CAMP SAN LUIS OBISPO

Integrated Natural Resources Management Plan

September 2022

Prepared For:

California Army National Guard
Sacramento, California

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Sacramento, California

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CAMP SAN LUIS OBISPO
Integrated Natural Resources Management Plan

Signature Pages

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Army National Guard Signature Page

This Camp San Luis Obispo Integrated Natural Resources Management Plan (INRMP) meets the requirements of the Sikes Act (16 U.S.C. 670a *et.seq*.) as amended. The plan has been prepared in accordance with Department of Defense Instruction 4715.03, Natural Resource Conservation Program; Department of Defense Manual 4715.03, INRMP Implementation Manual, and ARNG G-9 Policy for INRMPs in coordination with the U.S. Fish and Wildlife Service, California Department of Fish and Wildlife, and the National Marine Fisheries Service. The following signature indicates concurrence with the conservation, protection, and management of natural resources presented in this plan.

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17 March 2022

Anthony Hammett
Colonel, U.S. Army
Chief, G-9 Army National Guard

Date

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California Military Department Signature Page

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1 JUN 2022

Major General David. S. Baldwin
Adjutant General
California Military Department

Date

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California Military Department Signature Page

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29 April 2022

LTC Brian Wintzer

Commander, Camp San Luis Obispo
California Military Department

Date

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United States Fish and Wildlife Signature Page

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STEPHEN HENRY

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Stephen P. Henry

Field Supervisor, Ventura Office
United States Fish and Wildlife Service

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California Department of Fish and Wildlife Signature Page

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DocuSigned by:
Bob Stafford
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7/20/2022

Julie Vance

Date

Regional Manager, Central Region
California Department of Fish and Wildlife

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National Marine Fisheries Service Signature Page

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May 5, 2022

Alecia Van Atta
Assistant Regional Administrator
California Coastal Office
NOAA Fisheries West Coast Region
U.S. Department of Commerce

Date

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Acronyms

Ac	Acre
ACUB	Army Compatible Use Buffer
AMSL	Above mean sea level
AFY	Acre-feet per year
APHIS	Animal and Plant Health Inspection Service
AR	Army Regulation
Army	United States Department of the Army
ARNG	Army National Guard
ARNG TRS	ARNG Training
BCC	Birds of conservation concern
BGEPA	Bald and Golden Eagle Protection Act
BO	Biological Opinion
C	Celsius
CA ARNG	California Army National Guard
CAEV	CA ARNG Joint Staff- Environmental Office/Directorate
Cal Fire	California Department of Forestry and Fire Protection
Cal-IPC	California Invasive Plant Council
CAOT	CA ARNG Organization, Training, and Mobilization Directorate
CCC	California Conservation Corps
CDFA	California Department of Food and Agriculture
CDFG	California Department of Fish and Game
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CESU	Cooperative Ecosystem Studies Units
CH	Critical habitat
CLC	Creek Lands Conservation
Cm	centimeter
CMC	California Men's Colony
CNPS	California Native Plant Society
CRLF	California red-legged frog
CSSC	California species of special concern
CSLO	Camp San Luis Obispo
CX	Categorical Exclusion/Exemption
DOD	Department of Defense
DoDI	Department of Defense instruction
DoDM	Department of Defense Manual
DPOTS	Director of Plans, Operations, Training, and Security
DPS	Distinct Population Segments
DPW	Department of Public Works

EA	Environmental Assessment
ED	Environmental Determination
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
ESA	Endangered Species Act
ESMC	Endangered Species Management Component
EST	Engagement Skills Trainer
F	Fahrenheit
FC	Federal candidate
FDR	Federally delisted (recovered)
FE	Federally endangered
Ft	Foot
FT	Federal threatened
GC	Garrison Commander
HA	Hectares
I&E	Installations and Environment
ICRMP	Integrated Cultural Resources Management Plan
INRMP	Integrated Natural Resources Management Plan
IPMP	Integrated Pest Management Plan
IRWM	Integrated Regional Water Management
IS	Initial Study
IWFMP	Integrated Wildland Fire Management Plan
IRP	Installation Restoration Program
ITAM	Integrated Training Area Management
LRC	Leadership Reaction Course
LRMP	Legacy Resource Management Program
MBNEP	Morro Bay National Estuary Program
MBTA	Migratory Bird Treaty Act
MCV	Manual of California Vegetation
MPH	Miles per hour
MOU	Memorandum of Understanding
NAPPC	North American Pollinator Protection Campaign
NEPA	National Environmental Policy Act
NGB	National Guard Bureau
NIDIS	National Integrated Drought Information System
NMFS	National Marine Fisheries Service
NPPA	Native Plant Protection Act
NPS	National Parks Service
NRCS	Natural Resources Conservation Service
NVCS	National Vegetation Classification System
OES	Office of Emergency Services
PIP	Project information packet
Pub. L	Public Law
RCD	San Luis Obispo Resource Conservation District
RCMP	Range Complex Management Plan
RDM	Residual dry matter

RFMSS	Range Facility Management Support System
RTLA	Range and Training Land Assessment
RWQCB	Central Coast Regional Water Quality Control Board
SAR	Species at risk
SCCC	South-central California coast
SE	State endangered
SLCRCD	San Luis Coastal Resource Conservation District
SRA	Sensitive Resource Area
ST	State threatened
SWAP	State Wildlife Action Plan
SWRCB	State Water Resources Control Board
TMDL	Total Maximum Daily Load
TRI	Training Requirements Integration
UC	University of California
USACE	United States Army Corps of Engineers
U.S.C.	United States Code
USDA	United States Department of Agriculture
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USPFO	United States Property and Fiscal Office
VWS	Ventana Wildlife Society
WBWG	Western bat working group
WDR	Waste Discharge Requirement
WMA	Weed Management Area

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Executive Summary

Purpose

Consistent with the Sikes Act Improvement Act of 1997, the California Army National Guard (CA ARNG) has prepared this Integrated Natural Resources Management Plan (INRMP) Update to provide Camp San Luis Obispo (CSLO) with a long-term viable framework for managing natural resources on its lands.

As required by the Sikes Act (DoD 2017a), this CSLO INRMP provides guidelines for:

- Management and conservation of flora and fauna;
- Wetland, riparian, and aquatic protection, enhancement, and restoration;
- Establishment of specific natural resource management goals and objectives and time frames for proposed action;
- Sustainable use by the public to the extent that the use is not inconsistent with the needs of fish and wildlife resources;
- Enforcement of applicable natural resource laws (including regulations);
- No net loss in the capability of military installation lands to support the military mission; and
- Such other activities as the Secretary of the military department determines appropriate.

The primary focus of the update was to create a clearer, more useful document that will allow the CA ARNG to ensure the sustainability of training lands and maintain ecosystem viability. Natural resource management goals and objectives have been developed to align with the Department of Defense (DoD) ecosystem management strategy. Particular consideration has been given to the projected impacts of climate change and the approach for overall resource management on the installation has an increased focus on climate resiliency. Climate adaptation is critical in retaining training lands and maintaining military readiness.

Overview

Camp San Luis Obispo is a 5,612 acre state-owned military training site located in central California in San Luis Obispo County and operated by CA ARNG. It is composed of a cantonment area; training areas; and firing ranges with a designated impact area.

The CA ARNG's primary federal mission is to provide mission-ready forces to the federal government, counterterrorism, and weapons of mass destruction. The state mission is to protect the public safety of the citizens of California by providing military support to the civil authority during natural disasters and other emergencies. CSLO supports a variety of users, including military units, federal and state agencies, and civilians.

Natural resources on CSLO are characteristic of a Mediterranean climate of dry summers and mild wet winters. CSLO is comprised of 18 different plant communities, over 44.46 miles of waterways, and 9.72 acres of wetlands. A total of 527 plant species and 284 animal species have been recorded on the installation, including nine federal or state threatened and endangered species and 50 special status species.

Goals

The primary goals of this INRMP are as follows:

- Ensure no net loss in the capability of CSLO lands to support military training.
- Integrate natural resources management with the military training mission.
- Ensure compliance with all state and federal laws and regulations pertaining to natural resources
- Manage state and federally threatened and endangered species and critical habitat to ensure compliance with existing Biological Opinions, the California Endangered Species Act, and the federal Endangered Species Act.
- Conserve and protect riparian, wetland, and aquatic habitats.
- Conserve trees through protection and by mitigating for tree removal.
- Provide environmental awareness education to the CSLO Commander, staff, troops, employees, tenants, and visitors.
- Define responsibilities for the management of natural resources.
- Provide an accurate, up-to-date source of natural resources data and inventories of natural resources on CSLO.
- Continue to incorporate climate adaptation strategies into resource management actions.

The ability to achieve these goals is dependent on the cooperation and collaboration of CSLO Command and staff, installation users, governmental agencies, regional landholders, and local agencies and organizations. Adaptive management will also be a key component to effective ecosystem management as legal or mission requirements change and new scientific information becomes available.

Partnerships

The CA ARNG has fostered a number of partnerships with various agencies that assist and participate in the natural resources management program. Those partners include the U.S. Fish and Wildlife Service (USFWS); U.S. Army Corps of Engineers (USACE); U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS); National Marine Fisheries Service (NMFS); California Department of Fish and Wildlife (CDFW); California Department of Forestry and Fire Protection (Cal Fire); California Conservation Corps (CCC); San Luis Obispo Resource Conservation District (RCD); Morro Bay National Estuary Program (MBNEP); Water Conservation Districts; National Park Service (NPS); Federally Recognized Native American Tribes; universities; and others.

Organization

This document is organized into six chapters:

1. Introduction and Overview
2. Historic and Current Land Use
3. Natural Resources of Camp San Luis Obispo
4. Natural Resources Management Strategy
5. Sustainability and Compatible Use
6. INRMP Implementation

Natural resource management actions are described in detail in Chapters 4 and 5 and are broken into conservation measures and conservation projects. Conservation measures specify protocols and procedures necessary to protect and conserve natural resources and are often implemented in-house by CSLO or environmental staff. Conservation projects are discrete actions for natural resources management and often require funding and external contracting for implementation. A list of conservation projects can be found in Appendix A.

