3
<i>Cymopterus multinervatus</i>	Purple-nerve Cymopterus	CRPR 2B.2
<i>Cylindropuntia wigginsii</i>	Wiggin's Cholla	CRPR 3.3
<i>Datura wrightii</i>	Wright's Jimsonweed	T1
<i>Dudleya saxosa</i> ssp. <i>saxosa</i>	Panamint Liveforever	CRPR 1B.3
<i>Eremothera boothii</i> ssp. <i>boothii</i>	Booth's Evening-primrose	CRPR 2B.3
<i>Eriophyllum mohavense</i>	Mojave Woolly Sunflower	CRPR 1B.2
<i>Eriastrum harwoodii</i>	Harwood's Eriastrum	CRPR 1B.2
<i>Eriastrum sparsiflorum</i>	Few-flowered Eriastrum	CRPR 4.3
<i>Euphorbia abramsiana</i>	Abram's Spurge	CRPR 2B.2
<i>Euphorbia parryi</i>	Parry's Spurge	CRPR 2B.3
<i>Euphorbia revolute</i>	Revolvute Spurge	CRPR 4.3
<i>Funastrum utahense</i>	Utah Vine Milkweed	CRPR 4.2

<b>Table 3-3 Sensitive Status Plants</b>		
<b>Scientific name</b>	<b>Common Name</b>	<b>Special Status*</b>
<i>Galium angustifolium</i> spp. <i>gracillimum</i>	Slender Bedstraw	CRPR 4.2
<i>Larrea tridentata</i>	Creosote Bush	T1
<i>Lasthenia glabrata</i> ssp. <i>coulteri</i>	Coulter's Goldfields	CRPR 1B.1
<i>Matelea parvifolia</i>	Spearleaf	CRPR 2B.3
<i>Menodora spinescens</i> ssp. <i>mohavensis</i>	Mojave Mendora	CPRP 1B.2
<i>Mentzelia tridentata</i>	Dentate Blazing Star	CPRP 1B.3
<i>Monardella robisonii</i>	Robison's Monardella	CRPR 1B
<i>Muilla coronate</i>	Crowned Muilla	CRPR 4.2
<i>Nicotiana obtusifolia</i>	Desert Tobacco	T1
<i>Penstemon albomarginatus</i>	White-margined Beardtongue	CRPR 1B.1
<i>Penstemon pseudospectabilis</i>	Desert Beardtongue	CRPR 2B.2
<i>Penstemon thurberi</i>	Thurber's Penstemon	CRPR 4.2
<i>Physalis lobate</i>	Lobed Ground-cherry	CRPR 2B.3
<i>Populus fremontii</i> ssp. <i>fremontii</i>	Fremont's Cottonwood	T1
<i>Portulaca halimoides</i>	Desert Portulaca	CRPR 4.2
<i>Prosopis glandulosa</i> var. <i>torreyana</i>	Honey Mesquite	T1
<i>Salvia columbariae</i>	Chia	T1
<i>Sclerocactus polyancistrus</i>	Mohave (Red-spined) Fishhook Cactus	CRPR 4.2
<i>Sidalcea neomexicana</i>	Salt Spring checkerbloom	CRPR 2B.2
<i>Simmondsia chinensis</i>	Jojoba	T1
<i>Wislizenia refracta</i> ssp. <i>refracta</i>	Jackass-clover	CRPR 2B.2

\*Definitions:

**Tribes**

T1 Species of interest or concern as identified by tribes.

**California Rare Plant Ranks (CRPR)**

*Inventory of Rare and Endangered Vascular Plants of California:*

1B Rare or endangered in California and elsewhere.

2B Rare or endangered in California, but more common elsewhere.

3 Need more information (a review list).

4 Plants of limited distribution (watch list).

**CRPR Threat Ranks**

.1 - Seriously endangered in California

.2 – Fairly endangered in California

.3 – Not very endangered in California

One rare plant (*Quincula lobata*, Chinese Lantern; CRPR 2) may occur on base but has not been detected in surveys. Previous INRMPs have considered twelve other rare species as potentially occurring at the Combat Center, and they have been confirmed present (UCR 1993; Tierra Data 2000).

One regionally sensitive species not discussed above, the western Joshua tree (*Yucca brevifolia*), has been petitioned twice for listing under the federal ESA but the USFWS did not consider listing warranted. This species ranges from Death Valley National Park, along the western edge of the Mojave down to JTNP. The eastern Joshua tree (*Yucca jaegeriana*), recently recognized as a separate species, extends just north of the Combat Center between Interstate 15 and 40 northeast into Nevada. The most recent finding from 2023 found listing to be unwarranted as loss of habitat and reduction in recruitment is not expected to substantially decrease the species' redundancy or representation in the next 20-50 years. Nonetheless, this species is susceptible to climate change, habitat disturbance, pollinator community changes, and threatening fire regimes resulting from non-native plant invasions. The MAGTFTC recognizes this unique resource and has occurrence maps for the species aboard the installation. While no formal protections have been established for this species by the installation at this time, existing internal protections help to avoid and minimize impacts to this species. These protections include inventorying all the known Joshua trees on the installation, maintaining a 1 km-no-train buffer at base boundary that reduces potential indirect impacts, having portions of this population also within a restricted area, and NEPA reviews for new training and ground disturbing actions provide opportunities to incorporate avoidance and minimization measures for Joshua trees.

### **3.7 Fauna**

Wildlife species at the Combat Center are typical of Mojave Desert fauna except around Mainside, where a wide variety of non-desert adapted species can be found, particularly around areas with manmade water (Cutler *et al.* 1999). Most wildlife species on the installation (except those found only at Mainside) are adapted to desert scrub habitats which maintain xeric conditions with little cover.

In natural areas outside of the Mainside Cantonment Area, seeps, springs, and ephemeral streams sustain more vegetation and thermal cover, more individuals of particular species, higher species richness, and more biotic activity. Manmade water sources also provide a valuable source of perennial water for wildlife; ongoing monitoring at these sources has documented large mammals such as the bighorn sheep, coyote, and bobcat (*Lynx rufus*) using these water sources regularly. Bats also typically feed over these areas because of the increased abundance of invertebrate prey. Spring and fall migratory bird species, typically not associated with desert environments, forage and rest in these areas, particularly at ephemeral (retention basin) or other sources of manmade water.

Rocky terrain provides habitat for many reptiles, rodents, and bird species. Along with different vegetation communities that normally occur with increasing elevation in these ranges, differences in slope and aspect result in microhabitats that support different species. Species that occur in these areas include bats that rely on rocky outcrops for roosting sites, and raptors, that use cliff faces and rocky ledges for roosting or nesting.

Playas provide little wildlife habitat because they are usually devoid of vegetation. However, when wet, playas support endemic microbiological communities of algae that can support brine shrimp (*Artemia franciscana*). Migratory waterfowl and large mammals may visit these areas after periods of heavy rainfall for water and to forage.

As is typical of most desert systems, large animal species are uncommon, widely dispersed, and often nocturnal. Smaller mammals and reptiles, highly suited to harsh desert conditions, are much more common but are often secretive, nocturnal, or active for only short periods of 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 suited to one habitat type and restricted to these specialized areas.

The Natural Resources Management Plan (UCR 1993) included the first comprehensive inventory of vertebrate wildlife permanently or seasonally present at the Combat Center. This list included permanent residents, winter residents, summer residents, and species that do not occur regularly. Cutler *et al.* (1999) observed 256 species of vertebrates aboard the Combat Center. The Combat Center has more than forty species of animals that bear special status designations by the federal government or the state of California (Table 3-4).

### 3.7.1 Invertebrates

Although wildlife surveys typically do not focus on invertebrate species, invertebrates are an essential component of desert ecosystems, providing food for numerous vertebrate species and acting as pollinators for many plant species. The seasonal reproductive cycle of some insect species rapidly increases population growth. These insect swarms provide an important prey base for insectivores, such as smaller birds, reptiles, amphibians, and bats. UCR concluded a terrestrial invertebrate survey in 2005 that identified more than 1,500 species, though no listed species were detected (Pratt 2005).

<b>Table 3-4 Special Status Fauna</b>		
<b>Scientific Name</b>	<b>Common Name</b>	<b>Special Status*</b>
<b>Invertebrates</b>		
<i>Danaus plexippus</i>	Monarch Butterfly	FC
<b>Reptiles</b>		
<i>Uma scoparia</i>	Mojave Fringe-toed Lizard	CSSC
<i>Gopherus agassizii</i>	Desert Tortoise	FT, ST, T1
<b>Birds</b>		
<i>Aythya americana</i>	Redhead	CSSC
<i>Pelecanus erythrorhynchos</i>	American White Pelican	CSSC
<i>Haliaeetus leucocephalus</i>	Bald Eagle	BGEPA; SE
<i>Circus cyaneus</i>	Northern Harrier	CSSC
<i>Aquila chrysaetos</i>	Golden Eagle	BGEPA, FP
<i>Buteo swainsoni</i>	Swainson's Hawk	ST
<i>Charadrius nivosus</i>	Snowy Plover	FT, CSSC
<i>Numenius americanus</i>	Long-billed Curlew	BCC
<i>Chlidonias niger</i>	Black Tern	CSSC
<i>Geococcyx californianus</i>	Greater Roadrunner	T1

<b>Table 3-4 Special Status Fauna</b>		
<b>Scientific Name</b>	<b>Common Name</b>	<b>Special Status*</b>
<i>Athene cunicularia</i>	Burrowing Owl	BCC, CSSC
<i>Asio otus</i>	Long-eared Owl	CSSC
<i>Asio flammeus</i>	Short-eared Owl	CSSC
<i>Chaetura vauxi</i>	Vaux's Swift	CSSC
<i>Calypte costae</i>	Costa's Hummingbird	BCC
<i>Selasphorus sasin</i>	Allen's Hummingbird	BCC
<i>Colaptes chrysoides</i>	Gilded Flicker	SE
<i>Falco peregrinus anatum</i>	American Peregrine Falcon	FP
<i>Contopus cooperi</i>	Olive-sided Flycatcher	CSSC
<i>Empidonax trailii*</i>	Willow Flycatcher*	FE, SE
<i>Lanius ludovicianus</i>	Loggerhead Shrike	BCC, CSSC
<i>Vireo bellii*</i>	Bell's Vireo*	FE, SE
<i>Riparia riparia</i>	Bank Swallow	ST
<i>Toxostoma lecontei</i>	LeConte's Thrasher	CSSC
<i>Toxostoma bendirei</i>	Bendire's Thrasher	CSSC
<i>Oreothypis luciae</i>	Lucy's Warbler	CSSC
<i>Setophaga petechia</i>	Yellow Warbler	BCC, CSSC
<i>Xanthocephalus xanthocephalus</i>	Yellow-headed Blackbird	CSSC
	All raptors	CSSC
<b>Mammals</b>		
<i>Macrotus californicus</i>	California Leaf-nosed Bat	CSSC
<i>Lasiurus xanthinus</i>	Western Yellow Bat	CSSC
<i>Corynorhinus (= Plecotus) townsendii</i>	Townsend's Big-eared Bat	CSSC
<i>Antrozous pallidus</i>	Pallid Bat	CSSC
<i>Nyctinomops femorosaccus</i>	Pocketed Free-tailed Bat	CSSC
<i>Eumops perotis californicus</i>	Western Mastiff Bat	CSSC
<i>Chaetodipus (= Perognathus) fallax pallidus</i>	Pallid San Diego Pocket Mouse	CSSC
<i>Canis latrans</i>	Coyote	T1
<i>Vulpes macrotis marsipus</i>	Desert Kit Fox	FP
<i>Taxidea taxus</i>	American Badger	CSSC
<i>Ovis canadensis nelsoni</i>	Bighorn Sheep	BLM-S, FP, T1

\* No subspecies specified in records.

**\*Definitions:**

**Federal** - categories per the Endangered Species Act, administrated by the USFWS.

- FC Candidate – any species for which USFWS has sufficient information on their biological status and threats to propose them as endangered or threatened, but for which development of a proposed listing regulation is precluded by other higher priority listing activities.
- FE Endangered - any species officially listed by the USFWS that is in danger of extinction throughout all or a significant portion of its range.
- FT Threatened - any species officially listed by the USFWS that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.
- BGEPA Bald and Golden Eagle Protection Act of 1940.
- BLM-S Bureau of Land Management Sensitive
- BCC Bird of Conservation Concern

**Tribes**

- T1 Species of interest/concern as identified by tribes.

**State** State categories per the 1984 California Endangered Species Act

- SE Endangered - any species officially listed by the California Fish and Game Commission that is in danger of extinction throughout all or a significant portion of its range.
- ST Threatened - any species officially listed by the California Fish and Game Commission that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.
- CSSC California Species of Special Concern - a species, subspecies, or distinct population of an animal native to California that currently satisfies one or more of the following criteria:
- is extirpated from the State or, in the case of birds, is extirpated in its primary season or breeding role.
  - is listed as Federally, but not State, threatened or endangered; meets the State definition of threatened or endangered but has not formally been listed.
  - is experiencing, or formerly experienced, serious (noncyclical) population declines or range retractions (not reversed) that, if continued or resumed, could qualify it for State threatened or endangered status.
  - has naturally small populations exhibiting high susceptibility to risk from any factor(s), that if realized, could lead to declines that would qualify it for State threatened or endangered status.
- FP Fully Protected - Animals that are rare or face possible extinction.

Simovich (2006) investigated the Combat Center’s nine dry lakes for the presence of aquatic invertebrates. Six species of fairy shrimp, clam shrimp, and tadpole shrimp were detected. Nearly all expected species were detected in either their live or desiccated forms; no species were considered rare or sensitive.

### **3.7.2 Fish**

There currently are no active perennial springs located aboard the Combat Center. No documentation of native fish species occurring at any location exists. The introduced mosquito fish (*Gambusia affinis*) occurs in some of the manmade treatment ponds. However, no other native, introduced, or non-native fish species are known to occur on the installation.

### **3.7.3 Amphibians and Reptiles**

Five amphibian species and more than 40 reptile species have been detected at the Combat Center (Appendix C). Cutler *et al.* (1999) found that rocky areas may have lower species richness and abundance than washes, canyons, and sandy flats, particularly during years following low winter or spring precipitation. In 2011 and 2012, the San Diego Natural History Museum and Circle Mountain Biological Consulting, LLC surveyed small mammals and reptiles in 20 training areas to provide a baseline to monitor long-term trends in wildlife diversity and

populations. Species-specific surveys have been conducted for Mojave fringe-toed lizards in 1983, 2001, and 2017; common chuckwalla from 2008-2010 and 2017; and red-spotted toads in 2017 (Fromer et al. 1983, Cablk and Heaton 2002, ICF International 2010, NOREAS Inc. 2017).

### **3.7.4 Birds**

More than 215 species of birds have been detected at the Combat Center (Appendix C). In addition, the San Bernardino County Museum conducted a Neotropical Bird Survey for the Combat Center at Mainside and Wood Canyon, Gypsum Ridge Training Area. A Bird Airstrike Hazard (BASH) plan was completed in 2004. In general, it determined that the Combat Center and the Expeditionary Airfield have a low risk of airstrikes due to the remoteness of the airfield from any source of water.

Cutler *et al.* (1999) recorded 87 resident bird species aboard the Combat Center and another 122 migrants, vagrants, or other transient species of birds. These authors suspect, but did not prove, a greater bird species richness in washes and canyons than at other sites. Bird species richness and overall abundance were greater in 1998 following higher winter or spring precipitation than in 1997. While every other bird species native to the Mojave has stable or declining populations over the past 20 years, raven populations have grown exponentially in the Mojave Desert due to the increasing availability of anthropogenic food, water sources, and other subsidies (Boarman 2003, Iknayan and Beissinger 2018, MCAGCC 2022). This increase in predator numbers threatens desert tortoise populations (MCAGCC 2017, USFWS 2017).

### **3.7.5 Mammals**

Almost 60 mammal species have been observed at the Combat Center (Appendix C). Cutler *et al.* (1999) found small mammal species richness to be greater at high elevation sites than all other types of sites except washes. In 2011 and 2012, San Diego Natural History Museum and Circle Mountain Biological Consulting, LLC surveyed small mammals and reptiles in 20 training areas to provide a baseline to monitor long-term trends in wildlife diversity and populations.

In November 1992, 20 bighorn sheep (five rams and 15 ewes) were introduced onto the Combat Center near the Bullion and Cleghorn Pass Training Areas boundary north of Cleghorn Lakes (UCR 1993). This population is considered an experimental population.

### **3.7.6 Agassiz Desert Tortoise (*Gopherus agassizii*)**

**Legal Status** Federal Threatened – Listed April 1990

State Threatened – Listed August 1989

Agassiz's desert tortoise is a large, herbivorous reptile found throughout much of the Mojave and Colorado Deserts and spends much of the year underground to avoid extreme summer and winter temperatures (Nagy and Medica 1986). They construct and maintain single-opening burrows, of which several may exist within an individual's home range. The desert tortoise is typically active above ground during the spring, summer, and autumn when daytime air temperatures are below 90 °F. Most activity occurs during spring and early summer.



The USFWS determined the Mojave Desert population warranted federal listing in response to documented population declines over large portions of its range (USFWS 1990). The decline was likely due to several causes, including loss and degradation of habitat, upper respiratory tract disease (URTD), predation by ravens and coyotes, vehicle strikes, livestock grazing, and direct disturbance and collection by humans. The tortoise was emergency-listed as Endangered on 4 August 1989, and the Mojave population was listed officially as Federally threatened in April 1990 (USFWS 1990).

The Combat Center is within the southern Mojave subdivision of the Western Recovery Unit for the desert tortoise. Critical Habitat was not designated aboard the installation. However, it shares a 6.2-mile boundary with the Ord-Rodman Critical Habitat Unit to the northwest, and the Pinto Mountain Critical Habitat Unit is six miles southeast of the installation (Snover and Kellogg 1999).

The URTD, caused by the bacterium *Mycoplasma agassizii* (Brown *et al.* 1994), was a factor in the species listing as Threatened (USFWS 1990). A thick, nasal mucous discharge is a clinical sign of the disease, but URTD may present other signs, including raspy, difficult breathing, ocular discharge, swelling of the eyelids, inflamed eye membranes (such as conjunctivitis), and sunken eyes. Although a closely related bacterium (*Mycoplasma testudineum*) also occurs in desert tortoises, its role and pathogenicity has not been demonstrated. The primary external indicator of URTD, mucoid nasal discharge, may indicate other diseases (e.g., herpesvirus infection), so biological samples are analyzed to help diagnose URTD status.

Exposure to *Mycoplasma* is tested via Enzyme-Link ImmunoSorbent Assay (ELISA; anti-body response to *Mycoplasma* spp.), Quantitative Polymerase Chain Reaction (qPCR detection of *Mycoplasma* spp. DNA; Brown *et al.* 2002 and Braun *et al.* 2014), and bacterial culturing (Brown *et al.* 2002). The ELISA test detects an immune response by measuring concentrations of antibodies to *Mycoplasma* in blood samples. An immune response indicates a past exposure to, but does not confirm an active infection by, the bacteria of interest. Cultures of nasal exudate indicate the presence of live *Mycoplasma*, and qPCR tests of blood plasma indicate the presence of *Mycoplasma* DNA (indicating a more recent presence of the organism in the tortoise). Recent Combat Center surveys of tortoises included physical exams and diagnostic testing for health and disease assessments using both ELISA and qPCR tests.

Desert tortoises generally occur through much of the Combat Center (Woodman 2001). The most current density information for the installation is presented in Table 3-5 Tortoise Density (USMC 2017; USMC 2018b). Areas of steep bedrock outcrop, lava flow, and dry lakes are not typically considered habitat and are frequently not surveyed (see USMC 2018c). The following summary reviews tortoise abundance and density for the legacy base (i.e., prior to expansion in 2013), and subsequent expansion areas to the west and south. Legacy and expansion areas were surveyed at different scales (Tables 3-5, 3-6 and 3-7; and Figure 3-5) but metrics will be standardized over time.

### **Desert Tortoise Estimates in the Legacy Base**

In 1997 and 1999 Woodman *et al.* (2001) surveyed the Combat Center's desert tortoise population on what is now the legacy base, using survey protocols similar to Tortoise Regional

Estimate of Density (TRED) surveys (Karl 2010; Table 3-5). Like TRED protocols, Woodman's method performed calibration surveys to generate calibration coefficients to reflect the abilities of individual surveyors to detect tortoise sign. However, TRED protocols calibrate based on the number of tortoise burrows detected during a survey transect; Woodman *et al.* (2001) also included observations of scat and burrows in the calibration, rendering detectability by this method more sensitive. Data from the Woodman *et al.* (2001) survey provided the first established population baseline for the installation and are regularly used in a variety of ways by the NR Program, including tracking desert tortoise population trends over time.

The MAGTFTC employs a consistent and comparable approach for tracking population changes over time by comparing the Woodman *et al.* (2001) data with later datasets collected from mark recapture analyses performed at permanent plots located in Bullion, Emerson Lake, and Sandhill TAs (Woodman *et al.* 2001, Woodman 2012, and Karl 2017). Although detailed trend analysis of all population data available is neither appropriate nor realistic for the purposes of this document, generally declines measuring 67%, 80% and 90% over 14, 12 and 16 years, respectively, have occurred at the Bullion, Emerson Lake, and Sandhill TAs (Woodman *et al.* 2001, Woodman 2012, and Karl 2017). These numbers represent total population reductions over decades, and when presented as annual decline rates they are comparable to annual declines (ca. 8%) measured across the Western Mojave Recovery Unit from 2004 to 2014 (USFWS 2015).

Population declines may be attributed to a myriad of causes. At the Combat Center, incidence of URTD is low at these plots (Woodman *et al.* 2001, Woodman 2012, Karl 2017) but predation by canids has been a concern at all three sites, especially in the Sandhill TA (B.T. Henen, unpublished observations). Juvenile tortoises have been reported at the Bullion Plot, but less so at the other two sites, implicating poor recruitment at the Emerson Lake and Sandhill plots. The Sandhill TA should benefit from the tortoise headstart program contributing 100 to 140 mm long (carapace length) juveniles, for which 234 animals were released among September 2015, spring 2017, and spring 2019 (MAGTFTC, unpublished data).

The MAGTFTC recently compared qualitatively (USMC 2017) the Woodman results and data from LaRue (2013). In the LaRue study a survey team performed triangular transect surveys like those performed by Woodman *et al.* (2001); however, surveyors did not include calibration surveys in their data, and due to a lack of calibration, only regional patterns of tortoise abundance and their sign could be generally compared. Results from this analysis reflect tortoise sign were lower overall in the latter surveys (LaRue) for the Prospect and South Lavic Lake TAs, yet sign were higher in the Bullion TA and portions of the Delta TA. As a part of this comparison, the MAGTFTC created a new desert tortoise density map using a conservative analysis of LaRue (2013) data, modifying only areas where the original 0-5 tortoises per square mile density (Woodman *et al.*, 2001) may have increased, to better consider these areas during future planning efforts.

Density (#/ mi <sup>2</sup> )	Area (Acres)	Percent of Total	Average Density (#/ mi <sup>2</sup> )	Abundance*
0 – 5	235,753	39.47%	2.5	921
Density may be > 0-5	34,326	5.75%	2.5	697*
6 – 20	123,571	20.69%	13	2,510
21 – 50	67,290	11.26%	35.5	3,732
51 – 100	12,183	2.04%	75.5	1,437
<b>Sub-total, Occupied Habitat</b>	<b>473,123</b>	<b>79.20%</b>	<b>n/a</b>	<b>9,297</b>
<b>Data Gaps</b>	<b>42,029</b>	<b>7.04%</b>	<b>2.5</b>	<b>164</b>
<b>Landforms, No Habitat</b>	<b>82,237</b>	<b>13.77%</b>	<b>2.5</b>	<b>321</b>
<b>Grand Total</b>	<b>597,389</b>	<b>100.00%</b>	<b>n/a</b>	<b>9,782</b>

Notes: \*Tortoise data is from surveys conducted in 1997 and 1999 (area and densities from Woodman et al. 2001).  
Source: Final Environmental Assessment for Ongoing Training (USMC 2018c).

Marine Corps training impacts tortoise densities at the Combat Center (Henen 2012; MCAGCC 2023, USFWS 2023) but a new, formative analysis should quantify those impacts after identifying variation in tortoise densities and associating them with variation in habitat suitability (Barrows *et al.* 2016). The complex, interwoven import of habitat suitability (e.g., Barrows *et al.* 2016) and human disturbance on Combat Center desert tortoises (Henen 2012) is a key component of ongoing monitoring and analyses of tortoise distribution and density at the installation (INRMP Task 3.2.1-A, Appendix A). The new habitat suitability analyses proposed under this INRMP will evaluate human disturbance data (i.e., military training and other sources) from Woodman *et al.* 2001 and LaRue 2013. However, the comparison between studies will be neither simple nor precise due to variations in the methods, numbers, and spatial distribution across the landscape (Barrows 2011, Barrows *et al.* 2016).

### **Desert Tortoise Estimates in the Western Expansion Area**

In 2008, surveys detected multiple types of desert tortoise sign throughout the Western Expansion Area (WEA), now designated the Bessemer Mine, Galway Lake, and Means Lake Training Areas, with sign for all sizes and sexes on most topographic features from low bajadas to mountains (Karl 2009; Table 3-6). These surveys indicated approximately 9% of the area hosted no tortoises, mostly in unsuitable or disturbed habitat, and the greatest densities were observed in the valleys, bajadas, and foothills of upper Johnson Valley, especially in the north-central portion west of Emerson Dry Lake and west of the Fry Mountains (Table 3-6 and Figure 3-5). The number of desert tortoises in the WEA was estimated at 2,708 ± 780 adults (95% CI; Karl 2010).

Density (#/km <sup>2</sup> )	Area (acres)	Percent of Total
0	13,931	9.5%
1-3	60,458	41.2%
4-6	57,105	38.9%
7-9	11,104	7.6%

10-12	1,970	1.3%
13-15	0	0%
<b>Total</b>	<b>144,567</b>	<b>98.6%</b>
Notes: Tortoise surveys conducted in 2009. Based on the TRED survey method GIS data (Karl 2010).		

Mark recapture and belt transect surveys from 1977 to 2008 offer comparative data (see Karl 2010 for review). The BLM and USGS used mark-recapture sampling to survey the 1-mile (mi)<sup>2</sup> (2.59 km<sup>2</sup>) ‘Trend Plot’ in Upper Johnson Valley every four to six years since 1980. The density of adult tortoises (i.e., adult carapace length > 180 mm; Turner et al., 1987) was 179 per (mi)<sup>2</sup> (69 per km<sup>2</sup>) in 1980 (BLM 2005), 39 per mi<sup>2</sup> in 1990, and about half that in 1994. The densities now are likely lower as densities have declined range-wide (Karl 2010; Allison & McLuckie 2018).

From 1977 to 2002, biologists estimated tortoise abundance in the western Mojave Desert via belt transects, 10-meter wide and 2.4-km long, surveyed at two transects per 36 mi<sup>2</sup> (93 km<sup>2</sup>; Karl 2010) and at one or two per mi<sup>2</sup> (2.6 km<sup>2</sup>; between 1998 and 2002). The density of such transects would provide coarse estimates of tortoise abundance and density (Karl 2001), but more intense coverage (i.e., transects per unit area) should more accurately estimate abundance and density. The northern portion of Johnson Valley had relatively high tortoise abundance, with patterns, like more recent surveys (2008 TRED surveys by Karl 2009), including above average sign counts north of the WEA, and west of the Emerson Lake TA. Unlike earlier surveys, however, the recent surveys (Karl 2009) did not detect high tortoise abundance north of Means Dry Lake and west and northwest of the Fry Mountains and southern Johnson Valley. The differences between the earlier and later studies may be partially due to survey method (i.e., density of survey transects; Karl 2009), but the declines are consistent with range-wide declines (Karl 2010; USFWS 2015), suggesting other threats impacted densities.

### **Desert Tortoises in the Southern Expansion Area**

Although tortoise sign was detected in most of the Southern Expansion Area (SEA), now designated the Cleghorn Lake Training Area, tortoise densities were low, with the higher estimates in the northeast corner and on bajadas in the south (Table 3-7). The number of desert tortoises in the SEA was estimated as 389 ± 115 (95% CI) adults (Karl 2010). BLM (2005) belt transects provided estimates between 1998 and 2002 but did not detect high sign counts. Nearby on the Combat Center, calibrated, belt transect surveys indicated relatively high tortoise density (8 to 39 per km<sup>2</sup>; Woodman *et al.* 2001) for tortoises of all sizes.

Density Category (#/km <sup>2</sup> )	Area (acres)	Percent of Total
0	0	0%
1-3	4,328	22.3%
4-6	11,202	57.7%
7-9	3,335	17.2%
10-12	296	1.5%
13-15	249	1.3%

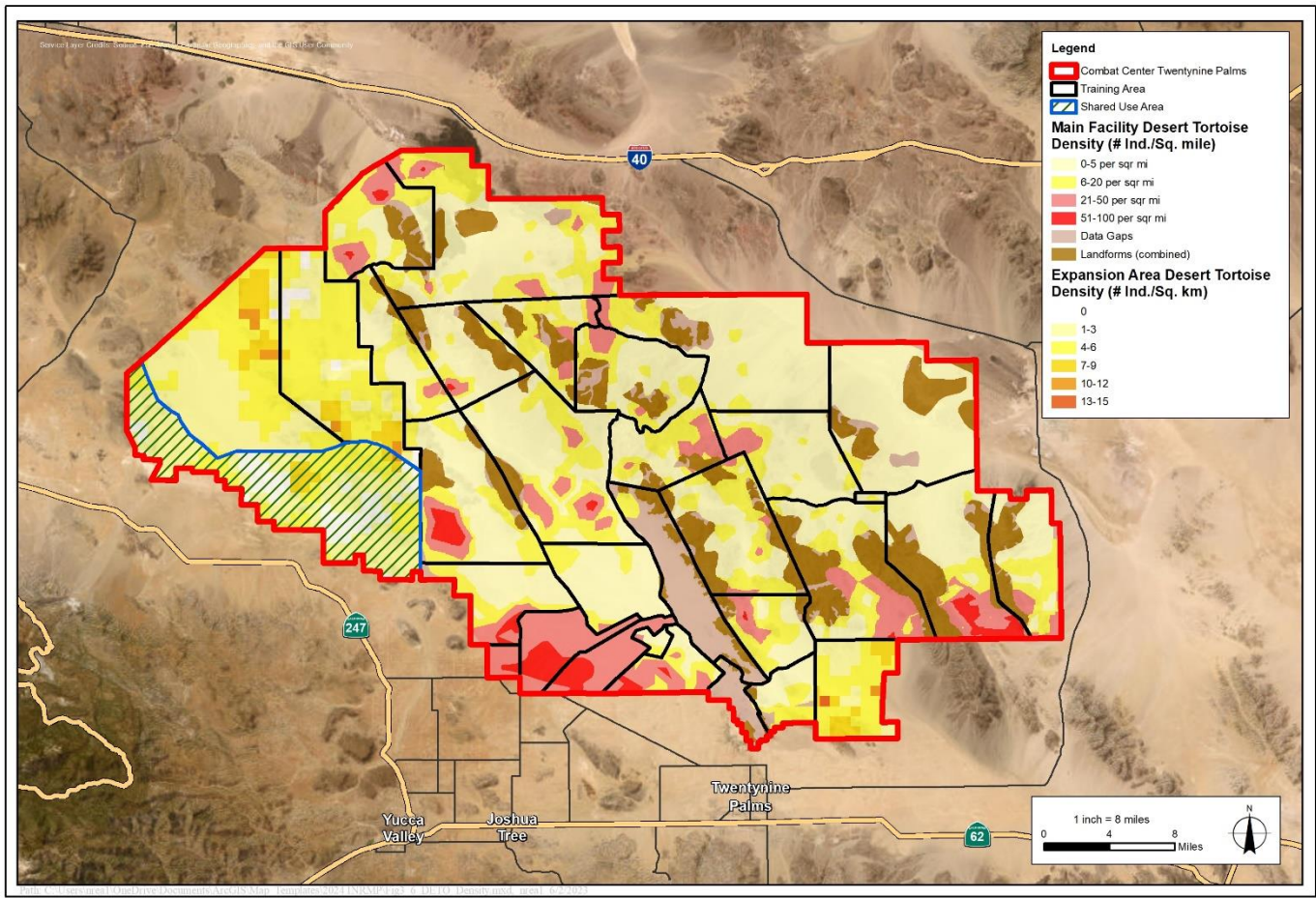
<b>Total</b>	<b>19,410</b>	<b>100%</b>
Notes: Tortoise surveys conducted in 2009. Based on the TRED survey method GIS data (Karl 2010). Note that the area estimated includes sections outside of the Combat Center.		

### **Initial Results of 2017 Desert Tortoise Translocation**

As a part of the recent land and airspace acquisition project, the MAGTFTC translocated 1014 large tortoises (carapace length  $\geq 160$  mm) from 2017 to 2020, and 523 small tortoises (carapace length  $< 160$  mm) from 2017 to 2021, to minimize the effects of military training on desert tortoises prior to military training in the expansion areas in 2017 (USMC 2017 and USFWS 2017). The clearance surveys ceased in 2019 when the population density of the tortoises, based on clearance surveys, was below two large tortoises per square kilometer (Tetra Tech 2021). The MAGTFTC translocated the 1537 tortoises to four recipient sites: Lucerne-Ord, Rodman Sunshine Peak North, Siberia, and the Constrained Release Area (Vernadero 2022c).

To monitor translocation efficacy (e.g., survivorship and integration), MAGTFTC used radiotelemetry to monitor similar numbers of translocated and resident tortoises at recipient sites, and a similar number of control tortoises at control sites, most of which were outside the installation. A total of 838 tortoises have been tracked since 2017: 277 residents, 259 translocatees, and 302 controls, but mortalities have occurred in each group. One hundred and ninety-eight tracked tortoises (23.6%) have either died or are not detected since 2017, nearly half of them (90) being control tortoises. Of the 640 tortoises that were still being tracked in 2022, the number of tortoises to be tracked in post-translocation years six to ten (see MCAGCC 2016a) was reduced to 191: 66 resident, 69 translocated, and 56 control tortoises. During the first five years, survival of the controls, residents and translocatees (95.5, 97.3 and 94.8% per year) were comparable to adult survival in robust, remote tortoise populations in good habitat in years with strong winter rainfall and plant production. The preliminary results for 2022, a second year of drought, indicated 82.6, 88.2, and 94.1% survival for the respective groups, demonstrating that these populations respond to droughts as known from other studies.

In addition to survival, effectiveness monitoring includes assessing physical and genetic assimilation, so a subset of resident and translocated females are monitored, their eggs collected and incubated, and hatchlings sampled to determine genetic assimilation with translocated and resident males, respectively. These efforts are ongoing, as is two-year monitoring of small expansion-area tortoises that were headstarted at TRACRS. The small tortoises were found during the 2014 to 2020 clearance surveys but were too small to wear transmitters for in situ monitoring prior to translocation.



**Desert Tortoise Densities (2018)  
Combat Center Twentynine Palms INRMP**

**FIGURE  
3-5**

Figure 3-5. Combat Center tortoise densities for legacy and expansion areas (Woodman et al., 2001; Karl 2010).

### 3.7.7 Migratory Birds

The Regional Internal Review Procedures prepared by Chief of Naval Operations (July 31, 2001) state that “INRMPs should be assessed to evaluate their compatibility and contribution to the conservation of migratory birds.” In general, the Combat Center has a lack of high-quality habitat for non-resident, migratory bird species, although numerous species (e.g., Mourning Doves, Horned Larks, Burrowing Owls, and Golden Eagles) use the Combat Center for much of their life cycle, including reproduction. Yet with the low primary production and no known perennial seeps or springs, many bird sightings occur in developed areas of Mainside, including the golf course and wastewater treatment ponds, with a limited number of sightings at ephemeral surface water sources. No formal surveys have been recently conducted at the golf course or treatment ponds, but they are considered viewing ponds and periodic avian surveys have documented MBTA use in years past. New avian surveys are anticipated at a low frequency in the future. Historically, the MAGTFTC has occasionally used a volunteer monitoring initiative with the Marine community which seasonally performed informal bird counts at the ponds. The activity depended on the interest, availability, and skillset of the individual volunteers but helped to improve community awareness and connection with the natural resources aboard the installation. Currently, there are no volunteers assisting with bird monitoring, but the surveys could resume in the future if interest reappears.

The following list describes many past and current actions completed to benefit migratory birds (future projects are detailed in the 5 Year Workplan presented in Appendix A):

- In 1999, MAGTFTC completed a comprehensive survey of all vertebrates, including birds. The study (Cutler *et al.* 1999) determined that at least 87 species of birds are resident and an additional 122 species are migratory through this area.
- In 1998, MAGTFTC and the San Bernardino County Museum completed a comprehensive survey of neotropical migratory birds at the Combat Center. This study (McKernan 1998) primarily focused on the developed areas of the Combat Center, including the golf course and sewage treatment facilities.
- In 1998, the MAGTFTC completed construction of a ten-acre stormwater retention pond. Though this facility serves other purposes, specific design changes were implemented to increase its use by migratory and resident species. Educational signs and bird viewing blinds have also been installed around the pond, now informally called the “Wildlife Viewing Area.” At least 70 species of birds have been documented using this area.
- The MAGTFTC developed a “Guidance” document that details allowed and prohibited actions that Marines, family members, contractors and civilian employees of the U.S. Marine Corps can do to reduce “Take” of migratory birds (CCO 5090.1F; see also Appendix E). This guidance is incorporated in a CCO, which is signed by the commanding general of the installation. This guidance also includes regulations and recommendations on the proper timing of tree-trimming within the Mainside area. EA improved a vegetation trimming Environmental Standard Operating Procedure (ESOP) to enhance training that enables landscaping crews to identify and assess nests that may require EA management or intervention.
- EA staff regularly cooperate with organizations such as Partners in Flight, The Wildlife Society, the American Bird Conservancy’s “Cats Indoors” campaign and

- others. EA staff are collaborating in DoD's new Avian Knowledge Network to better manage species data for installations. MAGTFTC also cooperates with the regional, interagency Raven Project team led by USFWS Palm Springs Field Office.
- The Marine Corps has worked to improve habitat quality of xeroriparian washes for migratory and resident birds (and other wildlife) through an aggressive saltcedar (tamarisk) eradication program (refer to section 4.12). The MAGTFTC has treated more than 40,000 saltcedar since 1997.
  - The USFWS Migratory Bird Permit Office - Region 8 in Sacramento has issued the MAGTFTC three separate Special Purpose Permits since 2018:
    - The first permit allows the limited removal of nests of ten frequently encountered species (Mourning Dove, Greater Roadrunner, Common Raven, Mallard, House Finch, Great Horned Owl, Barn Owl, White Crowned Sparrow, and Western Grebe) “when nests are built on or near tactical vehicles, pose a health or safety threat or the nests are in a location where birds are in danger.” Actions taken under authority of this permit are reported to the MBTO on an annual basis. This permit has been renewed annually since 2018 and the MAGTFTC intends to renew this permit in calendar year (CY) 2024.
    - The second permit issued for CY 2019 allowed for the removal of up to 100 ravens to reduce tortoise depredation.
    - The final permit issued for FY 2023 allowed for the removal of up to 1167 ravens and 130 active raven nests to reduce tortoise depredation, minimize damage to military equipment, and protect human health.
  - A BASH Plan was completed in 2004. In general, it determined that MAGTFTC and the Expeditionary Airfield have a low risk of airstrikes due to the distance between the airfield and any source of water.
  - Educational Outreach and briefings (Chapter 4, Goal 4) include information on migratory birds, specifically directing Marines to not feed ravens. Additionally, guidance from USFWS to ensure any new utility poles not be compatible for raven nesting (existing poles will be modified by MAGTFTC and Southern California Edison on a conditional basis).
  - Boarman and Chamblin (2005) studied the roosting behavior of the common raven; with context of the known predatory impact of ravens on the desert tortoise (Chapter 4, Goal 3). A similar survey in 2010 by Boarman (2014) indicated the similar patterns of high raven numbers near subsidies at Mainside and high numbers near units training in some training areas.
  - The MAGTFTC and USGS (Las Vegas, Nevada) completed a preliminary study of burrowing owl (*Athene cunicularia*) at the Combat Center in 2007. They observed 25 burrowing owl territories across 10 of 15 surveyed training areas. In 2022, a similar survey documented 2 territories on 2 of 24 surveyed RTA (Vernadero Group Inc. 2022b), with lower results suggesting either declining burrowing owl numbers, during the second year of drought, inter-survey variability in results, or a combination thereof.
  - A 2010 ICF Jones and Stokes report documented an Avian Point count survey around the Expeditionary Airfield in support of the 2004 BASH plan.