Review and Approval

This INRMP was developed in collaboration with signatory parties: National Guard Bureau, United States Fish and Wildlife Service, and California Department of Fish and Wildlife. Although not a required signatory, National Marine Fisheries Service also contributed to INRMP development by participating in document review and providing critical feedback. Upon mutual agreement between signatory parties, this INRMP will direct the natural resources management program on CSLO for a period of five years (2022-2027). Annual reviews with signatories will ensure management goals and objectives are being met and conservation actions are updated as necessary.

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1.0 Introduction and Overview

1.1 Purpose and Scope

The California Army National Guard (CA ARNG) has prepared this Integrated Natural Resources Management Plan (INRMP or Plan) Update to provide Camp San Luis Obispo (CSLO) with a long-term, viable framework for managing natural resources on its lands. An INRMP is required by the Sikes Act (16 United States Code [U.S.C.] 670a §101[a][2], as amended by the National Defense Authorization Act of 2015 [Public Law (Pub. L.) 113-291]). It is the primary means by which natural resources compliance and stewardship priorities are set, and funding requirements are determined for the U.S. Department of Defense (DoD).

The principal purpose of CSLO's land, waters, and airspace is to support various military training activities. Natural resources conservation program activities ensure there is no net loss in capability of CSLO's training lands to support the military training mission while also sustaining the long-term ecological integrity of the resource base and the ecosystem services it provides.

As required by the Sikes Act (DoD 2017a), this CSLO INRMP provides guidelines for:

- Management and conservation of flora and fauna;
- Wetland, riparian, and aquatic protection, enhancement, and restoration;
- Establishment of specific natural resource management goals and objectives and time frames for proposed action;
- Sustainable use by the public to the extent that the use is not inconsistent with the needs of fish and wildlife resources;
- Enforcement of applicable natural resource laws (including regulations);
- No net loss in the capability of military installation lands to support the military mission; and
- Such other activities as the Secretary of the military department determines appropriate.

This INRMP establishes planning and management strategies; identifies natural resources constraints and opportunities; supports the resolution of land use conflicts; provides baseline descriptions of natural resources necessary for the development of conservation strategies and environmental assessment; serves as the principal information source for the preparation of future environmental documents for proposed CSLO actions; and provides guidance for annual natural resources management reviews.

Additionally, the DoD is required to ensure that ecosystem management is the basis for all management of DoD lands and waters (Office of the Under Secretary of Defense 1994). Based on an ecosystem approach, the INRMP takes a broad view to ensure achievement of the overriding principle of protecting the properties and functions of natural ecosystems. This INRMP considers and uses a full and evolving array of ecosystem-based management tools

> *Ecosystem-based management is a "goal-driven approach to managing natural and cultural resources that considers the environment as a complex system functioning as a whole, not as a collection of parts, and recognizes that people and their social and economic needs are a part of the whole" (DoD Instruction 4715.03).*

which are described in detail in DoDI 4715.03. CSLO's ecosystem management approach is discussed further in Chapters 4 and 5.

> *INRMPs are to be prepared collaboratively with partner federal and state fish and wildlife agencies, consistent with the Sikes-Tripartite MOU (2013)…The final INRMP will reflect mutual agreement of the USFWS and CDFW representatives concerning the conservation of natural resources under their respective legal authorities. The natural resources manager coordinates with NMFS when the INRMP will benefit from their perspective and review (DoD Manual 4715.03).*

Section 2904a(2) of the Sikes Act states that INRMPs shall reflect the mutual agreement of installation commanders, the U.S. Fish and Wildlife Service (USFWS), and the states regarding natural resources management on DoD installations.. As required by the 2013 Sikes-tripartite Memorandum of Understanding (MOU), the DoD, USFWS, and Association of Fish and Wildlife Agencies work cooperatively on the development and implementation of integrated natural resource programs on military lands. The USFWS and California Department of Fish and Wildlife (CDFW) are signatories to this INRMP Update. Although not a required signatory, the National Marine Fisheries Service (NMFS) is also given the opportunity to review and provide feedback on the INRMP, consistent with DoD Instruction (DoDI) 4715.03 CH-1 (DoD 2017a).

The previous CSLO INRMP has served as the guiding document for natural resources management at CSLO. This document constitutes the required update and will not result in biophysical consequences materially different from those documented in the original INRMP.

1.2 Authority

This INRMP's content and the related planning process follows the direction provided in:

- DoDI 4715.03 (18 March 2011, Incorporating Change 1 5 October 2017) Natural Resources Conservation Program;
- DoD Manual (DoDM) 4715.03 (25 November 2013, Incorporating Change 1 13 December 2017) Integrated Natural Resources Management Plan Implementation Manual;
- U.S. Department of the Army (Army) Regulation (AR) 200-1 (13 December 2007) Environmental Protection and Enhancement; and
- National Guard Bureau (NGB; 20 Mar 2019), Army National Guard (ARNG) Installations and Environment (I&E) Directorate Policy for Integrated Natural Resource Management Plans (INRMP).

Sikes Act

The Sikes Act directs the DoD to take appropriate management actions necessary to protect and enhance land and water resources through the development of INRMPs on all installations under its control. INRMPs establish fundamental land management policies and procedures for all military lands to preserve the military mission, while simultaneously protecting natural resources.

DoDI 4715.03 and DoDM 4715.03

DoDI 4715.03 details policy to ensure that all DoD natural resources conservation program activities promote DoD continued access to its land, air, and water resources for realistic military training while also sustaining the long term ecological integrity of the resource base and the ecosystem services it provides.

It assigns natural resources management responsibilities, identifies procedures for natural resource management components, outlines programming, and budgeting, priorities, and details natural resource conservation metrics. DoDI 4715.03 is supported by DoDM 4715.03, which provides procedures to prepare, review, update, and implement INRMPs in compliance with the Sikes Act.

Army Regulation 200-1

AR 200-1 Environmental Protection and Enhancement (Army 2007), which superseded AR 200-3 Natural Resources—Land, Forest, and Wildlife Management, sets forth policy, procedures, and responsibilities for the conservation, management, and restoration of land and natural resources consistent with the military mission and national policies.

NGB INRMP Guidance Memorandum

This procedural Memorandum (NGB 2019) provides ARNG level guidance on developing the INRMP, coordinating with fish and wildlife agencies and the public, procedures for review, revision and update of INRMPs, assigning funding priorities, and reporting on INRMP effectiveness. Natural resources Measures of Merit are used by the DoD to gauge the effectiveness of natural resources management and compliance with the Sikes Act.

> *ARNG G-9 INRMP Guidance (NGB 2019) is intended as a supplement to the Sikes Act and AR 200-1 and supersedes all previous ARNG G-9 INRMP guidance.*

1.3 INRMP Integration with the Military Mission

The health of CSLO's natural resources is crucial to providing realistic training for military troops. Realistic training opportunities require areas of ecologically intact natural habitat with a variety of topographic and vegetative features. Training areas with intact ecosystems remain resilient to ecological threats and land use impacts. Functioning watersheds and wetlands are essential to provide troops with a realistic training environment.

1.3.1 Military Mission

The military mission at CSLO is described below. The mission is broken into components so that it's benefit from, and influence on, natural resources can be analyzed for sustainability.

> *Natural resources shall be managed to facilitate testing and training, mission readiness, and range sustainability in a long-term, comprehensive, coordinated, and cost-effective manner pursuant to DoD Directive 3200.15, "Sustaining Access to the Live Training and Test Domain" December 18, 2013.*

Federal Mission

CA ARNG has both a U.S. and a California state mission. Its primary federal mission is to provide mission-ready forces to the federal government for counterterrorism efforts and weapons of mass destruction response (CA ARNG2011).

The federal mission of the ARNG is as follows (ARNG 2021):

> During peacetime each state National Guard answers to the leadership in the 50 states, three territories and the District of Columbia. During national emergencies, however, the President reserves the right to mobilize the National Guard, putting them in federal duty status. While federalized, the units answer to the Combatant Commander of the theatre in which they are operating and, ultimately, to the President.

> Even when not federalized, the Army National Guard has a federal obligation (or mission). That mission is to maintain properly trained and equipped units, available for prompt mobilization for war, national emergency, or as otherwise needed. The Army National Guard is a partner with the Active Army and the Army Reserves in fulfilling the country's military needs.

State Mission

CA ARNG's state mission is to protect the public safety of the citizens of California by providing military support to the civil authority during natural disasters and other emergencies.

The state mission of the ARNG is as follows (ARNG 2021):

> The Army National Guard exists in all 50 states, three territories and the District of Columbia. The state, territory or district leadership are the Commanders in Chief for each Guard. Their Adjutants General are answerable to them for the training and readiness of the units. At the state level, the governors reserve the ability, under the Constitution of the United States, to call up members of the National Guard in time of domestic emergencies or need.

The mission of the CA ARNG is as follows (CA ARNG 2018):

> The CA ARNG organizes, trains, equips, and resources community-based land forces. On order, mobilizes to support state and/or federal authority. (CA ARNG 2018).

Camp San Luis Obispo Mission

CSLO's mission emanates from that of the CA ARNG as follows (CSLO 2020):

> CSLO, a Level IV Garrison Training Center, facilitates the training of California Military Department Service Members in Individual and Collective training, in Field and Garrison environments, in order to maintain readiness for Federal and State requirements. On order, CSLO provides infrastructure and life-support to California Military Department, California Department of Forestry and Fire Protection, Emergency Management Services, and other designated entities in support of Defense Support of Civil Authorities requirements.

> *The DoD shall demonstrate stewardship of natural resources in its trust by protecting and enhancing those resources for mission support, biodiversity conservation, and maintenance of ecosystem services (DoDI 4715.03).*

1.3.2 Roles and Responsibilities

The roles and responsibilities for developing, reviewing, and implementing this INRMP crosses several command layers within DoD and with external regional partners. They are described in DoD, Army, and ARNG guidance documents, as cited in *Section 1.2: Authority*. In addition, the DoD directs that natural resource managers engage with stakeholders on this INRMP regularly, and that this engagement follow an ecosystem management framework by:

- Involving the military operational community early in the planning process to accomplish ecosystem-based management consistent with the military mission.
- Developing a detailed ecosystem-based management implementation strategy for lands and other programs.

- Meeting regularly with regional stakeholders (i.e., state, tribal, and local governments; nongovernmental entities; private landowners; public) to discuss issues and to work toward common goals.
- Incorporating ecosystem-based management goals into strategic, financial, and program planning and design budgets.

1.3.2.1 Secretary of the Army

The Secretary of the Army is responsible to ensure scientifically sound, innovative, and effective stewardship of natural resources under Army jurisdictions. Through its environmental programs, the Secretary develops and implements programs to monitor, achieve, and maintain compliance with federal statutory requirements. The Secretary plans, programs, and budgets resources necessary to establish, execute, monitor, and maintain integrated natural resources conservation programs through INRMPs (DoDI 4715.03).

1.3.2.2 U.S. Army National Guard

National Guard Bureau

The NGB serves as the "channel of communication" between the Army and the National Guard of the States, Territories and the District of Columbia, providing policy direction and funding. The NGB, through the ARNG G-9, is responsible for executing the environmental program of ARNG and oversees compliance with applicable laws and regulations to support the Army training and testing mission. Two branches within this organization, ARNG G-9 and ARNG Training (ARNG TRS), are responsible for funding land management activities on ARNG installations. ARNG G-9 provides policy and guides preparation, implementation, and funds for natural resource activities, including preparation and implementation of INRMPs. All INRMPs, Biological Opinions, and other major compliance activities must be reviewed and approved by ARNG G-9. Natural resources-related responsibilities of each NGB Directorate are as follows.

1.3.2.3 California Military Department

The California Military Department is a State of California entity with federal, state, and community missions. It directs the CA ARNG, California Air National Guard, California State Guard, and California Youth and Community Programs.

California Army National Guard

At the state level, the Deputy Chief of Staff for Operations participates in, and coordinates with, development of INRMPs and other environmental documents to ensure that INRMPs reflect mission requirements for ranges and training lands. The Deputy Chief serves as a point of contact between ARNG-OTZ and Training Support Branch and the state, in coordination with the garrison commanders of training centers (National Guard Regulation 5-3, 10 August 2015).

State governors are empowered, under the U.S. Constitution, to call up members of the National Guard. The Governor of California may call individuals or units of the California National Guard into state service during emergencies or to assist in special situations of need.

Office of the Adjutant General

The Office of the Adjutant General, who is signatory to the INRMP, is directly responsible for the operation and maintenance of CSLO, including implementation of this INRMP. These responsibilities are

delegated through CA ARNG Headquarters Command Staff and the CSLO Commander, who ensures that all installation land users are aware of—and comply with—procedures, requirements, or applicable laws and regulations that accomplish the INRMP's objectives.

The CA ARNG Organization, Training, and Mobilization Directorate (CAOT) and CA ARNG Directorate of Public Works (DPW) are the two primary offices within the Office of the Adjutant General whose projects and operations affect natural resources.

Plans, Operations, Training, and Security

The CAOT is responsible for identifying and executing the training requirements of CA ARNG, including range development, equipment and personnel levels, and the types of training needed. At CSLO, these training requirements are coordinated with the CSLO Commander and the Director of Plans, Operations, Training, and Security (DPOTS) to ensure they are integrated with the facility's capabilities. CAOT also funds and manages the Integrated Training Area Management (ITAM) program at CSLO.

> *The Garrison Commander identifies/ addresses threats to mission land use… [and] ensures DPOTS (or equivalent) provides descriptions of mission landscape requirements to include recommendations for improving the capability, availability and accessibility of land (Army 2007).*

Directorate of Public Works

The DPW allocates funding and implements all military construction, facilities maintenance, and real estate activities for CA ARNG, including CSLO.

Environmental Directorate

The CA ARNG Joint Staff–Environmental Office (Environmental Directorate; CAEV) is responsible for ensuring CA ARNG's timely and proper compliance with all environmental laws and regulations. The Environmental Directorate's main office is located at CA ARNG Headquarters in Sacramento, with field offices located at CSLO and Camp Roberts. The Conservation Branch of the Environmental Directorate manages and funds the natural resources management programs statewide, including the INRMP at CSLO. The Environmental Directorate ensures operational readiness by sustaining environmental quality.

> *Natural resources managers… ensure consistency of goals/objectives/actions with mission requirements/other installation plans; identify potential project conflicts or opportunities for cooperative program implementation; and establish …-specific goals and measurable objectives for all INRMP elements and measure progress toward achieving them (DoD 2017b).*

The Environmental Directorate is responsible for managing flora, fauna, and all habitats at CSLO. This includes directing compliance with the INRMP requirements, ensuring compliance with Biological Opinions (BOs) and other permits/agreements issued by state or federal agencies, conducting environmental review of projects pursuant to the National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA), as well as providing technical expertise and environmental awareness to military and civilian personnel. The Environmental Directorate is directly responsible for preparing and updating the INRMP as required by DoD policy

1.3.2.4 Camp San Luis Obispo

Camp San Luis Obispo Garrison Commander

The Garrison Commander (GC) approves the INRMP. The GC uses the INRMP in conjunction with other installation plans to integrate land resource compliance and management activities with the military mission. The GC identifies and addresses threats to mission land use and gives high priority to management objectives that protect mission capabilities of installation lands.

The CSLO GC is responsible for coordination between the Environmental Directorate and DPOTS offices. The GC and the DPOTS determine the training load of CSLO based upon the force structure determined by the Adjutant General. The GC plans for land use based on accomplishing training requirements while minimizing negative environmental effects.

Camp San Luis Obispo Training Site Personnel

Other personnel who are involved with management of natural resources are listed below.

- DPOTS (including ITAM)
- Environmental Directorate (CAEV)
- Department Public Works (DPW)
- Real Property Maintenance Branch

These are the primary stakeholders who will ultimately implement this plan and ensure its success. These personnel are familiar with all aspects of CSLO, including training scheduling (and conflicts), locations of training facilities, impairments or problems with human-made structures or natural functions, and needs for improvement or maintenance of training lands.

The DPOTS coordinates the ITAM program for the CAOT by developing a baseline of current and projected training requirements and training lands/facilities for the training site, tracking, and managing training operations on the installation, and directing the ITAM program coordinator and staff. It is important to note that the ITAM program largely focuses on training lands at Camp Roberts and ITAM staff are stationed solely at Camp Roberts. When needed, ITAM support is offered to CSLO.

The DPW is responsible for routine and annual maintenance of the facilities and training lands of CSLO, including maintenance of roads and trails, buildings, grounds, firebreaks, and culverts, as well as minor construction projects. DPW also works with CAFÉ for large military construction projects initiated at the headquarters level. The Real Property Maintenance Branch manages leases and licenses for grazing, agricultural uses, and buildings/facilities.

1.3.2.5 External

Federal Agencies

U.S. Fish and Wildlife Service

The USFWS is responsible for ensuring compliance with the Endangered Species Act (ESA) as it pertains to plants, wildlife species, and non-anadromous fish. It also administers the Migratory Bird Treaty Act (MBTA) and Bald and Golden Eagle Protection Act (BGEPA). The USFWS is a cooperating and signatory agency to the INRMP and reviews the INRMP as it pertains to the species within USFWS jurisdiction.

National Marine Fisheries Service

NMFS is responsible for ensuring compliance with the ESA as it pertains to marine species and anadromous fish. Although not a signatory, the agency is invited to participate in INRMP review as it pertains to the south-central California coast (SCCC) steelhead (*Oncorhynchus mykiss irideus*) and its habitat.

Each ARNG installation shall involve the USFWS and State fish and wildlife agency in the scoping, design, preparation and/or review of a new or revised INRMP. At a minimum, this requires that the State ARNG provides these agencies with draft INRMPs for review and comment, and that the State ARNG address these comments appropriately.

State Agencies

California Department of Fish and Wildlife

The CDFW is a cooperating and signatory agency to the INRMP under the Sikes Act. This agency has regulatory authority over all plant and animal species listed under the California Endangered Species Act (CESA), as well as the state's wildlife resources, waterways, and fish and game animals. As with the federal agencies, CA ARNG and CDFW work cooperatively during plan development to ensure all species within their jurisdiction were adequately addressed in the INRMP policies.

1.4 INRMP Goals and Objectives

In close coordination with internal and external stakeholders, natural resources personnel consider management goals, objectives, and timelines for actions that serve to sustain training lands and mission capabilities. The goals of the INRMP integrate regional, ecosystem, military, social (community), and economic concerns. Natural resource conservation, restoration, and enhancement will be conducted to ensure the continued ability of CSLO to support its current and evolving mission, by applying the principles of ecosystem management in an integrated approach with other internal plans, and regional ecosystem management goals. The INRMP will fully comply with regulatory requirements while taking opportunities to enhance the resilience of natural resources to sustain military readiness. Goals and objectives are identified for each resource component in chapters 4 and 5.

DoD policy guidance is to use INRMP goals and objectives as a tool to monitor and evaluate ecosystem outcomes. Implementation strategies include specific and measurable objectives and criteria to evaluate activities in the ecosystem (DoDI 4715.03).

1.5 Review and Revision for Operation and Effect

Each INRMP is to "be reviewed as to operation and effect by the parties thereto on a regular basis, but not less often than every 5 years." This review is required to reflect mutual agreement among CSLO's signatory parties (USFWS, CDFW, and ARNG). The parties determine whether it is implemented pursuant to the Sikes Act, and contributes to the conservation and rehabilitation of natural resources on military installations. The conclusion may indicate that a revision or update to the INRMP is required or may result in a determination that the existing INRMP is adequate.

Ecosystem sustainability is a condition of living communities that meets, or can be manipulated to meet, current mission, compliance, stewardship and production needs without compromising the future ability to meet those needs (AR 200-1).

Annual reviews are also required. These reviews are to determine if the INRMP revisions are necessary and verify that funding, staffing, goals, and other aspects of the INRMP are current.