- Circle Mountain Biological Consulting, LLC (LaRue 2013) completed the general wildlife survey in 20 training areas. The project aim was to identify vertebrate species richness, heterogeneity, and diversity in disturbed areas and less disturbed areas. The data would form a statistical baseline of vertebrates in the training areas. This field work was completed in 2012.
- PWD and EA collaborated to incorporate “Avian Protection Guidelines” in accordance with to Southern California Edison line and power-pole configuration for all new power pole construction in 2011.

### 3.7.8 Other Special Status Fauna

There have been 41 special status species detected on the Combat Center, including 1 invertebrate, 2 reptile, 28 bird, and 10 mammal species. Four of these species are federally listed as Threatened or as Endangered, of which three are nonresidents, including the willow flycatcher (*Empidonax traillii*), Bell's vireo (*Vireo bellii*), and snowy plover (*Charadrius nivosus*). For each of these avian species, the subspecies observed on the Combat Center was unknown or unnoted (USMC 2012). The desert tortoise is the only federally listed, resident faunal species on the Combat Center and is a state-listed threatened species under the California Endangered Species Act. While the peninsular population of desert bighorn sheep (*Ovis canadensis nelsoni*) are listed federally as endangered, desert bighorn sheep at the Combat Center are outside of the peninsular population. The population is fully protected by the state, and federally identified as a BLM Sensitive species. The MAGTFTC has collaborated in population analyses, has a network of 10 guzzlers, and participated in the 2021 USMC helicopter delivery of water to refilled guzzlers on base and BLM guzzlers in the region.

Birds represent the largest number of sensitive species at the Combat Center. Twenty-eight sensitive species have been observed, primarily near Mainside due to the wet areas created by the golf course, sewage treatment systems, and the evaporation ponds. Sensitive birds have also been observed throughout the training areas.

One invertebrate infrequently found on the Combat Center (Pratt 2005), the monarch butterfly (*Danaus plexippus*), is a candidate for federal listing as a threatened or endangered species, after the USFWS found that listing the species was “warranted but precluded” in 2020 (USFWS 2020). Twenty-nine populations of monarch butterflies have been documented outside of North America, but these are believed to account for less than 10% of the worldwide population. Western and eastern North American populations account for the rest and are known for their seasonal, multigenerational migrations across the continent. The western population, which is split from the eastern populations by the Rocky Mountains, overwinter in forests along the California coast (NWF 2023). In the summer, they migrate throughout the West up to British Columbia, feeding on nectar and laying their eggs on milkweed plants (*Asclepias* spp.) along the way. While overwintering, monarchs can live up to 7 months. During the remainder of the year most monarchs live only a few weeks. It can take five generations for monarchs to complete a migration cycle.

Milkweed plants, and thus potential breeding habitat for monarch butterflies, occur in 16 of the 27 training areas on the Combat Center. Three species of milkweed are found here: whitestem milkweed (*A. albicans*), desert milkweed (*A. erosa*), and rush milkweed (*A. subulata*; Elvin

2000; ICF 2009). Monarchs seem to prefer riparian habitat and sheltered canyons where they are found in the desert Southwest. The Combat Center lacks perennial water bodies outside of the water treatment ponds at Mainside, and xeroriparian habitat associated with ephemeral waterbodies in washes and surrounding ephemeral seeps and tinajas covers between 2-5% of the installation. Should the USFWS list this species, the MAGTFTC would consult USFWS to develop a conservation plan that may include focused surveys, a threat assessment, and management recommendations to protect and recover the species.

## **4.0 NATURAL RESOURCES MANAGEMENT**

### **4.1 Introduction**

The NR Program at the MAGTFTC seeks to address local, regional, and national priorities using management practices and standard operating procedures that directly affect flora, fauna, soil, and available water. The program integrates landscape, ecosystem, and species-scale perspectives to address DoD requirements from the MCO 5090.2, such as the conservation of biota, sustaining yields of renewable resources, performing scientific research, education, and supporting various forms of recreation.

Managing environmental considerations requires a broad array of technical expertise, time, and resources. The program description presented here highlights elements of natural resources that are overseen by various entities within the installation, and those elements specifically under the purview of the Natural Resources Section of NCRB in the EA Directorate. Elements not directly related to the biological program managed by the NCRB are identified as such in the descriptions, varying levels of detail are provided depending on their applicability to natural resources management, and reference information is provided to assist the reader with accessing additional information outside the purview of biological resources, if needed.

The NR Program adopts management approaches that integrate large-scale planning objectives with specific, distinct projects and actions. The NR Program also elevates certain priorities into standard operating procedures. This program description is a written summary of the program background and context. Appendix A presents a 5 Year Workplan outlining specific actions, budgets, and timeframes.

### **4.2 Program Description**

#### **4.2.1 Goal 1: Strengthen the Combat Center's Operational Capabilities**

Activities performed under this goal seek to proactively enable or expand capability of the Combat Center to sustain existing and future training and operations, in alignment with environmental laws and regulations. Specific program elements include:

- 1.1 Align Natural Resources Management and Mission Statement.
- 1.2 Training Lands Degradation Minimization.
- 1.3 Ensure NEPA Compliance.

#### **Element 1.1 – Align Natural Resources Management and Mission Sustainment**

This element recognizes the NR Program's dual role in supporting the MAGTFTC's mission and managing the natural resources aboard the installation. While a new addition to the framework, the element ties into concepts from the earlier program.

The objectives listed below identify a structure for identifying current tasks and future initiatives with the explicit aim of reducing environmentally sourced encroachment on military training and other operations. Ongoing assessment of program operations against these objectives will assist the NR Program in maintaining its mission-supporting focus.

Objectives:

*1.1.1 - Reduce the regulatory burden on mission implementation.*

*1.1.2 - Use the Integrated Natural Resources Management Planning process for natural resources management.*

*1.1.3 - Coordinate installation resources management with training area users.*

*1.1.4 - Coordinate installation resources management with regional initiatives and management strategies.*

*1.1.5 - Minimize wildlife conflicts.*

*1.1.6 - Adequately staff and support implementation of the Natural Resources Program.*

The 5 Year Workplan identifies specific actions that will be taken to fulfill the objectives of this program element.

***Wildlife Conflict Minimization*** addresses topics such as *Pest Management, Animal Control, and Subsidy Management Program, and is described in greater detail, below.*

***Pest Management*** – The Integrated Pest Management Plan discusses many aspects of pest management that are not directly within the scope of this INRMP, such as control of disease vectors and protection of facilities. The Integrated Pest Management Plan (Naval Facilities Engineering 2022) is developed by an interdisciplinary team from EA, PWD, the Naval Facilities Hospital (Infectious Disease Branch), Naval Facilities Southwest, and others. The plan is revised every 5 years. The purpose of the plan is to:

- Support the military mission by protecting the health and welfare of military and dependent personnel.
- Maximize the service life of structures and other types of real property.
- Reduce reliance on pesticides to solve pest problems.
- Implement environmental protection measures at every opportunity.
- Protect native organisms and their habitats.

***Animal Control*** – All Combat Center wildlife are protected except for those specifically targeted for control. Targeted species include the European starling, house sparrow, Eurasian collared dove, rock pigeon, household invertebrates, household rodents, and Africanized or European honeybees. Coyotes are considered pests under very specific circumstances, such as animals habituated to human presence. Feral or free-roaming dogs and Africanized honeybees are considered pests aboard all areas of the Combat Center, and the MAGTFTC implements measures to control the populations of these species on the entire installation. Ravens are protected under the federal MBTA, but in certain areas of Mainside and the training areas, their numbers and predatory behaviors are problematic.

Africanized honeybees (*Apis mellifera scutellata*) are prevalent in San Bernardino County. A terrestrial invertebrate study aboard the Combat Center (Pratt 2005), estimated that greater than 85% of all bees found are Africanized honeybees. Africanized honeybees are much more aggressive than are European honeybees. They become agitated much easier and will stay agitated for a longer period. The two types of bees are virtually indistinguishable except through a microscope. Marines are warned to treat all bees as the more dangerous Africanized honeybee variety.

The spread of non-native fire ants (*Solenopsis invicta*) in southern California is a concern. It is not clear if the Combat Center has *S. invicta* yet, but the Combat Center has the native, desert fire ant (*S. xyloni*). Native fire ants, *S. xyloni*, occupy training areas and depredate tortoise eggs and juveniles. Preliminary studies of Combat Center *S. xyloni* indicate their populations increase in irrigated areas near TRACRS (Brian Henen and Gordon Pratt, unpublished data).

Feral and free-roaming dogs are a concern throughout the desert and are considered pests on the Combat Center. Coyotes are also a nuisance species as individual animals can become a nuisance in housing, Mainside, and near training Marines; they also depredate desert tortoises. Individuals that are found in housing areas, or continually staying in populated areas will be controlled by the Natural Resources staff and the CLEOs on a case-by-case basis. Coyotes in the training areas will be subject to control efforts, records indicate signs of decreased inhibition and sometimes aggression towards Marines. The control of coyotes is required to support the desert tortoise translocation (USFWS 2017); coyotes are the number one killer of translocation program tortoises, depredating translocatees, residents and control tortoises. A few installation depredation efforts for coyotes have been implemented to date. Targeted coyote depredation efforts have begun under the leadership of the CLEOs and used trained volunteers in the past. All depredation efforts will be in areas within and around headstart release areas and translocation control and recipient areas.

Ravens and many other species occur throughout the built and natural areas of the installation and their population sizes are artificially inflated by provision of subsidies such as food, water, and shelter. In the built environment, the overabundance of ravens degrades the quality of the Marines' work environment, particularly when several hundred ravens roost repeatedly in a single location. In natural areas, raven predation is thought to reduce the effectiveness of desert tortoise conservation measures taken by the installation. In one study at Fort Irwin, 18 of 23 captive-reared juvenile tortoises that were released were believed to have been depredated by ravens (Nagy 2015a) while another 7 of 15 juvenile tortoises released at Edwards Air Force Base were killed by ravens (Nagy 2015b). To manage these situations, the MAGTFTC secured depredation permits for ravens in 2019 and 2020. Following the Programmatic EA for Raven Management (MAGTFTC 2022), MAGTFTC acquired a 2022 depredation permit allowing lethal removal of up to 1167 birds and 130 nests containing eggs or young. The MAGTFTC will seek to renew this permit annually, adapting lethal and non-lethal controls as raven populations change. See Goal 2, Element 2.7 for more information on invasive species management and Goal 3, Element 3.1 for more information on depredation efforts for both ravens and coyotes in relation to the desert tortoise.

*Subsidy Reduction* - A subsidy reduction program is maintained by the MAGTFTC to identify and reduce subsidies made available by the presence of humans, but it is impossible for an installation of this size to eliminate these opportunities. The effectiveness of the subsidy reduction program is determined by monitoring the abundance of target species and resources made available to them and tracking changes in their use of space and other resources over time. Desert tortoise predators such as ravens and coyotes are of primary focus in this program, as they are identified in the 2017 BO (installation expansion and tortoise translocation) as desert tortoise predators warranting subsidy reductions, and both species pose hazards to the Marines and tortoises.

Under this program, as information about predator species is received, new management recommendations are formulated to address changing or emerging conditions and new practices and technologies for predator management are explored. In this way, the subsidy reduction program uses an adaptive management approach to respond to changing conditions to best manage the MAGTFTC's influence on these populations. For example, the use of acoustic wailers and falconry to haze ravens, combined with bird netting to prevent roosting, has been effective at reducing raven abundance at targeted locations. Some ravens appear to be habituating to the wailers, so we may need to implement a new hazing method. While the subsidy reduction program is outlined here, practices outlined under this plan are integrated in Goals 1 and 3, Objective 1.1.5 – Minimizing Wildlife Conflicts, Objective 3.1.2 - Inventory and Monitor to Identify Threats to Desert Tortoises, and Objective 3.1.4 - Minimize Tortoise Injury and Mortality Aboard the Combat Center. See the 5 Year Workplan under these Objectives for specific tasks identified for this program.

## **Element 1.2 –Training Lands Degradation Minimization**

Most land disturbance on the Combat Center is caused by military training. Considering the huge costs and long periods involved with restoration of disturbed lands, minimization and management of disturbance is the most cost-effective technique to manage natural resources at the Combat Center. The NR Program supports ongoing, military training flexibility by meeting the following objectives under this element:

### Objectives:

*1.2.1 - Minimize damage to training lands, disturbance to natural resources, and ensure ongoing coordination with military planners.*

*1.2.2 - Design roads to benefit both military use and conservation; and*

*1.2.3 - Prevent damage to sensitive areas.*

***Disturbance Minimization*** may be affected by creating new PRTSS and by locating new range projects in previously disturbed areas as much as possible. Master planners at the Combat Center contribute significantly to implementing this objective. NEPA documentation associated with new projects will emphasize strongly considering the use of already disturbed lands. Planners and Training Lands managers should also employ the following techniques, which are pertinent to the management of concentrated military use sites:

- Maintain and delineate road access to sites to discourage units from making alternate routes.
- Obscure, block access, or restore unauthorized trails not required for military training before they develop further. Work with military trainers to reduce unnecessary impacts to training lands to sustain range integrity and conserve natural resources.
- Ensure proper drainage when utilizing sites to return water to natural channels downstream from sites.
- Monitor conditions before traffic and training and find alternate solutions.

***Training Lands Restoration*** - Training lands restoration work to date has primarily emphasized soils stabilization first, and infrequently, the re-establishment of native plant assemblages. Usually, restoration projects are developed to address specific, small-scale areas of localized disturbance, emphasize reducing compaction and soils losses from wind and water erosion events, and employ soils management techniques such as ripping, pitting, swaling, and the creation of small catchment basins. Practices that actively seek to reestablish native vegetative cover can also assist with meeting these objectives and provide more rapid returns to healthy habitat. Restoration as a component of prudent land conservation efforts provides many long-term benefits, especially when focused in the upper drainsheds. Hydrological functioning is improved, and soil and water are retained on-site, benefiting groundwater recharge, subsurface streamflow, native plant reestablishment, and ultimately fulfills the goal of training lands restoration efforts to maintain a high-quality, realistic training environment and support ecosystem health and function.

For several reasons, revegetation practices have not historically been used; these include difficulties with attaining meaningful levels of seed germination and seedling establishment, costs of irrigation when used, which include up front system establishment and low success rates once water applications are stopped, and the general observation that native plant cover naturally return to disturbed areas over time. However, ground disturbance is well-documented to facilitate the establishment and spread of non-native, invasive plants such as Mediterranean grass (*Schismus* spp.), Sahara mustard (*Brassica tournefortii*), and saltcedar (*Tamarix ramosissima* and *T. aphylla*), all of which have long-term negative impacts on ecosystem health. For this reason, more attention will be paid to the decision to include revegetation in future projects, especially in environmentally sensitive areas, including those with higher densities of desert tortoises. The selection of revegetation practices during the planning of training lands restoration projects shall include cost-benefit considerations on a case-by-case basis, prior to their funding, to enhance meaningful value from the action (see Appendix A for details).

The goal of training lands restoration shall also be supported by other types of specific restoration approaches and general aspects of the NR Program, as outlined in this INRMP. Strategies such as removing jeep trails, minimizing encroachment and off-road travel, reevaluating the movement of roadway alignments to minimize disturbance through sensitive areas. The establishment and use of PRTSS will minimize impacts to soils and opportunities for non-native invasives to establish, further reducing impacts on the landscape.

***Roadway Construction and Repair*** - A major portion of land management involves the construction and maintenance of access roads. The road system in the training areas is

comprised of poorly marked, unpaved MSRs and secondary trails. MSRs are graded and better maintained to allow for faster travel among training areas. There are also smaller roads, often called jeep trails, to allow movement through the Combat Center. These roads are not well maintained, and frequently change due to washouts. They are not always repaired, and consequently new roads are occasionally created, increasing disturbance in the training areas. Roadway maintenance, construction, and repair cannot reasonably be restricted to seasonal actions, even in non-emergency situations, as such restrictions have significant potential to limit the implementation of the military mission. However, considering minimal impacts to the environment is given during maintenance and construction activities.

Road maintenance crews at the Combat Center must be particularly cautious about creating berms along road shoulders. Road berms can channel water and create rutting or washouts. Steep berms are problematic for desert tortoises, particularly juveniles, as they can create physical barriers to movement or cause tortoises to overturn when attempting to climb berms.

***Access Across BLM Lands*** - The BLM administers much of the lands adjacent to the Combat Center and there are times when it is advantageous for military units to use routes through BLM land to access the installation. This is necessary when transit through training ranges is prohibited due to live-fire training exercises. One training range, America Mine, is only ground accessible through BLM land. Units are required to request clearance from MTD to access any part of the installation through BLM land.

***Restricted Area Marking*** - The MAGTFTC is developing a uniform system of marking Restricted Areas to prevent further disturbance to sensitive areas. Desert tortoise awareness signs are posted at entry points to training areas, and off-limits signs are located along MSRs adjacent to off-limits areas. Information concerning a uniform marking system will be incorporated into mission awareness training.

***Special Interest Area Protection*** - Designation of special protection status for unique or fragile areas is an important management tool. It is more cost effective to establish use restrictions on areas to minimize disturbance than to mitigate damage. These areas are not considered off-limits to training; they are only being recognized as having unique features that warrant extra consideration in the planning process. Special interest areas include locations such as flood plains, lava tubes, mines, and wet areas. As part of the NEPA process, EA reviews proposed projects and activities at the Combat Center. Natural resources managers can identify concerns and recommend measures to minimize disturbance.

### **Element 1.3 - Ensure NEPA Compliance aboard the Installation**

The NEPA of 1969 mandates Federal agencies use a systematic, interdisciplinary approach which applies natural sciences, social sciences, and environmental design arts in project planning and decision-making processes to protect, restore, or enhance the environment. CCO 5090.4F regulates NEPA compliance at the Combat Center. The commanding general, through the Director of EA, is responsible for implementing a NEPA program. The MAGTFTC maintains NEPA compliance through the Environmental Impact Review Board (EIRB). The Chief of Staff is the Chairman of the Board. The AC/S ISD serves as a member, and the EA Director serves as the Executive Agent. The Director of PWD, AC/S MTD, and legal counsel participate as



standing members. The Combat Center Environmental Impact Working Group is a subcommittee of the Installation EIRB and assists in distributing information from the project proponent to EA. This working group has representatives from units and appropriate technical experts. The NR Program has two NEPA-related objectives to ensure compliance aboard the installation:

Objectives:

*1.3.1 - Use an established NEPA project review process to identify projects and activities on the Combat Center that might impact natural resources, and work with project planners to resolve issues early in the planning process.*

*1.3.2 - Maintain and acquire any necessary environmental reviews, permits, and other legal authorizations to operate the Natural Resources Program.*

***The Combat Center NEPA Project Review Process***

The NEPA review process is initiated when a project proponent creates a project file in the automated, online system (NEPA PAMS) and submits the file as a Request for an Environmental Impact Review (REIR) to the NEPA Program Manager. The project REIR is then routed via the electronic system through EA to subject matter experts who review the project file to determine information gaps, potential impacts, issue resolutions, permits or approvals requirements, and recommend modifications to the proposed action if necessary.

If all subject matter experts determine a project's actions will not have significant effects and do not require an Environmental Assessment or Environmental Impact Statement (EIS), the project is found to be categorically excluded. The Marine Corps uses the Department of the Navy's list of 45 Categorical Exclusions (CATEXs) to identify the types of exemption(s) that include such action(s), and a Decision Memorandum is prepared, summarizing CATEX determinations and pertinent project details, including measures or practices to avoid or minimize effects. Most CATEXs used at the Combat Center apply to actions such as studies, data, and information-gathering that involve no physical change to the environment; routine repair and maintenance of facilities in order to maintain existing operations; and new construction that is consistent with existing land use. If a proposed project includes the following "Extraordinary Circumstances," a CATEX may not be issued:

- Adversely affects public health or safety.
- Has the potential for significant environmental effects on wetlands, threatened or endangered species, historic or cultural resources.
- Involves effects that are highly uncertain or involve unknown risks.
- Establishes precedents or makes decision for future actions with significant effects; or
- Threatens to violate Federal, state, or local laws or requirements imposed for the protection of the environment.

An Environmental Assessment is completed when screening criteria for a CATEX are not met. Examples may include a new military exercise, construction of a new range, actions involving wide geographic areas, and projects that may affect wet areas, sensitive plant communities,

threatened or endangered species, or cultural resources. EAs require commanding general approval, and if appropriate, a Finding of No Significant Impact (FONSI) is signed and issued.

If the Environmental Assessment process determines that a FONSI is not appropriate, the project may be modified to remove significant impacts. The Environmental Assessment process may then be repeated, and if modifications or mitigation are sufficient to remove significant impacts, a FONSI may be issued. If these options fail, the action may be dropped, or a more detailed EIS may be prepared. An EIS is prepared for those actions that will have a significant effect on the quality of the human environment, which has a broad range of conditions ranging from human health and economics to effects on natural and cultural resources. Once the EIS is prepared and a Record of Decision issued, the Marine Corps may proceed with the project.

**Mitigation** actions are specific activities that minimize, avoid, or compensate for, impacts on the resources that would be negatively affected by the proposed project. Below are five general mitigation tactics as defined by Council of Environmental Quality regulations:

- Avoid the impact altogether by not taking a certain action or parts of an action.
- Minimize impacts by limiting the degree or magnitude of the action and its implementation.
- Rectify the impact by repairing, rehabilitating, or restoring the affected environment.
- Reduce or eliminate the impact over time by preservation and maintenance operations during the life of the action.
- Compensate for the impact by replacing or providing substitute resources or environments.

EA uses the afore-described NEPA review process to protect the Combat Center's natural resources via properly planned, coordinated, and documented activities or undertakings. It also uses the NEPA review process to identify aspects of other organizations' projects that have the potential to affect the installation's natural resources. Consequently, EA is a proponent and a responsible agent for compliance with NEPA.

### ***Existing NEPA Analyses***

The MAGTFTC has completed NEPA analyses for several projects. The analyses for these projects are incorporated into this document through the NR Program references listed below. These EA and EIS analyses include actions identified in our 2024 to 2029 INRMP programs.

- 2003 Environmental Assessment and associated 2002 BO: Addresses environmental effects resulting from basewide training operations, preparation of training lands, and maintenance and construction activities.
- 2012 Land Acquisition and Airspace Establishment EIS (and associated BO): Addresses the expansion of the Combat Center to include specific military training operations and preparation of military training lands, within pre- and post-expansion acreages.
- 2017 Supplemental EIS and associated 2017 BO: Addresses implementation of the desert tortoise translocation, as required under the 2012 Land Acquisition and Airspace Establishment (LAA) EIS.

- 2018 Ongoing Training Environmental Assessment: Addresses environmental effects resulting from rotary wing and tilt-wing landing operations in the pre-expansion lands.
- 2022 Programmatic Environmental Assessment: Addresses the management of common ravens on DoD lands in the California desert.
- 2022 Environmental Assessment: Addresses the ongoing use of the Shared Use Area and EMUA in Johnson Valley for King of the Hammers off-road race events.
- 2023 Supplemental Environmental Assessment and 2023 BO: Addresses environmental consequences of incremental changes to training and operations at the Combat Center, and the MAGTFTC’s inclusion in the RASP for desert tortoises.

***Existing Environmental Reviews, Permits and Other Legal Authorizations***

The NCRB of EA maintains permits and other legal authorizations, specific to federally protected species, that the installation requires for compliance with environmental law. These authorizations include one BO, one Section 10 permit (UCLA, for headstarting tortoises), and Special Use permit to handle or take birds via the MBTA, and a Depredation permit to help manage Common Ravens on installation and translocation sites. Compliance with these authorizations is reviewed in more detail under Goal 3 of this section.

**4.2.2 Goal 2: Support Natural Systems on the Landscape**

This Goal ensures natural resources management provides good stewardship of the public lands entrusted to the USMC for military training. Landscape level planning and adaptive ecosystem management strategies are employed to conserve the biodiversity of native flora and fauna. Ongoing monitoring and management of vegetation and wildlife considers all associated biological communities, ecosystem processes, and human values. Areas on DoD installations that contain natural resources (ecological, scenic, recreational, or educational) that warrant special conservation efforts may be designated as special natural areas, where such conservation is consistent with the military mission. Natural resource managers contribute expertise and otherwise coordinate with other MAGTFTC directorates and divisions to improve how operations indirectly influence natural resource considerations. Coordination with outside agencies, regional ecosystem initiatives and planning efforts improves the effectiveness of the NR Program. On a project-by-project basis, management efforts will steer projects and tasks towards science-based efforts as much as possible, such that in time, “routine” efforts resulting from the management and monitoring of ecosystems will also further general knowledge of desert systems. Program Elements under this goal include:

- 2.1 Coordinated Ecosystem Management.
- 2.2 Landscape Level Planning.
- 2.3 Habitat Management.
- 2.4 Wildlife Management.
- 2.5 Wet Areas Management.
- 2.6 Climate Change Adaptation.
- 2.7 Invasive Species Management.
- 2.8 Wildfire Management.
- 2.9 Mainside Grounds Management Support.
- 2.10 Soils Monitoring and Management.
- 2.11 Air Quality.
- 2.12 Water Resources.

## **Element 2.1 Coordinated Ecosystem Management**

Numerous regional land use or planning initiatives potentially influence natural resources management at the Combat Center, and many regional constraints and opportunities are shared between differing interests. Coordination with outside interests provides a significant opportunity to share information, identify early issues and upcoming priorities, and ensure natural resources management strategies are appropriately crafted to best address issues of regional significance.

### Objective:

*2.1.1 - Develop management strategies and projects that provide local and regional benefits.*

## **Element 2.2 - Landscape Level Planning**

The NCRB of EA is refining a landscape level planning approach, currently employed informally, to best identify how landscape level planning will be executed under the NR Program to best conserve the long-term sustainability and biodiversity at relevant ecological scales. The approaches developed will be science-based and work to identify, maintain and restore the composition, structure, and function of natural communities that comprise ecosystems. The approach will consider how and what effects installation programs have, on both spatial and temporal ecological scales, and identify options to develop sustainable human activities that best coexist with the dynamic landscape and mission needs. Effective management requires regional partners sharing, and working together towards, a vision of future ecosystem health. This standard is already emphasized during project development for the NR Program, and during the NEPA review process for installation projects. The best science and data available must be used to develop planning priorities, identify potential conflicts, and develop “SMART” goals (strategic, measurable, attainable, realistic, time bound). Once implemented, landscape level planning projects will be monitored, and results will inform the need for and direction of additional management actions.

### Objective:

*2.2.1 – Use landscape level planning to alter limiting factors and promote priority endemic species.*

Habitat modeling is a critical, efficient first step towards conservation planning for climate change aboard the installation. By nature, models capture and express abstractions of environmental patterns, and via ongoing monitoring at prudent intervals, will be used to establish baseline trend data to iteratively refine projections and improve robustness and utility. These data and models will inform the development of science-based, land management practices to best conserve flora, fauna, and natural communities. Science-based management practices provide capacity to evaluate effectiveness of the practice and facilitate the adaptive management process.

## **Element 2.3 Habitat Management**

The NCRB of EA provides ongoing monitoring and adaptive management to sustain habitat at the Combat Center. A habitat is the assemblage of biotic and abiotic elements in which a

particular individual or population of plant, animal, or other organism lives. Habitat contains a network of abiotic and biotic elements that cycle nutrients within and among species and trophic levels. Given localized natural and anthropogenic factors, the quality of habitats may vary spatially and temporally. Approaches to habitat monitoring and management will be reevaluated over time to ensure an organized, landscape approach to identify and track trends in health across a range of landscapes and natural communities. Monitoring will establish baseline conditions and evaluate trends for habitats and, on a case-by-case basis, grow to include measuring stressors and drivers, and identify and monitor indicator species. Specific objectives of the monitoring program include:

Objectives:

*2.3.1 – Survey and monitor habitat to assess trends in quality over time.*

*2.3.2 – Monitor training related changes to vegetation.*

*2.3.3 – Maintain and modify existing habitat as necessary to support healthy floral and faunal population sizes and overall diversity.*

The following strategies will be detailed, scheduled, and implemented to develop a more formalized monitoring schedule, to ensure consistency with the above objectives:

- The types of habitats across the installation will be mapped and ground truthed. Monitoring will include GIS analyses to assess the relationships between landforms, vegetative assemblages, and sensitive species. Monitoring will verify presence (via field-truthing) and assess the condition of representative areas of habitat types, in areas of different disturbance levels. We will build a geodatabase to document and analyze these habitat areas and establish long-term monitoring plots. Rare and unique habitat types, such as mesquite dune systems, will be emphasized.
- Vegetation mapping was conducted on the Legacy Base (i.e., pre-expansion), most recently from 2013 to 2015 (MCAGCC 2016b) and in the expansion areas from 2019 to 2021 (MCAGCC 2022), in which vegetation alliances and associations were determined using the general principles of Sawyer et al., 2009. The most recent mapping effort was more intensive than the 2016 effort and the Legacy Base mapping should be repeated to the same level of detail. In addition, mapping should be repeated on a decadal to multi-decadal scale to document changes across natural communities.
- Invasive plants are of particular interest and will be included in the mapping. Vegetation monitoring will follow the installations standardized protocol developed in 2016 (MCAGCC 2016b). This protocol incorporates the state's VegCAMP mapping standards, which themselves follow the Manual of California Vegetation and the protocols set by the Desert Renewable Energy Conservation Project.
- Integrated Monitoring of Habitat will closely examine relationships between select elements of habitats that are critical to sustaining sensitive or listed species across the habitats of the Combat Center. First, species-habitat associations will be measured.

Monitoring will then identify key components (drivers and stressors) of these habitats, collecting baseline data on these components, and the vegetation, water, and soils. Since habitats drastically change due to different disturbances, monitoring frequencies will be developed on a system-by-system basis, and will compare and contrast areas with high and low anthropogenic influences.

Habitat management and monitoring will be integrated, adaptive, and science based. Monitoring findings that indicate downward or undesired trajectories for habitat quality (extent, diversity, functioning, etc.) will be used to help identify underlying causes. Thresholds activating responses will be formalized based on site-specific considerations and include associating declines in habitat with declines in resident species of interest. We will use existing thresholds (e.g., minimally viable densities, USFWS 2011) or, with the scientific and regulatory communities, develop new thresholds to manage these resources, and will use the most up to date population viability information available. Management actions will target the causes of these declines and will be applied and evaluated in areas of need, as time and budget allow. In a hypothetical situation, if an invasive such as Sahara mustard encroaches on a sensitive or otherwise high-value dune system to the extent that loose sand is becoming stabilized and sand-dependent species were decreasing in abundance, then management may contain or exclude the weed from a particular area, map the desired boundary/area to be protected, and deploy techniques such as hand pulling and early application of pesticides to slow the spread of the target plant. Over the next few years, we will use mapping and ground truthing to quantify the management effectiveness and inform future management plans and efforts.

#### **Element 2.4 – Wildlife Management**

Successful ecosystem management requires native species be maintained in areas that support them. The MAGTFTC is taking appropriate steps via the processes outlined in this INRMP, informed by numerous studies and reports, so overall biodiversity is not compromised at the installation. In accordance with mission needs, the MAGTFTC shall maintain wildlife populations through targeted, adaptive management strategies that account for species priorities, population ecology, and population health and viability. Approaches to habitat monitoring and management will be reevaluated over time to ensure an organized, landscape approach to identify and track trends in health among landscapes and natural communities. Objectives of wildlife management actions include:

##### Objectives:

- 2.4.1 - Inventory and monitor wildlife to support self-sustaining populations while maintaining training lands.*
- 2.4.2 - Ensure state-listed species are considered in the MAGTFTC actions.*
- 2.4.3 - Provide other general, or otherwise miscellaneous, wildlife management and support services.*
- 2.4.4 - Restore and rehabilitate training lands when feasible.*

Wildlife management and monitoring will be structured similarly to habitat management and monitoring, and will be integrated, adaptive and science based. Monitoring results will inform

managers about the state of various species, communities, and landscapes and help develop management actions to retain and bolster critical species and installation biodiversity. Faunal monitoring and management actions taken to ensure consistency with the above objectives will encompass the following strategies:

- 1) Tracking the abundance of listed and sensitive species in known habitat: Significant species, as determined by their sensitivity or value to listed species, will be selected to represent the different landforms and ecosystems present at the Combat Center. Monitoring will prioritize assessing abundance of these species in areas of different disturbance levels, as practicable. Measurements should also include their habitat requirements including forage, shelter, and water resources and stressors such as invasives and habitat disturbance. After documenting baselines, trends should be measured, from which we will estimate magnitudes of influence from the different drivers and stressors.
- 2) Exploring presence or absence of sensitive and listed species in potential habitat: Monitoring will also inventory and field truth areas of potential habitat for listed and sensitive species and determine occupancy.
- 3) Measuring species richness and biodiversity changes across the installation: General wildlife inventories and vegetation mapping will be performed on broader time scales (e.g., every 5 to 10 years) to track ecosystem health over time. Years of most recent surveys are provided in Table 4-1.

<b>Table 4-1: Last Year of Installation Surveys for Taxa on the Combat Center</b>	
<b>Taxon</b>	<b>Year</b>
Desert bighorn sheep	Ongoing
Bats	Ongoing
Small mammals (Including pallid San Diego pocket mouse)	2013
Golden eagle	Ongoing
Burrowing owl	2022
Other birds	2013
Amphibians (including red-spotted toad)	2017
Reptiles other than desert tortoise (Including Mojave fringe-toed lizard)	2017
Terrestrial invertebrates (Including monarch butterfly)	2011

As with the adaptive management approach outlined in the floral management section, monitoring and management will be integrated and science base as much as is feasible. Negative data for target species (such as declines in population size or numbers of populations, or changes in behavior) will be used to develop and implement management strategies. Management actions that address the likely causes of these declines will be developed, applied, and evaluated as time and budget allow. Findings from the management efforts will inform management

decisions. For instance, desert bighorn sheep range across the installation seasonally in low numbers. While forage and other habitat elements are available, surface water is scarce, especially during high-heat months. By providing more stable, year-round water sources, we can reduce their water stress and sustain them for longer periods in areas of otherwise suitable habitat. In this way, management has determined placement of surface water resources can support the recruitment and retention of a single target species on the landscape.

The Marine Corps understands the importance of sensitive species to the health of any ecosystem and will consider state-listed species when developing management strategies per 15 USC 1535 and 16 USC 1540. Establishing management strategies for sensitive species can contribute to a reduction in their decline and may preclude listing under the Federal Endangered Species Act. Most species management on the Combat Center is directed towards the federally listed desert tortoise, primarily due to compliance requirements. Conservation measures for this species, however, may also benefit many other species such as the burrowing owl, Mojave fringed-toed lizard, the common chuckwalla, and Joshua Trees.

***Desert Bighorn Sheep*** - The experimental bighorn sheep population introduced in 1992 is now believed to be stable. To support the introduction of the experimental population, CDFW and the Society for the Conservation of Bighorn Sheep constructed drinker devices in the Bullion Mountains in 1991 and 1999. These devices collect rainwater in a cistern connected to a trough that wildlife can access. These guzzlers are beneficial to other wildlife species and remote sensing has documented use by coyotes, foxes, bobcat, avian species, and bighorn sheep. To date a total of 10 drinkers have been established on the landscape and are visited and maintained annually. Maintenance efforts include checking system functionality, water levels, levels of use, wear and tear, and direct impacts to local fauna including the desert tortoise. Water basins and the surrounding areas are examined closely for signs of desert tortoise presence and potential mortality in the low-entrance water basins. To date, none of these checks has documented a desert tortoise mortality, in or near to the guzzler fixture.

Desert bighorn guzzlers are also monitored continuously with wildlife cameras installed by the installation, and photographic data has documented increases in the number of bighorn users over time, with more frequent use of the systems in certain seasons. Several of the guzzlers now experience year-round occupancy by desert bighorn. However, population surveys conducted in 1997 and again in 2016 do not definitively reflect an increase in the number of head aboard the Combat Center. The 2016 survey estimated a population of 36 individuals, but this was based on a small sample size featuring 6 observations identifying 20 individual sheep. A survey by researchers from Oregon State University is currently estimating the size of the desert bighorn sheep population using game cameras and genetic analyses of sheep fecal pellets collected near the wildlife guzzlers. This will also indicate if there is movement or interbreeding between the Combat Center's sheep population and other nearby populations. Results are expected in 2024.

***Bats*** - are an important component of the desert ecosystem as they fill a crucial niche in both plant pollination and invertebrate pest control. Pallid bats (*Antrozous pallidus*), Mexican free-tailed bats (*Tadarida brasiliensis*), and canyon bats (*Parastrellus hesperus*) are periodically found within buildings on Mainside. Surveys in 1996-1997 and 2011-2012 confirmed the presence of six species of bats, and an additional six species were listed as suspected or possibly



occurring on the Combat Center. Of these twelve known or suspected species, six warrant special consideration as BLM, CDFW Species of Special Concern, or former Federal ESA candidate species. Habitat loss is a major contributor to the decline of bat species. The MAGTFTC has installed four bat gates in three mines in recent years to allow bats access to roosts without disturbance from humans. Additionally, Brown and Berry (1998) recommended evaluation of modifying the bighorn sheep guzzlers for use by bats. Any modifications would not allow for entrapment of tortoises or other terrestrial animals.

### **Element 2.5 - Wet Areas and Water Resources Management**

The Combat Center's Waters of the United States study (U.S. Army Corps of Engineers 1994) identified four types of wet areas of special concern: playa lakes, dry washes, seeps and springs, and man-made water bodies. No waters of the U.S. were identified aboard the Combat Center.