During the development of new or revised INRMPs, consultation takes place with Native Americans, per EO 13175, DoDI 4710.02, and DoDI 4715.03. Unless pre-existing consultation practices have been established, consultation with federally recognized tribes who have an interest in specific natural resources within the installation occurs during the review of new or revised INRMPs. Evidence of consultation with federally recognized tribes regarding the potential effect of INRMP plans and projects must be included. Concerns from Tribes should also be addressed within the INRMP (DoDM 4715.03).

1.6 Consistency with Other Plans and Programs

DoD policy seeks to ensure that current and planned installation activities (e.g., site development plans, construction requests, site approval requests, host- tenant agreements, and outleases) are effectively coordinated and consistent with activities described in the INRMP. The INRMP has been developed to align with goals and objectives of other installation plans and programs to ensure the long-term sustainability of training lands and support of the military mission.

> *Ensure that INRMPs are fully coordinated with appropriate installation offices responsible for preparing, maintaining, and implementing other programs and plans that may affect land used or be affected by land use decisions (DoDI 4715.03).*

Integrated Training Area Management Program

The INRMP identifies natural resource management requirements necessary to support and maintain training areas and ranges and incorporates the ITAM Annual Work Plan into the implementation of the INRMP where these activities support INRMP goals and objectives.

The Training Requirements Integration (TRI) component of the ITAM program provides a decision support procedure that integrates training requirements with land management, natural/cultural resources management processes, and data derived from the Range and Training Land Assessment (RTLA). TRI involves continuous consultation, coordination, and planning between the DPOTS, CAEV, and other installation personnel as appropriate to improve coordination, decision making, and uniform data regarding land condition and trend. The ITAM Annual Work Plan is included in Appendix C.

Range Complex Management Plan/Operational Area Plans

The Sustainable Range Program is the Army's overall approach for improving the way in which it designs, manages, and uses its ranges to ensure long-term sustainability. The Range Complex Management Plan (RCMP) is the primary tool of the ARNG's Sustainable Range Program. The RCMP integrates mission support, environmental stewardship, and economic feasibility The RCMP is designed to be a road map for the future development of the range complex to ensure that installations can meet their current and future training missions. CSLO is currently developing an RCMP and upon completion the plan will be integrated into the INRMP. Consideration of the Range Complex Master Plan during INRMP development is critical to avoid loss of training capabilities. Goals and objectives in the INRMP are developed to support long-term range operations and modernization.

Sustainable range planning focuses on the research, development, demonstration, and implementation of sustainable range technologies to address environmental requirements for Army ranges without compromising military readiness or training. This strategy provides CSLO with the capability to sustain environmentally compliant training ranges in order to accomplish its mission.

Integrated Cultural Resources Management Planning

CA ARNG manages cultural resources (e.g. archaeological resources and historic structures) through its Integrated Cultural Resources Management Plan (ICRMP), which is currently being updated. Like the INRMP, the ICRMP presents policies and management procedures to integrate the military training mission needs and legal requirements regarding cultural resources. Because management of cultural resources can adversely impact natural resources, all INRMP projects and conservation measures are intended to conform to the ICRMP.

Installation Restoration

The DoD established the Installation Restoration Program (IRP) in 1975 to provide guidance and funding for investigating and remediating hazardous waste sites caused by historical disposal activities at military installations. The fundamental goal of the IRP is to protect human health, safety, and the environment. The IRP investigates and, if necessary, remediates former disposal and test areas, some of which were used before the disposal of chemicals was regulated or even fully understood. Natural resources managers are directed to participate in IRP decision-making and restoration activities as a matter of Army policy.

Integrated Pest Management Plan

The Integrated Pest Management Plan (IPMP) is a long-range, comprehensive planning and operational document that establishes the procedures for conducting a safe, effective, and environmentally sound integrated pest management program. The purpose of the program is to aggressively control, by mechanical means or pesticide application, all noxious and undesirable weeds, rodents, insects and other pests on improved grounds and agricultural lease parcels. It covers all pest management and pesticide-related activities conducted by civilian and military DoD personnel, commercial pest management services providers, and lessees, including tenant commands.

Integrated Wildland Fire Management Plan

The Integrated Wildland Fire Management Plan (IWFMP) details effective wildland fire guidance and management for CSLO. It provides a planning framework for fire management as it relates to fuel load reduction and natural resource management.

Installation Master Plan

The INRMP supports development of the Installation and State Master Plans by providing information about resource concerns, management requirements, and general natural resources information.

Regional Plans and Programs

Several local and regional plans were reviewed to identify areas that may be similar or may conflict with CSLO's management practices. The following plans were considered during development of this INRMP:

> *Each installation shall evaluate and incorporate appropriate information from other Federal and State natural resources management plans and agreements (DoDI 4715.03).*

- Land Use and Circulation Elements of the San Luis Obispo County General Plan: Framework for Planning (Inland) (San Luis Obispo County 2015)
- Integrated Regional Water Management Plan (San Luis Obispo County 2019)
- Riparian Bird Conservation Plan (Riparian Habitat Joint Venture 2004)

- California State Wildlife Action Plan 2015 Update (SWAP; CDFW 2015)
- Comprehensive Conservation and Management Plan for the Morro Bay Estuary (Morro Bay National Estuary Program 2012)

1.7 Regulatory Context and Natural Resources Consultation

A detailed listing of the government regulatory context of natural resources management and Sikes Act compliance is available in DoDI 4715.03 (2017). The primary regulations driving species and resource management are described briefly below.

To ensure exclusion of proposed CH under Section 4(a)(3)(B)(i) of the ESA, an installation's INRMP should provide for the benefit of listed species through the management and/or enhancement of habitat utilized by federally-listed species occurring on or contiguous to the installation.

Federal Endangered Species Act (ESA)

As required under Section 7 of the ESA, federal agencies must enter into consultation with USFWS or NMFS if proposed actions "may affect" listed species. There are two different consultation processes; informal and formal. Informal consultation occurs when an action is "not likely to adversely affect" a listed species. The NGB has designated the CA ARNG as a non-federal entity operating on their behalf and is responsible for participating in the informal consultation process. Formal consultation occurs when an action "may adversely affect" a listed species. This consultation process determines if a proposed action is likely to jeopardize the continued existence of a listed species. NGB is the federal agency responsible for formal consultation and works closely with the CA ARNG during the process.

Federal agencies are also required to determine if designated critical habitat (CH) for listed species may be adversely affected by the proposed action and complete consultation accordingly. Under Section 4 of the ESA, DoD installations can be excluded from CH designations if an approved INRMP exists for the site and adequately addresses resource management actions that benefit the species.

California Endangered Species Act (CESA)

The CESA is the state equivalent of the ESA as is designed to "conserve, protect, restore, and enhance any endangered species or any threatened species" (California Department of Fish and Game [CDFG] Code § 2050-2089). Like the ESA, CESA allows for the incidental take of listed species in the process of otherwise lawful activities. The consultation process in many ways mirrors that of the ESA, and Incidental Take Permits are granted according to similar procedures.

Regulated Waters and Wetlands

In matters relating to Waters of the U.S. and Waters of the State, CSLO falls under the jurisdiction of the United States Army Corps of Engineers (USACE), Los Angeles District; the Central Coast Regional Water Quality Control Board (RWQCB); and the CDFW. The USACE, Central Coast RWQCB, and CDFW regulate work within waterways and wetlands with each agency having their own limits of jurisdiction. The USACE and Central Coast RWQCB jurisdictions are authorized under the Clean Water Act and the Porter-Cologne Water Quality Act. Consultation with these agencies is necessary for activities, such as filling, dredging, or clearing of streams, and require a USACE Section 404 Nationwide Permit and Section 401 Water Quality Certification, USACE individual permit, or coverage under a RWQCB Waste Discharge Requirement (WDR).

Per CFG Code § 1602, any entity must first notify CDFW before beginning a proposed construction project that will divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake; use materials from a streambed; or result in the disposal or deposition of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into any river, stream, or lake. Work proposed in water bodies regulated by CDFW normally requires completion of a CDFW Streambed Alteration Agreement prior to beginning the work.

National Environmental Policy Act (NEPA)/California Environmental Quality Act (CEQA)

NEPA requires federal agencies to consider and document the potential environmental impacts of federal actions. Similarly, CEQA requires analysis and documentation of environmental impacts from state actions. NEPA and CEQA review constitute the baseline of environmental review and must be applied to nearly all actions on the installation. The CA ARNG acts as both a federal and state agency and must comply with the requirements of both acts. The NEPA/CEQA process is discussed in more detail in *Section 5.6 Support for NEPA and CEQA Compliance.*

2.0 Current Land and Natural Resources Use

2.1 Real Estate Summary

CSLO is located on the central coast of California, midway between Los Angeles and San Francisco on State Route 1 (SR 1), approximately 5 miles (8 kilometers [km]) northwest of the city of San Luis Obispo and 8 miles (13 km) east of Morro Bay (Map 2-1 and Map 2-2). It is in San Luis Obispo County.

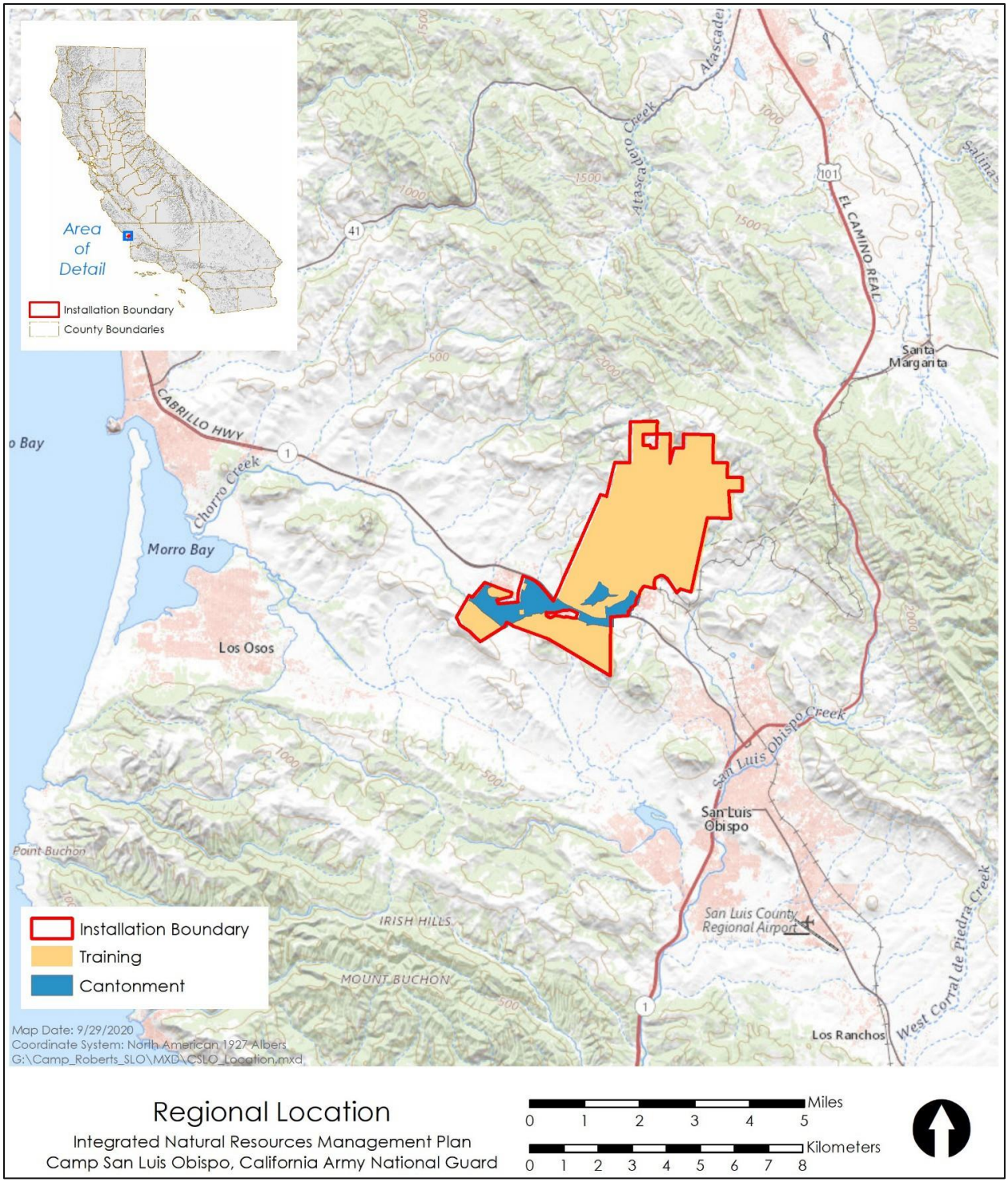
The installation is a 5,612-ac training site owned by the State of California Military Department and managed by the CA ARNG. The principal purpose of CSLO's land, waters, and airspace is to support military training. Within its boundaries, CSLO offers several supporting uses, including firing ranges and impact area (470 ac); large cantonment (administrative) area (611 ac); cropland (60 ac); grazing land (up to 2,358 ac); and limited outdoor recreation south of SR 1.

Real Estate and Ownership History

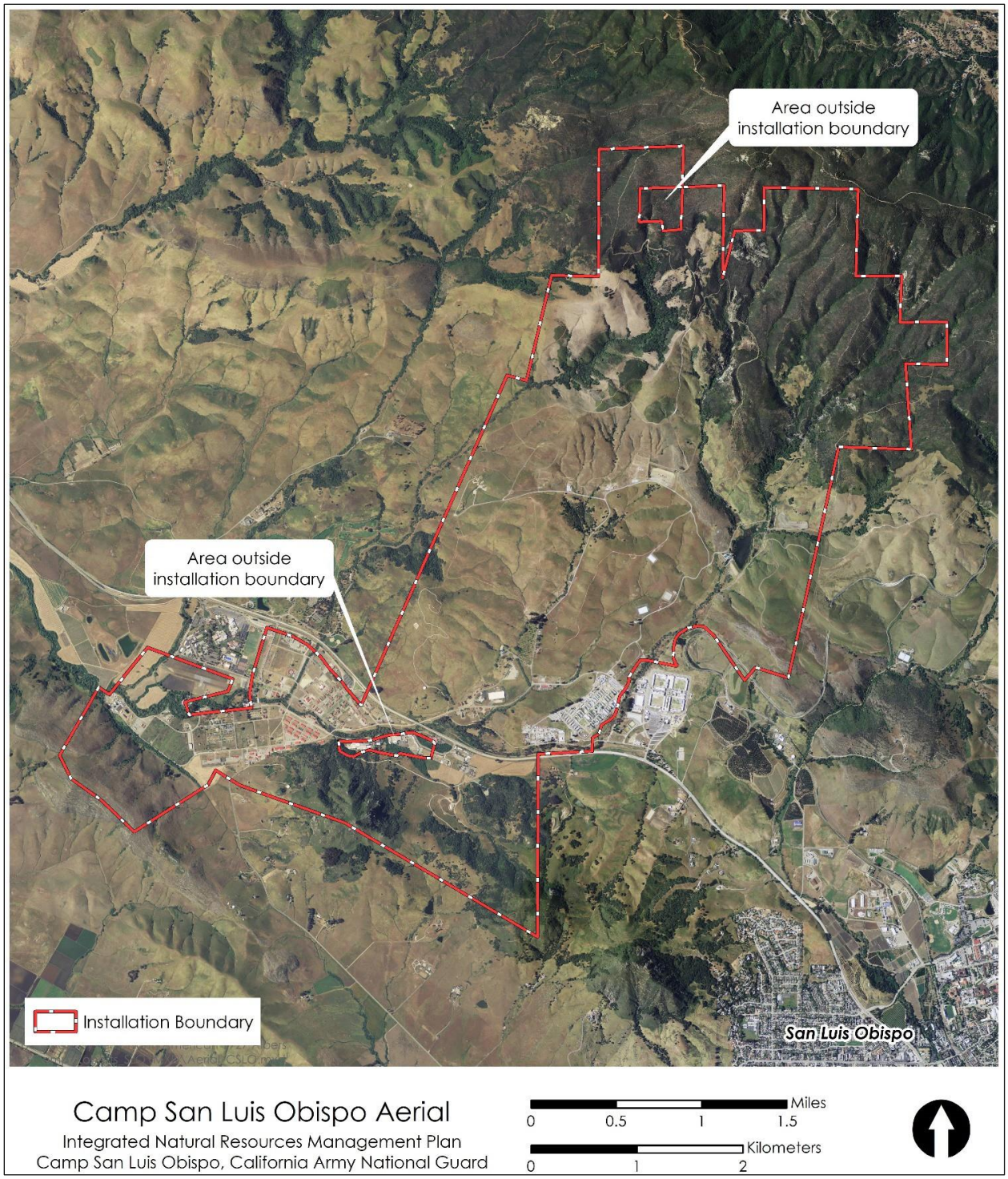
In 1928, the State of California began buying farms and ranches in the Chorro Valley for establishment of the Camp. Initially, CSLO consisted of 5,800 ac of State-owned land known as Camp Merriam, with the name changed to Camp San Luis Obispo in 1940, when the land was leased to the federal government. By 1945, the property extended as far west as Morro Bay to more than 14,000 ac of combined federal and state land. Between 1939 through 1945, it was the NGB's training site for the horse cavalry. During World War II, troops were trained on using tracked vehicles, pilot training at its three airfields, and it became the Western Regional Signal center which trained communication personnel.

Following World War II, the Army deactivated and returned control of all property to the State in 1947. In 1951, the Army opened its Southwest Signal Center at CSLO, to train soldiers during the Korean War. At war's end in 1953, Army logisticians placed part of the Camp in stand-by readiness as a mobilization site.

On 01 July 1965, the Army returned control of the land and improvements to the State of California Military Department. The camp was used during the Vietnam War for training special troops and was also the fielding site for the multiple subscriber equipment communication system for the 7th and 40th Infantry Divisions during the 1980s and 1990s (CSLO 2005). In 1972, land to the northwest (now occupied by El Chorro Regional Park) was deeded to San Luis Obispo County during President Nixon's "Legacy of Parks" program. Other federal lands which were part of the Camp have been granted to public agencies for other uses, including the California Polytechnic State University (CSLO 2011).



Map 2-1. Regional Location of Camp San Luis Obispo.



Map 2-2. Aerial View of Camp San Luis Obispo.

2.2 Regional Land Ownership and Use

CSLO is located west of the city of San Luis Obispo County near the coast. The surrounding community consists of Cuesta Community College to the west, Los Padres National Forest Lands and El Chorro Regional Park to the north, California Men's Colony (CMC) State Prison and County Jail/Operations facilities to the east, and private agricultural grazing lands to the south (Map 2-3).

The public exposure to CSLO is predominantly along SR 1, which divides the Camp and provides road access to the Camp's main entrance. Cerro Romauldo and Chumash Peak form a prominent spine along the southern border of CSLO and are part of the Morros, a series of volcanic peaks ranging in height from 700 to 1,400 feet (ft). The peaks and connecting ridge are designated as a Sensitive Resource Area (SRA) (Map 2-4) in the San Luis Obispo Area Plan (San Luis Obispo County 2007).