The MAGTFTC has a Stormwater Pollution Prevention Plan and a Groundwater Resources Management Plan which guide and ensure compliance for the management of these resources. Drinking water aquifers such as Mesquite basin offer mostly salt water, whereas the high-quality Surprise Springs basin offers potable water reserves. The 2023 opening of the drinking water plant based on the Deadman Lake Aquifer, which is near the Surprise Spring Aquifer, offers potable water and should alleviate draw on the Surprise Spring Aquifer.

The Surprise Spring Aquifer does not experience natural recharge and stored water is 20,000 years old. A Water Conservation Study (Beck 2004) reviewed the installation's water sources, future water demand, and conservation measures. This plan addresses the base's future water needs and options and includes methods to minimize water use. Most of the MAGTFTC's water resources management programs are not within the scope of the NR Program and thus are not pertinent to this INRMP. During 2024 to 2028, the MAGTFTC will continue to conserve, and protect from pollution, known water sources and seek new sources of water. CCO 5090, the Combat Center Drought Response Policy, includes measures that Marines and other forces training on the Combat Center will execute to conserve and protect water resources. For more information and references supporting other various aspects of water resources management, see INRMP sections 2.8.2, 3.2, and Chapter 4 Goal 2 Element 2.5.

All dry lakes, substantial dry washes, seeps, springs, and man-made impoundments aboard the Combat Center are important to biodiversity. Plant and animal diversity is related to availability of water, although in almost all cases this water is ephemeral.

#### Objective:

*2.5.1 - Manage wet areas to protect their ecosystem functionality.*

*2.5.2 - Define and monitor hydrological resources and the geomorphology that control them.*

**Playas** maintain intra- and inter-ecosystem integrity and were settings for prehistoric cultural activities. When filled with water, playas support complex invertebrate communities and attract significant numbers of wintering waterfowl. When dry, they are often populated with terrestrial birds and mammals when adequate vegetative cover exists (Krzysik and Trumbull 1996). The aquatic invertebrates survey completed in 2007 found fairy shrimp, tadpole shrimp, and clam shrimp in the different playas on the Combat Center. None of these species are listed or considered sensitive. The U.S. Army Corps of Engineers has identified a total of 14 important playas either entirely or partially within the Combat Center boundary. Eleven of these are within the legacy base boundary and include 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. Four are within the western EMUA (Bessemer Mine and Galway Lake Training Areas), including Galway Lake, Melville Lake, Means Lake, and Soggy Lake. There are no playas in southern EMUA (Cleghorn Lake Training Area), and Galway Lake is within the traditional boundary and western EMUA.

The two major impacts that occur to playas in the Combat Center result from vehicular use and bombing. Driving has created compacted and rutted surfaces; Emerson, Deadman, and Lavic Lakes each have more than four miles of roads. The 14 playas together have about 17 miles of roads.

Since a 1994 Army Corps of Engineers report, the berm on Mesquite Lake along the Combat Center boundary and the berm along the western boundary of Emerson Lake have been breached in several places to restore more natural water flows. Storm water retention ponds have been constructed above Mesquite Lake to protect it from Mainside runoff. The MAGTFTC identified a limited number of authorized crossing sites on Deadman Lake, a heavily used lakebed. Signs have been placed to identify these crossings and close others. Crossings are maintained to encourage vehicles to use the routes and not create new ones.

**Dry washes** serve as sediment transport corridors, maintain intra- and inter-ecosystem integrity, and are rich with historical and cultural resources (U.S. Army of Corps Engineers 1994). Dry washes are zones of high animal activity, most notably insects, which attract many birds and mammals. These washes also act as travel corridors for many desert wildlife species.

Most of the military impact to dry washes is from vehicular use; many washes are also locations for the MSR. In 1994, there were approximately 76 miles of desert wash roads on the installation (U.S. Army Corps of Engineers 1994).

**Seeps and springs** are, when discharging, valuable sources of water for wildlife. Most seeps and springs are in mountainous terrain and are generally inaccessible; therefore, they are not affected by military activities. There are only a few identified surface discharging seeps or springs on the installation. When standing or flowing water is available, these seasonal seeps are a valuable resource for wildlife.

**Man-made bodies of water** at the Combat Center include stormwater and wastewater ponds located in the “Mainside” cantonment area and the RA of Sandhill Training Area (P-192 Deadman Basin Water Treatment plant). These surface waters provide important resources to

both migratory and resident wildlife species, particularly birds. Besides the new (2023) Deadman Lake Drinking Water Plant, there are no man-made bodies of water located in the training areas to be impacted by military training. Man-made waters are not regulated under section 404 of the California Water Authority.

*Wet area inventory and floodplain delineation* are not critical for natural resources management aboard the Combat Center as they are few, with the possible exceptions of small seeps or intermittent springs. A 100-year floodplain report was completed for Deadman and Mesquite playa lakes in 1997. There is no need for additional floodplain delineations currently.

## **Element 2.6 – Climate Change Adaptation**

Climate change significantly influences the course and magnitude of environmental trends on the landscape and consequently is a priority in landscape level planning. The NCRB seeks to quantify risks associated with changing climate and determine whether species will persist under more extreme future climate regimes. Modeling is being used to examine the persistence of indicator species, and results indicate climate refugia exist for the desert tortoise. Examining whether such refugia exist for other sensitive or keystone species is a prime objective of this INRMP.

### Objective

*2.6.1 – Manage for climate change by ensuring suitable habitat exists for species, including habitat connectivity across and beyond the base boundaries as appropriate, and is maintained under an altered climate regime.*

Changes in temperature, rainfall, wind, and wildfire frequency may result in sections of the installation becoming unsuitable for some plant communities and the wildlife that depends on them. A Land Condition Trend Analysis (LCTA), targeted at both the projected effects of training and climate change, will be conducted. The last broad LCTA performed at MCAGCC was in 1999, so it did not include the expansion area. The design of a new LCTA is being prepared under cooperative agreement, due FY 2024, and includes 2020 and 2021 field efforts. The LCTA could also include areas north and west of the installation that would include some of the desert tortoise translocation sites. Such an analysis would also be useful for supporting the RASP by examining areas outside of the Combat Center for long-term persistence of the desert tortoise.

An LCTA combined with modeling will help the MAGTFTC determine if populations of sensitive species will be able to persist on the installation, and nearby RASP focal areas, in the future and where there will be potential habitat. Where such habitat overlaps with existing RA or is situated where training and other operations can be excluded, may allow the installation to prioritize protection of those sites as habitat refugia for the foreseeable future. Additionally, restoration efforts could be targeted at sites with the highest potential for use by sensitive species in response to climate change. Habitat and species on the Combat Center at greatest risk of loss due to climate change will be monitored to document this transformation. Translocating plants and wildlife to climate refugia may be considered if the need is great enough and the relocation is feasible. Increased bird mortality from worsening air pollution is another potential

consequence of a warming climate. The MAGTFTC currently documents dead or injured wildlife, so these incidents will document related increases in dead birds.

Climate change may also indirectly harm the natural resources at the Combat Center by forcing changes in the training and operation of the installation. Raising temperatures and number of days of extreme heat could cause training to be suspended or reduced during extreme weather events. This means additional activity in the steadily fewer weeks of moderate weather, potentially increasing stress on plants and wildlife when they would otherwise be recovering from extreme weather events. Damages to washes, and filling of playa lakes at inopportune times, could cause changes to the operations of the installation and unintended impacts to sensitive species. Climate change adaptation strategies, such as planning for alternate transit routes or using plants for landscaping that are suitable for a warmer, drier climate, will be considered in the Combat Center's Environmental Orders.

### **Element 2.7 - Invasive Species Management**

Invasive species may be native or non-native and may or may not be harmful to the environment, economy, or human health. The MAGTFTC is, and will, document presence and control of each type, and manage each according to risk priority (e.g., invasives that present the highest risk warrant priority intervention). The emphasis of the Combat Center's NR Program will be on risk to plant and animal species of concern. Examples of invasives harming native species include pathological fungi infecting bats and reptiles, invasive beetles killing mesquite trees, invasive grasses increasing the frequency and intensity of wildfires, and invasive plants displacing nutritious and edible native plants.

#### Objective:

*2.7.1 - Prevent, contain, slow the spread of, and eradicate where possible, invasive species aboard the Combat Center to conserve and enhance native species and functionality of natural systems.*

The invasive species management program seeks to both manage and understand the impacts from invasive species. The research, primarily on plant and animal taxa, investigates the effects of invasives on natural processes to inform exotic species management. For instance, some studies have documented that invasive species can provide benefits within an ecosystem, as shown in nutritional studies of *Schismus* on desert tortoises (Henen 1997, Nagy *et al.* 1998, Drake *et al.* 2016) while invasive-induced decreases in native forage and increases in wildfire frequency are a detriment to desert tortoises (Underwood *et al.* 2019; Brooks and Pyke 2001) and Joshua trees. In some cases, the management of invasive species also has the potential to overlap with those priorities identified under the integrated pest management and animal control aspects of wildlife management, as discussed in Element 1.2.

Management of invasive plants will typically follow an Early Detection and Rapid Response model whereby regular surveys for invasive plants will be immediately followed up by chemical or mechanical removal of the plants to prevent further spread. Areas formerly treated for invasives will be revisited in subsequent years and retreated if necessary. The amount of area monitored and treated will depend on funding availability. Priority will be given to infestations in environmentally sensitive areas (e.g., RAs), species rated by the California Invasive Plant

Council as having a “High” ecological impact, and species with limited distributions on the Combat Center such that eradication is possible. The extent of the invasive plant infestations, and treatment types and frequency, will be recorded annually to monitor the efficacy of the control methods.

The *Preliminary Survey of Non-native Plant Species at Marine Corps Air Ground Combat Center* (Anteon 2001) lists nine observed invasive species aboard the Combat Center, though they did not target grasses and only mention Mediterranean grass (*Schismus* spp.) based on its prevalence (Table 4-2). The study *Invasive Non-native Plant Survey* (Agri-Chemical and Supply, Inc. 2005) targeted nine invasive species and found all nine on the Combat Center. Vegetation mapping efforts in 2013-2015 mapped seven invasives, though they mention that there were other species that went unmapped (MultiMAC JV 2016). The 2021 survey (*MCAGCC Twentynine Palms Invasive Species Monitoring Report*; GSRC 2021) mapped the extent of 15 invasive species either observed previously or with the potential to occur on the Combat Center. The 2021 survey did not relocate any London rocket (*Sisymbrio irio*), which is commonly seen in developed areas at Mainside and in nearby human communities.

	Anteon 2001	Agri-Chemical and Supply, Inc. 2005	MultiMAC JV 2016	GSRC 2021
Tumbleweed amaranth ( <i>Amaranthus albus</i> )	X			
Russian thistle ( <i>Salsola tragus</i> )	X	X	X	X
Paulsen’s Russian thistle ( <i>Salsola paulsenii</i> )	X			
London rocket ( <i>Sisymbrio irio</i> )	X	X	X	
Redstem filaree ( <i>Erodium cicutarum</i> )	X	X	X	
Sahara mustard ( <i>Brassica tournefortii</i> )	X	X	X	X
Puncturevine ( <i>Tribulus terrestris</i> )	X		X	X
Mediterranean grass ( <i>Schismus</i> spp.)	X	X	X	
Saltcedar (including <i>T. parviflora</i> )	X	X	X	X
Red brome ( <i>Bromus madritensis</i> )		X		X*
Wall barley ( <i>Hordeum murinum</i> )		X		
Littleseed canarygrass ( <i>Phalaris minor</i> )		X		

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\*Did not differentiate between red brome and cheatgrass (*Bromus tectorum*).

The 2021 surveys documented 4,894 acres of Sahara mustard and 3,543 acres of Russian thistle on the Combat Center, but saltcedar and cheatgrass had infestations less than 5 acres each, while no other species had larger than a 1-acre infestation. Russian thistle and Sahara mustard are associated with roads and washes where water is more available, and seeds are more easily dispersed. Complete eradication of either species is not a reasonable goal but managing them will focus on containment and removal in high-priority areas.

The removal of saltcedar is an ongoing land restoration action. *T. ramossisima* is listed as a noxious weed by the California Department of Agriculture and has been ranked in the highest threat category of the California Invasive Plant Council. This species of tamarisk is being actively targeted for removal when found. Trees have been removed from Mainside and in the training areas, most notably Lead Mountain. More than 50,000 plants have been removed since 1996. *T. aphylla* is not listed by CDFG as a weed of concern and is ranked as “limited concern” by the California Invasive Plant Council. This tamarisk species is primarily found at Mainside, where it is cultivated as windbreaks or has become established in a select few natural areas with shallow water tables. It is thought that seed production at this latitude is poor, which reduces successful establishment in natural lands. A project to remove a *T. aphylla* windbreak was supported by the MAGTFTC until, in the late planning stages project costs rose above \$800,000 and became exorbitant. Management for *T. aphylla* shall focus on excluding the species from high-value natural areas with adequate habitat (shallow water tables).

Mediterranean grass is pervasive across the Combat Center while red brome and cheatgrass are locally common. The pervasiveness of these species poses risks to planning and to control options. With sufficient rainfall, red brome can form dense stands that become fuel capable of carrying fire across the landscape.

### **Element 2.8 - Wildfire Management**

Historically, fire is not common in the Mojave Desert and most plants native to these ecosystems are not fire-adapted. Increased soil disturbance and the spread of non-native grasses have resulted in increased fire frequency and fire size. In undisturbed Mojave Desert systems, limited precipitation supports “islands” of plant life separated by gaps and bare soil, which effectively served as fire breaks, limiting the ability of plant materials to carry, and spread flames across a landscape. In the past few hundred years, western expansion has increased use of desert lands, resulting in significant increases in anthropogenic disturbances and the introduction of an array of non-native grasses that thrive in desert climate with sufficient rainfall. These grasses burn well and can grow thickly between the natural vegetation in non-drought years, increasing vegetative cover and the distance that a fire may spread. Today, wildfire is a threat to ecosystem function and biodiversity in the Mojave Desert, mostly because the resident species are not resistant or resilient to the effects of fire. The MAGTFTC is monitoring for non-native annuals and grasses and has begun tracking increases in fire-related species such as red brome and Mediterranean grass (*Schismus barbatus*).

As an example of the risks of wildfire in the Mojave, over 43,000 acres of nearby Mojave National Preserve burned in the Dome Fire during August 2020. As many as 1.3 million Joshua

trees, or roughly a quarter of the Joshua tree woodland, may have been burned. Multiple historic structures were destroyed as well. The area is designated critical habitat for the desert tortoise, though no direct mortality of individual tortoises was observed.

Control efforts are available. Non-native annuals and grasses benefit from and are spread by disturbance events. Seeds may be spread from vehicles, boots, and clothes to new areas. Disturbed areas with reduced native vegetative cover provide less competition for non-native seedling establishment. Disturbance minimization is a priority. Containment and early eradication are critical efforts to controlling potential fuels. Potential causes of fires should also be addressed. The combination of non-native annual grass proliferation and military use of pyrotechnics increases the risks of wildfires on the Combat Center.

The issue of wildfire control has legal implications involving federally listed species, such as the desert tortoise (Duck *et al.* 1997). There is currently no observable need for wildfire prevention (*e.g.*, firebreak construction and maintenance) activities due to the vegetation in much of the Combat Center being too sparse and widely spaced to carry wildfire. However, should a high rainfall year occur, it is possible that a resultant wildfire would require active suppression (*e.g.*, equipment and personnel moving across open desert, firebreak construction, and back-burning operations) which would involve "take" risks. In addition, wildfire suppression creates other negative impacts on ecosystem functionality, such as soil compaction, vegetation destruction, and the creation of trails that can lead to increased long-term human impacts. Pre-emptive controls of non-native invasives reduces wildfire risk, reduces risk to tortoises and other sensitive species, and supports the condition of the natural and training environments.

Objective:

*2.8.1 - Implement the Wildland Fire Management Plan for the Combat Center.*

Wildland Fire Management Plans are required for installations by USMC policy, and the Conservation Branch, along with the Combat Center Fire Department, will revise the existing plan to ensure awareness and oversight of wildfire potential and develop appropriate monitoring and oversight responses to ensure the maintenance of ecosystem biodiversity and functionality. Wildfire management planning is an important step in responding to a potentially increasing risk for the Combat Center ecosystem, and there may be value-added components to enhance military training.

**Element 2.9 - Mainside Grounds Management Support**

The Mainside area occupies approximately 8.2 square miles of the 1,102 total square miles of the Combat Center. The improved or landscaped areas of the Combat Center are within Mainside. There are various types of landscaping at Mainside, from formalized xeriscaping conducted by professional landscape companies to informal plantings done by Marine units around their buildings. Residents in base housing also have different degrees of landscaping in place around their homes. Mainside landscapes consist of a variety of trees, shrubs, and ground cover that requires routine maintenance efforts, such as mowing, weeding, pruning, fertilizing, pest control, and irrigation.

Objective:

*2.9.1 - Ensure that Mainside landscaping, and grounds maintenance are integrated and*

*consistent with natural resources goals and objectives.*

**Landscaping** - Desert landscaping presents a unique opportunity for plant and irrigation selection to maximize water conservation, limit energy use, and improve the visual landscape for the Marine Corps community. Xeriscaping emphasizes the use of drought tolerant, and desert adapted species in landscaping. The NR Program requires all new buildings incorporate xeriscaping principles during the regular maintenance of existing landscaping and in the planning of new landscape features. Since 2005, the headquarters building, battalion office buildings, chow halls, and bachelor enlisted quarters have all been re-landscaped. Irrigation systems prioritize using two types of water, non-potable water, and recycled wastewater. The golf course is the only user of recycled wastewater, and most of the other landscaping is irrigated with non-potable water. The MAGTFTC is continuing to develop a distribution system for non-potable water; however, non-potable water cannot be used in some situations such as residential lawns or playgrounds because the quality is too poor. Water conservation efforts are also overseen by EA in conjunction with PWD, and irrigation system evaluations can be performed by the PWD to evaluate efficiencies and improve usage. Micro-irrigation is encouraged when appropriate.

### **Element 2.10 - Soils Monitoring and Management**

The MAGTFTC completed an installation-wide soils inventory in 1999 (Lato *et al.* 1999) and does not need to update this product soon. Natural resource management efforts are not typically defined around soils considerations, and there is no focused management program for soils at the installation or NCRB level. However, soil parameters are included with other considerations while managing military activities, protecting stability, conserving wildlife habitat, and restoring training lands when and if feasible. Site-specific soil testing is also performed for natural resources management activities such as training land rehabilitation and erosion control, and soils inventory data are used to make decisions regarding land use and wildlife habitat management options.

#### Objective:

*2.10.1 - Monitor cryptogammatic crust disturbance and track activity and operation influences on soil conditions.*

*2.10.2- Develop a strategy for cryptogamic crust restoration in areas disturbed by training activities.*

*2.10.3- Prevent, to the extent feasible, erosion and soil loss through habitat management and best management practices.*

Soil erosion best management practices include reducing off-trail vehicular use, maximizing native vegetation, diverting problematic surface flow, and stabilizing channels where appropriate. During facilities construction and maintenance, best management practices include reducing overland flow, concentrating laydown areas and footprints, placing settling and swale devices where appropriate, minimizing impermeable surface, and reducing wind-driven soil loss on fresh or recently bared surfaces.



## **Element 2.11 - Air Quality**

In California, air pollutant emissions are regulated at the federal, state, and local levels. Federal and state requirements are the responsibility of the Environmental Protection Agency (EPA) and the California Air Resources Board, respectively, and local requirements are implemented through the Mojave Desert Air Quality Management District's (MDAQMD) Rules and Regulations. MDAQMD requirements are based primarily on federal and state attainment directives and ensure compliance with state and national standards. Any equipment, operation, or process that has the potential to emit air contaminants to the environment or that controls air contaminants is required to have an MDAQMD Permit to Operate, unless specifically exempted under MDAQMD Rule 219.

The Pollution Prevention Branch of EA oversees air quality management, thus specific objectives and projects for air quality are not presented in this chapter or in the 5 Year Workplan. There are two air quality monitoring stations aboard the legacy base, the Mainside and Sandhill stations. These characterize air quality trends and help differentiate between pollutant loads moving to the installation from external sites (largely resulting from disturbance occurring on neighboring lands), and loading resulting from internal, mission-related activities. The Pollution Prevention Branch monitors these data and prioritizes any necessary corrective actions. MDAQMD recognizes the region for non-attainment of several pollutants, one of which is PM<sub>10</sub> (suspended particles of diameters 10 microns or less in size) and are largely associated with dust levels. Generation of PM<sub>10</sub> at the Combat Center is largely associated with activities that fall under the purview of the NCRB of EA, and management strategies are outlined in CCO 5090.4F and below, including:

- Maintaining, managing, and restricting vehicle use to unpaved roadways to minimize road width proliferation, off-road vehicular travel, and minimize environmental disturbance.
- Avoiding desert playa lakebeds (which are composed of high levels of fine soil particulates and are sensitive ecological resources).
- Complying with the 20-mph speed limit which reduces dust proliferation and improves sighting and response time for desert tortoises on roadways.

### **4.2.3 Goal 3: Manage Federally Protected Species**

The Marine Corps is committed to the protection of federally listed species found aboard the Combat Center and will ensure installation compliance with all applicable laws, particularly the Sikes Act upon, which this INRMP is predicated, and the ESA, MBTA, BGEPA of 1940, EO 13186, DoD Directive 4715.03, MCO P5090.2A, USFWS regulations and agreements, and other applicable laws and guidance from USMC headquarters. Activities performed under this Goal shall protect listed species from harm and work to support recovery, as feasible, while ensuring the least disturbance possible to the military mission. Elements of this program Goal include:

- 3.1 Desert Tortoise Management.
- 3.2 Other Sensitive Species Management.

### **Element 3.1 - Desert Tortoise Management**

The desert tortoise is the only federally listed species resident aboard the Combat Center. The Desert Tortoise Management Element of the NR Program strives to both protect and improve desert tortoise habitat, and increase tortoise population growth using research, habitat management, awareness, and other methods. This INRMP includes a variety of actions that are specifically intended to benefit the recovery of the species, and which align with the USFWS Recovery Plan for the Desert Tortoise. Please see relevant sections of the 5 Year Workplan for details.

#### Objectives:

- 3.1.1 - Inventory and regularly monitor desert tortoises using standardized protocols to improve the understanding of long-term population trends aboard the Combat Center.*
- 3.1.2 - Inventory and monitor to identify threats to desert tortoise.*
- 3.1.3 - Perform health assessments to further the MAGTFTC's knowledge of desert tortoise health aboard the installation.*
- 3.1.4 - Minimize tortoise injury and mortality aboard the Combat Center.*
- 3.1.5 - Operate TRACRS to contribute to the recovery and eventual delisting of the desert tortoise.*
- 3.1.6 - Implement the required provisions, including RASP contributions, of the 2023 Biological Opinion: Ongoing and Future Military Training Activities and Support Operations at the Marine Corps Air Ground Combat Center, Twentynine Palms, California.*
- 3.1.7 - Improve desert tortoise population numbers aboard the installation, support viability of the population aboard the installation and in adjacent recovery units and apply appropriate land use restrictions to high-density tortoise population areas aboard the installation that balance training and natural and fiscal resource requirements.*

### **Effects of the MAGTFTC Activities on the Desert Tortoise**

Various military activities occur on the Combat Center and not all types occur equally across the landscape. Facility development at Mainside, air operations, fixed range use, and small arms operations are not likely to have significant effects on tortoise populations. Large munition impacts (e.g., aerial bombs; artillery, tank, and mortar rounds) have little direct impact on populations. Direct mortality and injury from on-the-ground military training and maintenance activities are likely, with vehicle strike or crushing one of the more frequent forms of tortoise take. Operations in undisturbed tortoise habitat areas may have the most significant effects on populations through habitat degradation, and possibly direct mortality. The most significant contributor to tortoise mortality will most likely be off-road travel, which can crush either

tortoises or their burrows with tortoises inside. This type of impact is a concern in all tortoise habitat areas, not just on the Combat Center. The MAGTFTC has created flow charts to minimize impacts to desert tortoises encountered on the installation (Appendix D).

The MAGTFTC operates under a single, basewide BO: the 2023 *Biological Opinion for Ongoing and Future Military Training Activities and Support Operations at the Marine Corps Air Ground Combat Center, Twentynine Palms, California* (USFWS 2023). It describes training, land use, and their combined effects on the desert tortoise, along with conservation strategies that focus on general conservation measures to be taken by the installation, and conservation strategies specific to mission-related construction and maintenance activities. The BO also analyzes the potential impacts to natural resources from the expansion of training activities in Exclusive Military Use Areas acquired in 2017. This BO allows the take of up to 15 desert tortoises per year from training activities and support operations per the incidental take statement. The MAGTFTC produces an annual report to meet the reporting requirements of the BO.

In addition, the MAGTFTC may occasionally operate under project-specific BOs addressing impacts with discrete, short-term actions such as facility construction. One Section 10 USFWS Permit also enables UCLA to operate the headstart program (via TRACRS) under a cooperative agreement with the MAGTFTC.

### **Conservation Initiatives**

The MAGTFTC conducts a variety of desert tortoise conservation activities in response to requirements identified in the BOs referenced above (i.e., ESA Section 7(a)(2)), and generally in keeping with its requirements under section 7(a)(1) of the ESA to further conservation of threatened and endangered species.

**Translocation** - The MAGTFTC developed a scientifically rigorous program, consistent with USFWS guidance, to translocate tortoises from high and moderate impact areas before the first MEB exercise (refer to Appendix A in the 2017 Supplemental EIS for the final translocation plan for methods). Habitat quality, tortoise health, and population assessments were performed over three years; the evaluations assessed impact, recipient and control areas, and their associated tortoises. Tortoises were translocated prior to the first MEB or building block exercise to recipient sites (Figure 4-1, below) based on scientific evaluation of population density estimates, habitat quality, and habitat potential for supporting augmented tortoise populations (Table 4-3). Final health assessments were performed, and radio transmitters were attached to or replaced for tortoises before translocation. Recipient and control site tortoises were also assessed for health status and monitored before translocation, with subsets fitted with radio transmitters.

Annually, the MAGTFTC has reported post-translocation monitoring results (e.g., survival) for the translocatee, control and resident tortoises, and their sites, to the USFWS as required in the revised LAA BO (USFWS 2017) that addressed translocation details. Survival has been extremely good during the first five years (see above, section 3.7.6 Agassiz Desert Tortoise), is continuing with reduced numbers for years 6 to 10, and the populations and site conditions will be monitored for up to 30 years (USFWS 2017). Results are being analyzed for publication in peer-reviewed, scientific journals.

<b>Table 4-3. Post-Translocation tortoise densities at recipient sites (MCAGCC 2016)</b>				
Alternative 2 Recipient Site	Initial Density (tortoises per km <sup>2</sup> )	Projected Density (tortoises per km <sup>2</sup> )	Planned Number of Translocatees	Post-Translocation Density (tortoises per km <sup>2</sup> )
Lucerne-Ord	5.2	4.0	447	8.2
Rodman-Sunshine Peak North	4.9	3.8	341	8.2
Siberia <sup>2</sup>	2.6	2.1	155	5.5
Broadwell	5.1	4.1	18	5.5
Cleghorn	6.5	5.2	37	10.4
<p><i>Notes:</i> <sup>1</sup>Based on draft USFWS translocation guidance (USFWS 2016); assumes 8.3% decrease per year for the Lucerne-Ord and Rodman-Sunshine Peak recipient site and a 7.1% decrease per year for remaining sites over 3 years.</p> <p><sup>2</sup>Value represents the 62% of 21,612-acre site (13,999 acres) that has a habitat suitability index of 0.6 or greater, derived from Barrows <i>et. al.</i> (2016).</p>				

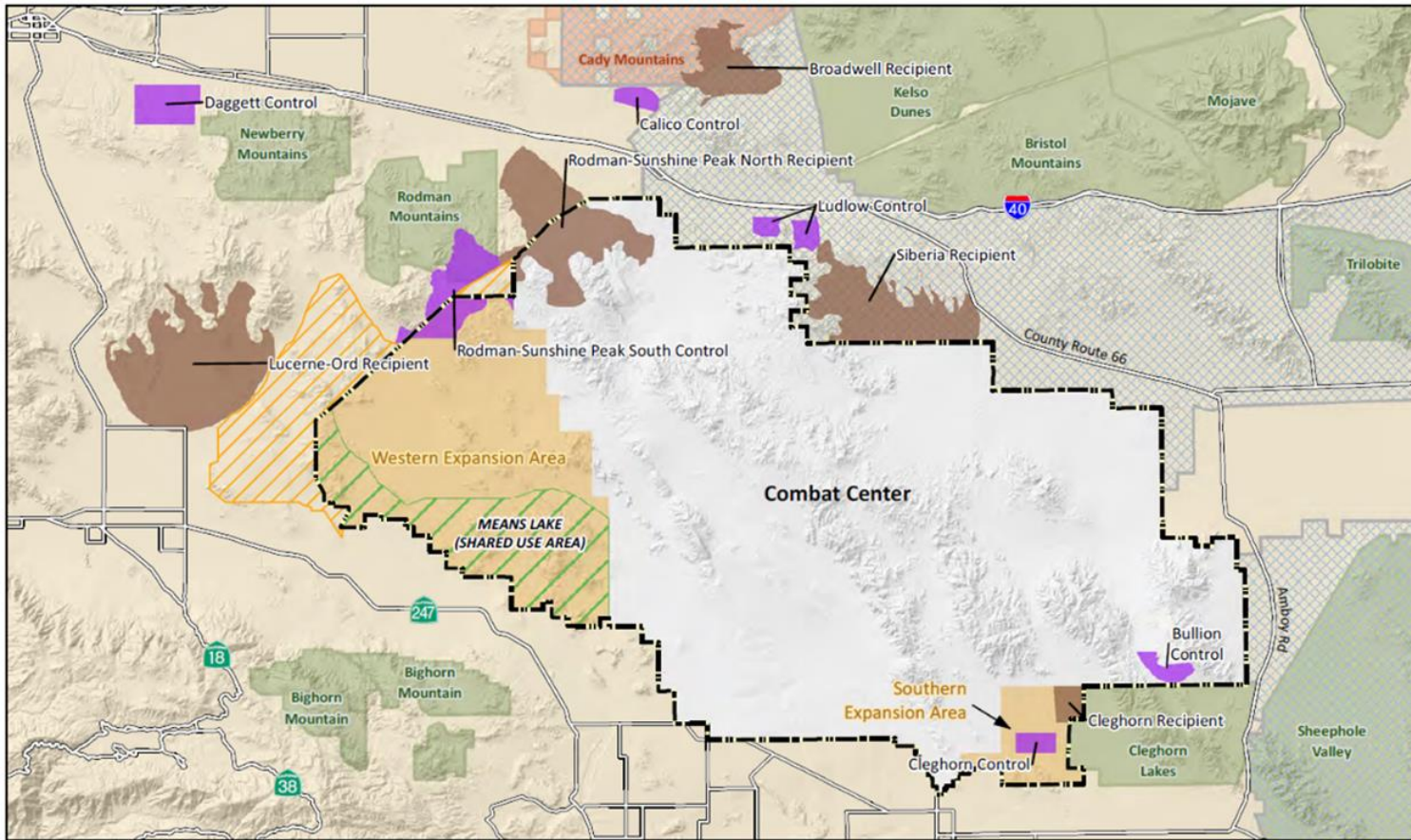


Figure 4-2: Desert Tortoise Translocation Recipient and Control Sites



Figure 4-1. Desert tortoise translocation recipient and control sites (MCAGCC 2016).

***Environmental Awareness*** - The EA mission awareness program develops an awareness of values and requirements of natural and cultural resources protection on the Combat Center to support sustained military training. The primary target audience for this program is those who train or in some way affect training at the Combat Center. A secondary audience is those who are interested in the impacts of training on the Combat Center. Experienced EA personnel deliver verbal briefings to military and contract personnel, encouraging awareness of the value of protecting natural resources via programs, initiatives, and other messaging, but since the previous INRMP revision (2019), most personnel receive the natural and cultural briefs via online video. The briefs and videos require updating, especially given the 2023 BO clarifies when personnel report tortoise sightings and take to Range Control and the EA NCRB. More detail on these activities can be found under Goal 4, Element 4.3 Environmental Awareness, found later in this chapter.

***Tortoise Studies*** at the Combat Center numerous desert tortoise population health and headstart research since 1983 (see USMC 2000; 2011 INRMP; MCAGCC 2023). Earlier studies emphasized population size and demographics (UCR 1993; Jones & Stokes Associates, Inc. 1998, Gardner and Brodie 2000, and Woodman *et al.* 2001), including three permanent plots and base-wide surveys of tortoise density (Woodman *et al.* 2001). The three plots are in the Sandhill (one established 1985-1986 and now part of the RA), Emerson Lake, and Bullion Training Areas (the latter two were established in 1990 and 1991). Two studies (Boarman and Chamblin 2005; Boarman 2014) used point count surveys to assess the relative abundance of Common Ravens aboard the Combat Center, finding relatively high indices of ravens at or near subsidies in the Cantonment, and relatively few ravens in the training areas; recent observations confirm this tendency. The earlier survey documented a nighttime roost of 2000 ravens on a power line near Camp Wilson. Although that power line was removed during the second study, recent EA staff counts near Camp Wilson have also documented roosts of 2000 ravens on power lines. The Programmatic EA for Raven Management (MCAGCC 2022) is poised to provide better controls on ravens at the Combat Center.

***Tortoise Health Assessments*** - the MAGTFTC has performed more than 12 years of health and disease research aimed at understanding the incidence, distribution, causes, and effects of diseases on the Combat Center's desert tortoises. Complete health assessments (Berry and Christopher 2001 and USFWS 2011) have been completed on more than 100 tortoises in at least ten training areas. In general, it appears that most disease-affected tortoises are found adjacent to areas of the installation bounded by urbanization. Given that the percentage of infected individuals decreases with distance from the base boundary, it is assumed that the disease enters the base from urbanized areas and spreads towards the interior of the facility. This phenomenon is thought to occur from the release of captive tortoises and turtles back into the wild, which then transfer the diseases to the wild population.

The MAGTFTC has been tracking the incidence of URTD aboard the installation since 1998. Testing for the presence of URTD is accomplished by taking blood and plasma samples from tortoises in the field and sending them to a testing laboratory at the

University of Florida. It currently requires approximately six weeks to get test results. More recent qPCR tests indicate whether there has been a current exposure to the URTD-causing agent, *Mycoplasma agassizii*. See section 3.7.6 for technical information about disease monitoring.

***Tortoise Mortality Minimization*** - Injury or death of desert tortoises can occur because of training activities. However, there are many rules to minimize potential adverse effects to the tortoise population at the Combat Center. A significant proportion of training lands are not intensively used because of topography and other limiting factors such as the one-kilometer buffer around the entire base boundary to reduce trespass on neighboring lands (MCAGCC 2023). Desert tortoises in areas not used for land-based training are rarely affected by activities associated with training. Additionally, each unit that trains on the Combat Center and contractors that work on the Combat Center in construction or in target maintenance receive BO-mandated tortoise protection briefs, as part of environmental awareness briefs, before entering the ranges. These briefs provide sufficient information to minimize inadvertent take and provide options, including moving tortoises out of harm's way, to allow mission or other actions to continue without undue delays.

***Predation Control*** – Coyotes and ravens are the two desert tortoise predators upon which the MAGTFTC focuses. Mortality due to predation is a naturally occurring event but increases in the presence of anthropogenic subsidies to predators increases the population of these predators in distant portions of the desert. A subsidy reduction program is discussed in Chapter 4, Goal 1 due to the significance of these predators, not only to tortoises but to the well-being of the Marine community; most of these details are described in the recent Programmatic EA for DoD installations in the California Deserts. Generally, the MAGTFTC strives to reduce subsidies for raven and coyote populations through a variety of targeted means. Trash serves as a food source and access is reduced through on-base rules regarding the disposition of refuse and handling of refuse containers, which is supported by the EA compliance inspectors. Water availability is also reduced incidental to the installation's water conservation efforts, which have seen drastic reduction in water use over the last decade.

The CLEOs regularly patrol training areas around Mainside and Camp Wilson, such as Sandhill, that may be subject to increased coyote populations resulting from anthropogenic subsidies. Coyotes that act aggressively towards people or their pets, are unafraid of humans, or have damaged property, are removed by the CLEOs. The CLEOs also perform targeted patrols of these predators at tortoise translocation sites in the Cleghorn Lake and Sunshine Peak Training Areas (USFWS 2017). per.

The MAGTFTC conducts raven monitoring in key areas on and around the installation (e.g., Vernadero 2023). Raven roosting and nesting subsidies are reduced through modifications to new utility poles, and incidentally, by the recent focus on demolition of unused shade and other structures. EA also conducted an in-house test that found inexpensive, single-strand wire was effective as a roosting deterrent when strung above support beams in shade structures; recent evidence indicates these wires may fail

physically after a few years. In 2020 to 2022, EA's NCRB worked with the Raven Core Team (a multi-state, multi-agency review) to justify a Conservation Order to enable depredation of raven to counter raven depredation of desert tortoises. Similarly, the NCRB served on the Raven Management Subgroup of the DMG to address this wildlife-wildlife conflict. In 2022, EA coordinated with five other California desert DoD installations to prepare the Programmatic EA (PEA) for Raven Management on DoD lands. While these measures help reduce raven issues aboard the installation, the MAGTFTC has also secured a raven depredation permit under the MBTA in 2022 to address acute raven predation concerns through lethal control means. The PEA and depredation permit require non-lethal controls (e.g., subsidy reduction and hazing) continue in parallel with lethal controls.

***The TRACRS facility*** - at the Combat Center is a Captive Rearing ("Head Start") Facility for the desert tortoise that began operating in spring 2006. The purpose of the facility, called the "Tortoise Research and Captive Rearing Site" or "TRACRS," is to contribute to the recovery and eventual delisting of the desert tortoise. The facility is intended to protect nests, hatchlings, and juvenile tortoises from predation until they are larger to substantially reduce annual mortality. At about 110 mm carapace length, the tortoises' shells harden to near adult levels, and their masses exceed carrying by ravens. Three batches of captive reared tortoises were large enough for release in September 2015, spring 2017, and spring 2019. The survival rates appear to match that anticipated for their size, and scientists are preparing a manuscript of these early findings.

To "Head Start" tortoises, gravid (egg-carrying) females are transported to the facility for egg deposition, allowed to rehydrate and forage, and then returned to their original location. Native vegetation within the enclosures is irrigated, providing more and better-quality forage. This allows individual tortoises to grow faster, hardening their shells and becoming more resistant to predation sooner in life.

While in captivity, growth rates and health status of juveniles are closely monitored. Many other research questions may be answered by activities at TRACRS. The degree of multiple paternity within clutches is 50 to 80% (Davy *et al.* 2011), the cohorts from TRACRS have sex ratios indicative of nest temperatures to generate male hatchlings (low temperatures) and female hatchlings (high nest temperatures; Nagy *et al.* 2016). These demonstrate the temperature dependent sex determination (TSD) that is common in reptiles, and the vulnerability of populations to experience biased sex ratios with projected climate warming (Nagy *et al.* 2016; Henen *et al.* 2022). Upon release into the wild, subject animals are monitored by radio telemetry for at least one year.