2.3 Historical Overview of Land Use

Livestock Grazing

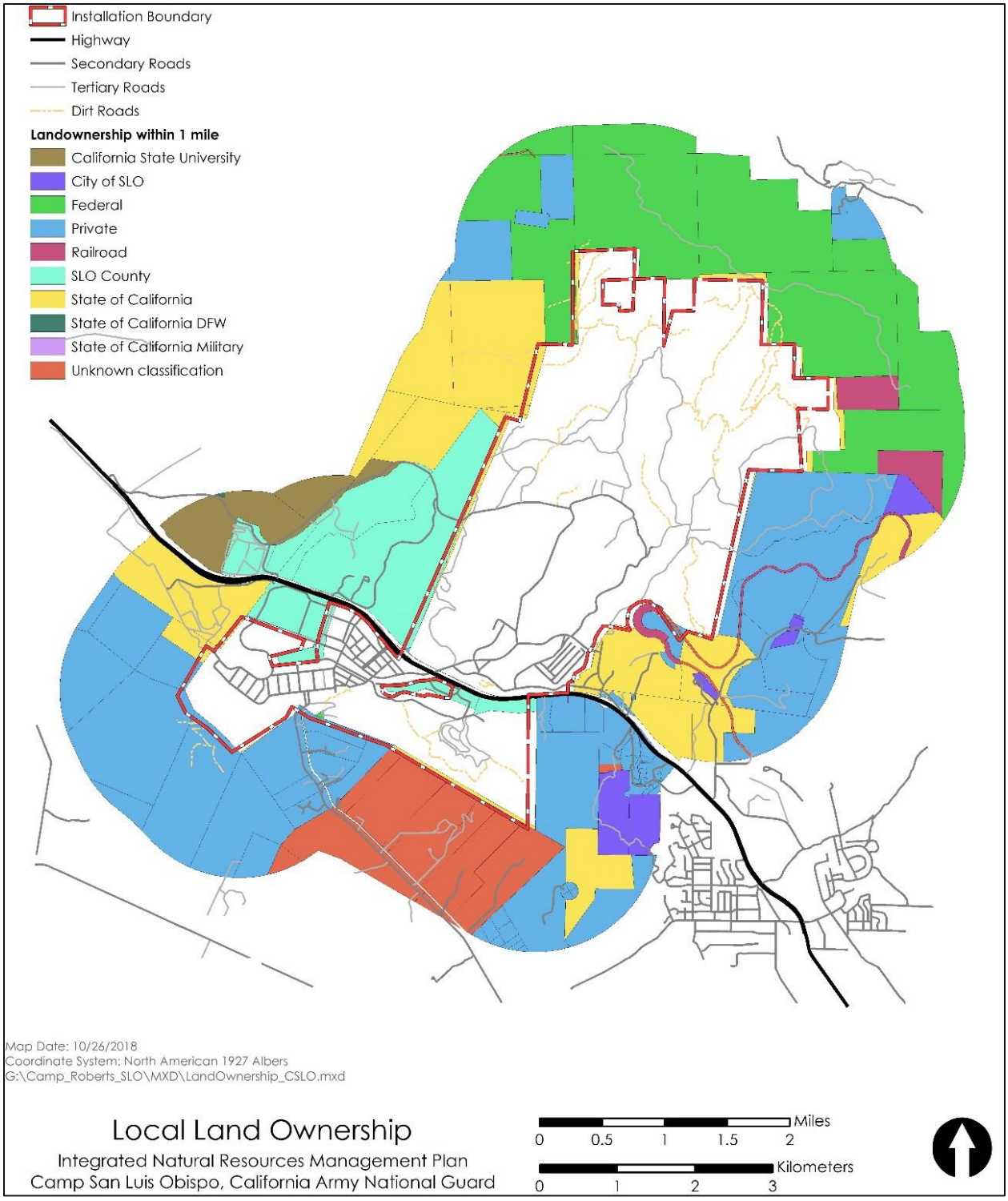
The majority of property occupied by the present CSLO was once part of the El Chorro Mexican Ranch, which was farmed continuously from 1845 through the late 1800s. Grazing by beef, dairy cattle, and sheep as well as cultivation of hay, grain, orchards, and vineyards were all practiced (U.S. Department of Agriculture [USDA] 1994). In the early 1900s, dairy farming declined with a gradual conversion to beef cattle.

Mining

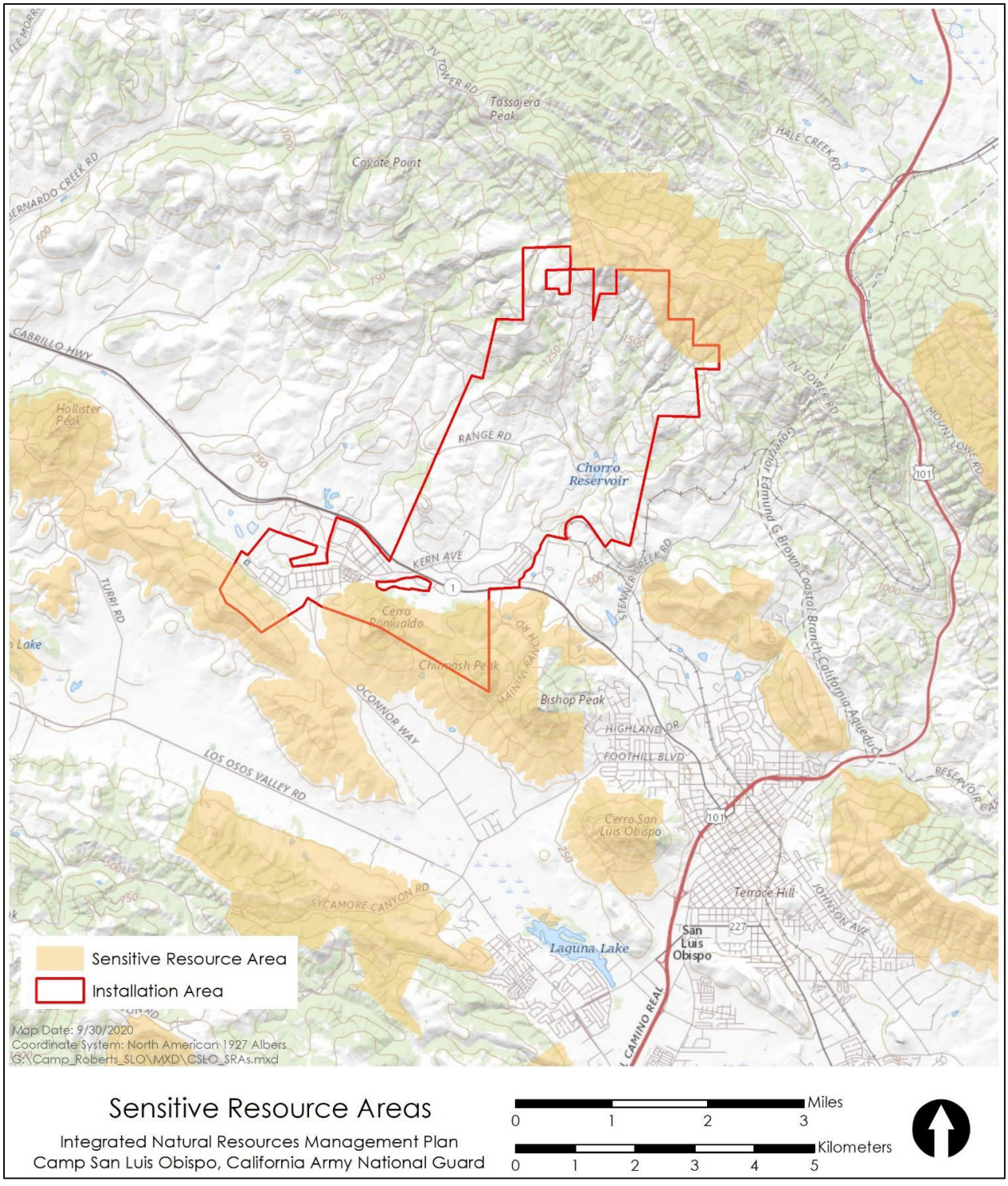
In the late 1800s, significant chromite deposits, were discovered in the main ridge of the Santa Lucia Range. Four mines were established (Primera, Trinidad, Pick and Shovel, and New London), and both nickel and chromium were mined in the late 1800s and again from 1916–1920 (during World War I) and 1942–1945 (World War II). Both open pit and underground operations were practiced (USDA 1994) (Map 2-5).

Charcoal Industry

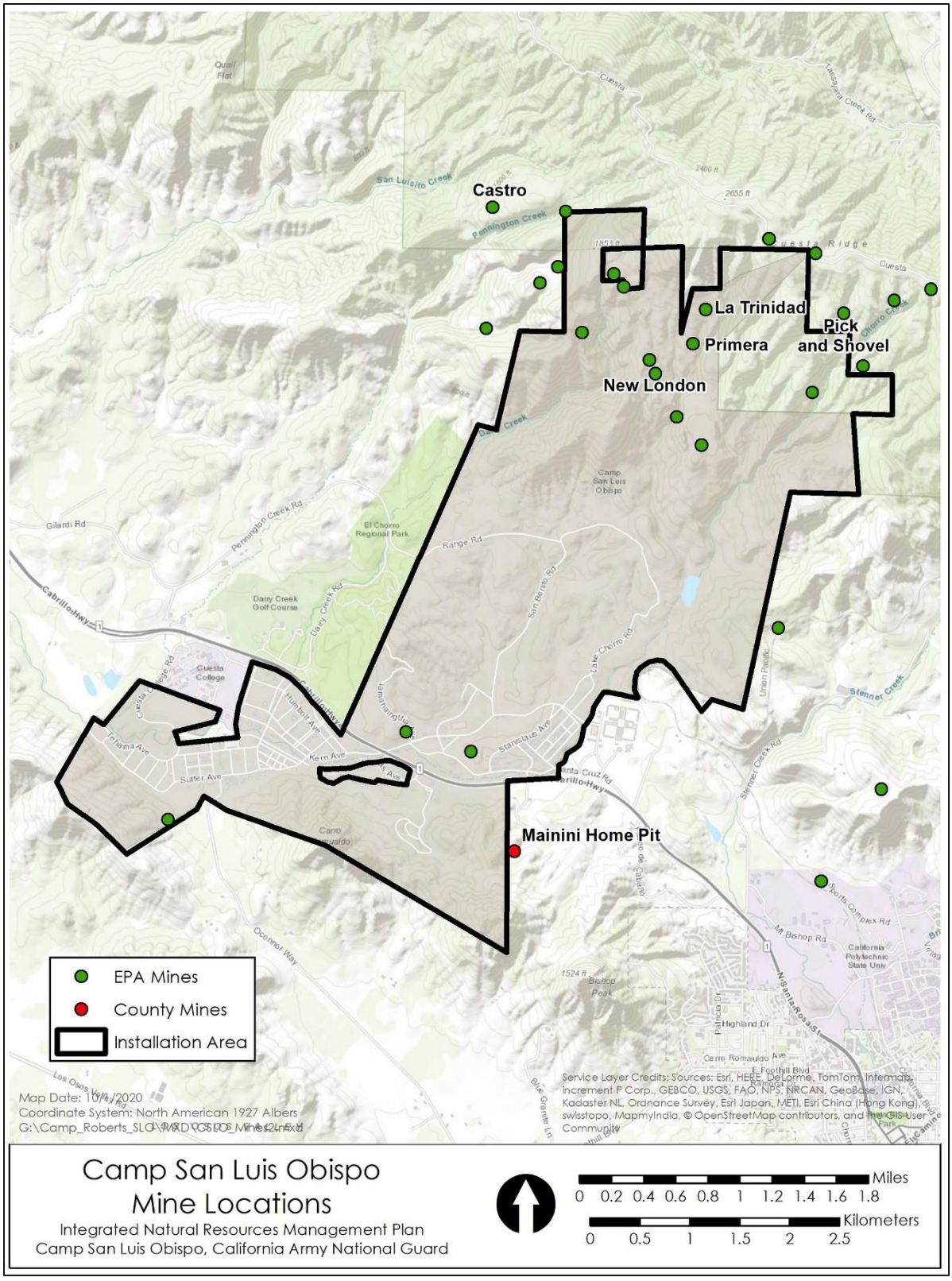
San Luis Obispo County was a center of California's wood charcoal industry. It accounted for 79 percent of California's 4,650 tons produced in 1956, and 87 percent of 3,159 tons in 1955. Coast live oak (Quercus agrifolia) was most commonly used in San Luis Obispo County. Pacific madrone (*Arbutus menziesii*) made up the rest, based on National Forest records.