The captive rearing facility includes a fenced compound, enclosing several fenced pen structures in various configurations. In 2022, an incubation room was established at TRACRS, to support efforts for the translocation project (e.g., genetic assimilation) and RASP program, i.e., population augmentation via headstarting the hatchlings derived from translocation tortoises. Each enclosure consists of a nylon netting canopy and a chain-link or hard-side fence buried 24 inches into the ground to prevent animals from



digging under and into the enclosure. Additional barriers attached to the lower portion of the fence prevents entry by rodents.

***Critical Habitat*** - On February 8, 1994, the USFWS published a final rule in the Federal Register (59 CFR 5820) designating 6.4 million acres of Critical Habitat for the Mojave population of desert tortoise. No critical habitat was designated on the Combat Center. However, the Ord-Rodman Critical Habitat unit was designated adjacent to the installation and the MAGTFTC used this critical habitat for the placement of some of the translocated tortoises related to the base expansion elsewhere.

***Special Use Areas*** – Special Use Areas were formerly designated as RAs (no mechanized maneuver) or Limited Use Areas (bivouacs, OHV use, or training involving vehicle activity are discouraged but not prohibited [MAGTFTC 2009]). However, since ground disturbing activities have never been limited in Limited Use Areas, that designation has been removed. An RA of approximately 7,900 acres was established in 1991 in the northeastern portion of Sandhill Training Area, where off-road travel or training is not authorized with case-by-case deviation authorized by the MTD and EA Director. Signs are located at regular intervals along the MSR’ in that area, warning “No off-road travel permitted,” which have significantly reduced off-road violations. New signage was erected in this area during 2008-2009. This fencing and signage are ongoing projects per BO Implementation projects.

The MAGTFTC has designated RAs within the boundaries of recently acquired lands for the conservation of desert tortoises. A portion at the northern end of the Exclusive Military Use Area was designated as an RA. The southern portion of Bullion Training Area, containing a high-density desert tortoise population, was similarly designated. These areas are being fenced and signed and will be maintained to prevent military vehicle transit into RAs and, where relevant, prevent tortoises from homing back to the high- and medium-impact areas.

***On the Horizon*** -. Based on surveys, monitoring, and analysis of translocated desert tortoises, the MAGTFTC would devise a strategy for population augmentation supported by the MAGTFTC’s ongoing headstart program based at TRACRS. Population augmentation strategies would be developed with USFWS and CDFW, as appropriate, and would be integrated with translocation and monitoring efforts to provide a comprehensive population sustainment and recovery strategy. The DoD and DoI have partnered via the RASP to develop collaborate species conservation and recovery programs. This includes the MAGTFTC participating in the Desert Tortoise RASP since 2018 and Desert Tortoise Recovery Partnership (DTRP) starting in 2021. The MAGTFTC is using TRACRS to help augment populations for the RASP and translocation. The MAGTFTC will assist the DTRP by providing funding for recovery actions, such as installing exclusion fencing along highways to minimize the risk of vehicle strikes, blocking unauthorized OHV routes on existing public land to decrease habitat degradation caused by OHV use, purchasing unprotected desert tortoise habitat, restoring up to 250,000 acres of desert tortoise habitat off installation, and providing community outreach on desert conservation topics.

## Element 3.2 – Other Sensitive Species Management

### Objectives:

3.2.1 - *Comply with the Migratory Bird Treaty Act and its implementing regulations while meeting mission requirements.*

3.2.2 - *Comply with the Bald Eagle and Golden Eagle Protection Act and its implementing regulations.*

3.2.3 - *Ensure conservation benefits can be provided for candidate species which occur on base and those petitioned for federal listing by developing species-specific conservation plans.*

**The Migratory Bird Treaty Act** of 1918 protects most birds found in North America, excluding non-native species such as the house sparrow (*Passer domesticus*), European starling (*Sturnus vulgaris*), and rock pigeon (*Columba livia*). The act was originally developed to protect birds migrating across international borders but over time the list of covered species grew to include non-migratory species. The MBTA specifically prohibits actions that may have negative effects on individuals or populations of covered species. Prohibitions include but are not limited to the killing, collection, and transport of covered species, and relocation or transport of migratory birds must be authorized by the USFWS on a case-by-case basis, under certain conditions, through the issuance of special purpose permits.

The military readiness exemption for incidental take for armed forces (US Congress 2002) applies to training and operations related to combat and testing of equipment for combat use. However, the exemption does not apply to routine military support functions and operation of industrial activities. Additionally, the Secretary of defense must identify, minimize, and mitigate the adverse effect of military-readiness activities on migratory birds.

The MAGTFTC provides limited habitat for migrating species but ample and varied habitat for resident bird species covered under the MBTA. As discussed in section 3.7.7, seasonal harborage for non-resident migratory birds is localized primarily in areas with surface waters, which include the man-made water treatment ponds within Mainside and Sandhill Training Area, and ephemeral catchments, basins, and lake beds distributed across the built and natural environments (Cutler *et al.* 1999). Resident birds however exhibit a variety of roosting and breeding habitat preferences, across the urban habitat within Mainside and native habitats in the training areas. Periodic bird surveys are performed by specialists via contract to investigate species richness, overall abundance, and frequency of habitat use by resident and migratory birds.

Conserving the natural state of existing aquatic resources and minimizing vegetation disturbance during military training, transit, and construction benefits MBTA covered species, and this management strategy is incorporated into various NR Program elements such as disturbance minimization identified under Goal 1.

The NR Program also prescribes three specific measures by which the installation avoids or otherwise minimizes impacts to MBTA covered species the NEPA program, an MBTA Special Use Permit, and Standard Operating Procedures (SOPs) provided in the Environmental Protection Instruction Manual for CCO 5090.1F. The NEPA program ensures subject matter experts can improve proposed actions aboard the Combat Center prior to implementation to ensure take of MBTA covered species is avoided. The MAGTFTC's MBTA Special Use Permit #MB053740-3 always ensures military mission readiness by authorizing specially trained staff to remove avian species from wildlife conflict situations when those species cannot avoid the conflict on their own. The permit also authorizes the relocation of 10 active nests per year. Finally, SOPs outline wildlife response guidance to assist the installation community in appropriately responding to wildlife issues and maintaining MBTA compliance. An animal response matrix identifies appropriately trained staff who may be contacted to respond to and diffuse conflicts between humans and wildlife (including MBTA covered species).

A relatively new ESOP enables EA staff to train supervisors of vegetation clearing teams to survey vegetation for nests, active or not, prior to trimming vegetation. Simpler tree-trimming guidance is provided to ensure PWD gardeners request surveys of potential nesting habitat prior to scheduled work events during the avian breeding season (February through September). Finally, a bird nest decision flowchart outlines who Marines and residents can contact, and what they can do under certain circumstances, when nesting activity is of concern (see Appendix E). The 5 Year Workplan presented in Appendix A outlines additional specific measures the MAGTFTC will take to maintain current information and protections for species protected under this Act.

***Bald and Golden Eagle Protection Act*** - The golden eagle is afforded protection under the BGEPA of 1940, which provides for the protection of both the bald eagle (*Haliaeetus leucocephalus*) and the golden eagle (*Aquila chrysaetos*) by prohibiting, except under certain specified conditions, the taking, possession and commerce of such birds. The 1972 amendments increased penalties for violating provisions of the Act or regulations issued pursuant thereto and strengthened other enforcement measures. Rewards are provided for information leading to arrest and conviction for violation of the Act.

Golden eagles have been observed on several different occasions, with surveys identifying three active nests in 2012-2013. The San Diego Natural History Museum is performing golden eagle surveys in 2023 and 2024 to determine the number, location, and productivity of golden eagle nests.

#### **4.2.4 Goal 4: Support Other Uses and Engagement**

As per DoD Instruction 4715.03, DoD lands, waters, and coastal resources shall be made available to the public for the educational or recreational use of natural resources when such access is compatible with military mission activities, ecosystem sustainability, and with other considerations such as security, safety, and fiscal soundness. Therefore, the MAGTFTC shall identify and make available areas and conditions appropriate for public access. These may include coordinating with Federal or State conservation officials to

allow access to DoD-controlled natural resources for their official business, allowing active and retired Service members and disabled veterans access to its lands and waters for hunting, fishing, and/or non-consumptive use of wildlife, allowing Native Americans to use DoD sites and resources of cultural value, facilitate hunting opportunities when not in conflict with mission or natural resource conservation goals, and facilitate public awareness and outreach programs to educate the public regarding resources on military lands and DoD conservation efforts. Program Elements under this goal include:

- 4.1 Outdoor Recreation.
- 4.2 Conservation Law Enforcement Program.
- 4.3 Environmental Awareness.
- 4.4 Cultural Resources.

#### **Element 4.1 – Outdoor Recreation**

Outdoor recreation enhances the quality of life for military and civilian personnel. The Sikes Act requires that Marine Corps lands with suitable natural resources be managed to allow outdoor recreational opportunities. For the purposes of this INRMP, outdoor recreation is defined as recreational programs, activities, or opportunities that depend on the natural environment. Outdoor recreational opportunities associated with natural resources are currently limited at the Combat Center and include some horseback riding and hiking areas in the outlying areas of Mainside, away from facilities and housing but not part of the active training ranges. There is an OHV course accessible to the Marine community at certain times of the year, located within the Mainside area but away from most development. OHV activities are also supported for 10 months a year in the Means Lake Shared Use Area, when it is managed by BLM. A wildlife viewing area is also a recreational feature located in Mainside; it includes riparian habitat around a managed drainage basin, and offers a walking trail, natural resources educational information in the form of signage, a bat house, and viewing points. Recreational firing of firearms is available at the Formal Marksmanship Training Center Range Complex at Rifle Range Road (CCO 3574.3).

##### Objectives:

- 4.1.1 - Support the access and sustainable use of on-base natural resources by the general public and military interest groups by identifying and developing other outdoor recreational opportunities on the Combat Center.*

The nature of the military mission, with its rapidly changing maneuver and firing activities, combined with inherent dangers associated with unexploded munitions, make public access for outdoor recreation in training areas extremely difficult. The Combat Center is also situated near many outstanding opportunities off-base, such as hiking, rock climbing and off-highway driving. Allowed activities vary with the land manager, but are provided by the JTNP, Johnson Valley Off-Highway Vehicle Area, Amboy Crater, and other public recreation areas. An outdoor recreation plan will be updated and focus on the limited opportunities available on the Combat Center. While the Sikes Act requires special consideration be given to disabled sportsmen and there is significant interest in developing a hunting program within the Mainside boundary, there are no

plans to allow hunting on the installation. The many inhabited buildings throughout Mainside, including residential areas, means using firearms outside of the designated ranges would be an unacceptable risk. Further, managing a hunting program would require enforcing hunting regulations, which is not practical given CLEO staffing to meet their primary responsibilities across the 760,000-acre installation and translocation sites.

#### **Element 4.2 – Conservation Law Enforcement Program**

U.S.C. Title 16, Chapter 5C of the SAIA and MCO 5090.4a require military installations to operate a Federal Conservation Law Enforcement Program comprised of specialized professionals trained in federal natural and cultural resources law (Conservation Law Enforcement Officers, CLEOs). These Federally uniformed officers are mandated to enforce several federal environmental laws and regulations pertaining to the ESA, MBTA, Antiquities Act of 1906, Archeological Resources Protection Act, Native American Graves Protection and Repatriation Act, and the Lacey Act. The MAGTFTC maintains a staff of five CLEOs who perform a wide range of complex law enforcement activities, including arrest and detention, to reduce the exploitation of plant and animal species and protect the abundant cultural resources found here. CLEOs provide direct and indirect benefits to the installation – they discourage environmental lawlessness, such as illegal trespassing and scrapping, and facilitate the sustained use of the military lands for readiness activities. Changing social, natural, and political landscapes requires a flexible program. The current objective is:

##### Objective:

*4.2.1 - Operate a Conservation Law Enforcement Program to prevent exploitation of natural and cultural resources from occurring on the installation.*

In addition to regular ongoing program operations, new emphases have been added to the CLEO program addressing MAGTFTC responsibilities resulting from the LAA (base expansion). These new requirements include the development and implementation of strategies intended to discourage subsidized predators, particularly around Mainside and Camp Wilson; education of military and civilian personnel on the importance of proper trash disposal, especially food items; discouragement of pest proliferation; leadership and oversight of the coyote depredation management plan; support of integrated pest management activities; and investigations of trespass and resources degradation aboard existing and newly acquired range training lands.

#### **Element 4.3 – Environmental Awareness**

The MAGTFTC NR Program is founded on the principle of using stewardship to provide user benefits and resource protections while meeting the requirements of the military mission. The USMC has a long tradition of leadership in natural resource management, and the MAGTFTC builds and enhances this reputation through the NR Program. Cultivating and maintaining an understanding of the need for conservation in both the Marine and external communities is a critical aspect of this program. Ultimately, environmental awareness and enforcement of environmental regulations minimizes damages to the natural resources and minimizes violations of environmental laws. The first step in enlisting support protecting and conserving natural and cultural resources of

the Combat Center is to make users understand why it is important to protect and conserve these resources. Ensuring public familiarity with installation resources and activities further improves regional understanding and impacts from management efforts. The MAGTFTC environmental awareness element addresses both installation and external interests, to maximize reach and effectiveness.

Objectives:

*4.3.1: Encourage awareness of natural resources for internal stakeholders.*

*4.3.2 - Encourage awareness of natural resources for external stakeholders.*

The term “environmental awareness” is used here to reflect a general knowledge, perception, or understanding of environmental issues, including but not limited to the fragility of natural resources to impacts from human actions. Efforts to cultivate environmental “awareness” outside of the NR Program use various forms of planned communication. Subject matter knowledge is critical to identifying needs and objectives for communication, therefore natural resources staff must be kept knowledgeable on all aspects of the NR Program to plan and relay content. Objectives (need) for communication must be identified well in advance and appropriate strategies developed to meet those objectives. The most appropriate channels for communication must be reviewed updated to maximize the effectiveness of message delivery. Information must then be delivered clearly, concisely and in the most relatable way possible to ensure information is received and understood as intended. Different communication objectives and delivery methods are identified for internal and external stakeholders.

***Internal Stakeholders and Environmental Mission Awareness*** – Internal stakeholders who use installation resources are required to understand environmental regulations. Programs such as cultural resources protection, hazardous materials storage, spill prevention and cleanup, pollution prevention, and NEPA requirements all depend on awareness to succeed. The primary communication tool that provides environmental requirements to internal stakeholders is briefings. Additional tools that cultivate awareness include educational outreach at Marine community events, the promotion of Earth Day, provision of notices in media such as installation wide Speedcall emails for the Marine community, and direct production or contribution of informational pamphlets and brochures.

*Educational briefings* are the primary means of promoting environmental awareness aboard the Combat Center. They are delivered verbally by trained EA personnel and by video at Range Safety. The briefing content includes all environmental requirements that must be followed to achieve mission success. Environmental mission awareness briefings are targeted toward all levels of military personnel and the planners who either use or affect military training activities. Other audiences who also receive an environmental awareness briefing include military family members, civilian employees, and external organizations or individuals who have a demonstrated interest in training activities aboard the Combat Center. The purpose of these briefings is to develop an understanding of how protecting natural resources supports the military training mission,

what actions military users can take to minimize their impacts to the land and natural resources, and how the actions help to sustain and enhance the military training program.

All military units (both permanent and visiting) must be briefed prior to using training lands. These briefings are training requirements that must be received every year. Topics covered include safety precautions for working around unexploded ordnance, desert survival techniques, and environmental mission awareness. Approximately 30,000 to 40,000 Marines receive these briefings annually, primarily via online video. The environmental mission awareness reviews pertinent environmental laws, land management prescriptions such as restricted use areas, hazardous material compliance, cultural resource protections, venomous animals, desert tortoise conservation measures, and other general desert safety issues. In addition to the annual briefing requirement, Marine units residing aboard the Combat Center (tenant units) also receive natural resource briefs from EA when conducting Safety Stand-downs or “New Join” briefs. These involve about 2,000 to 5,000 Marines per year.

When providing briefs, EA has historically provided field cards to succinctly focus Marines and contractors to concepts and practices to protect natural and cultural resources aboard the Combat Center. EA intends to develop updated, wallet-size cards during this INRMP cycle.

The CCO addressing Environmental Protection, CCO 5090.1F, is the most important environmental management tool for the installation and EA. CCOs are signed by the commanding general and are lawful orders that all Marines must follow while aboard the Combat Center. In recent years, the awareness value of CCO 5090.1F has been enhanced through the inclusion of maps of areas valuable to natural and cultural resources, especially Restricted Areas. Marines and contracting personnel are instructed to carry current maps, with Restricted Areas, when downrange.

*External Stakeholders/Public Awareness* efforts aim to keep those outside the immediate Combat Center community informed about a variety of topics related to the NR Program. Public information needs and communication strategies are typically project or activity-specific in nature, with a few exceptions. One example includes the installation land and airspace expansion action, which is a complex regional scale undertaking for which public awareness efforts involved significant pre-planning between different directorates and multiple outreach methods employed over a sustained period of time, maximizing opportunities for public involvement and discussion. Another example is addressing unauthorized OHV trespass, which is an ongoing issue again requiring coordination with other directorates, neighboring landowners, and the OHV community.

The Natural Resources Section of EA works to address public information needs in many ways. Some personnel maintain direct personal communication with high ranking enlisted or officer personnel, environmental organization officers, outside agency personnel, and civic leaders as appropriate. EA staff have also given prepared talks to schools, boy and girl scouts, civic organizations, and other federal agencies such as JTNP

(both staff and visitors). Over time, several educational brochures and fliers have been produced to inform readers of Native American Rock Art found aboard the base and efforts aimed to conserve and protect desert tortoises. Posters are produced and distributed to highlight natural and cultural resources. Information requests from external news media are supported by Government and External Affairs. Opportunities to represent the NR Program at community events are also well-supported by EA personnel.

**Element 4.4 – Cultural Resources**

The Cultural Resources Program is part of the NCRB of EA and is responsible for all Cultural Resources Management aboard the installation. Cultural resources are managed through the implementation of the ICRMP, thus specific objectives and projects for cultural resources are not presented in this INRMP. However, Cultural and NR Programs work together, recognizing that Native American Tribes view many of the resources managed under the NR Program as cultural resources.

Several tribes have cultural or historic ties to MCAGCC, which has floral and faunal species of interest to tribes. The NR Program recognizes there is an interest with tribal members to access the installation and sample natural resources that are of particular significance. No formal policy has been developed to support tribal sampling of natural resources at the Combat Center. However, requests shall be handled on a case-by-case basis by contacting the EA Division.

**4.3 Implementation**

The cost to implement this INRMP is estimated at \$34,297,341 for FY 2024 to 2028 (Table 4-4). Funding will come primarily from Operations and Maintenance Marine Corps (OMMC) Funds. Budgets will be adjusted as needed each year. Not included in the estimate are costs specific to water and air quality management, pest management, the NEPA program, pollution prevention, and in-house salaries.

<b>Table 4-4 Summary Budget Request for Natural Resources Across FYs 2024 to 2028</b>					
	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>FY 2027</b>	<b>FY 2028</b>
<b>COLS 3 Totals</b>	\$ 7,463,689	\$ 7,192,188	\$ 5,740,376	\$ 6,559,427	\$ 7,025,595
<b>COLS 2 Totals</b>	\$ 52,616	\$ 53,642	\$ 96,116	\$ 56,316	\$ 57,376
<b>COLS 1 Totals</b>	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Total Request</b>	<b>\$ 7,516,305</b>	<b>\$ 7,245,830</b>	<b>\$ 5,836,492</b>	<b>\$ 6,615,743</b>	<b>\$ 7,082,971</b>

**4.3.1 Staffing**

The NR Program has the following authorized billets:

1 Natural and Cultural Resources Officer GS 13

**Planned and Authorized Positions in the Natural Resources Section**

1 Ecologist GS 12

1 Ecologist GS 11/12



Contract staff also contribute to the implementation of this INRMP. GIS support is not listed but is critical to plan implementation. Congress, in reauthorizing the Sikes Act (16 USC 670a-670f) as part of the Fiscal Year 2004 Defense Authorization Act, endorsed natural resource management positions, such as those at the Combat Center, as “Inherently Governmental positions” in a "Sense of Congress" section.

#### **4.3.2 Funding Sources**

Natural resources management relies on a variety of funding mechanisms. Below are general discussions about the various funding sources used to implement this INRMP.

##### ***Operations and Maintenance Marine Corps Funds***

OMMC funds are provided to the Combat Center commanding general for base operations. Virtually any project or program within this INRMP can compete for these discretionary funds. Most of the EA program is funded from this avenue and is critical to the success of INRMP implementation.

##### ***Legacy and Grant Funds***

The DoD Legacy Resources Management Program was instituted by Congress in 1991 to promote stewardship of natural and cultural resources. The Legacy Program is managed through special Legacy project proposal and reporting procedures. Legacy funds are generally for nonrecurring items that are neither routine operations nor compliance driven. They are typically used for projects that provide valuable information but are lower on the priority list. Funding levels from Legacy are highly variable and unreliable for planning purposes. Other Defense “grant” funds include Strategic Environmental Research and Development Program (SERDP) and Environmental Security Technology Certification Program (ESTCP), which have not traditionally financed projects at MCAGCC but could if base needs are aligned with program objectives (which change annually and are announced with the request for proposals). These efforts are typically operated with strong oversight by Legacy, SERDP and ESTCP program managers.

##### ***Headquarters Marine Corps Environmental Management Funds***

HQMC Environmental Management Funds are a special category within OMMC dollars and are managed by HQMC. These funds are "fenced" (i.e., segregated for specific uses) by Defense but are still subject to the restrictions of OMMC funds. The program heavily favors high priority funding for projects that are out of compliance with federal or state laws, especially if Notices of Violation or other enforcement agency actions have been issued.

##### ***Agricultural Outlease Reimbursable Funds***

Agricultural outlease income funds support natural resource management operations that are managed by Marine Corps Installations Command (MCICOM; Natural Resources Section). Direct obligation authority provided for the agricultural outleasing funds may not be transferred to other accounts or used for purposes not identified by integrated

natural resources management. NR Program requirements that may be funded with agricultural outlease income do not include (MCO 5090.2, para. 11201.8).

- a. mitigation or compensation for damages to natural resources caused by construction projects or military activities.
- b. costs of the production of forest products (e.g., lumber).
- c. costs of recurring grounds maintenance on improved and semi-improved grounds (e.g., mowing, fertilizing, irrigating, seeding, pruning, ornamental planting, and pest control).
- d. archaeological or cultural resource survey costs and other cultural resource management costs unrelated to natural resource management.
- e. costs of animal damage control unrelated to natural resource management (costs of controlling or reducing bird or animal aircraft strike hazards are not excluded).
- f. general environmental and facilities organizational support costs that are unrelated to natural resources management.

### **4.3.3 Command Support**

Command support is essential to the implementation of this plan. Many priority projects for natural resources management within the next five years require command support. The commanding general is liable for noncompliance with environmental laws, and therefore has a personal interest in ensuring this plan is properly implemented.

This plan has the support of the MAGTFTC-Combat Center Commanding General and other personnel in command positions that are needed to implement it. The MAGTFTC is dedicated to implementing this plan as required by the SAIA and other Federal laws. The MAGTFTC is also dedicated to maintaining and improving the military mission at the Combat Center. Implementation of this plan facilitates that end.

INRMP Projects, Goals and Objectives are summarized in the tables in the 5 Year Workplan in Appendix A, and full explanations of each project can be found within this chapter. Projects are identified as ongoing, occurring annually, at some fixed recurring multi-year frequency, or specific and timebound in nature.

### **4.3.4 Partnering and Cost Sharing**

Opportunities exist in natural resources management to share and distribute costs among agencies or non-governmental partnerships. At MCAGCC, these typically include Cooperative Agreements; collaborative work with the Desert Tortoise Council; work with the USFWS, BLM, and CDFW; and other areas where shared resource concerns require communication and coordinated effort. These opportunities can also exist with private

landowners in certain circumstances, such as Shield F Ranch, and can use external programs such as the Readiness and Environmental Protection Integration program through DoD and HQMC.

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## Appendix A. 5-Year Workplan and Implementation Schedule\*

This workplan outlines the Goals, Elements, Objectives and Tasks to implement this plan as outlined in Section 1.8.1 and detailed in Section 4. The fiscal year (FY) schedule indicates when a task is planned for implementation and, if a contract is required, the FY year the contract is awarded. The workplan is organized based on task number, description, and schedule, plus the entity overseeing tasks and whether implementation requires future NEPA.

### \*Workplan Key

Task Number	<u>Coding for the task no. developed using the following approach:</u> Goal #. Element #. Objective # - Task Letter
Task Description	This section provides a general discussion of the proposed task.
Lead Entity	<u>The entities implementing tasks include:</u> CG - Commanding General CLEP - Conservation Law Enforcement Program EA - Environmental Affairs GEA - Government and External Affairs MA - Mission Assurance MTD - MAGTF/TC training directorate NR - Natural Resources PWD - Public Works Department RTAMS - Range Training and Maintenance SELF - Sustained Expeditionary Landing Field
Timeframe	The different types of project timeframes are described below: ONGOING - happens more than once a year over multiple years ANNUALLY - happens once a year over multiple years EVERY X YEARS - recurs on a regular, multi-year frequency FY(s) - One-time events, identified by the fiscal year(s) in which they are planned, or contract awarded.
NEPA Status	COVERED - task is covered by INRMP analysis (or is already covered by another NEPA analysis; we are considering that all actions identified as "covered" have minimal negative impacts on the environment and therefore can be analyzed here, even if already analyzed under another document). NFA - Needs future (later) analysis
FY 23 to FY 28	This is the 5 Year Schedule for project implementation. It reflects two things - the years in which funding requests are planned, and the years in which implementation activities may occur. Coding is described below.  <u>\$#, ###</u> - Funding requests currently budgeted in ENCORE are identified in dollars under the year in which the request is planned  <u>X</u> - indicates planned implementation activities (without a specific FY fund request)  <u>TBD</u> - indicates "to be determined," this code indicates a funding request, and/or general implementation activity, may occur later.

**Table A-1 Natural Resources Program 5 Year Workplan**

**GOAL 1: Strengthen the Combat Center’s Operational Capabilities**

**Element 1.1 - Align Natural Resources Management and Mission Sustainment**

**Objective 1.1.1 - Reduce the regulatory burden on mission implementation**

Task No.	Task Description	Lead Entity	Timeframe	NEPA Status	FY 23	FY24	FY25	FY26	FY 27	FY28
1.1.1-A	Enhance success of the Recovery and Sustainment Partnership for the desert tortoise.	EA	ONGOING	COVERED	X	X	X	X	X	X
1.1.1-B	Maintain a preemptive conservation planning strategy to minimize impacts to the military mission from the federal listing of new species.	EA	ONGOING	COVERED	X	X	X	X	X	X
1.1.1-C	Support GEA encroachment minimization while sustaining or improving the NR Program.	EA	AS NEEDED	COVERED	X	X	X	X	X	X

**Objective 1.1.2 - Use the Integrated Natural Resources Management Planning process for natural resources management**

Task No.	Task Description	Lead Entity	Timeframe	NEPA Status	FY 23	FY24	FY25	FY26	FY 27	FY28
1.1.2-A	Report INRMP implementation and effectiveness to USFWS and CDFW by 01 Jan each year. Content will cover previous fiscal year.	EA	ANNUALLY	COVERED	X	X	X	X	X	X
1.1.2-B	Review and revise the INRMP annually in coordination with USFWS, CDFW, and HQMC.	EA	ANNUALLY	COVERED	X	X	X	X	X	X

1.1.2-C	Formally update or revise the INRMP every 5 years in coordination with USFWS, CDFW and HQMC. Major revisions may require NEPA. *	EA	5 YEARS	COVERED*				X	X	X
<b>Objective 1.1.3 - Coordinate installation resources management with training area users</b>										
Task No.	Task Description	Lead Entity	Timeframe	NEPA Status	FY 23	FY24	FY25	FY26	FY 27	FY28
1.1.3-A	Coordinate guidelines for disturbance minimization.	EA	ONGOING	COVERED	X	X	X	X	X	X
1.1.3-B	Implement the EA Mission Awareness Program.	EA	ONGOING	COVERED	X	X	X	X	X	X
<b>Objective 1.1.4 - Coordinate installation resources management with regional initiatives and management strategies</b>										
Task No.	Task Description	Lead Entity	Timeframe	NEPA Status	FY 23	FY24	FY25	FY26	FY 27	FY28
1.1.4-A	Participate in regional land manager groups such as the Mojave Weed Management Area, Desert Tortoise RASP, DT MOG, and other desert advisory or management groups, to maintain presence, open communication and ensure alignment of management and monitoring, as applicable, with the larger context of regional issues.	EA, GEA	ONGOING	COVERED	X	X	X	X	X	X
1.1.4-B	Support regional military planning groups.	EA, GEA	ONGOING	COVERED	X	X	X	X	X	X
1.1.4-C	Revise the MOA between the installation and CDFW for cooperative management of Desert Bighorn Sheep on base.	EA	FY 24	COVERED		X				
1.1.4-D	Establish policies and procedures related to tribal access to natural resources aboard the Combat Center.	EA	FY 24	COVERED		X				

<b>Objective 1.1.5 - Minimize wildlife conflict.</b>										
<b>Task No.</b>	<b>Task Description</b>	<b>Lead Entity</b>	<b>Timeframe</b>	<b>NEPA Status</b>	<b>FY 23</b>	<b>FY24</b>	<b>FY25</b>	<b>FY26</b>	<b>FY 27</b>	<b>FY28</b>
1.1.5-A	Update wildlife conflict ESOPs and CCOs.	NR	ONGOING	COVERED	X					
1.1.5-B	Respond to requirements for wildlife control aboard the Combat Center and record actions in a log.	NR	ONGOING	COVERED	X	X	X	X	X	X
1.1.5-C	Identify and act appropriately to control Africanized honeybees.	PWD	ONGOING	COVERED	X	X	X	X	X	X
1.1.5-D	Implement targeted canid depredation (e.g., trapping and shooting).	NR, CLEP	ONGOING	COVERED	X	X	X	X	X	X
1.1.5-E	Develop and implement an annual, on-base community outreach plan for wildlife safety.	NR, CLEP	start FY 24 ONGOING	COVERED		X	X	X	X	X
<b>Objective 1.1.6 – Adequately staff and support implementation of the Natural Resources Program</b>										
<b>Task No.</b>	<b>Task Description</b>	<b>Lead Entity</b>	<b>Timeframe</b>	<b>NEPA Status</b>	<b>FY 23</b>	<b>FY24</b>	<b>FY25</b>	<b>FY26</b>	<b>FY 27</b>	<b>FY28</b>
1.1.6-A	Ensure staffing levels are adequate to implement the Combat Center’s NR Program.	CG, EA	ONGOING	COVERED	X	X	X	X	X	X
1.1.6-B	Maintain an official representative who is designated responsible for ensuring compliance with all protective measures in the Biological Opinion.	EA	ONGOING	COVERED	X	X	X	X	X	X
1.1.6-C	Ensure annual Individual Development Plans (IDP) are generated for each NR staff person, and quality trainings are authorized, to assist with INRMP implementation.	EA	ANNUAL	COVERED	X	X	X	X	X	X

1.1.6-D	Ensure attendance at relevant Desert Tortoise Council Handling Workshops is included in all NR IDP.	EA	AS NEEDED	COVERED	X	X	X	X	X	X
1.1.6-E	Support implementation of individual IDPs to meet Sikes Act requirements.	NR	ONGOING	COVERED	X	X	X	X	X	X
<b>Element 1.2 Training Lands Degradation Minimization</b>										
<b>Objective 1.2.1 - Minimize damage to training lands, disturbance to natural resources, and ensure ongoing coordination with military planners</b>										
Task No.	Task Description	Lead Entity	Timeframe	NEPA Status	FY 23	FY24	FY25	FY26	FY 27	FY28
1.2.1-A	Consider natural resources when developing and executing cleanup and restoration projects.	EA	ONGOING	COVERED	X	X	X	X	X	X
1.2.1-B	Create additional Predesignated Range Training Support Sites.	MTD	AS NEEDED	NFA		X	X	X	X	X
<b>Objective 1.2.2 - Design roads to benefit both military use and conservation</b>										
Task No.	Task Description	Lead Entity	Timeframe	NEPA Status	FY 23	FY24	FY25	FY26	FY 27	FY28
1.2.2-A	Identify future road network requirements to minimize impacts of new roads on natural resources.	MTD	TBD	COVERED		TBD	TBD	TBD	TBD	TBD
1.2.2-B	Identify opportunities for road realignments to reduce impacts to resources.	NR	FY23-24	COVERED	X	X				
1.2.2-C	Identify and add road design elements to existing and planned roads to minimize erosion and facilitate safe passage of desert tortoises across the landscape.	NR	ONGOING	COVERED	X	X	X	X	X	X

1.2.2-D	Assess whether recurring storm damage to roads results from training impacts to adjacent lands (e.g., via vegetation or soil structure alterations, or berm placement.).	EA	FY 23-24	COVERED	X	X				
<b>Objective 1.2.3 - Prevent damage to sensitive areas</b>										
Task No.	Task Description	Lead Entity	Timeframe	NEPA Status	FY 23	FY24	FY25	FY26	FY 27	FY28
1.2.3-A	Develop and implement a uniform conservation marking system for signage and boundary delineation (e.g., fencing) to support requirements of military training.	EA	FY 23-24	COVERED	X	X				
1.2.3-B	Identify sensitive areas where damage will trigger future encroachment on sensitive areas.	NR	EVERY OTHER YEAR	COVERED		X		X		X
1.2.3-C	Ensure Special Use Areas are in CCOs and the military installation map.	MTD, EA	EVERY OTHER YEAR	COVERED		X		X		X
<b>Element 1.3 - Ensure NEPA Compliance aboard the Installation</b>										
<b>Objective 1.3.1 - Use an established NEPA project review process to identify projects and activities on the Combat Center that might impact natural resources, and work with project planners to resolve issues early in the planning process</b>										
Task No.	Task Description	Lead Entity	Timeframe	NEPA Status	FY 23	FY24	FY25	FY26	FY 27	FY28
1.3.1-A	Within 2 weeks of the request, review and respond to Requests for Environmental Impact Reviews (REIRs) in the NEPA PAMS system.	EA	ONGOING	COVERED	X	X	X	X	X	X
1.3.1-B	Proactively execute NEPA in advance of the INRMP project list schedule.	NR	As needed	NFA	X	X	X	X	X	X



Objective 1.3.2 - Maintain and acquire any necessary environmental reviews, permits, and other legal authorizations to operate the Natural Resources Program										
Task No.	Task Description	Lead Entity	Timeframe	NEPA Status	FY 23	FY24	FY25	FY26	FY 27	FY28
1.3.2-A	Develop a schedule for all natural resource permit reporting requirements, points of contact, and data needs. Update annually and submit reports on time.	NR	ANNUALLY	COVERED	X	X	X	X	X	X
<b>GOAL 2: Support Natural Systems on the Landscape</b>										
<b>Element 2.1 Coordinated Ecosystem Management</b>										
<b>Objective 2.1.1 - Develop management strategies and projects that provide local and regional benefits</b>										
Task No.	Task Description	Lead Entity	Timeframe	NEPA Status	FY 23	FY24	FY25	FY26	FY 27	FY28
2.1.1-A	Consider priorities of regional resource planning groups (e.g., DMG and MOG) when developing resource management projects.	NR	ONGOING	COVERED	X	X	X	X	X	X
2.1.1-B	Maintain a current list of regional contacts relevant to natural resource management.	NR	ONGOING	COVERED	X	X	X	X	X	X
2.1.1-C	Coordinate Natural Resource Program operations with local stakeholders (e.g., USFWS, BLM, CDFW, and JTNP) to enhance management and monitoring activities.	NR	ONGOING	COVERED	X	X	X	X	X	X
2.1.1-D	Work with BLM to develop a cooperative resources management strategy for the SUA and translocation sites.	NR	Every 2 years	COVERED	X		X		X	

2.1.1-E	Evaluate the application of appropriate land use restrictions for the conservation of natural resources	NR	ONGOING	COVERED	X	X	X	X	X	X
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**Element 2.2 - Landscape Level Planning**

**Objective 2.2.1 - Use landscape level planning to alter limiting factors and promote priority endemic species**

Task No.	Task Description	Lead Entity	Timeframe	NEPA Status	FY 23	FY24	FY25	FY26	FY 27	FY28
2.2.1-A	Update the natural resources library and build a digital, geospatial database of all data associated with natural resource management.	NR	ONGOING	COVERED	X	X	X	X	X	X
2.2.1-B	Develop and implement a method to inventory and assess baseline trend data of ecological conditions for all washes and canyons.	NR	ONGOING	COVERED	X	X	X	X	X	X
2.2.1-C	Study the effects of aquifer use on vegetation communities.	NR	FY 25-26	COVERED			X	X		
2.2.1-D	Study existing and potential corridors for bighorn sheep; investigate where improvements in habitat resources would minimize conflicts with training exercises and maintain adequate geneflow across the installation under an altered climate.	NR	FY 23-24	COVERED	X	X				

**Element 2.3 Habitat Management**

**Objective 2.3.1 - Survey and monitor habitat to assess trends in quality over time**

Task No.	Task Description	Lead Entity	Timeframe	NEPA Status	FY 23	FY24	FY25	FY26	FY 27	FY28
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2.3.1-A	Revise and maintain a floral management plan that identifies priority species (including rare plants) and monitoring frequencies for priority habitat features. Monitor flora to ensure viability and non-negative trends in health and quality. Monitor using adaptive management after the second year.	NR	ONGOING	COVERED	X	X	X	X	X	X
2.3.1-B	Maintain a database of survey and monitoring findings, including Federal and State status as appropriate.	NR	ONGOING	COVERED	X	X	X	X	X	X
2.3.1-C	Update the vegetation map for the legacy base using the most current and accurate mapping protocols and integrate GIS data into the existing database.	NR	One Time	COVERED					X	X
2.3.1-D	Survey sensitive plants.	NR	ANNUALLY	COVERED	X	X	X	X	X	X
2.3.1-E	Update herbarium mounts.	NR	ONGOING	COVERED	X	X	X	X	X	X
<b>Objective 2.3.2 - Monitor training related changes to vegetation</b>										
Task No.	Task Description	Lead Entity	Timeframe	NEPA Status	FY 23	FY24	FY25	FY26	FY 27	FY28
2.3.2-A	Identify long-term monitoring locations and controls within the expansion area.	NR	FY 24	COVERED		X				
2.3.2-B	Collect new data at monitoring locations and control locations.	NR	EVERY 3 YEARS	COVERED		X			X	
<b>Objective 2.3.3 - Maintain and modify existing habitat as necessary to support healthy floral and faunal populations and overall biodiversity</b>										
Task No.	Task Description	Lead Entity	Timeframe	NEPA Status	FY 23	FY24	FY25	FY26	FY 27	FY28
2.3.3-A	Annually maintain existing guzzlers and coordinate efforts with the Society for the Conservation of Bighorn Sheep.	NR	ANNUALLY	COVERED	X	X	X	X	X	X

2.3.3-B	Install new guzzlers, as needed, to support wildlife transit across the full extent of mountains on base and monitor all guzzlers to confirm use by wildlife, including Desert Bighorn Sheep (DBS).	NR	FY 24-25	NFA		X	X			
2.3.3-C	Use installation's DBS population demographics, size, and connectivity to assess needs for guzzlers.	NR	FY24-25	NFA		X	X			
2.3.3-D	Inspect bat gate condition and evidence of trespass.	NR	ANNUALLY	COVERED	X	X	X	X	X	X
2.3.3-E	Evaluate wildlife activity at mine entrances, caves, adits, shafts, tunnels, and pits to determine need to add bat gates or other barriers to benefit existing wildlife populations.	NR	FY 25-26	COVERED			X	X		
2.3.3-F	Prepare and annually update fencing, signage, and cleanup plan, with assistance from CLEOs.	NR	ANNUALLY	COVERED	X	X	X	X	X	X
2.3.3-G	Maintain existing fencing and install new fencing and signage in areas, including the base boundary, to reduce encroachment; enforce management prescriptions.	NR	ANNUALLY	NFA	X	X	X	X	X	X
<b>Element 2.4 - Wildlife Management</b>										
<b>Objective 2.4.1 – Inventory and monitor wildlife to support self-sustaining populations while maintaining training lands</b>										
Task No.	Task Description	Lead Entity	Timeframe	NEPA Status	FY 23	FY24	FY25	FY26	FY 27	FY28
2.4.1-A	Develop a faunal monitoring plan	NR	ONGOING	COVERED	X	X	X	X	X	X
2.4.1-B	Update the Combat Center species geodatabase with grey literature produced on base after Cutler et al. 1999.	NR	ONGOING	COVERED	X	X	X	X	X	X

2.4.1-C	Survey and monitor the Combat Center's bighorn sheep with cooperators to determine population size, demographics, distribution, and viability.	NR	2 YEARS, EVERY 5 YEARS	NFA				X	X	
2.4.1-D	Resurvey bat species, demographics, and distributions.	NR	FY 24-25	COVERED		X	X			
2.4.1-E	Survey the pallid San Diego pocket mouse in expansion areas.	NR	FY 24-25	COVERED		X	X			
2.4.1-F	Survey installation's amphibians, emphasizing the red-spotted toad.	NR	FY 25-26	COVERED			X	X		
2.4.1-G	Survey installation reptiles with an emphasis on at-risk species (e.g., Mojave fringe-toed lizard and the common chuckwalla).	NR	FY 26-27	COVERED				X	X	
<b>Objective 2.4.2 - Ensure state-listed species are considered in MAGTFTC actions</b>										
Task No.	Task Description	Lead Entity	Timeframe	NEPA Status	FY 23	FY24	FY25	FY26	FY 27	FY28
2.4.2-A	Annually update the state sensitive species list.	NR	ANNUALLY	COVERED	X	X	X	X	X	X
2.4.2-B	Develop conservation measures for state-listed species for use in NEPA Project Reviews.	NR	FY 24	COVERED		X				
<b>Objective 2.4.3 - Provide other general, or otherwise miscellaneous, wildlife management and support services</b>										
Task No.	Task Description	Lead Entity	Timeframe	NEPA Status	FY 23	FY24	FY25	FY26	FY 27	FY28
2.4.3-A	Maintain access to a wildlife rehabilitation facility for rehabilitation services.	NR	ANNUALLY	COVERED	X	X	X	X	X	X
2.4.3-B	Monitor and report on BASH.	SELF	ONGOING	COVERED	X	X	X	X	X	X
2.4.3-C	Provide BASH support to MAGTFTC.	NR	ONGOING	COVERED	X	X	X	X	X	X

<b>Objective 2.4.4 - Restore and rehabilitate training lands when feasible</b>										
<b>Task No.</b>	<b>Task Description</b>	<b>Lead Entity</b>	<b>Timeframe</b>	<b>NEPA Status</b>	<b>FY 23</b>	<b>FY24</b>	<b>FY25</b>	<b>FY26</b>	<b>FY 27</b>	<b>FY28</b>
2.4.4-A	Evaluate methods and costs for common restoration efforts.	NR	ONGOING	COVERED	X	X	X	X	X	X
2.4.4-B	Develop a set of recommended tools to restore higher value locations and consider climate change as applicable.	NR	ANNUALLY	COVERED	X	X	X	X	X	X
<b>Element 2.5 - Wet Areas and Water Resources Management</b>										
<b>Objective 2.5.1: Manage wet areas to protect their ecosystem functionality</b>										
<b>Task No.</b>	<b>Task Description</b>	<b>Lead Entity</b>	<b>Timeframe</b>	<b>NEPA Status</b>	<b>FY 23</b>	<b>FY24</b>	<b>FY25</b>	<b>FY26</b>	<b>FY 27</b>	<b>FY28</b>
2.5.1-A	Inventory natural and artificial water sources.	NR	FY 24	COVERED		X				
2.5.1-B	Assess the condition of abiotic and biotic resources at existing water sources, natural and man-made (e.g., guzzlers).	NR	EVERY 5 YEARS	COVERED	X	X			X	X
2.5.1-C	Annually monitor the use of natural and artificial water sources.	NR	ANNUALLY	COVERED	X	X	X	X	X	X
<b>Element 2.6 – Climate Change Adaptation</b>										
<b>Objective 2.6.1: Manage for climate change by ensuring suitable habitat exists for species, including habitat connectivity across and beyond the base boundaries as appropriate, and is maintained under an altered climate</b>										
<b>Task No.</b>	<b>Task Description</b>	<b>Lead Entity</b>	<b>Timeframe</b>	<b>NEPA Status</b>	<b>FY 23</b>	<b>FY 24</b>	<b>FY 25</b>	<b>FY 26</b>	<b>FY 27</b>	<b>FY 28</b>
2.6.1-A	Develop climate change refugia models for sensitive species on base.	NR	ONGOING	COVERED	X	X	X	X	X	X

2.6.1-B	Incorporate the results of habitat refugia modeling into installation planning documents to protect areas of high natural resource value.	NR	ONGOING	COVERED	X	X	X	X	X	X
2.6.1-C	Survey areas expected to be highly impacted by climate change, such as canyons and washes, to document and analyze habitat change or loss.	NR	FY 25-28	COVERED			X	X	X	X
2.6.1-D	Integrate climate change adaptation strategies into the Combat Center's Environmental Protection Instruction Manual.	NR	ONGOING	COVERED	X	X	X	X	X	X
2.6.1-E	Evaluate the risks of climate change on existing Restricted Areas to determine if additional protections are needed.	NR	FY 25-27	COVERED			X	X	X	

### Element 2.7 - Invasive Species Management

**Objective 2.7.1 - Prevent, contain, slow the spread of, and eradicate where possible, invasive species aboard the Combat Center to conserve and enhance native species and functionality of natural systems**

Task No.	Task Description	Lead Entity	Timeframe	NEPA Status	FY 23	FY 24	FY 25	FY 26	FY 27	FY 28
2.7.1-A	Develop a risk-based list of priority invasive species.	NR	FY 23	COVERED	X					
2.7.1-B	Perform limited, low-cost field surveys to map the occurrence of priority invasives on the Combat Center.	NR	ANNUALLY	NFA	X	X	X	X	X	X
2.7.1-C	Formulate and estimate control measure costs. Implement measures. Monitor effectiveness over time.	NR	ANNUALLY	COVERED	X	X	X	X	X	X

### Element 2.8 - Wildfire Management

**Objective 2.8.1 - Implement the Wildland Fire Management Plan for the Combat Center**

Task No.	Task Description	Lead Entity	Timeframe	NEPA Status	FY 23	FY 24	FY 25	FY 26	FY 27	FY 28
2.8.1-A	Maintain a GIS shapefile of burnable acres and if a fire occurs, update the layer to track locations of burned acres and monitor post-fire effects.	NR	ONGOING	COVERED	X	X	X	X	X	X

2.8.1-B	As a proactive measure, inventory treatment methods for burned areas to reduce soil erosion and invasion by exotic species.	NR	FY 26	COVERED				X		
2.8.1-C	Ensure the Wildland Fire Management Plan is reviewed for updates every 5 years.	MA	FY 24	COVERED		X			TBD	TBD

### Element 2.9 - Mainside Grounds Management Support

**Objective 2.9.1 – Ensure that Mainside landscaping, and grounds maintenance are integrated and consistent with natural resource goals and objectives**

Task No.	Task Description	Lead Entity	Timeframe	NEPA Status	FY 23	FY 24	FY 25	FY 26	FY 27	FY 28
2.9.1-A	Facilitate xeriscape principals and native plant incorporation in landscaping projects through revisions of the approved plant list and the Base Exterior Architecture Plan.	NR	ONGOING	COVERED	X	X	X	X	X	X
2.9.1-B	Ensure compliance with the vegetation trimming ESOP.	NR	ONGOING	COVERED	X	X	X	X	X	X

### Element 2.10 – Soil Monitoring and Management

**2.10.1 - Monitor cryptogammatic crust disturbance and track activities and operations' influence on soil conditions**

Task No.	Task Description	Lead Entity	Timeframe	NEPA Status	FY 23	FY 24	FY 25	FY 26	FY 27	FY 28
2.10.1-A	Establish monitoring plots for cryptogamic soils in training areas and track changes in the extent of cryptogamic soils.	NR	EVERY 2 YEARS	COVERED		X		X		X

**2.10.2- Develop a strategy for cryptogamic crust restoration in areas disturbed by training activities**

Task No.	Task Description	Lead Entity	Timeframe	NEPA Status	FY 23	FY 24	FY 25	FY 26	FY 27	FY 28
2.10.2-A	Investigate the feasibility of “seeding” previously unoccupied areas with cryptogamic organisms to promote cryptogamic biocrust establishment.	NR	FY 25	NFA			X			



2.10.2-B	Reestablish and track the extent of cryptogamic soils in previously disturbed areas.	NR	FY 26	NFA				X		
<b>2.10.3- Prevent, to the extent feasible, erosion and soil loss through habitat management and best management practices</b>										
<b>Task No.</b>	<b>Task Description</b>	<b>Lead Entity</b>	<b>Timeframe</b>	<b>NEPA Status</b>	<b>FY 23</b>	<b>FY 24</b>	<b>FY 25</b>	<b>FY 26</b>	<b>FY 27</b>	<b>FY 28</b>
2.10.3-A	Ensure construction projects conform to the Combat Center's Stormwater Management Plan or project-specific erosion control plans.	EA	ONGOING	COVERED	X	X	X	X	X	X
2.10.3-B	Require restoration and revegetation projects be designed to minimize or mitigate erosion.	EA	ONGOING	COVERED	X	X	X	X	X	X
<b>GOAL 3: Manage Federally Protected Species</b>										
<b>Element 3.1 - Desert Tortoise Management</b>										
<b>Objective 3.1.1 - Inventory and regularly monitor desert tortoises using standardized protocols to improve the understanding of long-term population trends aboard the Combat Center</b>										
<b>Task No.</b>	<b>Task Description</b>	<b>Lead Entity</b>	<b>Timeframe</b>	<b>NEPA Status</b>	<b>FY 23</b>	<b>FY 24</b>	<b>FY 25</b>	<b>FY 26</b>	<b>FY 27</b>	<b>FY 28</b>
3.1.1-A	Update tortoise density information for installation lands.	NR	4-year cycle	COVERED		X				X
3.1.1-B	Monitor long-term study plots on a 3-year rotation.	NR	3-year cycle	COVERED		X			X	
3.1.1-C	Monitor desert tortoise habitat condition.	NR	3-year cycle	COVERED		X			X	
<b>Objective 3.1.2 - Inventory and monitor to identify threats to the desert tortoise</b>										
<b>Task No.</b>	<b>Task Description</b>	<b>Lead Entity</b>	<b>Timeframe</b>	<b>NEPA Status</b>	<b>FY 23</b>	<b>FY 24</b>	<b>FY 25</b>	<b>FY 26</b>	<b>FY 27</b>	<b>FY 28</b>
3.1.2-A	Examine disturbance effects on desert tortoise population health.	NR		COVERED		X				X
3.1.2-B	Assess threat of desert tortoise predators (mostly raven and coyote); ravens annually per PEA.	NR	ONGOING	COVERED	X	X	X	X	X	X
<b>Objective 3.1.3 - Perform health assessments to further the MAGTFTC's knowledge of desert tortoise health aboard the installation</b>										

Task No.	Task Description	Lead Entity	Timeframe	NEPA Status	FY 23	FY 24	FY 25	FY 26	FY 27	FY 28
3.1.3-A	Perform tortoise health assessments on established plots, in restricted areas, and elsewhere on base as needed.	NR	ONGOING	COVERED	X	X	X	X	X	X
3.1.3-B	Maintain awareness of emergent desert tortoise health issues.	NR	ONGOING	COVERED	X	X	X	X	X	X
<b>Objective 3.1.4 - Minimize tortoise injury and mortality aboard the Combat Center</b>										
Task No.	Task Description	Lead Entity	Timeframe	NEPA Status	FY 23	FY 24	FY 25	FY 26	FY 27	FY 28
3.1.4-A	Continue implementing a Raven Management Plan, per PEA.	NR	ONGOING	COVERED	X	X	X	X	X	X
3.1.4-B	Maintain a MBTA depredation permit for ravens.	NR	ANNUALLY	COVERED	X	X	X	X	X	X
<b>Objective 3.1.5 - Operate TRACRS to contribute to the recovery and eventual delisting of the desert tortoise</b>										
Task No.	Task Description	Lead Entity	Timeframe	NEPA Status	FY 23	FY 24	FY 25	FY 26	FY 27	FY 28
3.1.5-A	Manage the TRACRS facility.	NR	ONGOING	COVERED	X	X	X	X	X	X
3.1.5-B	Monitor TRACRS hatchlings and juveniles for growth, health, and survival.	NR	ONGOING	COVERED	X	X	X	X	X	X
3.1.5-C	Monitor success of released headstarted desert tortoises.	NR	ONGOING	COVERED	X	X	X	X	X	X
<b>Objective 3.1.6 - Implement the required provisions, including RASP contributions, of the 2023 Biological Opinion: Ongoing and Future Military Training Activities and Support Operations at the Marine Corps Air Ground Combat Center, Twentynine Palms, California</b>										
Task No.	Task Description	Lead Entity	Timeframe	NEPA Status	FY 23	FY 24	FY 25	FY 26	FY 27	FY 28
3.1.6-A	Conduct line distance sampling to monitor tortoise density and recovery in the Ord-Rodman ACEC.	NR	ANNUALLY	COVERED	X	X	X	X	X	X
3.1.6-B	Maintain a record of all observations of desert tortoises encountered at the Combat Center.	NR	ONGOING	COVERED	X	X	X	X	X	X

3.1.6-C	Provide an annual report to the USFWS, due March 31, that summarizes required reporting information outlined in the BO	NR	ANNUALLY	COVERED	X	X	X	X	X	X
3.1.6-D	Install OHV barriers, rehabilitate unauthorized routes, and maintain closures over time, in the Ord - Rodman ACEC.	NR	ONGOING	COVERED	X	X	X	X	X	X
3.1.6-E	Perform post-translocation monitoring.	NR	ONGOING	COVERED	X	X	X	X	X	X
3.1.6-F	Perform post-translocation research.	NR	ONGOING	COVERED	X	X	X	X	X	X
3.1.6-G	Establish authorization and implement patrols of translocation recipient sites.	CLEO	ONGOING	COVERED	X	X	X	X	X	X
<b>Objective 3.1.7 – Improve desert tortoise population numbers aboard the installation, support viability of the population aboard the installation and in adjacent recovery units, and apply appropriate land use restrictions to high-density tortoise population areas aboard the installation that balance training and natural and fiscal resource requirements</b>										
<b>Task No.</b>	<b>Task Description</b>	<b>Lead Entity</b>	<b>Timeframe</b>	<b>NEPA Status</b>	<b>FY 23</b>	<b>FY 24</b>	<b>FY 25</b>	<b>FY 26</b>	<b>FY 27</b>	<b>FY 28</b>
3.1.7-A	Implement a population augmentation initiative combined with RASP.	NR	ONGOING	COVERED	X	X	X	X	X	X
3.1.7-B	Use the habitat assessment study to identify habitat quality variables that influence tortoises and may be positively influenced aboard the installation.	NR	ONGOING	COVERED	X	X	X	X	X	X
<b>Element 3.2 - Other Sensitive Species Management</b>										
<b>Objective 3.2.1 - Comply with the Migratory Bird Treaty Act and its implementing regulations while meeting mission requirements</b>										
<b>Task No.</b>	<b>Task Description</b>	<b>Lead Entity</b>	<b>Timeframe</b>	<b>NEPA Status</b>	<b>FY 23</b>	<b>FY 24</b>	<b>FY 25</b>	<b>FY 26</b>	<b>FY 27</b>	<b>FY 28</b>
3.2.1-A	Provide an annual report, required by the Special Purpose Permit, to continue authorization to relocate nests and transport sick or injured birds.	NR	ANNUALLY	COVERED	X	X	X	X	X	X
3.2.1-B	Survey Combat Center bird numbers for shifts or trend assessments. Include sensitive species (e.g., burrowing owls).	NR	FY 26-27	COVERED				X	X	

3.2.1-C	Work with PWD and MTD to place anti-roosting and anti-nesting devices on facilities in training areas and Mainside.	NR	ONGOING	NFA	X	X	X	X	X	X
3.2.1-D	Coordinate raven management with other installation directorates, from planning to implementing operations, aligned with 2022 Raven Management PEA	NR	ONGOING	COVERED	X	X	X	X	X	X
<b>Objective 3.2.2 - Comply with the Bald and Golden Eagle Protection Act and its implementing regulations</b>										
Task No.	Task Description	Lead Entity	Timeframe	NEPA Status	FY 23	FY 24	FY 25	FY 26	FY 27	FY 28
3.2.2-A	Conduct periodic aerial surveys for eagles within training areas.	NR	2 CONSECUTIVE YEARS, EVERY 5 YEARS	COVERED	X	X				
3.2.2-B	Identify and monitor eagle nesting locations and productivity.	NR	2 CONSECUTIVE YEARS, EVERY 5 YEARS	COVERED	X	X				
<b>Objective 3.2.3 - Ensure conservation benefits can be provided for candidate species that occur on base and those petitioned for federal listing by developing species-specific conservation plans</b>										
Task No.	Task Description	Lead Entity	Timeframe	NEPA Status	FY 23	FY 24	FY 25	FY 26	FY 27	FY 28
3.2.3-A	Maintain awareness of emerging petitioned and candidate species for federal listing, assess their status on the Combat Center, develop a conservation management plan to help obviate need for listing petitioned species.	NR	PRIOR TO LISTING	COVERED	X	X	X	X	X	X
3.2.3-B	Develop a conservation management plan in coordination with USFWS to address any species approved for listing.	NR	YEAR 1 OF LISTING	COVERED	TBD	TBD	TBD	TBD	TBD	TBD

## GOAL 4: Support Other Uses and Engagement

### Element 4.1 - Outdoor Recreation

**Objective 4.1.1 - Support the access and sustainable use of on-base natural resources by the public and military interest groups by identifying and developing other outdoor recreational opportunities on the Combat Center**

Task No.	Task Description	Lead Entity	Timeframe	NEPA Status	FY 23	FY 24	FY 25	FY 26	FY 27	FY 28
4.1.1-A	Work with other Divisions to formalize an outdoor recreational plan.	NR, CLEP	FY 25	COVERED			X			
4.1.1-B	Develop, as outlined in plan, a multi-use area for outdoor education and recreation activities.	NR, CLEP	FY 24-26	NFA		X	X	X		

### Element 4.2 - Conservation Law Enforcement Program

**Objective 4.2.1 - Operate a Conservation Law Enforcement Program to prevent exploitation of the natural and cultural resources from occurring on the installation**

Task No.	Task Description	Lead Entity	Timeframe	NEPA Status	FY 23	FY 24	FY 25	FY 26	FY 27	FY 28
4.2.1-A	Annually review CLEO SOPs.	CLEP	ANNUALLY	COVERED	X	X	X	X	X	X
4.2.1-B	Monitor for natural resources degradation and exploitation, reduce illegal trespass and OHV activity, and reduce lawlessness on installation.	CLEP	ONGOING	COVERED	X	X	X	X	X	X
4.2.1-C	Investigate violations of natural resource laws and take appropriate action.	CLEP	ONGOING	COVERED	X	X	X	X	X	X
4.2.1-D	Ensure all CLEOs are certified in Federal Law Enforcement Training Center's Land Management Police Training.	CLEP	ONGOING	COVERED	X	X	X	X	X	X
4.2.1-E	CLEOs participate in relevant desert tortoise workshops.	CLEP	ONGOING	COVERED	X	X	X	X	X	X

4.2.1-F	Provide all CLEOs resource training.	CLEP	ONGOING	COVERED	X	X	X	X	X	X
4.2.1-G	Develop and maintain CLEO resource monitoring books in electronic and hardcopy formats.	CLEP	ANNUALLY	COVERED	X	X	X	X	X	X
4.2.1-H	Develop and implement an agreement with BLM regarding patrol of translocation and other off-installation sites.	NR, CLEP	TBD	NFA	TBD	TBD	TBD	TBD	TBD	TBD
<b>Element 4.3 - Environmental Awareness</b>										
<b>Objective 4.3.1: Encourage awareness of natural resources for internal stakeholders</b>										
Task No.	Task Description	Lead Entity	Timeframe	NEPA Status	FY 23	FY 24	FY 25	FY 26	FY 27	FY 28
4.3.1-A	Update the contractor field briefing video.	NR	ANNUALLY	COVERED		X	X	X	X	X
4.3.1-B	Revise range briefings and develop appropriate handouts.	NR	ANNUALLY	COVERED		X	X	X	X	X
4.3.1-C	Provide natural resource information at community outreach events on-base.	NR	ONGOING	COVERED	X	X	X	X	X	X
4.3.1-D	Develop a natural resource education program for the curation center to host the Marine community (e.g., backyard birding, Earth Day, guided hikes, know your species, and desert ecology lectures).	NR	ONGOING	COVERED	X	X	X	X	X	X
4.3.1-E	Develop an outreach interpretive module regarding Native American plant use.	NR	FY 24-25	COVERED		X	X			
4.3.1-F	Update EA website (e.g., QR coding, ESOPs, BEAP, and public versions of INRMP and ICRMP).	NR	ONGOING	COVERED	X	X	X	X	X	X

4.3.1-G	Review, update and add interpretive signage on-base, as necessary.	NR	ONGOING	NFA	X	X	X	X	X	X
4.3.1-H	Engage interested volunteers to assist EA with functions (e.g., taxidermy, support with marsh bird monitoring and desert tortoise tracking, seed collection, weed treatments).	NR	ONGOING	COVERED	X	X	X	X	X	X
4.3.1-I	Develop a pollinator initiative aboard the Combat Center.	NR	ONGOING	COVERED	X	X	X	X	X	X
<b>Objective 4.3.2 - Encourage awareness of natural resources for external stakeholders</b>										
Task No.	Task Description	Lead Entity	Timeframe	NEPA Status	FY 23	FY 24	FY 25	FY 26	FY 27	FY 28
4.3.2-A	Provide natural resource information at external community outreach events.	NR	ONGOING	COVERED	X	X	X	X	X	X
4.3.2-B	Develop an Educational Outreach Plan working with local leaders, communities, and groups to promote awareness of environmental sensitivity and responsible OHV use.	GEA	ONGOING	COVERED	X	X	X	X	X	X

## Appendix B. Training Areas and Fixed Ranges

The Combat Center has 28 training areas (TA) plus Mainside and Camp Wilson. Seven TAs, Acorn, Backyard, Cleghorn Lake, East, Gypsum Ridge, Sandhill, and West, are generally no-live fire TAs. These TA descriptions are from various sources (e.g., Snover and Kellogg, 1999, MCAGCC 2012, CCO 3500.4K), with acreages from the EA Geographical Information System (GIS) database.

### Training Areas:

**Acorn** Training Area (17,369 acres) is in the western portion of the installation. This area is currently used as a non-live-fire maneuver area.

**America Mine** Training Area (20,808 acres) is located on the eastern boundary of the Combat Center. America Mine is primarily used for patrolling, mortar firing, infantry training, and light armored vehicle training. Use is limited mainly due to lack of direct ground access. Its physical character is a combination of mountainous (37%) and rolling terrain.

**Backyard** Training Area (170 acres) is located between Mainside and East TA. It is used for small unit standard operating procedures and crew serve weapons gun drills.

**Bessemer Mine** Training Area (49,818 acres) is in the northwestern portion of the Combat Center. This training area is used for aviation, artillery, live fire, and maneuver exercises involving heavy wheeled vehicles in support of unit and major exercises. Primary use occurs during large scale exercises.

**Black Top** Training Area (44,014 acres) is located on the northern boundary of the Combat Center. It is a live-fire and maneuver area. The topography is gently sloping (13% mountainous or rough). Black Top is mainly used for artillery and small arms training and major exercises.

**Bullion** Training Area (35,681 acres), in the eastern portion, is non-accessible from the south due to the Cleghorn Lakes Wilderness Area and the Bullion Mountain Range to the southwest. About 44% of the area is mountainous. It is used for aviation bombing and strafing, gunnery practice, artillery firing, and infantry maneuvers. Fixed Ranges 603, 605, and 607 and Range 210 Military Operations in Urban Terrain (MOUT) facility are in this RTAA.

**Cleghorn Lake** Training Area (17,646 acres) is in the southeastern portion of the Combat Center, is non-live fire, and used primarily for staging and marshaling by units involved in large scale exercises.

**Cleghorn Pass** Training Area (36,338 acres) consists of mountains surrounding a valley (40% mountainous or rough terrain) and contains the 400 series and Range 500. Cleghorn Pass is used primarily for small arms, light armored vehicle live-fire, and maneuvers. Off-road vehicle transit is not permitted, and the only area authorized for bivouacking is west of Universal Transverse Mercator (UTM) Grid UTM 11 S 0599000E and south of UTM Grid UTM 11 S 3797000N.



Range 500 is the Armor Multi-Purpose Range Complex that supports light armored vehicles conducting live-fire training.

**Delta** Training Area (29,791 acres) is used for live-fire maneuver and major exercises. OP Crampton and Prospect Hill (also known as VIP Hill) are located here. The training area is 48% gently sloping land and 52% mountainous. It is essentially a narrow valley with the Bullion Mountains defining both sides of the corridor. Delta is used heavily for transit to other training areas, and two main supply routes (MSRs) form the "Delta T" intersection in the northern portion of the training area.

**East** Training Area (8,263) is gently sloping (12% mountainous or rough) and used for staging for major exercises, MOUT operations, non-live fire activities, and live-fire activities that impact Prospect and Delta Training Areas. This area is limited to these uses due to its proximity to Mainside. Range 100 is in the East Training Area.

**Emerson Lake** Training Area (32,287 acres) is located on the western boundary of the Combat Center, with 70 percent of the land being gently sloping, and the remaining comprised of low rolling terrain (13% mountainous or rough). This area is used mainly for aviation bombardment and aerial targeting, and previously included tank maneuvers.

**Galway Lake** Training Area (38,582 acres) is in the northwestern portion of the Combat Center. This training area is used for aviation, artillery, live fire, and maneuver exercises heavy wheeled vehicles in support of unit and major exercises. Primary use occurs during large scale exercises. The majority of Galway Lake is gently sloping with 23% of this area being mountainous.

**Gays Pass** Training Area (18,320 acres) is used for ground-based, live-fire exercises and artillery. Its physical characteristics are denoted with the pass as gently sloping land with mountains (44%) straddling each side.

**Gypsum Ridge** Training Area (18,265 acres) is mostly low, rolling terrain and contains the northern part of Deadman Lake. The essentially non-live fire training is used for bivouac, artillery fire out of Gypsum Ridge, wheeled vehicle maneuvers, and occasionally, live-fire demonstrations.

**Lava** Training Area (22,925 acres) is in the northern portion of the Combat Center. The area has exposed lava rock with 26% mountainous or rough terrain. Lava is used primarily for battalion tactical training, including ground-based and combined ground and air live-fire, and artillery.

**Lavic Lake** Training Area (56,985 acres, the largest training area) is the primary training area for aviation training exercises and is also used for live-fire maneuvers with major exercises. Most of the area is gently sloping and comprised of lava rock (17% mountainous or rough).

**Lead Mountain** Training Area (45,792 acres) is located at the northeastern boundary of the Combat Center. Lead Mountain is composed of mostly gently sloping land (only 8% rough), lava flows from Amboy Crater and Dry Lake. Its training exercises consist of aviation, artillery, and ground-based live-fire. A dummy airfield is in the southern portion of the training area.

**Maumee Mine** Training Area (16,141 acres) is located on the western boundary of the Combat Center. It is 19% mountainous or rough and is used mainly for artillery and maneuver training exercises.

**Means Lake** Training Area (56,058) is located on the southwestern boundary of the Combat Center. This training area is classified as a “Shared Use Area.” Means Lake will be managed by the USMC for up to two 30-day periods per year. A primary USMC use for Means Lake is to support full-scale, Marine Expeditionary Brigade (MEB) Exercises conducted twice per year. All live fire conducted within Means Lake Training Area must be from direct fire weapons and non-dud producing ordnance. All fires must impact on designated company objectives.

**Morgans Well** Training Area (23,361 acres) is in the center of the Combat Center, composed mostly of mountains. This area is commonly used for aviation and ground-based live-fire, infantry training, artillery, and previously, tank maneuvers. Due to the mountainous terrain, there is limited cross-country mobility for vehicles.

**Noble Pass** Training Area (16,834 acres), in the center of the Combat Center, is composed mostly of mountains. This area is commonly used for aviation and/or ground-based live-fire, tank maneuvers, infantry training, artillery, and previously, tank maneuvers. Due to the mountainous terrain (59%), there is limited cross-country mobility for vehicles.

**Prospect** Training Area (13,188 acres) was the southern one-third of Delta before the 1998 realignment. Prospect is 22% mountainous or rough terrain and is used primarily for battalion- and company-level training.

**Quackenbush** Training Area (41,814 acres) has low, slightly rolling terrain (13% mountainous or rough terrain). Ground-based live-fire, artillery, aviation, and maneuvers are the most common training exercises for this area. Also, Range 220, Combined Arms Military Operations in Urban Terrain (CAMOUT) facility, is in this training area.

**Rainbow Canyon** Training Area (16,569 acres) is used as a live-fire maneuver area. It is 63% mountainous terrain and 37% maneuver area. The Bullion Mountains run through the southern portion of the area. It is used for maneuvers and artillery. Located within the Rainbow Canyon Training Area is Range 601 (Sensitive Fuse Impact Area), an abandoned air-to-ground range. Range 601 is a no-maneuver area where neither personnel nor vehicles are authorized.

**Range** Training Area (20,161 acres) is in the central part of the Combat Center, directly north of Mainside. The training area is mostly gently sloping and rolling terrain with 19% being mountainous or rough terrain. Most of the fixed ranges are in the Range Training Area.

**Sandhill** Training Area (11,904 acres) is off-limits to live-fire due to its proximity to Mainside and surrounding communities. It is used for maneuvers, and the Exercise Support Base and Expeditionary Air Field are partially located here along with the Assault Landing Zone Sandhill.

**Sunshine Peak** Training Area (22,860 acres) is 38% mountainous. This training area is one of the least used due to its location in the upper northwestern boundary of the Combat Center. Its primary use is as an emergency, ordnance drop zone.

**West** Training Area (9,966 acres) is generally gently sloping and contains Drop Zone Sandhill, portions of the Expeditionary Air Field and Exercise Support Base, and the Assault Landing Zone. West is used for non-live fire maneuvers and major exercise staging. West also has Range 225, Range 705 and Range 800 training facilities.

### **Fixed Ranges:**

These following fixed range descriptions are brief descriptions from various sources (e.g., Snover and Kellogg, 1999, MCAGCC 2012, CCO 3500.4K).

**7<sup>th</sup> MarReg Squad Range Complex**, Small Arms BZO Range.

**Live-Fire Urban Developed Aviation Facility**, Indirect Range specifically designed to allow the release of inert GBU-31, 33, and 35 Joint Directed Attack Munitions as well as other inert aviation delivered ordnance.

**Machine Gun Range**, MK-19 Range is designed to train use of the MK-19 machine gun.

**Multi-purpose Range Complex**, Armored Live Fire and Maneuver Range provide the site and supporting facilities for armor and anti-armor training.

**Platoon Hasty Attack and Maneuver Range**, Rifle Platoon Attack is designed to provide the opportunity for a rifle platoon to conduct a minefield breach, and a dismounted, live attack against a hastily defending enemy squad.

**Range 051**, Explosive Ordnance Device (EOD) Range.

**Range 100**, Squad Maneuver Range is a land navigation range.

**Range 101**, Small Arms Battle Sight Zero (BZO) Range.

**Range 102**, Squad Maneuver Range is a land navigation range.

**Range 103**, Squad Defensive Fire Range is designed to improve squad defensive tactics by incorporating changing deployment requirements and scenarios.

**Range 104**, Anti-Mechanized / Grenade Range is designed to develop confidence of unit members in their abilities to use grenades and special weapons.

**Range 105**, Gas Chamber is designed to train units in the use of CS gas and develop confidence of unit members in the use of gas masks.

**Range 106**, Multi-Purpose range complex consisting of a Combat Marksmanship range & Mortar Range.

**Range 106A**, Light, Medium, and Heavy machinegun range.

**Range 107**, Infantry Squad Battle Course, is a live-fire range that incorporates quick reaction scenarios, such as ambushes, raids, and reconnaissance.

**Range 108**, Infantry Squad Assault Range, is designed to improve offensive tactics during changing deployment requirements and scenarios.

**Range 109**, Anti-Armor Live-Fire Tracking Range is designed primarily for use by JAVALINE or TOW weapons systems.

**Range 110A**, M-203 Qualification Course.

**Range 111**, MOUT Assault Course train units for MOUT operations and features automated stationary and moving targets, three story Sniper Tower.

**Range 112**, EOD Demolition Range.

**Range 113**, Multi-Purpose Machine Gun Range is designed to train units in the offensive and defensive use of all machine guns systems in the Marine Corps arsenal also has a four-story Sniper Tower which provides Snipers and Designated Marksman an environment to engage targets in an Urban Setting.

**Range 113A**, Small Arms BZO Range and 40mm qualification range.

**Range 114**, Combat Engineer Demolition Range is designed to accommodate mine and countermine operations at the company level and can be used for demonstrating protective, tactical, point, interdictions, and simulated mine fields.

**Range 200**, Non-Live Fire MOUT Town simulates urban warfare in a town or city setting.

**Range 205**, Live-Fire MOUT Facility allows Marines to practice both offensive and defensive maneuvers during convoy operations.

**Range 210**, MOUT Live Fire allows Marines to practice warfare in an urban setting using live ammunition.

**Range 215**, Non-Live Fire MOUT town simulates urban warfare in a town or city setting.

**Range 215A**, Tactical Exploitation Site to train small groups in battlefield intelligence skills in an urban environment.

**Range 220**, Non-Live Fire MOUT combined arms town simulates urban warfare in a city setting.

**Range 225**, Non-Live Fire MOUT used for urban warfare in a city setting and K-9 patrols.

**Range 230**, MOUT Live Fire allows Marines to practice warfare in an urban setting using live fire ammunition.

**Range 400**, Company Live-Fire and Maneuver Range is designed to provide a rifle company with the opportunity to conduct a live-fire attack on enemy strongholds.

**Range 401**, Company Live-Fire, and maneuver range for rifle companies conduct live fire attack on enemy strongholds.

**Range 410**, Platoon Live-Fire and Maneuver Range is designed to provide the opportunity for a rifle platoon to attack enemy positions and practice wire breaching and trench clearing procedures.

**Range 601**, Super Sensitive Fuse Impact Range, is restricted to only critical fuse ordnance that can be delivered by indirect fire weapons or aircraft.

**Range 640**, Weapons Impact Scoring System. Inert aviation ordnance. BDU-33 Only.

**Range 700**, Helicopter suspension and Rappelling tower.

**Range 705**, Combat Vehicle Operator Training Course (CVOT) consists of 11 miles of varied road conditions from improved roads to soft sand to develop driving skills for combat vehicle operators.

**Range 705A**, CVOT Intermediate/Advanced.

**Range 706**, CVOT.

**Range 800**, Improvised Explosive Device (IED) Range provides MOUT facilities for tactical engagement simulations involving the use of IEDs.



## Appendix C. Plant Species List

Scientific and common names of Combat Center plants, with identifications of status per the California Native Plant Society (2001; California Rare Plant Rank, CRPR in footnote) and historical tribal input (T1) on species. Scientific names provided recently via Calflora, The Calflora Database, at <https://www.calflora.org>. (Accessed 14 June 2023). Non-natives are asterisked (\*).