Map 2-3. Land Ownership in the Vicinity of Camp San Luis Obispo.



Map 2-4. Sensitive Resource Areas surrounding Camp San Luis Obispo.



Map 2-5. Mines on Camp San Luis Obispo.

2.4 Current Operations and Activities

2.4.1 Training Activities Overview

Training Activities and Mission Setting

The CSLO training areas available are listed in Table 2-1 and Table 2-2 below. The installation has 16 training areas including firing ranges, the target impact area (470 ac), a helipad, and the cantonment. The types of training include basic marksmanship and weaponry skills, light demolitions, sniper training, a nuclear/biological/chemical chamber, rappelling, obstacle courses, land navigation, military assault, military operations in urban terrain, and leadership reaction. All firing ranges are at the southern boundary of the impact area. so weapons can be fired into it. The firing ranges accommodate a broad range of small arms and other weapons, including small and large caliber pistols, rifles, machine guns, hand grenades, grenade launchers, and light explosives. Live- fire exercises occur only on the firing ranges (USFWS 2015).

CSLO's cantonment area (611 ac) is located in the middle of the Camp, with direct access to SR 1. There are more than 1,000 structures (houses, apartments, and barracks) that can support a troop population of more than 2,000 under normal conditions and more than 2,500 under emergency conditions (CSLO 2005). There are administrative buildings, a parade field, supply buildings, warehouses, a vehicle hard stand, vehicle wash racks, covered storage, and an arms and ammunition storage facility. A motor pool and maintenance facilities handle motorized battalion-size operations.

Aviation facilities consist of O'Sullivan Army Helipad with one administrative operations building and associated facilities. The longest runway is approximately 2,400 ft long and 75 ft wide. Helipad operations are limited at this time to rotary wing operations because the runway does not support fixed wing traffic. However, the helipad is used extensively for helicopter landing. Huddleson Field within the Cantonment Area is a grassy field used in urgent situations only (CLSO 2005, 2011).

Utilization

CSLO operates year-round on weekdays and weekends. The peak annual training period runs from April through August, but ARNG and reserve units utilize the facilities up to 50 weekends a year for inactive duty training. Military and nonmilitary organizations typically train as many as 200 weekdays a year. CA ARNG generally uses the training site on weekends and during annual training periods. Units that conduct their annual training period at CSLO participate in a two-week training activity. Weekend training generally involves individual, team, squad, platoon, or collective Army Warrior Task or Battle Drill activities.

The most intensive use of CSLO occurs during the summer months when Annual Training, ROTC summer training, and Officer Candidate School graduation take place. Total personnel usage by FY was 153,680 in FY 2015, 152,051 in FY 2016, 178,256 in FY 2017, 170,284 in FY 2018, 166,160 in FY 2019, and 107,840 for FY 2020.

Table 2-1. Training Areas in Camp San Luis Obispo.

AREA	ACREAGE	DESCRIPTION
H	275	Tactical Training; Land Navigation
II	3	Bivouac. Challenge Courses
J	20	Tactical Training
K	150	Tactical Training; Basic Land Navigation; Convoy Operations
K-1	3	Warrior Task Testing (CTT); Basic Land Navigation; Rope Bridge Crossing Course
L	200	Basic Land Navigation; Tactical Training; Rappelling; Mountaineering; Fort Merriam (BBQ, Rappelling Site)
M	1	Obstacle Course
N	300	Tactical Training; Intermediate Land Navigation
0	1	CBRNE Chamber
P	20	Parade Ground; Huddleson helicopter LZ
R	220	Tactical Training; Land Navigation
T	100	Tactical Training
U	360	Tactical Training
V	120	Tactical Training
W	175	Tactical Training
X	800	Tactical Training
Y	15	Aviation/Airfield Operations

Source: CSLO Regulation 350-1 (24 February 2017).

Table 2-2. Camp San Luis Obispo Special Courses Located within the Cantonment Area.

SITE	DESCRIPTION
1	Intermediate Land Navigation
2	CBRNE Chamber
3	Leadership Challenge Course, North
4	Leadership Challenge Course, South
5	Obstacle courses
6	Beginner Land Navigation
7	Engagement Skills Trainer (EST) 2000
8	Fort Merriam (Rappelling, BBQ site)
9	Rappel Site 2
10	Leadership Reaction Course (LRC)

Source: CSLO Regulation 350-1 (24 February 2017).

2.4.2 Installation Users

The Camp supports the following types of military training: Military Support for Civil Authority, counter drug, air assault, small arms training, basic rifle marksmanship, orienteering, combat medic, non-commission officer leadership training, Officer Candidate School, counter terrorism training, common task training, Military Occupational Specialty Schools, non-prior service training and pre-command courses (CSLO 2005).

CSLO users are grouped into four categories: federal tenants, state tenants, nonmilitary tenant organizations, and nontenants. The Training Center is used extensively by nontenants (Special Operations Units, police-affiliated agencies, and other DoD entities). Through leases and other agreements, CA ARNG, in conjunction with the State of California Department of General Services, has several other state, county, and nonprofit lease arrangements for use of training facilities.

2.4.2.1 Federal Tenants

Federal tenants at CLSO include:

- *Headquarters Camp San Luis Obispo Collective Training Center* is a 50-person detachment providing service and support to the installation.
- *The 223rd Regiment (Combat Arms)* provides regionalized individual training to support the Total Army School System, performs regionalized management and quality assurance oversight for the functionally aligned training battalions, conducts Adjutant General directed training, and sustains essential cadre war fighting skills. The 223rd Regiment (Combat Arms) is one of the largest, most active users of CSLO. Their mission requires the use of permanent office space, warehouse area, classrooms, firing ranges, and open grounds to conduct soldier training.
- *Detachment 1, 349th Quartermaster Supply Company* operates a Direct Support Facility in support of 18,500 non-divisional soldiers; provides receipt, storage, and issue of Class I, II, III, IV, and VII supplies; and provides potable water and unclassified map support.
- *649th Military Police Company* provides a trained and disciplined combat support force as part of a Corps combined arms team, concurrent with state emergency contingent plans that encompass military support to civil authorities in the protection of life, property, essential services, and assistance to law enforcement in combating drug trafficking.
- The *U.S. Property and Fiscal Office* (USPFO) receives, procures, distributes, and accounts for all Federal property and funds allocated by the NGB for the State in support of the CA ARNG.
- *Detachment 1 State Area Command* advises and assists National Guard units within the State to ensure proper use of federal property and funds; manages the Federal Logistics Support system for the state; and upon mobilization, provides support for the transition of mobilized units into the active status and reconstitutes mobilized units when released from active duty.
- *Field Maintenance Shop* provides unit training support to military units and other requesting agencies. A new field maintenance facility is currently in the initial design phase because the existing facility was built in 1941 and no longer supports the needs of CA ARNG.
- *Defense Investigative Services* is primarily used to conduct national security background investigations for CSLO and Camp Roberts ARNG personnel who require security clearance for work.

- *Civil Air Patrol.* CSLO is a major training base for the California Wing (State) cadets and for training Air and Ground crews for their duties in U.S. Air Force and State Office of Emergency Services (OES) missions. It is also used in training for other federal missions such as Drug Enforcement Agency flights, customs flights, U.S. Forest Service (USFS) missions, OES sanctioned Civil Air Patrol Live Organ Transplant missions, and search and rescue operations.
- *Army and Air Force Exchange Service* runs the CSLO Post Exchange, which offers a wide variety of gifts, food, drink, military clothing, and small appliances.
- *Recruiting and Retention.* A recruiting and retention office and district headquarters for District 6.

2.4.2.2 State Tenants

State tenants at CLSO include:

- The *Grizzly ChalleNGe Program* targets high school dropouts in California before they become seriously involved in the juvenile or adult corrections system. This year-round program uses a military model for defining structure and discipline. The five-month residential phase of "ChalleNGe" takes place at CSLO in conjunction with the San Luis Obispo County Office of Education.
- The *California Conservation Corps (CCC)* is a multifaceted youth development program that seeks to develop the youth of California (ages 18–23) by providing corps members with productive avenues for work, educational opportunities, community service, and social and recreational activities.
- *California Department of Forestry and Fire Protection (CalFire), Training Group.* CSLO is a training academy and site for state and county firefighters training in hazardous materials situations.
- The *CalFire/Cuesta Camp* is a permanent facility that provides administrative offices and training, vehicle repair and storage, shops, warehouse facilities, as well as the necessary support structures, such as fuel, oil, and gas storage, fire hose wash racks, and a corporation yard.
- The California Men's Colony (*CMC)* provides secure housing for minimum and medium security inmates, as well as water and sewer support in return for leased land from CSLO.
- *California Emergency Management Services* promotes public safety and security in the areas of emergency disaster management, criminal justice, and hazardous materials emergency response and mitigation through training courses.