Scientific Name	Common Name	Special Status	Reference
<b>Pteridaceae</b>			
<i>Myriopteris parryi</i>	Parry's lip fern		2
<i>Notholaena californica</i>	Cloak-fern		1
<b>Ephedraceae</b>			
<i>Ephedra aspera</i>	Boundary ephedra		1, 8
<i>Ephedra californica</i>	California ephedra		1, 8
<i>Ephedra funerea</i>	Death Valley ephedra		1
<i>Ephedra nevadensis</i>	Nevada ephedra		1
<i>Ephedra viridis</i>	Green ephedra		1
<b>Aizoaceae</b>			
<sup>N</sup> <i>Mesembryanthemum nodiflorum</i>	Slender-leaved iceplant		1
<sup>N</sup> <i>Sesuvium verrucosum</i>	Western sea purslane		1
<b>Amaranthaceae</b>			
<sup>N</sup> <i>Amaranthus albus</i>	Tumbleweed		1
<i>Amaranthus blitoides</i>	Prostrate pigweed		1
<i>Amaranthus fimbriatus</i>	Fringed amaranth		1
<i>Tidestromia oblongifolia</i>	Honeysweet		1
<b>Apiaceae</b>			
<i>Cymopterus multinervatus</i>	Purplenerve springparsley	CRPR 2B.2	1
<i>Cymopterus panamintensis</i> var. <i>acutifolius</i>	Panamint springparsley		1
<i>Lomatium parryi</i>	Parry's lomatium		1
<b>Apocynaceae</b>			
<i>Amsonia tomentosa</i>	Woolly bluestar		1
<i>Asclepias albicans</i>	White-stemmed milkweed		1
<i>Asclepias erosa</i>	Desert milkweed		1, 9
<i>Asclepias subulata</i>	Rush milkweed		1
<i>Funastrum crispum</i>	Rigid climbing milkweed		1
<i>Funastrum utahense</i>	Utah vine milkweed	CRPR 4.2	1, 2, 7

Scientific Name	Common Name	Special Status	Reference
<i>Matelea parvifolia</i>	Spearleaf	CRPR 2B.3	2, 5
<b>Asteraceae</b>			
<i>Acamptopappus sphaerocephalus</i> var. <i>hirtellus</i>	Hairy goldenhead		1
<i>Adenophyllum cooperi</i>	Cooper's dogweed		1
<i>Adenophyllum porophylloides</i>	San Felipe dogweed		1
<i>Ambrosia acnathicarpa</i>	Annual bursage		1
<i>Ambrosia dumosa</i>	White bursage		1, 7
<i>Ambrosia salsola</i> var. <i>salsola</i>	Burrobrush		1, 7
<i>Anisocoma acaulis</i>	Scale bud		1
<i>Atrichoseris platyphylla</i>	Parachute plant		1, 7
<i>Baccharis brachyphylla</i>	Shortleaf baccharis		1
<i>Bahiopsis parishii</i>	Parish viguiera		1, 7
<i>Baileya multiradiata</i>	Desert marigold		1
<i>Baileya pauciradiata</i>	Colorado Desert marigold		1, 7
<i>Baileya pleniradiata</i>	Woolly desert marigold		1
<i>Bebbia juncea</i> var. <i>aspera</i>	Rough Sweetbush		1, 7
<i>Brickellia atractyloides</i> var. <i>arguta</i>	California spear leaved brickellia		1
<i>Brickellia californica</i>	California brickellbush		1
<i>Brickellia desertorum</i>	Desert brickellbush		1, 7
<i>Brickellia incana</i>	Woolly brickellbush		1
<i>Calycoseris parryi</i>	Yellow tackstem		1, 7
<i>Chaenactis carphoclinia</i> var. <i>carphoclinia</i>	Pebble pincushion		1
<i>Chaenactis fremontii</i>	Fremont's pincushion		1, 7
<i>Chaenactis stevioides</i>	Desert pincushion		1, 7
<i>Dicoria canescens</i>	Desert twinbugs		1
<sup>N</sup> <i>Dimorphotheca sinuata</i>	African daisy		1
<i>Encelia actoni</i>	Acton encelia		1
<i>Encelia farinosa</i>	Brittlebush		1, 7
<i>Encelia frutescens</i>	Rayless encelia		1
<i>Encelia virginensis</i>	Virgin river encelia		7
<i>Ericameria cooperi</i> var. <i>cooperi</i>	Cooper goldenbush		7
<i>Ericameria cuneata</i> var. <i>spathulata</i>	Wide leaved rock goldenbush		1
<i>Ericameria paniculata</i>	Mojave rabbitbush		1
<i>Erigeron canadensis</i>	Canada horseweed		1
<i>Erigeron divergens</i>	Diffuse Daisy		1

Scientific Name	Common Name	Special Status	Reference
<i>Eriophyllum lanosum</i>	White easter bonnets		7
<i>Eriophyllum mohavense</i>	Barstow Woolly Sunflower	CRPR 1B.2	5
<i>Eriophyllum wallacei</i>	Wallace eriophyllum		1, 7
<i>Geraea canescens</i>	Desert sunflower		1, 7
<i>Glyptopleura marginata</i>	Carveseed		1
<i>Gutierrezia microcephala</i>	Sticky snakeweed		1
<i>Gutierrezia sarothrae</i>	Matchweed		1
<i>Heterotheca grandiflora</i>	Telegraph weed		1
<i>Isocoma acradenia</i>	Alkali goldenbush		1
<sup>N</sup> <i>Lactuca serriola</i>	Prickly lettuce		1
<i>Laennecia coulteri</i>	Coulter's horseweed		1
<i>Lasthenia glabrata ssp. coulteri</i>	Coulter's goldfields	CRPR 1B.1	2
<i>Layia glandulosa</i>	White tidy tips		1, 7
<i>Lepidospartum squamatum</i>	California broomsage		1
<i>Leptosyne bigelovii</i>	Bigelow coreopsis		1, 7
<i>Leptosyne californica</i>	California coreopsis		1
<i>Logfia arizonica</i>	Arizona cottonrose		1
<i>Logfia depressa</i>	Dwarf cottonrose		1
<i>Logfia filaginoides</i>	California cottonrose		1, 7
<i>Malacothrix californica</i>	California dandelion		1
<i>Malacothrix coulteri</i>	Snake's head		1
<i>Malacothrix glabrata</i>	Smooth desert dandelion		1, 7
<i>Monoptilon bellidiforme</i>	Small desert star		1
<i>Monoptilon bellioides</i>	Mojave desertstar		1, 7
<i>Nicolletia occidentalis</i>	Hole in the sand plant		1
<i>Palafoxia arida var. arida</i>	Desert palafox		1, 7
<i>Pectis papposa var. papposa</i>	Chich weed		1
<i>Perityle emoryi</i>	Emory's rock daisy		1, 7
<i>Peucephyllum schottii</i>	Schott's pygmycedar		1
<i>Pleurocoronis plurisetata</i>	Bush arrowleaf		1
<i>Pluchea sericea</i>	Arrow weed		1
<i>Porophyllum gracile</i>	Slender poreleaf		1
<i>Prenanthesella exigua</i>	Brightwhite		1
<i>Psathyrotes ramosissima</i>	Velvet turtleback		1, 7
<sup>N</sup> <i>Pseudognaphalium luteoalbum</i>	Jersey cudweed		1
<i>Psilostrophe cooperi</i>	Whitestem paperflower		7
<i>Rafinesquia neomexica</i>	Desert chicory		1, 7



Scientific Name	Common Name	Special Status	Reference
<i>Senecio flaccidus</i> var. <i>monoensis</i>	Mono ragwort		1
<i>Senecio mohavensis</i>	Mojave ragwort		1
<sup>N</sup> <i>Sonchus oleraceus</i>	Common sow thistle		1
<i>Stephanomeria exigua</i> ssp. <i>exigua</i>	Small wirelettuce		1
<i>Stephanomeria pauciflora</i>	Wire lettuce		1, 7
<i>Stylocline micopoides</i>	Desert nest straw		1
<i>Symphotrichum subulatum</i>	Eastern annual saltmarsh aster		1
<i>Syntrichopappus fremontii</i>	Fremont's syntrichopappus		1
<i>Taraxacum officinale</i> ssp. <i>officinale</i>	Common dandelion		1
<i>Tetradymia spinosa</i>	Short spine horsebrush		1
<i>Trichoptilium incisum</i>	Yellowdome		1
<i>Trixis californica</i> var. <i>californica</i>	California trixis		1
<i>Xylorhiza tortifolia</i> var. <i>tortifolia</i>	Mojave aster		1, 7
<b>Bignoniaceae</b>			
<i>Chilopsis linearis</i> ssp. <i>arcuata</i>	Desert willow	T1	1, 4, 7
<b>Boraginaceae</b>			
<i>Amsinckia menziesii</i>	Menzies' Fiddleneck		1
<i>Amsinckia tessellata</i>	Bristly fiddleneck		7
<i>Amsinckia tessellata</i> var. <i>tessellata</i>	Bristly fiddleneck		1
<i>Johnstonella angustifolia</i>	Narrow-leaved johnstonella		1
<i>Cryptantha barbiger</i>	Bearded cryptantha		1, 7
<i>Cryptantha circumscissa</i>	Cushion cryptantha		1, 7
<i>Cryptantha costata</i>	Ribbed cryptantha	CRPR 4.3	2
<i>Cryptantha rattanii</i>	Rattan's cryptantha		1
<i>Cryptantha dumetorum</i>	Bush loving cryptantha		1, 7
<i>Cryptantha holoptera</i>	Winged cryptantha	CRPR 4.3	1, 2
<i>Cryptantha maritima</i>	Guadalupe cryptantha		1
<i>Eremocarya micrantha</i>	Desert red-root		1, 7
<i>Cryptantha nevadensis</i>	Nevada cryptantha		1, 7
<i>Cryptantha pterocarya</i>	Wingnut cryptantha		1, 7
<i>Johnstonella racemosa</i>	Shrubby johnstonella		1
<i>Cryptantha utahensis</i>	Scented cryptantha		1
<i>Emmenanthe penduliflora</i> var. <i>penduliflora</i>	Whispering bells		1, 7
<i>Eucrypta chrysanthemifolia</i> var. <i>bipinnatifida</i>	Spotted hideseed		1
<i>Eucrypta micrantha</i>	Dainty desert hideseed		1

Scientific Name	Common Name	Special Status	Reference
<i>Heliotropium convolvulaceum</i> var. <i>californicum</i>	Morning glory heliotrope		1
<i>Heliotropium curassavicum</i> var. <i>oculatum</i>	Alkali heliotrope		1
<i>Nama demissa</i> var. <i>demissa</i>	Coville's weak purple mat		1, 7
<i>Nama hispida</i> var. <i>spathulatum</i>	Rough purple mat		1
<i>Nama pusilla</i>	Small leaf nama		1
<i>Pectocarya heterocarpa</i>	Chuckwalla pectocarya		1
<i>Pectocarya platycarpa</i>	Broad nuted comb bur		1, 7
<i>Pectocarya recurvata</i>	Arch nuted comb bur		1, 7
<i>Phacelia calthifolia</i>	Caltha leafed phacelia		1
<i>Phacelia crenulata</i>	Cleftleaf wild heliotrope		7
<i>Phacelia crenulata</i> var. <i>ambigua</i>	Purplestem phacelia		1
<i>Phacelia crenulata</i> var. <i>crenulata</i>	Heliotrope phacelia		1
<i>Phacelia crenulata</i> var. <i>minutiflora</i>	Little flowered heliotrope phacelia		1
<i>Phacelia cryptantha</i>	Hiddenflower phacelia		1
<i>Phacelia distans</i>	Wild heliotrope		1
<i>Phacelia fremontii</i>	Fremont's phacelia		1
<i>Phacelia neglecta</i>	Alkali phacelia		1
<i>Phacelia pachyphylla</i>	Blacktack phacelia		1
<i>Phacelia pedicellata</i>	Pedicellate phacelia		1
<i>Phacelia rotundifolia</i>	Round leafed phacelia		1
<i>Phacelia tanacetifolia</i>	Lacy hacelia		7
<i>Plagiobothrys arizonicus</i>	Arizona popcornflower		7
<i>Simpson's jonesii</i>	Mojave popcornflower		1
<i>Tiquilia nuttallii</i>	Annual crinklemat		1
<i>Tiquilia plicata</i>	Fanleaved crinklemat		1
<b>Brassicaceae</b>			
<i>Boechera inyoensis</i>	Inyo rockcross		1
<sup>N</sup> <i>Brassica tournefortii</i>	Saharan mustard		1, 3, 4, 5, 6, 7
<sup>N</sup> <i>Capsella bursa-pastoris</i>	Sheperd's purse		1
<i>Caulanthus cooperi</i>	Cooper's jewel flower		1
<i>Caulanthus lasiophyllus</i>	California mustard		1, 7
<i>Descurainia pinnata</i>	Yellow tansy mustard		7
<i>Descurainia pinnata</i> ssp. <i>glabra</i>	Smooth western tansy mustard		1
<i>Descurainia sophia</i>	Herb sophia		1
<i>Dithyrea californica</i>	California shiedpod		1

Scientific Name	Common Name	Special Status	Reference
<i>Draba cuneifolia</i>	Wedge leaved draba		1
<sup>N</sup> <i>Hirschfeldia incana</i>	Short, podded mustard		1
<i>Lepidium flavum</i>	Yellow pepper grass		7
<i>Lepidium fremontii</i>	Desert pepper grass		1, 7
<i>Lepidium lasiocarpum ssp. lasiocarpum</i>	Shaggyfruit pepperweed		1
<i>Lepidium thurberi</i>	Thurber's pepper grass		9
<sup>N</sup> <i>Sisymbrium altissimum</i>	Tumble mustard		3
<sup>N</sup> <i>Sisymbrium irio</i>	London rocket		1, 3, 6
<sup>N</sup> <i>Sisymbrium orientale</i>	Indian hedge mustard		1
<i>Stanleya pinnata</i>	Desert princesplume		1, 7
<i>Streptanthella longirostris</i>	Longbeak streptanthella		1
<i>Thysanocarpus curvipes</i>	Common fringe pod		1
<i>Thysanocarpus laciniatus</i>	Narrow leaved lacepod		1
<b>Cactaceae</b>			
<i>Coryphantha alversonii</i>	Foxtail cactus		1, 7
<i>Cylindropuntia acanthocarpa</i>	Buck horn cholla		7
<i>Cylindropuntia bigelovii</i>	Teddybear cholla		7
<i>Cylindropuntia echinocarpa</i>	Silver cholla		1, 7
<i>Cylindropuntia ramosissima</i>	Branch pencil cholla		1, 7
<i>Opuntia wigginsii</i>	Wiggins's Cholla	CRPR 3.3	1
<i>Echinocactus polycephalus var. polycephalus</i>	Cottontop cactus		1, 7
<i>Echinocactus engelmannii</i>	Engelmann's hedgehog cactus		1, 7
<i>Ferocactus cylindraceus</i>	California barrel cactus		1
<i>Mammillaria dioica</i>	Fish hook Cactus		7
<i>Mammillaria tetrancistra</i>	Common fish hook cactus		1
<i>Opuntia basilaris var. basilaris</i>	Beavertail cactus		1, 7
<i>Sclerocactus polyancistrus</i>	Mojave fish hook cactus	CRPR 4.2	2
<b>Campanulaceae</b>			
<i>Nemacladus glanduliferus</i>	Glandular threadplant		1, 7
<i>Nemacladus rubescens</i>	Desert threadplant		1
<i>Nemacladus sigmoideus</i>	Sigmoid threadplant		1
<b>Caryophyllaceae</b>			
<i>Achyronychia cooperi</i>	Onyxflower		1
<i>Spergularia marina</i>	Salt marsh sand spurry		2
<b>Cleomaceae</b>			
<i>Cleomella obtusifolia</i>	Mojave cleomella		1
<i>Peritoma arborea</i>	Bladderpod		1, 7

Scientific Name	Common Name	Special Status	Reference
<i>Wislizenia refracta ssp. refracta</i>	Jackass clover	CRPR 2B.2	1, 2
<b>Chenopodiaceae</b>			
<i>Allenrolfea occidentalis</i>	Iodine bush		1
<i>Atriplex canescens var. canescens</i>	Fourwing saltbush		1, 7
<i>Atriplex confertifolia</i>	Shadscale		1
<i>Atriplex elegans</i>	Wheelscale		1
<i>Atriplex hymenelytra</i>	Desert holly		1
<i>Atriplex lentiformis</i>	Big saltbush		1, 7
<i>Atriplex polycarpa</i>	Allscale saltbush		1, 7
<sup>N</sup> <i>Atriplex rosea</i>	Tumbling saltweed		1
<sup>N</sup> <i>Atriplex semibaccata</i>	Australian saltbush		1
<sup>N</sup> <i>Bassia hyssopifolia</i>	Fivehorn smotherweed		1, 7
<sup>N</sup> <i>Chenopodium album</i>	Lambs quarters		1
<sup>N</sup> <i>Chenopodium murale</i>	Nettle leaf goosefoot		1
<sup>N</sup> <i>Cycloloma atriplicifolium</i>	Winged pigweed		1
<i>Grayia spinosa</i>	Spiny hopsage		1, 7
<i>Krascheninnikovia lanata</i>	Winter fat		1
<i>Monolepis nuttalliana</i>	Nuttall's poverty weed		1
<sup>N</sup> <i>Salsola paulsenii</i>	Paulsen's russian thistle		1, 5
<sup>N</sup> <i>Salsola tragus</i>	Prickly russian thistle		1, 3, 5, 6
<i>Suaeda nigra</i>	Bush seepweed		1, 7
<b>Crossosomataceae</b>			
<i>Crossosoma bigelovii</i>	Ragged rockflower		1
<b>Cucurbitaceae</b>			
<i>Brandegea bigelovii</i>	Desert starvine		1
<i>Cucurbita palmata</i>	Coyote Melon		1, 7
<b>Cuscutaceae</b>			
<i>Cuscuta denticulata</i>	Desert dodder		1
<b>Euphorbiaceae</b>			
<i>Croton californicus</i>	California croton		1, 7
<i>Ditaxis neomexicana</i>	New mexico ditaxis		1, 7
<i>Ditaxis serrata var. californica</i>	California ditaxis		1
<i>Euphorbia abramsiana</i>	Abrams' spurge	CRPR 2B.2	2
<i>Euphorbia albomarginata</i>	Rattlesnake sandmat		1, 7
<sup>N</sup> <i>Euphorbia maculata</i>	Spotted spurge		1
<i>Euphorbia micromera</i>	Sonoran sandmat		1
<i>Euphorbia ocellata ssp. arenicola</i>	Dune spurge		1

Scientific Name	Common Name	Special Status	Reference
<i>Euphorbia parryi</i>	Parry's spurge	CRPR 2B.3	2
<i>Euphorbia polycarpa</i>	Smallseed sandmat		1
<i>Euphorbia revoluta</i>	Revolute spurge	CRPR 4.3	2
<i>Euphorbia setiloba</i>	Yuma sandmat		1
<i>Stillingia linearifolia</i>	Narrow leaved stillingia		1
<i>Stillingia spinulosa</i>	Broad leaved stillingia		1
<b>Fabaceae</b>			
<i>Acmispon brachycarpus</i>	Short podded lotus		1
<i>Acmispon strigosus</i>	Strigose lotus		1, 7
<i>Astragalus acutirostris</i>	Sharpkeel milkvetch		1
<i>Astragalus didymocarpus</i> var. <i>dispermus</i>	Two Seeded Milkvetch		1
<i>Astragalus layneae</i>	Layne's milk vetch		1
<i>Astragalus lentiginosis</i> var. <i>fremontii</i>	Fremont's milk vetch		1, 7
<i>Dalea mollis</i>	Hairy prairie clover		1,
<i>Dalea mollissima</i>	Soft prairie clover		1
<i>Lupinus arizonicus</i>	Arizona lupine		1
<i>Lupinus bicolor</i>	Miniature lupine		7
<i>Lupinus concinnus</i>	Bajada lupine		1
<i>Lupinus shockleyi</i>	Shockley lupine		1
<i>Lupinus sparsiflorus</i>	Coulter's lupine		7
<i>Marina parryi</i>	Parry's false prairie clover		1
<sup>N</sup> <i>Medicago lupulina</i>	Black medick		1
<sup>N</sup> <i>Melilotus indicus</i>	Annual yellow sweetclover		1
<i>Parkinsonia aculeata</i>	Mexican palo verde		1
<i>Parkinsonia florida</i>	Blue paloverde		1, 4
<i>Prosopis glandulosa</i> var. <i>torreyana</i>	Honey mesquite	T1	1, 7
<i>Psoralea argophylla</i> var. <i>simplicifolia</i>	California indigo bush		1
<i>Psoralea emoryi</i>	Emory's indigo bush		1, 7
<i>Psoralea polydenia</i>	Nevada indigo bush		1
<i>Psoralea spinosa</i>	Smoke tree		1, 7
<i>Senecioia greggii</i>	Catclaw		1, 7
<i>Senna armata</i>	Desert senna		1, 7
<b>Geraniaceae</b>			
<sup>N</sup> <i>Erodium cicutarium</i>	Red stemmed filaree		1, 3, 6, 7
<i>Erodium texanum</i>	Texas filaree		1, 7
<b>Krameriaceae</b>			

Scientific Name	Common Name	Special Status	Reference
<i>Krameria bicolor</i>	White rhatany		1, 7
<i>Krameria erecta</i>	Pima rhatany		1
<b>Lamiaceae</b>			
<i>Condea emoryi</i>	Desert lavender		1, 7
<i>Monardella robisonii</i>	Robison's monardella	CRPR 1B.3	2
<i>Salvia columbariae</i>	Chia sage	T1	1, 7
<i>Salvia mohavensis</i>	Mojave sage		1
<i>Scutellaria mexicana</i>	Mexican bladdersage		1, 7
<b>Lennoaceae</b>			
<i>Pholisma arenarium</i>	Desert christmas tree		1
<b>Loasaceae</b>			
<i>Mentzelia affinis</i>	Yellow blazing star		1, 7
<i>Mentzelia albicaulis</i>	White stemmed blazing star		1
<i>Mentzelia involucrata</i>	Whitebract blazingstar		1, 7
<i>Mentzelia obscura</i>	Pacific blazing star		7
<i>Mentzelia oreophila</i>	Argus blazingstar		1
<i>Mentzelia tridentata</i>	Dentate blazing star		8
<i>Petalonyx thurberi ssp. thurberi</i>	Thurber's sandpaper plant		1
<b>Malvaceae</b>			
<i>Eremalche exilis</i>	White mallow		1
<i>Eremalche rotundifolia</i>	Desert fivespot		1, 7
<sup>N</sup> <i>Malva neglecta</i>	Common mallow		7
<sup>N</sup> <i>Malva parviflora</i>	Cheeseweed		1
<i>Sphaeralcea ambigua var. ambigua</i>	Apricot mallow		1, 7
<i>Sphaeralcea angustifolia</i>	Narrow leaved desert mallow		1
<i>Sphaeralcea emoryi var. emoryi</i>	Emory's globemallow		1
<b>Molluginaceae</b>			
<sup>N</sup> <i>Mollugo cerviana</i>	Threadstem carpetweed		1
<b>Montiaceae</b>			
<i>Calyptidium monandrum</i>	Common pussypaws		1
<i>Cistanthe ambigua</i>	Desert cistanthe		1
<b>Nyctaginaceae</b>			
<i>Abronia villosa</i>	Desert sand verbena		7
<i>Abronia villosa var. villosa</i>	Desert sand verbena		1
<i>Allionia incarnata</i>	Trailing allionia		1, 7
<i>Boerhavia triquetra var. intermedia</i>	Fivewing spiderling		1
<i>Boerhavia wrightii</i>	Wright's boerhavia		1

Scientific Name	Common Name	Special Status	Reference
<i>Mirabilis laevis</i> var. <i>retrorsa</i>	Wishbone bush		1, 7
<i>Mirabilis laevis</i> var. <i>villosa</i>	Hairy Wishbone		1
<b>Oleaceae</b>			
<i>Menodora spinescens</i>	Spiny desert olive		1
<b>Onagraceae</b>			
<i>Camissonia campestris</i> ssp. <i>campestris</i>	Mojave suncup		1, 7
<i>Camissoniopsis pallida</i> ssp. <i>hallii</i>	Hall's sun cup		1
<i>Chylismia brevipes</i> ssp. <i>brevipes</i>	Golden suncup		1, 7
<i>Chylismia cardiophylla</i> ssp. <i>cardiophylla</i>	Heart leaved primrose		1
<i>Chylismia claviformis</i> ssp. <i>aurantiaca</i>	Pinnate leaved primrose		1, 7
<i>Eremothera boothii</i> ssp. <i>boothii</i>	Booth's evening-primrose	CRPR 2B.3	2, 7
<i>Eremothera boothii</i> ssp. <i>condensata</i>	Clustered booth's desert primrose		1
<i>Eremothera chamaenerioides</i>	Long fruit suncup		1
<i>Eremothera refracta</i>	Narrow leaved primrose		1
<i>Eulobus californicus</i>	California primrose		7
<sup>N</sup> <i>Oenothera curtiflora</i>	Velvetweed		1
<i>Oenothera deltoides</i> ssp. <i>deltoides</i>	Basket Evening-primrose		1, 7
<i>Oenothera primiveris</i> ssp. <i>bufonis</i>	Desert Toad Evening-primrose		1
<b>Orobanchaceae</b>			
<i>Orobanche cooperi</i>	Cooper's Broom-rape		1
<b>Papaveraceae</b>			
<i>Argemone corymbosa</i>	Mojave Pricklypoppy		1, 7
<i>Argemone munita</i>	Chicalote		1
<i>Eschscholzia glyptosperma</i>	Desert Poppy		1, 7
<i>Eschscholzia minutiflora</i>	Pygmy Poppy		1, 7
<i>Eschscholzia parishii</i>	Parish's Poppy		1
<b>Phrymaceae</b>			
<i>Diplacus bigelovii</i>	Bigelow's Monkeyflower		1, 7
<i>Mimetanthe pilosus</i>	Downy Monkeyflower		7
<b>Plantaginaceae</b>			
<i>Antirrhinum filipes</i>	Desert Snapdragon		1
<i>Antirrhinum mohavea</i>	Golden Desert Snapdragon		1
<i>Mohavea confertiflora</i>	Mojave Ghost Flower		1
<i>Penstemon albomarginatus</i>	White-margined Beardtongue	CRPR 1B.1	1, 2
<i>Penstemon clevelandii</i> var. <i>mohavensis</i>	Cleveland's Mojave Beardtongue		1

Scientific Name	Common Name	Special Status	Reference
<i>Penstemon pseudospectabilis</i>	Desert Beardtongue	CRPR 2B.2	1
<i>Penstemon thurberi</i>	Thurber's Beardtongue	CRPR 4.2	2
<sup>N</sup> <i>Plantago lanceolata</i>	English Plantain		3
<i>Plantago ovata</i>	Desert Plantain		1, 7
<sup>N</sup> <i>Veronica anagallis-aquatica</i>	Water Speedwell		1
<b>Polemoniaceae</b>			
<i>Aliciella leptomeria</i>	Sand Aliciella		1
<i>Aliciella micromeria</i>	Dainty Aliciella		1
<i>Eriastrum diffusum</i>	Miniature Woollystar		1, 7
<i>Eriastrum eremicum ssp. eremicum</i>	Desert Woollystar		1
<i>Eriastrum harwoodii</i>	Harwood's Eriastrum	CRPR 1B.2	8
<i>Eriastrum sparsiflorum</i>	Few-flowered Eriastrum	CRPR 4.3	1
<i>Eriastrum wilcoxii</i>	Wilcox's Woollystar		1
<i>Gilia latiflora</i>	Broad Flowered gilia		1
<i>Gilia latiflora var. davyi</i>	Davy's Broad Flowered gilia		1
<i>Gilia minor</i>	Little Gilia		7
<i>Gilia scopulorum</i>	Rock Gilia		1
<i>Gilia sinuata</i>	Rosy Gilia		1
<i>Gilia stellata</i>	Star Gilia		1, 7
<i>Ipomopsis polycladon</i>	Many Branched Ipomopsis		1
<i>Langloisia setosissima ssp. punctata</i>	Lilac Sunbonnet		1, 7
<i>Leptosiphon chrysanthus ssp. chrysanthus</i>	Golden Leptosiphon		1
<i>Linanthus arenicola</i>	Sand Linanthus		1
<i>Linanthus demissus</i>	Desert Snow		1
<i>Linanthus filiformis</i>	Yellow Linanthus		1
<i>Linanthus jonesii</i>	Jone's Linanthus		1
<i>Loeseliastrum matthewsii</i>	Desert Calico		1, 7
<i>Loeseliastrum schottii</i>	Schott's Calico		1
<b>Polygonaceae</b>			
<i>Chorizanthe brevicornu var. brevicornu</i>	Brittle Spineflower		1, 7
<i>Chorizanthe corrugata</i>	Wrinkled Spineflower		1
<i>Chorizanthe rigida</i>	Rigid Spineflower		1, 7
<i>Chorizanthe spinosa</i>	Mojave Spineflower	CRPR 4.2	2
<i>Eriogonum brachyanthum</i>	Short-flower Buckwheat		1
<i>Eriogonum brachypodum</i>	Parry's Buckwheat		1



Scientific Name	Common Name	Special Status	Reference
<i>Eriogonum deflexum</i> var. <i>deflexum</i>	Reflexed Buckwheat		1, 7
<i>Eriogonum fasciculatum</i>	California Buckwheat		7
<i>Eriogonum fasciculatum</i> var. <i>polifolium</i>	Mojave Desert Buckwheat		1
<i>Eriogonum inflatum</i>	Desert Trumpet		1, 7
<i>Eriogonum maculatum</i>	Spotted Buckwheat		1, 7
<i>Eriogonum nidularium</i>	Birdnest Buckwheat		1, 7
<i>Eriogonum pusillum</i>	Yellow Turbans		1
<i>Eriogonum reniforme</i>	Kidney-leaf Buckwheat		1
<i>Eriogonum thomasii</i>	Thomas' Buckwheat		1, 7
<i>Eriogonum trichopes</i>	Little Desert Trumpet		1
<i>Eriogonum viridescens</i>	Greenish Buckwheat		1
<i>Eriogonum wrightii</i> var. <i>nodosum</i>	Knotstem Wright's Buckwheat		1
<i>Oxytheca perfoliata</i>	Round-leaf Puncturebract		1
<sup>N</sup> <i>Polygonum argyrocoleon</i>	Persian Knotweed		1
<sup>N</sup> <i>Polygonum aviculare</i> ssp. <i>depressum</i>	Dented Oval Leaf Knotweed		1
<i>Rumex hymenosepalus</i>	Fleshy Dock		1
<b>Portulacaceae</b>			
<i>Portulaca halimoides</i>	Desert Portulaca	CRPR 4.2	2
<b>Ranunculaceae</b>			
<i>Delphinium parishii</i> ssp. <i>parishii</i>	Parish's Larkspur		1
<b>Resedaceae</b>			
<i>Oligomeris linifolia</i>	Lineleaf Whitepuff		1
<b>Rosaceae</b>			
<i>Coleogyne ramosissima</i>	Blackbrush		1
<i>Prunus fasciculata</i> var. <i>fasciculata</i>	Desert Almond		1
<i>Purshia tridentata</i>	Antelope Bush		7
<b>Rubiaceae</b>			
<i>Galium angustifolium</i> ssp. <i>gracillimum</i>	Slender Bedstraw	CRPR 4.2	1, 2, 7
<i>Galium stellatum</i>	Starry Bedstraw		1
<b>Rutaceae</b>			
<i>Thamnosma montana</i>	Turpentine Bush		1, 7
<b>Salicaceae</b>			
<i>Populus fremontii</i> ssp. <i>fremontii</i>	Fremont's Cottonwood	T1	1, 4
<i>Salix gooddingii</i>	Goodding's Black Willow		1
<b>Simaroubaceae</b>			
<i>Castela emoryi</i>	Emory's Crucifixion-thorn	CRPR 2B.2	1, 2
<b>Simmondsiaceae</b>			

Scientific Name	Common Name	Special Status	Reference
<i>Simmondsia chinensis</i>	Joboba	T1	1
<b>Solanaceae</b>			
<i>Datura wrightii</i>	Wright's Jimsonweed	T1	1
<i>Lycium andersonii</i>	Anderson's Box-thorn		1, 7
<i>Lycium cooperii</i>	Cooper's Box-thorn		1
<i>Nicotiana obtusifolia</i>	Desert Tobacco	T1	1, 7
<i>Physalis crassifolia</i>	Yellow Nightshade		1, 7
<i>Physalis lobata</i>	Lobed Ground-cherry	CRPR 2B.3	2
<b>Tamaricaceae</b>			
<sup>N</sup> <i>Tamarix aphylla</i>	Athel Tamarix		1, 3, 4, 5, 6
<sup>N</sup> <i>Tamarix ramosissima</i>	Hairy Tamarix		1, 3, 4, 5, 6
<b>Urticaceae</b>			
<i>Parietaria hespera</i> var. <i>hespera</i>	Western Pellitory		1
<b>Verbenaceae</b>			
<i>Verbena gooddingii</i>	Gooding's Vervain		1
<b>Viscaceae</b>			
<i>Phoradendron californicum</i>	Desert Mistletoe		1, 7
<b>Zygophyllaceae</b>			
<i>Fagonia laevis</i>	California Fagonbush		1
<i>Kallstroemia californica</i>	California Caltrop		1
<i>Larrea tridentata</i>	Creosote Bush	T1	1, 7
<sup>N</sup> <i>Tribulus terrestris</i>	Puncturevine		1, 7
<b>Agavaceae</b>			
<i>Hesperocallis undulata</i>	Desert Lily		7
<i>Yucca brevifolia</i>	Joshua Tree		1, 7
<i>Yucca schidigera</i>	Mojave yucca		1, 7
<b>Alliaceae</b>			
<i>Allium parishii</i>	Parish's Onion	CRPR 4.3	1, 2
<b>Liliaceae</b>			
<i>Calochortus kennedyi</i> var. <i>kennedyi</i>	Desert Mariposa Lily		1
<b>Cyperaceae</b>			
<i>Bolboschoenus robustus</i>	Seacoast Bulrush		1
<i>Cyperus esculentus</i>	Edible Flatsedge		1
<b>Melanthiaceae</b>			
<i>Toxicoscordion brevibracteatum</i>	Desert Death Camas		1
<b>Poaceae</b>			

Scientific Name	Common Name	Special Status	Reference
<i>Aristida adscensionis</i>	Sixweeks Three-awn		1
<i>Aristida californica</i>	California Three-awn		1
<i>Aristida purpurea</i> var. <i>parishii</i>	Parish three-awn		1
<i>Aristida purpurea</i> var. <i>purpurea</i>	Purple Three-awn		1
<sup>N</sup> <i>Avena barbata</i>	Slender wild Oat		1
<i>Bouteloua aristidoides</i> var. <i>aristidoides</i>	Needle Grama		1
<i>Bouteloua barbata</i> var. <i>barbata</i>	Sixweeks Grama		1
<i>Bromus arizonicus</i>	Arizona Brome		1
<sup>N</sup> <i>Bromus catharticus</i>	Rescuegrass		1
<sup>N</sup> <i>Bromus rubens</i>	Red Brome		1, 3, 6, 7
<sup>N</sup> <i>Bromus tectorum</i>	Cheat Grass		1
<sup>N</sup> <i>Chloris virgata</i>	Feather Finger Grass		1
<sup>N</sup> <i>Cynodon dactylon</i>	Bermuda Grass		1
<i>Dasyochloa pulchella</i>	Low Woollygrass		1
<sup>N</sup> <i>Digitaria</i> sp.	Crabgrass		3
<sup>N</sup> <i>Digitaria sanguinalis</i>	Hairy Cottontop		1
<i>Distichlis spicata</i>	Salt Grass		1, 7
<sup>N</sup> <i>Echinochloa crus-galli</i>	Barnyard Cockspurgrass		1
<sup>N</sup> <i>Festuca myuros</i>	Rattail Fescue		1
<i>Festuca octoflora</i>	Eight Flowered Fescue		1
<i>Hilaria rigida</i>	Big Galleta		1
<i>Hordeum depressum</i>	Low Barley		7
<sup>N</sup> <i>Hordeum murinum</i>	Wall Barley		1, 3, 6
<i>Leptochloa fusca</i> ssp. <i>univervia</i>	Mexican Sprangletop		1
<i>Muhlenbergia microsperma</i>	Littleseed Muhly		1
<i>Muhlenbergia porteri</i>	Bush Muhly		1
<sup>N</sup> <i>Phalaris aquatica</i>	Harding Grass		1, 3, 6
<sup>N</sup> <i>Poa annua</i>	Annual Blue Grass		1
<sup>N</sup> <i>Polypogon monspeliensis</i>	Rabbit Foot Beard Grass		1
<sup>N</sup> <i>Schismus arabicus</i>	Arabian Schismus		1, 3, 6
<sup>N</sup> <i>Schismus barbatus</i>	Mediterranean Schismus		1, 3, 5, 6, 7
<i>Sporobolus cryptandrus</i>	Sand Dropseed		1
<i>Stipa hymenoides</i>	Indian Rice Grass		1, 7
<i>Stipa speciosa</i>	Desert Needle Grass		1, 7
<b>Themidaceae</b>			
<i>Androstephium breviflorum</i>	Small-flowered Androstephium	CRPR 2B.2	2
<i>Muilla coronata</i>	Crowned Muilla	CRPR 4.2	1, 2

Scientific Name	Common Name	Special Status	Reference
<b>Typhaceae</b>			
<i>Typha domingensis</i>	Southern Cattail		1
<i>Typha latifolia</i>	Broad-leaved Cattail		1
<sup>N</sup> <b>Non-native species</b>  <b>Federal</b> R Taxon removed from Candidate status (no present compliance status). <b>Tribes</b> T1 Species of interest/concern as identified by tribes. <b>State</b> CR State-listed as Rare. CC Candidate for State listing. <b>California Rare Plant Ranks (CRPR)</b> <i>Inventory of Rare and Endangered Vascular Plants of California:</i> 1B Rare or endangered in California and elsewhere. 2 Rare or endangered in California, but more common elsewhere. 3 Need more information (a review list). 4 Plants of limited distribution (watch list). <b>CRPR Threat Ranks</b> .1 - Seriously endangered in California .2 – Fairly endangered in California .3 – Not very endangered in California Reference: 1 Elvin, Mark A. 2000. Rare Plant Survey and Floristic Inventory. Tierra Data Systems. January 2000. 2 AgriChemical & Supply, Inc. 2006. Sensitive Plant Surveys Final Report. July 2006. 3 AgriChemical & Supply, Inc. 2005. Invasive Non-Native Plant Survey Final Report. August 2005. 4 AgriChemical & Supply, Inc. 2008. Exotic Pest Plant Treatment on Marine Corps Air Ground Combat Center, Twentynine Palms, CA Final Report. February 2008. 5 Marine Air Ground Task Force Training Command. 2008. Invasive Plant Species Management Plan. 6 Tierra Data, Inc. 2009. MCAGCC Twentynine Palms Historic Invasive Species Survey of the Western Training Areas. November 2009. 7 ICF Jones & Stokes. 2009. Twentynine Palms Proposed Western and Southern, Base Expansion Areas; Rare and Sensitive Plant Surveys Final Report. July 2009. 8 2022a. Vegetation Community Mapping for Marine Corps Air Ground Combat Center, Twentynine Palms, California. Prepared for Marine Corps Air Ground Combat Center, Twentynine Palms, California. 348 pp.			

## Appendix D. Animal Species List

The Combat Center animals are listed with their scientific and common names, and Special Status. See footnotes for designations of special status, and for References. Non-natives are asterisked (\*).

Scientific Name	Common Name	Special Status	Reference
<b>Invertebrates</b>			
<i>Branchinecta lindahli</i>	Versatile Fairy Shrimp		14
<i>Thamnocephalus platyurus</i>	Beavertail fairy shrimp		14
<i>Triops newberryi</i>	Tadpole shrimp		14
<i>Eocyclus diguiti</i>	Straight-backed clam shrimp		14
<i>Leptestheria compleximanus</i>	Playa clam shrimp		14
<i>Eulimnadia cylindrova</i>	Clam shrimp		14
Order Cladocera	Water fleas		14
<i>Branchia potens</i>	Solpugid		11
<i>Eremobates ajoanus</i>	Solpugid		11
<i>Eremochelis morrissi</i>	Solpugid		11
<i>Eremorhax titania</i>	Solpugid		11
<i>Eremocosta titania</i>	Solpugid		11
<i>Hermerotrecha branchi</i>	Solpugid		11
Order Opiliones	Daddy Long Legs		11
<i>Aphonopelma iodium</i>	Desert Tarantula		11
<i>Paruroctonus mesaensis</i>	Scorpion		11
Family Araneidae	Orb Weaver		11
<i>Gnaphosa</i> sp.	Stealthy Ground Spider		11
Family Lycosidae	Wolf Spider		11
<i>Syspira tigrina</i>	Prowling Spider		11
<i>Peucetia viridans</i>	Lynx Spider		11
<i>Philodromus</i> sp.	Running Crab Spider		11
<i>Psilochorus</i> sp.	Cellar Spider		11
Family Salticidae	Jumping Spider		11
<i>Loxosceles deserta</i>	Violin (Recluse) Spider		11
<i>Misumenops rothi</i>	Crab Spider		11
Order Isopoda	Desert Pillbug		11
Family Poduridae	Springtail		11
<i>Leucolepisma arenaria</i>	Silverfish		11
<i>Machilis</i> sp.	Jumping Bristletail		11
<i>Baetidae</i> sp.	Minnow Mayfly		11
<i>Pachydiplax longipennis</i>	Blue Dasher		11
<i>Erythemis collocata</i>	Western Pondhawk		11
<i>Sympetrum corruptum</i>	Variiegated Meadowhawk		11
<i>Pantala hymenaea</i>	Spot-winged Glider		11

Scientific Name	Common Name	Special Status	Reference
<i>Pantala flavescens</i>	Wandering Glider		11
Family Libellulidae	Skimmer		11
Family Coenagrionidae	Damselfly		11
<i>Enallagma civile</i>	Familiar Bluet		11
<i>Aeoloplides tenuipennis</i>	Grasshopper		11
<i>Anconia integra</i>	Alkali Grasshopper		11
<i>Boottettix argentatus</i>	Creosote Bush Grasshopper		11
<i>Cibolacris parviceps</i>	Cream Grasshopper		11
<i>Ligurotettix coquilletti</i>	Desert Clicker Grasshopper		11
<i>Melanoplus yarrowii</i>	Yarrow's Grasshopper		11
<i>Paropomala pallida</i>	Grasshopper		11
<i>Poecilotettix sanguineus</i>	Grasshopper		11
<i>Schistocerca</i> sp.	Red-lined Grasshopper		11
<i>Trimerotropis pallidipennis</i>	Pallid-winged Grasshopper		11
<i>Trimerotropis pseudofasciata</i>	Grasshopper		11
<i>Conozoa (=Trimerotropis) rebellis</i>	Grasshopper		11
<i>Tytthotyle maculata</i>	Grasshopper		11
<i>Gryllus (=Acheta) assimilis</i>	Cricket		11
<i>Acheta domestica</i>	House Cricket		11
<i>Anaxipha</i> sp.	Cricket		11
Subfamily Nemobiinae	Cricket		11
<i>Ceuthophilus</i> sp.	Camel Cricket		11
<i>Tanaocerus koebelei</i>	Koebele's Desert Long-horned Grasshopper		11
<i>Capnobotes fuliginosus</i>	Sooty-winged Katydid		11
<i>Eremopedes bilineatus</i>	Two-lined Shieldback Katydid		11
<i>Insara covilleae</i>	Creosote Bush Katydid		11
<i>Blatta orientalis</i>	Oriental Cockroach		11
<i>Periplaneta</i> sp.	Cockroach		11
<i>Arenivaga</i> sp.	Desert Cockroach		11
<i>Eremoblatta subdiaphana</i>	Hairy Desert Cockroach		11
<i>Litaneutria minor</i>	Minor Ground Mantid		11
<i>Iris oratoria</i>	Mediterranean Mantid		11
<i>Stagmomantis californica</i>	California Mantid		11
Order Isoptera	Termite		11
Family Phasmatidae	Walking Stick		11
<i>Oligotoma nigra</i>	Black Webspinner		11
<i>Orius tristicolor</i>	Minute Pirate Bug		11

Scientific Name	Common Name	Special Status	Reference
<i>Apiomeris</i> sp.	Bee Assassins		11
Family Berytidae	Stilt Bug		11
Family Coreidae	Leaf-footed Bug		11
<i>Corisella decolor</i>	Water Boatmen		11
<i>Pangaeus congruus</i>	Burrower Bug		11
<i>Cydnidae</i> sp.	Burrower Bug		11
<i>Largus californicus</i>	California Plant Bug		11
<i>Geocoris pallens</i>	Western Big-eyed Bug		11
<i>Lygaeus kalmii</i>	Small Milkweed Bug		11
<i>Melacoryphus</i> (= <i>Neacoryphus</i> ) <i>lateralis</i>	Black-and-red Seed Bug		11
<i>Nysius tenellus</i>	Seed Bug		11
<i>Pseudopamera nitidula</i>	Dirt-colored Seed Bug		11
<i>Chlamydatus monilipes</i>	Plant Bug		11
<i>Hadronema princeps</i>	Plant Bug		11
<i>Hoplomachides consors</i>	Plant Bug		11
<i>Lopidea confraterna</i>	Plant Bug		11
<i>Parthenicus picicollis</i>	Plant Bug		11
<i>Phytocoris ramosus</i>	Plant Bug		11
<i>Phytocoris ingens</i>	Plant Bug		11
<i>Taylorilgus pallidulus</i>	Plant Bug		11
<i>Tropidosteptes</i> sp.	Plant Bug		11
<i>Nabis americanoferus</i>	Common Damsel Bug		11
<i>Buenos</i> sp.	Back Swimmer		11
<i>Notonecta indica</i>	Back Swimmer		11
<i>Chlorochroa sayi</i>	Say's Stink Bug		11
<i>Dendrocoris contaminatus</i>	Stink Bug		11
<i>Tepa brevis</i>	Stink Bug		11
<i>Thyanta pallidovirens</i>	Stink Bug		11
<i>Thyanta custator</i>	Red-shouldered Stink Bug		11
Family Phymatidae	Ambush Bug		11
<i>Paratriatoma hirsuta</i>	Assassin Bug		11
<i>Triatoma protracta</i>	Western Bloodsucking Conenose		11
<i>Zelus renardii</i>	Leaf Hopper Assassin Bug		11
<i>Arhyssus lateralis</i>	Scentless Plant Bug		11
<i>Harmostes reflexulus</i>	Scentless Plant Bug		11
<i>Liorhyssus hyalinus</i>	Scentless Plant Bug		11
<i>Saldula pallipes</i>	Shore Bug		11
Family Tingidae	Lace Bug		11

Scientific Name	Common Name	Special Status	Reference
Family Aphidae	Aphid		11
Family Cercopidae	Spittlebug		11
<i>Norvellina</i> sp.	Leafhopper		11
<i>Xerophloea peltata</i>	Leafhopper		11
<i>Okanagana vanduzeei</i>	Cicada		11
<i>Oecleus decens</i>	Cixiid Planthopper		11
Family Delphacidae	Delphacid Planthopper		11
Family Dictyopharidae	Dictyopharid Planthopper		11
<i>Ormenis saucia</i>	Flatid Planthopper		11
<i>Micrutalis</i> sp.	Treehopper		11
<i>Multareis cornutus</i>	Treehopper		11
<i>Multareoides bifurcatus</i>	Treehopper		11
Family Psyllidae	Psyllid (Jumping Plantlice)		11
<i>Coniopteryx</i> sp.	Dusty-wing		11
<i>Neoconis</i> sp.	Dusty-wing		11
<i>Chrysopa coloradensis</i>	Green Lacewing		11
<i>Chrysoperla comanche</i>	Comanche Green Lacewing		11
<i>Chrysoperla plorabunda</i>	Weeping Green Lacewing		11
<i>Eremochrysa tibialis</i>	Green Lacewing		11
<i>Eremochrysa punctinervis</i>	Green Lacewing		11
<i>Pimarchrysa albicostales</i>	Green Lacewing		11
<i>Micromus variolosus</i>	Brown Lacewing		11
<i>Sympherobius killingtoni</i>	Brown Lacewing		11
<i>Sympherobius perparvus</i>	Brown Lacewing		11
<i>Megalomus moestus</i>	Brown Lacewing		11
<i>Plega</i> sp.	Mantispid		11
<i>Plega signata</i>	Mantispid		11
<i>Brachynemurus pulchellus</i>	Antlion		11
<i>Brachynemurus sackeni</i>	Antlion		11
<i>Clathroneuria coquilletti</i>	Antlion		11
<i>Clathroneuria schwarzi</i>	Antlion		11
<i>Eremoleon insipidus</i>	Antlion		11
<i>Eremoleon nigribasis</i>	Antlion		11
<i>Gnopholeon barberi</i>	Antlion		11
<i>Gnopholeon delicatulus</i>	Antlion		11
<i>Myrmeleon arizonicus</i>	Antlion		11
<i>Myrmeleon californicus</i>	Antlion		11
<i>Paranthaclisis congener</i>	Antlion		11
<i>Paranthaclisis hageni</i>	Antlion		11



Scientific Name	Common Name	Special Status	Reference
<i>Paranthaclisis nevadensis</i>	Antlion		11
<i>Scotoleon carrizonus</i>	Antlion		11
<i>Scotoleon eiseni</i>	Antlion		11
<i>Scotoleon deflexus</i>	Antlion		11
<i>Scotoleon expansus</i>	Antlion		11
<i>Scotoleon fidelitas</i>	Antlion		11
<i>Scotoleon intermedius</i>	Antlion		11
<i>Scotoleon longipalpis</i>	Antlion		11
<i>Scotoleon minusculus</i>	Antlion		11
<i>Scotoleon minutus</i>	Antlion		11
<i>Scotoleon pallidus</i>	Antlion		11
<i>Scotoleon quadripunctatus</i>	Antlion		11
<i>Scotoleon singularis</i>	Antlion		11
<i>Scotoleon yavapai</i>	Antlion		11
<i>Tyttholeon puerilis</i>	Antlion		11
<i>Xeranobium</i> sp.	Anobiid Beetle		11
Family Anthicidae	Antlike Flower Beetle		11
<i>Apatides fortis</i>	Horned Powderpost Beetle		11
Family Bruchidae	Seed Beetle		11
<i>Acmaeodera lata</i>	Metallic Wood-boring Beetle		11
<i>Agrilus</i> sp.	Metallic Wood-boring Beetle		11
<i>Chrysobothris debilis</i>	Metallic Wood-boring Beetle		11
<i>Hippomelas</i> sp.*	Metallic Wood-boring Beetle		11
<i>Bembidion</i> sp.	Ground Beetle		11
<i>Calosoma peregrinator</i>	Ground Beetle		11
<i>Cicindela punctulata</i>	Tiger Beetle		11
<i>Aneflomorpha</i> sp.	Longhorn Beetle		11
<i>Derobrachus geminatus</i>	Longhorn Beetle		11
<i>Plionoma rubens</i>	Longhorn Beetle		11
<i>Neochlamisus</i> sp.	Leaf Beetle		11
<i>Saxinis saucia</i>	Red-shouldered Leaf Beetle		11
<i>Phyllotreta</i> sp.	Leaf Beetle		11
<i>Chaetocnema ectypa</i>	Leaf Beetle		11
<i>Pachybrachis desertus</i>	Leaf Beetle		11
<i>Stenopodius</i> sp.	Leaf Beetle		11
<i>Cymatodera punctata</i>	Checkered Beetle		11
<i>Trichodes ornatus</i>	Ornate Checkered Beetle		11
<i>Hippodamia convergens</i>	Convergent Lady Beetle		11
<i>Olla v-nigrum</i>	Ashy Gray Lady Beetle		11

Scientific Name	Common Name	Special Status	Reference
Family Cryptophagidae	Silken Fungus Beetle		11
<i>Ophryastes argentatus</i>	Broad-Nosed Weevil		11
<i>Apleurus angularis</i>	Cylindrical Weevil		11
Family Dascillidae	Soft-bodied Plant Beetle		11
<i>Anthrenus</i> sp.	Carpet Beetle		11
<i>Dermestes marmoratus</i>	Common Carrion Dermestid		11
<i>Trogoderma variabile</i>	Warehouse Beetle		11
<i>Novelsis uteana</i>	Skin Beetle		11
Family Dyticidae	Predaceous Diving beetle		11
<i>Horistonotus</i> sp.	Click Beetle		11
<i>Aphricus</i> sp.	Click Beetle		11
<i>Aeolus</i> sp.	Click Beetle		11
<i>Heterocerus gnatho</i>	Variegated Mud-loving Beetle		11
<i>Saprinus</i> sp.	Hister Beetle		11
<i>Xerosaprinus</i> sp.	Hister Beetle		11
<i>Tropisternus lateralis</i>	Water Scavenger Beetle		11
<i>Berosus punctulatus</i>	Water Scavenger Beetle		11
<i>Cysteodemus armatus</i>	Inflated Blister Beetle		11
<i>Eupompha</i> sp.	Blister Beetle		11
<i>Lytta auriculata</i>	Red-eared Blister Beetle		11
<i>Lytta magister</i>	Magisterial Blister Beetle		11
<i>Nemognatha macswaini</i>	Blister Beetle		11
<i>Nemognatha nigripennis</i>	Blister Beetle		11
<i>Pleuropasta mirabilis</i>	Blister Beetle		11
<i>Zonitis atripennis</i>	Blister Beetle		11
<i>Epicauta lauta</i>	Blister Beetle		11
<i>Epicauta tenella</i>	Blister Beetle		11
<i>Epicauta wheeleri</i>	Blister Beetle		11
<i>Meloe strigulosus</i>	Blister Beetle		11
<i>Tanaops</i> sp.	Soft-winged Flower Beetle		11
<i>Attalus</i> sp.*	Soft-winged Flower Beetle		11
<i>Pentaria</i> sp.*	Tumbling Flower Beetle		11
<i>Mordella albosuturalis</i>	Tumbling Flower Beetle		11
<i>Mordellistena</i> sp.	Tumbling Flower Beetle		11
Family Nitidulidae	Sap Beetle		11
Family Oedemeridae	False Blister Beetle		11
Family Phengodidae	Water-penny Beetle		11
Subfamily Pedilinae	Fire-colored Beetle		11
Family Ripiphoridae	Ripiphorid Beetle		11

Scientific Name	Common Name	Special Status	Reference
<i>Labarrus (=Aphodius) lividus</i>	Scarab Beetle		11
<i>Cyclocephala longula</i>	Scarab Beetle		11
<i>Diplotaxis subangulata</i>	Scarab Beetle		11
<i>Diplotaxis moerens</i>	Scarab Beetle		11
<i>Ligyris gibbosus</i>	Carrot Beetle		11
<i>Phobetus mojavus</i>	Scarab Beetle		11
<i>Belonuchus sp.</i>	Rove Beetle		11
<i>Cryptoglossa verrucosa</i>	Darkling Beetle		11
<i>Alleculina sp.</i>	Darkling Beetle		11
<i>Auchmobius picipes</i>	Darkling Beetle		11
<i>Cryptoglossa sp.*</i>	Darkling Beetle		11
<i>Cryptoglossa (=Centrioptera) muricata</i>	Darkling Beetle		11
<i>Chilometopon sp.</i>	Darkling Beetle		11
<i>Cnemodinus sp.</i>	Darkling Beetle		11
<i>Coniontis parviceps</i>	Darkling Beetle		11
<i>Edrotes ventricosus</i>	Darkling Beetle		11
<i>Eleodes armata</i>	Armored Stink Beetle		11
<i>Eupsophulus castaneus</i>	Darkling Beetle		11
<i>Eurymetopon sp.</i>	Darkling Beetle		11
<i>Hymenorus montivagus</i>	Darkling Beetle		11
<i>Melanastus sp.</i>	Darkling Beetle		11
<i>Metoponium sp.</i>	Darkling Beetle		11
<i>Philolithus acutuosus</i>	Darkling Beetle		11
<i>Euchaetes zella</i>	Tiger Moth		11
			11
<i>Givira mucida</i>	Goat Moth (Carpenterworm)		
<i>Aroga paulella</i>	Gelechiid Moth		11
<i>Arotrura sp.</i>	Gelechiid Moth		11
<i>Lita sp.</i>	Gelechiid Moth		11
<i>Animomyia smithii</i>	Measuringworm Moth		11
<i>Archirhoe neomexicana</i>	Measuringworm Moth		11
<i>Chesiadodes coniferaria</i>	Measuringworm Moth		11
<i>Chlorochlamys appellaria</i>	Measuringworm Moth		11
<i>Dichorda rectaria</i>	Measuringworm Moth		11
<i>Eupithecia deserticola</i>	Measuringworm Moth		11
<i>Glaucina erroraria</i>	Measuringworm Moth		11
<i>Lobocleta lanceolata</i>	Measuringworm Moth		11
<i>Lobocleta ossularia</i>	Measuringworm Moth		11

Scientific Name	Common Name	Special Status	Reference
<i>Marmopteryx tessellata</i>	Measuringworm Moth		11
<i>Narraga fimetaria</i>	Measuringworm Moth		11
<i>Nasusina minuta</i>	Measuringworm Moth		11
<i>Nemoria intensaria</i>	Emerald		11
<i>Plataea diva</i>	Measuringworm Moth		11
<i>Digrammia (=Semiothisa) colorata</i>	Creosote Moth		11
<i>Semiothisa cyda</i>	Measuringworm Moth		11
<i>Yermoia perplexata</i>	Measuringworm Moth		11
<i>Erynnis funeralis</i>	Funereal Duskywing		11
<i>Heliopetes ericetorum</i>	Northern White-skipper		11
<i>Hylephila phyleus</i>	Fiery Skipper		11
<i>Lerodea eufala</i>	Eufala Skipper		11
<i>Burnsius albezens</i>	White Checkered-skipper		11
<i>Pyrgus scriptura</i>	Small Checkered-skipper		11
<i>Hesperopsis (=Pholisora) libya</i>	Sootywing		11
<i>Tegeticula yuccasella</i>	Yucca Moth		11
<i>Atlides halesus</i>	Great Purple Hairstreak		11
<i>Brephidium exilis</i>	Pygmy Blue		11
<i>Euphilotes enoptes</i>	Dotted Blue		11
<i>Euphilotes mojave</i>	Dotted Blue		11
<i>Euphilotes bernardino</i>	Dotted Blue		11
<i>Hemiargus ceraunus</i>	Ceraunus (Edward's) Blue		11
<i>Echinargus (=Hemiargus) isola</i>	Reakirt's Blue		11
<i>Icaricia (=Plebejus) acmon</i>	Acmon Blue		11
<i>Leptotes marina</i>	Marine Blue		11
<i>Strymon melinus</i>	Gray Hairstreak		11
<i>Abagrotis discoidalis</i>	Owlet Moth		11
<i>Abagrotis forbesi</i>	Owlet Moth		11
<i>Abagrotis nefascia</i>	Owlet Moth		11
<i>Abagrotis reedi</i>	Owlet Moth		11
<i>Tarache (=Acontia) arida</i>	Owlet Moth		11
<i>Acontia disconnecta</i>	Owlet Moth		11
<i>Acontia tetragonsa</i>	Owlet Moth		11
<i>Allerastria albiciliatus</i>	Owlet Moth		11
<i>Agrotis ipsilon</i>	Black Cutworm Moth		11
<i>Feltia (=Agrotis) subterranea</i>	Owlet Moth		11
<i>Aseptis serrula</i>	Owlet Moth		11

Scientific Name	Common Name	Special Status	Reference
<i>Autographa californica</i>	Alfalfa Looper		11
<i>Bulia deducta</i>	Owlet Moth		11
<i>Argentostiria (=Chalcopasta) koebelei</i>	Owlet Moth		11
<i>Ponometia (=Conochares) acutus</i>	Owlet Moth		11
<i>Ponometia elegantula (=Conochares arizonae)</i>	Owlet Moth		11
<i>Protogygia (=Copablepharon) album</i>	Owlet Moth		11
<i>Cucullia cucullioides</i>	Owlet Moth		11
<i>Cucullia (=Copicucullia) antipoda</i>	Owlet Moth		11
<i>Cucullia (=Copicucullia) heinrichi</i>	Owlet Moth		11
<i>Dargida procinctus</i>	Owlet Moth		11
<i>Anarta (=Discestra) fulgora</i>	Owlet Moth		11
<i>Euaontia clarki</i>	Owlet Moth		11
<i>Euxoa auxiliaris</i>	Army Cutworm		11
<i>Euxoa oncocnemoides</i>	Owlet Moth		11
<i>Euxoa olivalis</i>	Owlet Moth		11
<i>Euxoa reclusa</i>	Owlet Moth		11
<i>Euxoa silens</i>	Owlet Moth		11
<i>Grotella stretchii</i>	Owlet Moth		11
<i>Grotellaforma lactea</i>	Owlet Moth		11
<i>Hadenella pergentilis</i>	Owlet Moth		11
<i>Heliolonche pictipennis</i>	Owlet Moth		11
<i>Heliothis phloxiphaga</i>	Owlet Moth		11
<i>Helicoverpa (=Heliothis) zea</i>	Owlet Moth		11
<i>Heteranasia</i> sp.	Owlet Moth		11
<i>Hypopta palmata</i>	Owlet Moth		11
<i>Lacinipolia laudabilis</i>	Owlet Moth		11
<i>Leucocnemis variabilis</i>	Owlet Moth		11
<i>Melipotis indomita</i>	Owlet Moth		11
<i>Melipotis jucunda</i>	Owlet Moth		11
<i>Mimoschinia rufofascialis</i>	Owlet Moth		11
<i>Neotarache deserticola</i>	Owlet Moth		11
<i>Nocloa pallens</i>	Owlet Moth		11
<i>Viridiseptis (=Oligia) marina</i>	Owlet Moth		11

Scientific Name	Common Name	Special Status	Reference
<i>Unciella</i> (=Oncocnemis) <i>primula</i>	Owlet Moth		11
<i>Oxycnemis fusimacula</i>	Owlet Moth		11
<i>Peridroma saucia</i>	Owlet Moth		11
<i>Ponometia macdunnoughi</i>	Owlet Moth		11
<i>Ponometia megocula</i>	Owlet Moth		11
<i>Protogygia biclavis</i>	Owlet Moth		11
<i>Provia argentata</i>	Owlet Moth		11
<i>Pseudanarta crocea</i>	Owlet Moth		11
<i>Parabagrotis</i> (=Rhynchagrotis) <i>formalis</i>	Owlet Moth		11
<i>Rhizagrotis cloanthoides</i>	Owlet Moth		11
<i>Schinia dobla</i>	Owlet Moth		11
<i>Schinia ligeae</i>	Owlet Moth		11
<i>Spaelotis havilae</i>	Owlet Moth		11
<i>Spodoptera exigua</i>	Beet Armyworm Moth		11
<i>Spodoptera frugiperda</i>	Fall Armyworm Moth		11
<i>Drasteria</i> (=Synedoida) <i>fumosa</i>	Owlet Moth		11
<i>Drasteria</i> (=Synedoida) <i>tejonica</i>	Owlet Moth		11
<i>Toxonprucha volucris</i>	Owlet Moth		11
<i>Trichoplusia ni</i>	Cabbage Looper Moth		11
<i>Tridepia nova</i>	Owlet Moth		11
<i>Triocnemis saporis</i>	Owlet Moth		11
<i>Zale insuda</i>	Owlet Moth		11
<i>Furcula nivea</i>	Prominent Moth		11
<i>Chlosyne</i> (=Charidryas) <i>neumogeni</i>	Brush-footed Butterfly		11
<i>Chlosyne californica</i>	California Patch		11
<i>Danaus gillippus</i>	Queen		11
<i>Danaus plexippus</i>	Monarch		11
<i>Euptoieta claudia</i>	Brush-footed Butterfly		11
<i>Libytheana bachmanii</i>	Snout Butterfly		11
<i>Junonia</i> (=Precis) <i>coenia</i>	Common Buckeye		11
<i>Vanessa cardui</i>	Painted Lady		11
<i>Vanessa annabella</i>	West Coast Lady		11
<i>Papilio indra</i>	Indra Swallowtail		11
<i>Papilio polyxenes</i>	Black Swallowtail		11
<i>Anthocharis cethura</i>	Desert Orangetip		11

Scientific Name	Common Name	Special Status	Reference
<i>Anthocharis sara</i>	Sara's Orangetip		11
<i>Colias eurytheme</i>	Alfalfa (Orange) Sulphur		11
<i>Euchloe hyantis</i>	Pearly Marble		11
<i>Euchloe</i> sp.*	Marble		11
<i>Nathalis iole</i>	Dainty Sulphur		11
<i>Pieris rapae</i>	Cabbage White		11
<i>Pontia protodice</i>	Common (Checkered) White		11
<i>Pontia beckerii</i>	Becker's White		11
<i>Phoebis sennae</i>	Senna (Cloudless) Sulphur		11
Family Pterophoridae	Pterophorid Moth		11
<i>Ypsolopha delicatella</i>	Diamondback Moth		11
<i>Oiketicus</i> sp.	Bagworm Moth		11
<i>Achyra occidentalis</i>	Pyralid Moth		11
<i>Achyra rantalis</i>	Pyralid Moth		11
<i>Arenochroa flavalis</i>	Pyralid Moth		11
<i>Cahela ponderosella</i>	Pyralid Moth		11
<i>Euchromius ocellus</i>	Pyralid Moth		11
<i>Evercestis comstocki</i>	Pyralid Moth		11
<i>Helvibotys pseudohelvialis</i>	Pyralid Moth		11
<i>Toripalpus (=Jocara) trabalis</i>	Pyralid Moth		11
<i>Loxostege albiceralis</i>	Pyralid Moth		11
<i>Loxostege oberthuralis</i>	Pyralid Moth		11
<i>Loxostege sticticalis</i>	Pyralid Moth		11
<i>Nomophila nearctica</i>	Lucerne Moth		11
<i>Prorasea sideralis</i>	Pyralid Moth		11
<i>Pyrausta pseudonythesalis</i>	Pyralid Moth		11
<i>Ragonotia dotalis</i>	Pyralid Moth		11
<i>Spoladea recurvalis</i>	Pyralid Moth		11
<i>Apodemia mormo</i>	Mormon Metalmark		11
<i>Hemileuca burnsi</i>	Giant Silk Moth		11
<i>Erinnyis ello</i>	Hawk Moth		11
<i>Erinnyis obscura</i>	Hawk Moth		11
<i>Hyles lineata</i>	White-lined Sphinx		11
<i>Manduca quinquemaculatus</i>	Tomato Hornworm Moth		11
<i>Acrolophus variabilis</i>	Tineid Moth		11
<i>Cydia latiferreana</i>	Tortricid Moth		11
<i>Eucosma</i> sp.	Tortricid Moth		11
Family Agromyzidae	Leafminer Fly		11
<i>Pegomya</i> sp*	Anthomyiid Fly		11

Scientific Name	Common Name	Special Status	Reference
<i>Apiocera pearcei</i>	Flower-loving Fly		11
<i>Ablautus</i> sp.	Robber Fly		11
<i>Cerotainiops</i> sp.	Robber Fly		11
<i>Efferia</i> sp.	Robber Fly		11
<i>Protocanthella</i> sp.	Robber Fly		11
<i>Megaphorus frustrus</i>	Robber Fly		11
<i>Proctacanthus</i> sp.	Robber Fly		11
<i>Stichopogon</i> sp.	Robber Fly		11
<i>Backomyia</i> sp.	Robber Fly		11
<i>Itolia timberlakei</i>	Robber Fly		11
<i>Saropogon</i> sp.	Robber Fly		11
<i>Promachus</i> sp.	Robber Fly		11
<i>Haplopogon</i> sp.	Robber Fly		11
<i>Anthrax</i> sp.	Bee Fly		11
<i>Apoloyysis</i> sp.	Bee Fly		11
<i>Aphoebantus</i> sp.	Bee Fly		11
<i>Bombylius</i> sp.	Bee Fly		11
<i>Chrysanthrax</i> sp.*	Bee Fly		11
<i>Eucessia</i> sp.	Bee Fly		11
<i>Exoprosopa</i> sp.	Bee Fly		11
<i>Geminaria</i> sp.	Bee Fly		11
<i>Geron</i> sp.	Bee Fly		11
<i>Lepidanthrax</i> sp.	Bee Fly		11
<i>Lordotus</i> sp.	Bee Fly		11
<i>Neodipiocampta</i> sp.	Bee Fly		11
<i>Ogcodocera</i> sp.	Bee Fly		11
<i>Oligodranes</i> sp.	Bee Fly		11
<i>Pantarbes</i> sp.	Bee Fly		11
<i>Phthiria</i> sp.	Bee Fly		11
<i>Poecilanthrax</i> sp.	Bee Fly		11
<i>Parabombylius</i> sp.	Bee Fly		11
<i>Thevenemyia</i> sp.	Bee Fly		11
<i>Thyridanthrax</i> sp.	Bee Fly		11
<i>Toxophora virgata</i>	Bee Fly		11
<i>Triploechus</i> sp.	Bee Fly		11
<i>Villa</i> sp.	Bee Fly		11
Family Calliphoridae	Blow Fly		11
<i>Asphondylia</i> sp.	Gall Midge		11
Family Ceratopogonidae	Biting Midge		11



Scientific Name	Common Name	Special Status	Reference
Family Chamaemyiidae	Aphid Fly		11
Family Chironomidae	Midge		11
<i>Siphonella</i> sp.	Chloropid Fly		11
<i>Thaumatomyia rubida</i>	Chloropid Fly		11
Family Culicidae	Mosquito		11
Family Cuterebridae	Robust Bot Fly		11
<i>Hydrophorus</i> sp.	Long-legged Fly		11
<i>Drapetis</i> sp.	Dance Fly		11
<i>Ephydra</i> sp.	Brine Fly		11
<i>Mosillus tibialis</i>	Shore Fly		11
<i>Scatella paludum</i>	Shore Fly		11
Family Heleomyzidae	Heleomyzid Fly		11
Family Lauxaniidae	Lauxaniid Fly		11
Family Lonchaeidae	Spear-winged Fly		11
Family Milichiidae	Milichiid Fly		11
Family Muscidae	House Fly		11
Family Mycetophilidae	Fungus Gnat		11
<i>Opomydas</i> sp.	Mydas Fly		11
<i>Rhaphiomidas acton</i>	Flower-loving Fly		11
<i>Euxesta</i> sp.	Picture-winged Fly		11
Family Pipunculidae	Big-headed Fly		11
<i>Blaesoxipha plinthopyga</i>	Flesh Fly		11
<i>Metrichia bulbosa</i>	Window Fly		11
<i>Pherbellia vitalis</i>	Marsh Fly		11
<i>Sepsis</i> sp.	Black Scavenger Fly		11
Family Simuliidae	Black Fly		11
Family Sphaeroceridae	Small Dung Fly		11
<i>Nemotelus arator</i>	Soldier Fly		11
<i>Dieuryneura stigma</i>	Soldier Fly		11
<i>Eristalis latifrons</i>	Flower Fly		11
<i>Syrirta pipiens</i>	Flower Fly		11
<i>Eupeodes volucris</i>	Flower Fly		11
<i>Mallota</i> sp.	Flower Fly		11
<i>Meliscaeva</i> sp.	Flower Fly		11
<i>Chrysotoxum</i> sp.	Flower Fly		11
<i>Platycheirus stegnus</i>	Flower Fly		11
<i>Epistrophe</i> sp.	Flower Fly		11
<i>Tabanus punctifer</i>	Tachinid Fly		11
<i>Gymnosoma fuliginosum</i>	Tachinid Fly		11

Scientific Name	Common Name	Special Status	Reference
<i>Microchaetina</i> sp.	Tachinid Fly		11
<i>Paradidyma</i> sp.	Tachinid Fly		11
<i>Phasia aldrichi</i>	Tachinid Fly		11
<i>Peleteria malleola</i>	Tachinid Fly		11
<i>Exorista</i> sp.	Tachinid Fly		11
<i>Chetogena</i> sp.	Tachinid Fly		11
<i>Trupanea jonesi</i>	Fruit Fly		11
<i>Euarestoides acutangulus</i>	Fruit Fly		11
<i>Thereva</i> sp.	Stiletto Fly		11
Family Threophoridae	Threophorid Fly		11
Family Tipulidae	Crane Fly		11
Family Trixoscelididae	Trixoscelidid Fly		11
<i>Ancylandrena</i> sp.	Andrenid Bee		11
<i>Andrena</i> sp.	Burrowing Bee		11
<i>Perdita</i> sp.	Andrenid Bee		11
<i>Megandrena enceliae</i>	Andrenid Bee		11
<i>Nomada</i> sp.	Cuckoo Bee		11
<i>Melissodes</i> sp.	Cuckoo Bee		11
<i>Diadasia</i> sp.	Cuckoo Bee		11
<i>Svastra</i> sp.	Cuckoo Bee		11
<i>Tetraloniella</i> sp.	Cuckoo Bee		11
<i>Xeromelecta californica</i>	Cuckoo Bee		11
<i>Xeromelecta larreae</i>	Cuckoo Bee		11
<i>Xylocopa</i> sp.	Cuckoo Bee		11
<i>Anthophora</i> sp.	Cuckoo Bee		11
<i>Centris</i> sp.	Cuckoo Bee		11
<i>Melecta</i> sp.	Cuckoo Bee		11
<sup>N</sup> <i>Apis mellifera</i>	Honey Bee		11
<i>Anthophorula</i> sp.	Bee		11
<i>Idiomelissodes duplocincta</i>	Bee		11
Family Argidae	Argid Sawfly		11
Family Bethylidae	Bethylid Wasp		11
<i>Chelonus</i> sp.	Braconid Wasp		11
Family Chrysididae	Cuckoo Wasp		11
<i>Colletes</i> sp.	Yellow-faced (Plasterer) Bee		11
Family Chalcididae	Chalcid Wasp		11
Family Cynipidae	Gall Wasp		11
Family Encyrtidae	Encyrtid Wasp		11
Family Eulophidae	Eulophid Wasp		11

Scientific Name	Common Name	Special Status	Reference
Family Eupelmidae	Eupelmid Wasp		11
Family Eurytomidae	Seed Chalcid		11
<i>Crematogaster</i> sp.	Ant		11
<i>Leptothorax rugatulus</i>	Honey Ant		11
<i>Myrmecocystus kennedyi</i>	Honey Ant		11
<i>Myrmecocystus creightoni</i>	Honey Ant		11
<i>Monomorium minimum</i>	Ant		11
<i>Camponotus</i> sp.	Carpenter Ant		11
<i>Pogonomyrmex rugosus</i>	Harvester Ant		11
<i>Pogonomyrmex californicus</i>	California Harvester Ant		11
<i>Pogonomyrmex magnacanthus</i>	Harvester Ant		11
<i>Pseudomyrmex pallidus</i>	Ant		11
<i>Messor pergandei</i>	Black Harvester Ant		11
<i>Pheidole</i> sp.	Ant		11
<i>Iridomyrmex humulis</i>	Argentine Ant		11
<i>Dorymyrmex pyramicus</i>	Ant		11
<i>Dorymyrmex bicolor</i>	Ant		11
<i>Solenopsis xyloni</i>	Ant		11
Family Ichneumonidae	Ichneumonid Wasp		11
Family Halictidae	Halictid bee		11
<i>Ashmeadiella bigeloviae</i>	Leafcutting Bee		11
<i>Coeloxys</i> sp.	Leafcutting Bee		11
<i>Dianthidium</i> sp.	Leafcutting Bee		11
<i>Hoplitis</i> sp.	Leafcutting Bee		11
<i>Epeolus</i> sp.	Leafcutting Bee		11
<i>Neolarra</i> sp.	Leafcutting Bee		11
<i>Trachusa bequaerti</i>	Leafcutting Bee		11
<i>Trachusa larreae</i>	Leafcutting Bee		11
<i>Megachile</i> sp.	Leafcutting Bee		11
<i>Hesperapis</i> sp.	Melittid Bee		11
<i>Dasymutilla satanas</i>	Melittid Bee		11
Family Mutillidae	Velvet Ant		11
<i>Spharopthalma</i> sp.	Velvet Ant		11
Family Perilampidae	Perilampid Wasp		11
Family Platygasteridae	Platygasterid Wasp		11
Family Pteromalidae	Pteromalid Wasp		11
<i>Pepsis</i> sp.	Tarantula Hawk		11
<i>Anoplius cleora</i>	Blue-black Spider Wasp		11

Scientific Name	Common Name	Special Status	Reference
Family Scelionidae	Scelionid Wasp		11
<i>Campsomeris</i> sp.	Scoliid Wasp		11
<i>Ammophila wrighti</i>	Sphecid Wasp		11
<i>Aphilanthops hispidus</i>	Sphecid Wasp		11
<i>Astata</i> sp.	Sphecid Wasp		11
<i>Bembecinus</i> sp.	Sphecid Wasp		11
<i>Bembix rugosa</i>	Sphecid Wasp		11
<i>Cerceris acanthophila</i>	Sphecid Wasp		11
<i>Cerceris sextoides</i>	Sphecid Wasp		11
<i>Clypeadon evansi</i>	Sphecid Wasp		11
<i>Diploplectron</i> sp.	Sphecid Wasp		11
<i>Dryudella</i> sp.	Sphecid Wasp		11
<i>Eucerceris canaliculata</i>	Sphecid Wasp		11
<i>Eucerceris arenaria</i>	Sphecid Wasp		11
<i>Hoplisoides spiloapterus</i>	Sphecid Wasp		11
<i>Glenostictia</i> sp.	Sphecid Wasp		11
<i>Microbembix argyropleura</i>	Sphecid Wasp		11
<i>Microstictia</i> sp.	Sphecid Wasp		11
<i>Philanthus</i> sp.	Sphecid Wasp		11
<i>Podalonia</i> sp.*	Sphecid Wasp		11
<i>Prionyx foxi</i>	Sphecid Wasp		11
<i>Prionyx parkeri</i>	Sphecid Wasp		11
<i>Steniola duplicata</i>	Sphecid Wasp		11
<i>Stictiella</i> sp.	Sphecid Wasp		11
<i>Sphecius convallis</i>	Sphecid Wasp		11
<i>Sphex ashmeadii</i>	Sphecid Wasp		11
<i>Tachytes ermineus</i>	Sphecid Wasp		11
Family Tiphiidae	Tiphiid Wasp		11
Family Torymidae	Torymid Wasp		11
<i>Trichogramma pratti</i>	Trichogrammatid Wasp		11
<i>Trichogramma kaykai</i>	Trichogrammatid Wasp		11
Subfamily Eumeninae	Vespid Wasp		11
<i>Euodynerus annulatus</i>	Vespid Wasp		11
<i>Pseudomasaris edwardsii</i>	Vespid Wasp		11
<i>Pseudomasaris maculifrons</i>	Vespid Wasp		11
<i>Pseudomasaris wheeleri</i>	Vespid Wasp		11
<i>Pterocheilus mirandus</i>	Vespid Wasp		11
<i>Pterocheilus hirsutipennis</i>	Vespid Wasp		11
<i>Pterocheilus laticeps</i>	Vespid Wasp		11

Scientific Name	Common Name	Special Status	Reference
<i>Pterocheilus pimorum</i>	Vespid Wasp		11
<i>Polistes fuscatus</i>	Paper Wasp		11
<b>Fish</b>			
<sup>N</sup> <i>Gambusia affinis</i>	Western Mosquitofish		15
<b>Amphibians</b>			
<i>Anaxyrus boreas</i>	Western Toad		12
<i>Anaxyrus punctatus</i>	Red-spotted Toad		12
<b>Reptiles</b>			
<i>Aspidoscelis tigris</i>	Western Whiptail		1, 7, 8, 12, 17
<i>Callisaurus draconoides</i>	Zebra-tailed Lizard		1, 7, 8, 9, 12, 17
<i>Coleonyx variegatus</i>	Banded Gecko		1, 7, 8, 9, 12
<i>Crotaphytus bicinctores</i>	Great Basin Collared Lizard		1, 9
<i>Crotaphytus insularis</i>	Desert Collared Lizard		12
<i>Dipsosaurus dorsalis</i>	Desert Iguana		1, 7, 8, 9, 12, 17
<i>Sauromalus ater</i>	Chuckwalla		1, 2, 9, 12, 17
<i>Gambelia wislizenii</i>	Long-nosed Leopard Lizard		1, 7, 8, 9, 12, 17
<i>Phrynosoma platyrhinos</i>	Desert Horned Lizard		1, 7, 8, 9, 12, 17
<i>Sceloporus magister</i>	Desert Spiny Lizard		1, 8, 9, 12, 17
<i>Uma scoparia</i>	Mojave Fringe-toed Lizard	CSC	7, 9
<i>Urosaurus graciosus</i>	Western Long-tailed Brush Lizard		1, 7, 9, 12
<i>Uta stansburiana</i>	Side-blotched Lizard		1, 7, 8, 9, 12, 17
<i>Plestiodon gilberti</i>	Gilbert Skink		Hypothetical
<i>Xantusia vigilis</i>	Desert Night Lizard		9, 12, 17
<i>Arizona elegans</i>	Glossy Snake		8, 9, 12
<i>Chionactis occipitalis</i>	Shovel-nosed Snake		8, 9, 12
<i>Coluber flagellum</i>	Red Racer (Coachwhip)		1, 8, 9, 12
<i>Crotalus atrox</i>	Western Diamondback		Hypothetical
<i>Crotalus cerastes</i>	Sidewinder		8, 9, 12, 17
<i>Crotalus mitchelli</i>	Speckled Rattlesnake		9, 12
<i>Crotalus oreganos (viridis)</i>	Western Rattlesnake		Hypothetical
<i>Crotalus scutulatus</i>	Mohave Rattlesnake		8, 9, 12
<i>Leptotyphlops humilis</i>	Western Blind Snake		Hypothetical
<i>Diadophis punctatus</i>	Ring-necked Snake		Hypothetical
<i>Hypsiglena torquata</i>	Night Snake		Hypothetical

Scientific Name	Common Name	Special Status	Reference
<i>Lampropeltis californiae</i>	California Kingsnake		9
<i>Lampropeltis getula</i>	Common Kingsnake		8, 12
<i>Lichanura trivirgata</i>	Rosy Boa		12
<i>Phyllorhynchus decurtatus</i>	Spotted Leaf-nosed Snake		8, 9, 12
<i>Pituophis catenifer</i>	Gopher Snake		1, 8, 9, 12
<i>Rhinocheilus lecontei lecontei</i>	Long-nosed Snake		12
<i>Salvadora hexalepis</i>	Western Patch-nosed Snake		9, 12
<i>Tantilla hobartsmithi</i>	Southwestern Black-headed Snake		Hypothetical
<i>Sonora semiannulata</i>	Western Groundsnake		1, 9
<i>Trimorphodon bisculatus</i>	Lyre Snake		17
<i>Gopherus agassizii</i>	Desert Tortoise	FT, ST, T1	7, 9, 12, 17
<b>Birds</b>			
<i>Anser albifrons</i>	Greater White-fronted Goose	MBTA	12
<i>Chen caerulescens</i>	Snow Goose	MBTA	12, 16
<i>Anser rossii</i>	Ross' Goose	MBTA	12
<i>Branta canadensis</i>	Canada Goose	MBTA	12
<i>Cygnus columbianus</i>	Tundra Swan	MBTA	12
<i>Mareca strepera</i>	Gadwall	MBTA	3, 12, 16
<i>Mareca americana</i>	American Wigeon	MBTA	12, 16
<i>Anas platyrhynchos</i>	Mallard	MBTA	3, 12, 16
<i>Spatula discors</i>	Blue-winged Teal	MBTA	3, 12, 16
<i>Spatula cyanoptera</i>	Cinnamon Teal	MBTA	3, 12, 16
<i>Spatula clypeata</i>	Northern Shoveler	MBTA	3, 12, 16
<i>Anas acuta</i>	Northern Pintail	MBTA	3, 12, 16
<i>Anas crecca</i>	Green-winged Teal	MBTA	3, 12, 16
<i>Aythya valisineria</i>	Canvasback	MBTA	12
<i>Aythya americana</i>	Redhead	CSC, MBTA	3, 12, 16
<i>Aythya collaris</i>	Ring-necked Duck	MBTA	3, 12, 16
<i>Aythya marila</i>	Greater Scaup	MBTA	12
<i>Aythya affinis</i>	Lesser Scaup	MBTA	3, 12, 16
<i>Clangula hyemalis</i>	Oldsquaw (Long-tailed Duck)	MBTA	12
<i>Bucephala albeola</i>	Bufflehead	MBTA	3, 12, 16
<i>Mergus merganser</i>	Common Merganser	MBTA	12
<i>Oxyura jamaicensis</i>	Ruddy Duck	MBTA	3, 12, 16
<i>Callipepla gambelii</i>	Gambel's Quail		1, 12
<i>Oreortyx pictus</i>	Mountain Quail		16

Scientific Name	Common Name	Special Status	Reference
<sup>N</sup> <i>Alectoris chukar</i>	Chukar		1
<i>Podilymbus podiceps</i>	Pied-billed Grebe	MBTA	12, 16
<i>Podiceps grisegena</i>	Red-necked Grebe	MBTA	12
<i>Podiceps nigricollis</i>	Eared Grebe	MBTA	3, 12, 16
<i>Aechmophorus occidentalis</i>	Western Grebe	MBTA	12
<i>Phalacrocorax auritus</i>	Double-crested Cormorant	MBTA	12
<i>Pelecanus erythrorhynchos</i>	American White Pelican	CSC, MBTA	12, 16
<i>Botaurus lentiginosus</i>	American Bittern	MBTA	16
<i>Ixobrychus exilis</i>	Least Bittern	CSC, MBTA	16
<i>Ardea herodias</i>	Great Blue Heron	MBTA	12
<i>Ardea alba</i>	Great Egret	MBTA	12
<i>Egretta thula</i>	Snowy Egret	MBTA	12, 16
<i>Bubulcus ibis</i>	Cattle Egret	MBTA	12
<i>Nycticorax nycticorax</i>	Black-crowned Night Heron	MBTA	16
<i>Butorides virescens</i>	Green Heron	MBTA	12, 16
<i>Plegadis chihi</i>	White-faced Ibis	MBTA	12
<i>Cathartes aura</i>	Turkey Vulture	MBTA	1, 12, 17
<i>Pandion haliaetus</i>	Osprey	MBTA	12
<i>Circus cyaneus</i>	Northern Harrier	CSC, MBTA	12, 13, 16
<i>Accipiter striatus</i>	Sharp-shinned Hawk	MBTA	12, 13, 16
<i>Accipiter cooperii</i>	Cooper's Hawk	MBTA	12, 13, 16
<i>Buteo lineatus</i>	Red-shouldered Hawk	MBTA	12
<i>Buteo jamaicensis</i>	Red-tailed Hawk	MBTA	1, 12, 16
<i>Buteo regalis</i>	Ferruginous Hawk	MBTA	12, 13, 16
<i>Buteo swainsoni</i>	Swainson's hawk	ST, MBTA	16, 17
<i>Aquila chrysaetos</i>	Golden Eagle	BEPA, CFP, MBTA	12, 13, 16
<i>Porzana carolina</i>	Sora	MBTA	12
<i>Rallus limicola</i>	Virginia Rail	MBTA	16
<i>Gallinula galeata</i> (= <i>chloropus</i> )	Common Gallinule	MBTA	16
<i>Fulica americana</i>	American Coot	MBTA	3, 12, 16
<i>Himantopus mexicanus</i>	Black-necked Stilt	MBTA	3, 12
<i>Recurvirostra americana</i>	American Avocet	MBTA	3, 12, 16
<i>Pluvialis squatarola</i>	Black-bellied Plover	MBTA	12
<i>Charadrius nivosus</i>	Snowy Plover	MBTA	12

Scientific Name	Common Name	Special Status	Reference
<i>Charadrius semipalmatus</i>	Semipalmated Plover	MBTA	12
<i>Charadrius vociferus</i>	Killdeer	MBTA	3, 12, 16
<i>Actitis macularius</i>	Spotted Sandpiper	MBTA	12, 16
<i>Tringa solitaria</i>	Solitary Sandpiper	MBTA	12, 16
<i>Tringa melanoleuca</i>	Greater Yellowlegs	MBTA	3, 12, 16
<i>Tringa semipalmata</i>	Willet	MBTA	12
<i>Tringa flavipes</i>	Lesser Yellowlegs	MBTA	3, 12
<i>Numenius americanus</i>	Long-billed Curlew	MBTA	12
<i>Limosa fedoa</i>	Marbled Godwit	MBTA	12
<i>Calidris alpina</i>	Dunlin	MBTA	12, 16
<i>Calidris minutilla</i>	Least Sandpiper	MBTA	3, 12, 16
<i>Calidris melanotos</i>	Pectoral Sandpiper	MBTA	12
<i>Calidris pusilla</i>	Semipalmated Sandpiper	MBTA	12
<i>Calidris mauri</i>	Western Sandpiper	MBTA	3, 12, 16
<i>Limnodromus griseus</i>	Short-billed Dowitcher	MBTA	12
<i>Limnodromus scolopaceus</i>	Long-billed Dowitcher	MBTA	12, 16
<i>Gallinago delicata</i> (= <i>gallinago</i> )	Wilson's Snipe	MBTA	12, 16
<i>Phalaropus tricolor</i>	Wilson's Phalarope	MBTA	12
<i>Phalaropus lobatus</i>	Red-necked Phalarope	MBTA	12, 16
<i>Phalaropus fulicarius</i>	Red Phalarope	MBTA	12
<i>Larus pipixcan</i>	Franklin's Gull	MBTA	12
<i>Larus philadelphia</i>	Bonaparte's Gull	MBTA	12, 16
<i>Larus canus</i>	Mew Gull	MBTA	12
<i>Larus delawarensis</i>	Ring-billed Gull	MBTA	3, 12, 16
<i>Larus occidentalis</i>	Western Gull	MBTA	12
<i>Larus californicus</i>	California Gull	MBTA	3, 12, 16
<i>Larus argentatus</i>	Herring Gull	MBTA	12
<i>Hydroprogne caspia</i>	Caspian Tern	MBTA	12
<i>Chlidonias niger</i>	Black Tern	CSC, MBTA	12, 13
<i>Sterna forsteri</i>	Forster's Tern	MBTA	12, 16
<sup>N</sup> <i>Columba livia</i>	Rock Pigeon		12, 16
<sup>N</sup> <i>Streptopelia decaocto</i>	Eurasian Collared-Dove		Hypothetical
<i>Zenaida asiatica</i>	White-winged Dove	MBTA	1, 12
<i>Zenaida macroura</i>	Mourning Dove	MBTA	1, 12, 16, 17
<i>Columbina inca</i>	Inca Dove	MBTA	12
<i>Patagionas fasciata</i>	Band-tailed Pigeon	MBTA	16
<i>Geococcyx californianus</i>	Greater Roadrunner	MBTA, T1	1, 12, 16



Scientific Name	Common Name	Special Status	Reference
<i>Tyto alba</i>	Barn Owl	MBTA	1, 12, 16
<i>Bubo virginianus</i>	Great Horned Owl	MBTA	1, 10, 12, 16
<i>Athene cunicularia</i>	Burrowing Owl	CSC, MBTA	4, 12, 13, 16
<i>Asio otus</i>	Long-eared Owl	CSC, MBTA	12, 13
<i>Asio flammeus</i>	Short-eared Owl	CSC, MBTA	12
<i>Chordeiles acutipennis</i>	Lesser Nighthawk	MBTA	1, 12
<i>Phalaenoptilus nuttallii</i>	Common Poorwill	MBTA	1, 12
<i>Chaetura vauxi</i>	Vaux's Swift	CSC, MBTA	12, 13, 16
<i>Aeronautes saxatalis</i>	White-throated Swift	MBTA	1, 12, 16, 17
<i>Archilochus alexandri</i>	Black-chinned Hummingbird	MBTA	1, 12
<i>Calypte anna</i>	Anna's Hummingbird	MBTA	1, 12, 16
<i>Calypte costae</i>	Costa's Hummingbird	MBTA	1, 12, 16
<i>Selasphorus rufus</i>	Rufous Hummingbird	MBTA	12
<i>Selasphorus sasin</i>	Allen's Hummingbird	MBTA	12
<i>Megaceryle alcyon</i>	Belted Kingfisher	MBTA	12, 16
<i>Melanerpes lewis</i>	Lewis' Woodpecker	MBTA	12
<i>Sphyrapicus varius</i>	Yellow-bellied Sapsucker	MBTA	12, 16
<i>Sphyrapicus nuchalis</i>	Red-naped Sapsucker	MBTA	12
<i>Dryobates scalaris</i>	Ladder-backed Woodpecker	MBTA	1, 12, 16
<i>Colaptes auratus</i>	Northern Flicker	MBTA	12, 16
<i>Colaptes chrysoides</i>	Gilded Flicker	SE, MBTA	12, 13
<i>Falco sparverius</i>	American Kestrel	MBTA	1, 12, 16
<i>Falco columbarius</i>	Merlin	MBTA	12, 13, 16
<i>Falco peregrinus anatum</i>	American Peregrine Falcon	CFP, MBTA	12, 13
<i>Falco mexicanus</i>	Prairie Falcon	MBTA	12, 16
<i>Contopus cooperi</i>	Olive-sided Flycatcher	CSC, MBTA	12
<i>Contopus sordidulus</i>	Western Wood-pewee	MBTA	12, 16, 17
<i>Empidonax traillii</i>	Willow Flycatcher	SE, MBTA	12, 16
<i>Empidonax hammondii</i>	Hammond's Flycatcher	MBTA	1, 12, 16
<i>Empidonax wrightii</i>	Gray Flycatcher	MBTA	12, 16, 17
<i>Empidonax oberholseri</i>	Dusky Flycatcher	MBTA	12
<i>Empidonax difficilis</i>	Pacific-slope Flycatcher	MBTA	1, 12, 16
<i>Sayornis nigricans</i>	Black Phoebe	MBTA	3, 12, 16

Scientific Name	Common Name	Special Status	Reference
<i>Sayornis saya</i>	Say's Phoebe	MBTA	1, 3, 12, 16, 17
<i>Myiarchus cinerascens</i>	Ash-throated Flycatcher	MBTA	1, 12, 16, 17
<i>Myiarchus tyrannulus</i>	Brown-crested Flycatcher	MBTA	12, 13
<i>Tyrannus vociferans</i>	Cassin's Kingbird	MBTA	12, 16
<i>Tyrannus verticalis</i>	Western Kingbird	MBTA	1, 12, 16
<i>Tyrannus forficatus</i>	Scissor-tailed Flycatcher	MBTA	12
<i>Lanius ludovicianus</i>	Loggerhead Shrike	CSC, MBTA	3, 12, 13, 16, 17
<i>Vireo bellii</i>	Bell's Vireo	MBTA	12
<i>Vireo solitarius</i>	Solitary Vireo	MBTA	12
<i>Vireo flavifrons</i>	Yellow-throated Vireo	MBTA	12
<i>Vireo huttoni</i>	Hutton's Vireo	MBTA	16
<i>Vireo gilvus</i>	Warbling Vireo	MBTA	12
<i>Aphelocoma californica</i>	Western Scrub Jay	MBTA	12
<i>Corvus brachyrhynchos</i>	American Crow	MBTA	12
<i>Corvus corax</i>	Common Raven	MBTA	1, 3, 12, 16, 17
<i>Eremophila alpestris</i>	Horned Lark	MBTA	1, 3, 12, 16, 17
<i>Tachycineta bicolor</i>	Tree Swallow	MBTA	3, 12, 16
<i>Tachycineta thalassina</i>	Violet-green Swallow	MBTA	1, 12, 16
<i>Stelgidopteryx serripennis</i>	Northern Rough-winged Swallow	MBTA	1, 3, 12, 16
<i>Riparia riparia</i>	Bank Swallow	ST, MBTA	12, 13
<i>Petrochelidon pyrrhonota</i>	Cliff Swallow	MBTA	1, 3, 12, 16
<i>Hirundo rustica</i>	Barn Swallow	MBTA	1, 3, 12, 16, 17
<i>Auriparus flaviceps</i>	Verdin	MBTA	1, 12, 16, 17
<i>Sitta canadensis</i>	Red-breasted Nuthatch	MBTA	12, 16
<i>Sitta carolinensis</i>	White-breasted Nuthatch	MBTA	12
<i>Salpinctes obsoletus</i>	Rock Wren	MBTA	1, 12, 16, 17
<i>Catherpes mexicanus</i>	Canyon Wren	MBTA	12
<i>Troglodytes aedon</i>	House Wren	MBTA	12
<i>Cistothorus palustris</i>	Marsh Wren	MBTA	12, 16
<i>Thryomanes bewickii</i>	Bewick's Wren	MBTA	12
<i>Campylorhynchus brunneicapillus</i>	Cactus Wren	MBTA	1, 12, 16, 17
<i>Polioptila caerulea</i>	Blue-gray Gnatcatcher	MBTA	1, 12, 16
<i>Polioptila melanura</i>	Black-tailed Gnatcatcher	MBTA	1, 12, 16, 17
<i>Regulus calendula</i>	Ruby-crowned Kinglet	MBTA	1, 12

Scientific Name	Common Name	Special Status	Reference
<i>Regulus satrapa</i>	Golden-crowned Kinglet	MBTA	16
<i>Sialia currucoides</i>	Mountain Bluebird	MBTA	12, 16
<i>Catharus ustulatus</i>	Swainson's Thrush	MBTA	12
<i>Catharus guttatus</i>	Hermit Thrush	MBTA	12, 16
<i>Turdus migratorius</i>	American Robin	MBTA	12, 16
<i>Myadestes townsendi</i>	Townsend's solitaire	MBTA	16
<i>Certhia americana</i>	Brown Creeper	MBTA	16
<i>Toxostoma redivivum</i>	California Thrasher	MBTA	12
<i>Toxostoma lecontei</i>	Le Conte's Thrasher	CSC, MBTA	12, 13, 16, 17
<i>Toxostoma bendirei</i>	Bendire's thrasher	CSC, MBTA	16
<i>Oreoscoptes montanus</i>	Sage Thrasher	MBTA	1, 12
<i>Mimus polyglottos</i>	Northern Mockingbird	MBTA	1, 12
<sup>N</sup> <i>Sturnus vulgaris</i>	European Starling		1, 3, 12, 16
<i>Anthus rufescens</i>	American Pipit	MBTA	3, 12
<i>Anthus spragueii</i>	Sprague's Pipit	MBTA	12
<i>Bombycilla cedrorum</i>	Cedar Waxwing	MBTA	12, 16
<i>Phainopepla nitens</i>	Phainopepla	MBTA	1, 12, 16
<i>Parkesia noveboracensis</i>	Northern Waterthrush	MBTA	12
<i>Oreothlypis luciae</i>	Lucy's Warbler	CSC, MBTA	1
<i>Oreothlypis celata</i>	Orange-crowned Warbler	MBTA	1, 12, 16, 17
<i>Oreothlypis ruficapilla</i>	Nashville Warbler	MBTA	12
<i>Geothlypis tolmiei</i>	MacGillivray's Warbler	MBTA	12, 16
<i>Geothlypis trichas</i>	Common Yellowthroat	MBTA	3, 12, 16
<i>Setophaga ruticilla</i>	American Redstart	MBTA	12
<i>Setophaga petechia</i>	Yellow Warbler	CSC, MBTA	12, 16, 17
<i>Setophaga pensylvanica</i>	Chestnut-sided Warbler	MBTA	12
<i>Setophaga coronata</i>	Yellow-rumped Warbler	MBTA	1, 3, 12, 16, 17
<i>Setophaga nigrescens</i>	Black-throated Gray Warbler	MBTA	12, 16
<i>Setophaga townsendi</i>	Townsend's Warbler	MBTA	1, 12, 16
<i>Setophaga occidentalis</i>	Hermit Warbler	MBTA	12
<i>Cardellina pusilla</i>	Wilson's Warbler	MBTA	1, 12, 16, 17
<i>Pipilo chlorurus</i>	Green-tailed Towhee	MBTA	12
<i>Pipilo maculatus</i>	Spotted Towhee	MBTA	12
<i>Spizella passerina</i>	Chipping Sparrow	MBTA	12, 16
<i>Spizella breweri</i>	Brewer's Sparrow	MBTA	1, 12, 16

Scientific Name	Common Name	Special Status	Reference
<i>Poocetes gramineus</i>	Vesper Sparrow	MBTA	12, 16
<i>Chondestes grammacus</i>	Lark Sparrow	MBTA	12, 16
<i>Amphispiza bilineata</i>	Black-throated Sparrow	MBTA	1, 12, 16, 17
<i>Artemisiospiza belli</i>	Sage Sparrow	MBTA	1, 12, 16, 17
<i>Passerculus sandwichensis</i>	Savannah Sparrow	MBTA	1, 3, 12, 16
<i>Melospiza melodia</i>	Song Sparrow	MBTA	12, 16
<i>Melospiza lincolnii</i>	Lincoln's Sparrow	MBTA	1, 12, 16
<i>Zonotrichia leucophrys</i>	White-crowned Sparrow	MBTA	1, 3, 12, 16
<i>Junco hyemalis</i>	Dark-eyed Junco	MBTA	12
<i>Spinus pinus</i>	Pine siskin	MBTA	16
<i>Rhynchophanes mccownii</i>	Thick-billed longspur	MBTA	16
<i>Piranga ludoviciana</i>	Western Tanager	MBTA	1, 12, 16, 17
<i>Pheucticus ludovicianus</i>	Rose-breasted Grosbeak	MBTA	12
<i>Pheucticus melanocephalus</i>	Black-headed Grosbeak	MBTA	1, 12, 16
<i>Passerina amoena</i>	Lazuli Bunting	MBTA	12
<i>Agelaius phoeniceus</i>	Red-winged Blackbird	MBTA	12, 16
<i>Sturnella neglecta</i>	Western Meadowlark	MBTA	1, 12, 16
<i>Xanthocephalus xanthocephalus</i>	Yellow-headed Blackbird	CSC, MBTA	12, 16
<i>Euphagus cyanocephalus</i>	Brewer's Blackbird	MBTA	3, 12, 16
<i>Quiscalus mexicanus</i>	Great-tailed Grackle	MBTA	3, 12
<sup>N</sup> <i>Molothrus ater</i>	Brown-headed Cowbird	MBTA	12, 16
<i>Icterus cucullatus</i>	Hooded Oriole	MBTA	12
<i>Icterus bullockii</i>	Bullock's Oriole	MBTA	12, 16
<i>Icterus parisorum</i>	Scott's Oriole	MBTA	12, 17
<i>Haemorhous mexicanus</i>	House Finch	MBTA	1,3, 12, 16, 17
<i>Loxia curvirostra</i>	Red Crossbill	MBTA	12
<i>Spinus psaltria</i>	Lesser Goldfinch	MBTA	1, 12, 16
<i>Spinus lawrencei</i>	Lawrence's Goldfinch	MBTA	12, 16
<sup>N</sup> <i>Passer domesticus</i>	House Sparrow		1, 12, 16
<b>Mammals</b>			
<i>Notiosorex crawfordi</i>	Desert Shrew		Hypothetical
<i>Macrotus californicus</i>	California Leaf-nosed Bat	CSC	17
<i>Myotis californicus</i>	California Myotis		5, 9, 10, 12
<i>Myotis ciliolabrum</i>	Small-footed Myotis	CSC	17
<i>Myotis thysanodes</i>	Fringed Myotis	CSC	Hypothetical
<i>Myotis volans</i>	Long-legged Myotis	CSC	Hypothetical

Scientific Name	Common Name	Special Status	Reference
<i>Myotis yumanensis</i>	Yuma Myotis		17
<i>Lasiurus blossevillii</i>	Western Red Bat	CSC	Hypothetical
<i>Lasiurus cinereus</i>	Hoary Bat		9, 12
<i>Lasiurus xanthinus</i>	Western Yellow Bat	CSC	10
<i>Parastrellus hesperus</i>	Canyon Bat		9, 10, 12, 17
<i>Eptesicus fuscus</i>	Big Brown Bat		12
<i>Euderma maculatum</i>	Spotted Bat	CSC	Hypothetical
<i>Corynorhinus townsendii</i>	Townsend's Big-eared Bat	ST	5, 10, 12
<i>Idionycteris phyllotis</i>	Allen's Big-eared Bat		Hypothetical
<i>Antrozous pallidus</i>	Pallid Bat	CSC	5, 9, 10, 12, 17
<i>Tadarida brasiliensis</i>	Mexican (Brazilian) Free-tailed Bat		5, 9, 10, 12
<i>Nyctinomops femorosaccus</i>	Pocketed Free-tailed Bat	CSC	9
<i>Nyctinomops macrotis</i>	Big Free-tailed Bat	CSC	Hypothetical
<i>Eumops perotis californicus</i>	Western Mastiff Bat	CSC	12
<i>Sylvilagus audubonii</i>	Desert Cottontail		9, 12
<i>Lepus californicus</i>	Black-tailed Jackrabbit		9, 12, 17
<i>Xerospermophilus tereticaudus</i>	Round-tailed Ground Squirrel		6, 9, 17
<i>Ammospermophilus leucurus</i>	White-tailed Antelope Squirrel		8, 9, 17
<i>Thomomys bottae</i>	Botta's Pocket Gopher		8, 9
<i>Perognathus longimembris</i>	Little Pocket Mouse		8, 9, 17
<i>Chaetodipus formosus</i>	Long-tailed Pocket Mouse		9
<i>Chaetodipus fallax pallidus</i>	Pallid San Diego Pocket Mouse	CSC	12
<i>Chaetodipus penicillatus</i>	Desert Pocket Mouse		9, 17
<i>Chaetodipus rudinoris</i>	Baja California Pocket Mouse		9
<i>Chaetodipus spinatus</i>	Spiny Pocket Mouse		9
<i>Dipodomys merriami</i>	Merriam's Kangaroo Rat		8, 12, 17
<i>Dipodomys deserti</i>	Desert Kangaroo Rat		9, 12, 17
<i>Peromyscus eremicus</i>	Cactus Mouse		12
<i>Peromyscus crinitus</i>	Canyon Deer Mouse		9
<i>Peromyscus fraterculus</i>	Northern Baja Deer Mouse		9
<i>Peromyscus maniculatus</i>	North American Deer Mouse		9, 17
<i>Peromyscus truei</i>	Pinyon Deer Mouse		9
<i>Onychomys torridus</i>	Southern Grasshopper Mouse		8, 9
<i>Neotoma albigula</i>	White-throated Woodrat		9, 17
<i>Neotoma lepida</i>	Desert Woodrat		9, 12

Scientific Name		Common Name	Special Status	Reference
<sup>N</sup>	<i>Rattus rattus</i>	Black (Roof) Rat		9
<sup>N</sup>	<i>Mus musculus</i>	House Mouse		Hypothetical
<sup>N</sup>	<i>Canis familiaris</i>	Domestic Dog		12
	<i>Canis latrans</i>	Coyote	T1	9, 12
	<i>Vulpes macrotis arsipus</i>	Desert Kit Fox	CFP	9, 12
	<i>Urocyon cinereoargenteus</i>	Common Gray Fox		9, 12
	<i>Bassariscus astutus</i>	Ringed-tailed Cat	CFP	Hypothetical
	<i>Procyon lotor</i>	Northern Raccoon		12
	<i>Taxidea taxus</i>	American Badger	CSC	9, 12
	<i>Mephitis mephitis</i>	Striped Skunk		2, 14
<sup>N</sup>	<i>Felis catus</i>	Domestic Cat		12
	<i>Puma concolor</i>	Mountain Lion		Hypothetical
	<i>Lynx rufus</i>	Bobcat		9, 12
	<i>Ovis canadensis nelsoni</i>	Desert Bighorn Sheep	CFP	9, 12
<sup>N</sup>	<b>Non-native species</b>			
*	Scientific name from original report no longer valid and current binomial name could not be determined past genus.			
<b>Federal</b>	Federal categories per the Endangered Species Act, administered by the USFWS.			
FE	Endangered - any species officially listed by the USFWS that is in danger of extinction throughout all or a significant portion of its range.			
FT	Threatened - any species officially listed by the USFWS that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.			
BGEPA	Bald and Golden Eagle Protection Act of 1940.			
MBTA	Migratory Bird Treaty Act of 1918			
<b>Tribes</b>				
T1	Species of interest/concern as identified by tribes.			
<b>State</b>	State categories per the 1984 California Endangered Species Act			
SE	Endangered - any species officially listed by the California Fish and Game Commission that is in danger of extinction throughout all or a significant portion of its range.			
ST	Threatened - any species officially listed by the California Fish and Game Commission that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.			
CSC	California Species of Special Concern.			
CFP	Fully Protected by the California Department of Fish and Wildlife			
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Scientific Name	Common Name	Special Status	Reference
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3	Marine Corps Air Ground Combat Center (MCAGCC). 2004. Bird/Wildlife Aircraft Strike Hazard (BASH) Plan, Expeditionary Airfield.		
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6	ICF Jones & Stokes. 2008. Final Report: Mohave Ground Squirrel Presence/Absence Surveys in San Hill, Acorn, Emerson Lake, and Maumee Mine Training Areas, Marine Corps Air Ground Combat Center, Twentynine Palms, California. Report prepared for Marine Air Ground Task Force Training Command and Naval Facilities Engineering Command Southwest.		
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## Appendix E. Response for encounters with Desert Tortoises

When you encounter a tortoise (USFWS 2023\*):

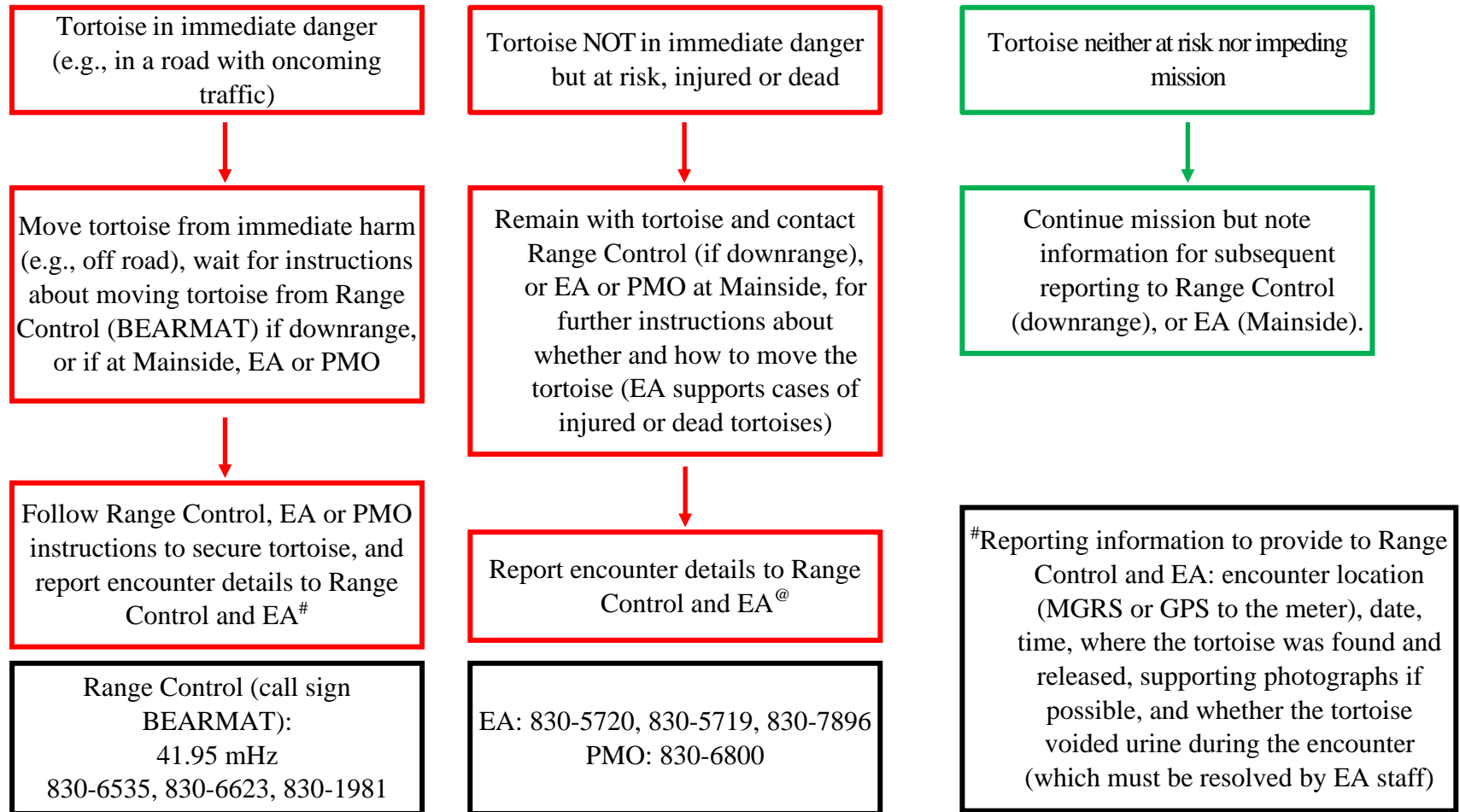
1. If the tortoise is in immediate danger, such as in a road with oncoming traffic,
  - a. The Marine or worker can move the tortoise from harm's way.
    - i. Carry the tortoise from harm (e.g., road traffic) and remain with the tortoise until instructed by:
      1. Range Control (BEARMAT range radio or 760 830 6535) if downrange or,
      2. if at Mainside,
      3. Environmental Affairs (EA) at (760 830 x5270, x5719, x7896 or x5728), or PMO (760 830 6800).
    - b. Provide encounter details to Range Control and EA.
2. If the tortoise is not in immediate danger but still at risk from your mission, or appears injured or dead, remain with the tortoise and contact Range Control, EA or PMO as soon as possible for further instructions (e.g., whether and how to move the tortoise, or standby for additional support from EA).
3. If tortoise is neither at risk nor impeding your mission, continue mission, but note information for subsequent reporting to BEARMAT and EA as soon as possible.
4. Tortoise encounters along access routes within lands managed by BLM will involve the same processes, including reporting.

\*An accidental death or injury to the tortoise is covered under the Combat Center's Biological Opinion (USFWS 2023), but intentional harm, death or other form of take are subject to legal penalties under the Endangered Species Act.

#Information to report - the encounter location (MGRS or GPS coordinates to the meter), date, time, where the tortoise was found and released, supporting photographs if possible, and whether the tortoise voided urine during the encounter. Tortoises that void urine must be monitored until Environmental Affairs staff resolve the tortoise's condition.

@Marines will report desert tortoise encounters to Range Control and Environmental Affairs as soon as training allows but will not be required to halt their exercise to report the encounter. For injured or freshly dead tortoises, report immediately when possible.

## Desert Tortoise Encounter Flowchart



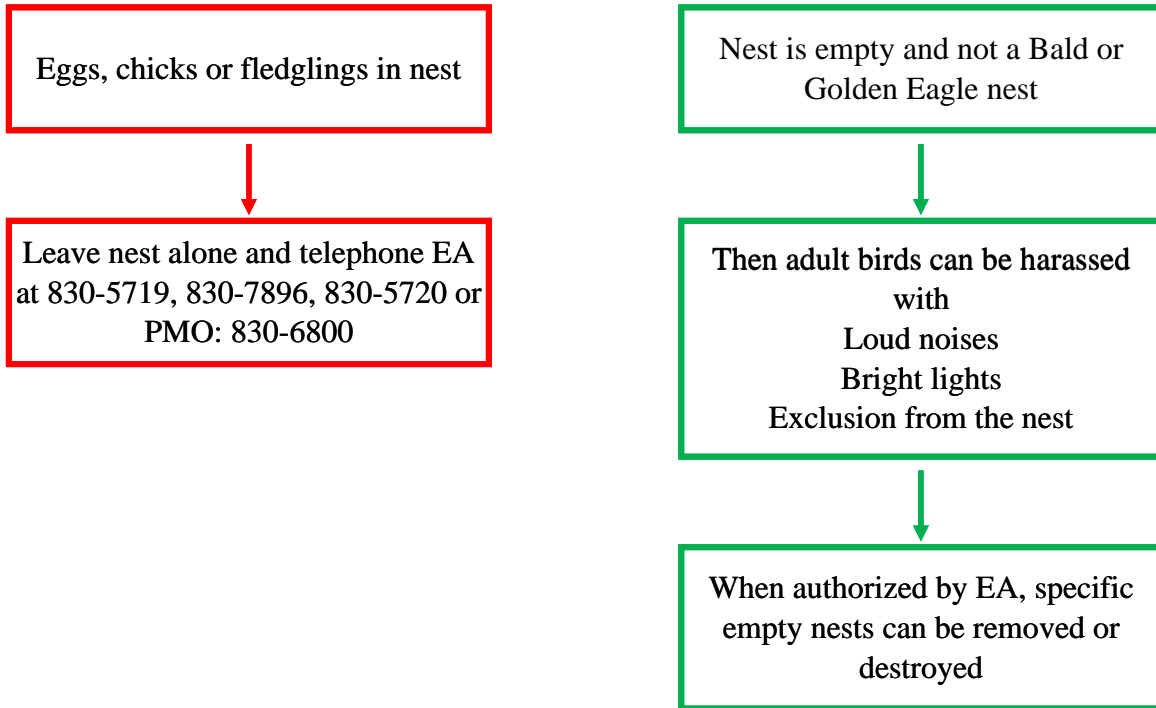
\*An accidental death or injury to the tortoise is covered under the Combat Center's Biological Opinion (USFWS 2023), but intentional harm, death or other form of take are subject to legal penalties under the Endangered Species Act.

@Marine units will report the desert tortoise encounters to Range Control and Environmental Affairs as soon as training allows but will not be required to halt their exercise to report the encounter. For injured or freshly dead tortoises, report immediately when possible.

## Appendix F. Response Chart for Bird Nests

Inactive nests, those without eggs or chicks, can be removed unless they are Bald or Golden Eagle nests.

It is legally prohibited to intentionally harm, kill, or injure birds, or destroy eggs or nests with eggs, per the Migratory Bird Treaty Act.



Three species of birds are not protected by the Migratory Bird Treaty Act and can be killed and removed by Pest Control at the Facilities Maintenance Division, 830-6271. These species are the Rock Dove (pigeon), European Starling, and English House Sparrow.

The Combat Center has an Environmental Standard Operation Procedure (ESOP) that is related to bird nests. The Vegetation trimming ESOP indicates the months (October, November, December, and January), when nest checks are not required when trimming vegetation. EA provides training for vegetation trimming supervisors to facilitate nest checks during the nesting season (February through September).