2.4.2.3 Nonmilitary Tenants

Nonmilitary tenants at CLSO include:

- *Achievement House Inc.* provides programs for individuals with disabilities so that they may attain their highest level of independence.
- San Luis Obispo County Office of Emergency Services (OES) coordinates emergency planning and preparedness for county, city, and special district jurisdictions
- Cuesta College provides community access to programs and services that include educational and vocational training, counseling, and recreational services.
- The Archaeological Society provides San Luis Obispo County with services in conjunction with historic preservation of artifacts found throughout the county.
- The Operating Engineers Training Trust provides apprentice and journeyman union members with training for heavy earth moving equipment and cranes, commercial driver licenses, and

hazardous materials. The instructors of the training trust work with CSLO Facilities and Engineering and the CSLO Real Property Maintenance Branch to maintain roads and firing ranges and prevent erosion. The operating engineers have helped with environmental concerns to prevent and clean up any flood damage.

2.4.2.4 Nontenant Users

Nontenant users at CLSO include:

- CA ARNG and Air National Guard Units.
- U.S. Army, U.S. Air Force, U.S. Navy, U.S. Marine Units.
- U.S. Army Training and Doctrine Command.
- U.S. Army Forces Command.
- U.S. Pacific Command.
- U.S. Army Reserve Troop Program Units.
- U.S. Army Reserve Schools.
- Special Operations Units.
- Police-affiliated agencies.

3.0 Natural Resources of Camp San Luis Obispo

3.1 Ecoregional Setting and Values

CSLO is in California's Central Coast bioregion (Tietje et al. 2019), set in the rolling hills and sometimes rugged topography of the Central Coast Ranges (Map 3-1). This is the South Coast Ranges subregion according to the Jepson Herbarium which delineates geographic subdivisions of California based on plant occurrences and geomorphic settings (Jepson Online 2019). CSLO is on the coastal slopes which face the Pacific Ocean to the west. The area is richly biodiverse in its native habitats, interspersed by small cities, working landscapes of rangeland and agriculture, highways, and infrastructure. The mild climate supports a long growing season for farm crops, and settlers of this region found abundant groundwater to establish an agricultural economy and coastal communities. Perennial and intermittent streams drain most of these coastal slopes, and those of CSLO are crucial to the health of marine resources in the Morro Bay estuary, as well as freshwater habitats and species of the connecting riparian zone.

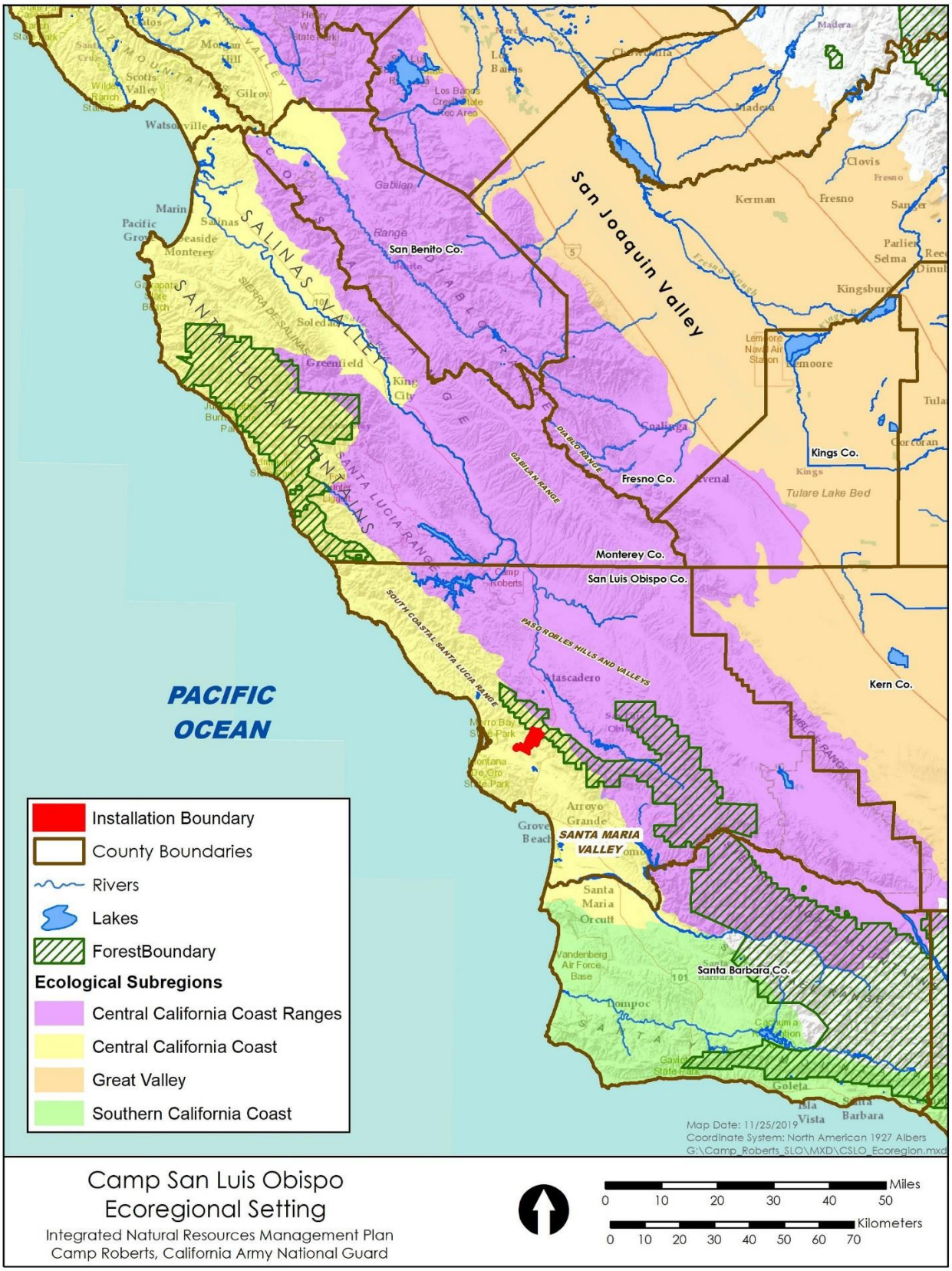
3.2 Climate and Weather Patterns

CSLO lies within the Mediterranean climate zone, characterized by hot dry summers and cool moist winters, with highly variable annual and monthly rainfall patterns. Upwelling has an important climatic effect on the region. First, upwelling cools the air along the coastline close to the ocean's surface. As relatively warmer and moist winds generated by the North Pacific High encounter this region of cool air along the coast, moisture in the air condenses and forms dense marine fog. As descending air from the North Pacific High encounters this region of cooler air along the coast, a temperature inversion results. These processes lead to the sustained fog commonly observed along the California coast, a climatic phenomenon to which many coastal terrestrial organisms are adapted.

Daytime winds at CSLO are distributed between the dominant west/northwest winds and east/southeast winds. Winds blow from the northwestern quadrant a slight majority of the time, averaging 7.6 knots (8.7 miles per hour [mph]) (CA ARNG 2015).

3.2.1 Precipitation

Between 1927-2019, the total annual precipitation was 21.5 inches (54.6 centimeters [cm]), with a low of 4.6 inches (11.7 cm) in 2013 and a high of 49.9 inches (126.7 cm) in 1983 (Figure 3-1; Data source: Western Regional Climate Center, San Luis Obispo Polytech station). Most rainfall occurs in the winter and early spring from November through April, with little rain falling in May through October (Figure 3-2).



Map 3-1. Camp San Luis Obispo ecoregional setting.

3.2.2 Temperature and Relative Humidity

Average monthly temperatures range from a low of 52.8 degrees Fahrenheit (°F; 11.6 degrees Celsius [°C]) in January to a high of 65.9°F (18.8°C) in August (Figure 3-3). Relative humidity recovery from daytime lows at night is high due to the marine influence, and consistent throughout the year with average nighttime maximums around 90% (CA ARNG 2015). The summertime relative humidity is moderated by the ocean and monthly averages rarely drop below 40%.

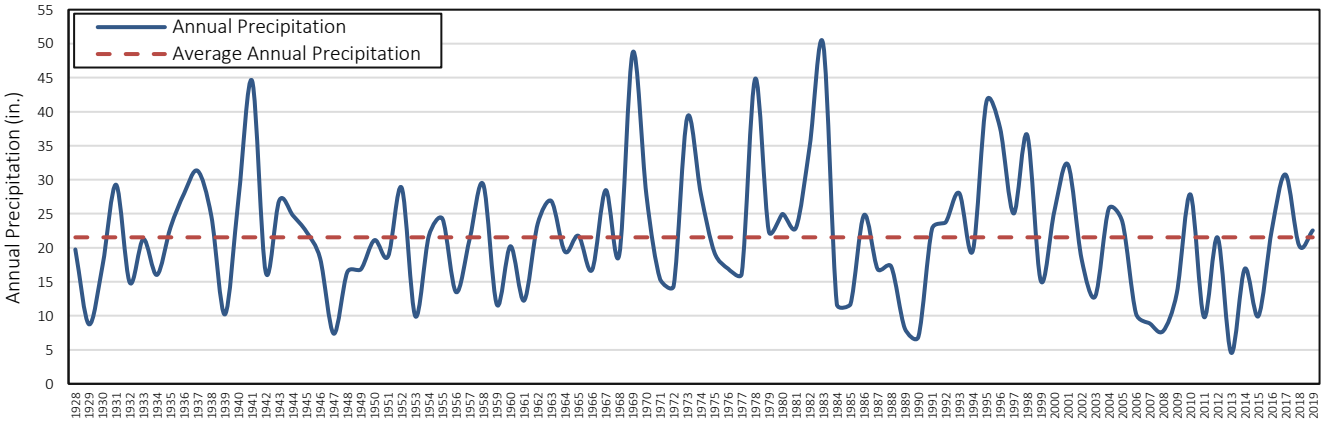


Figure 3-1. Annual precipitation in the vicinity of Camp San Luis Obispo (Data Source: Western Regional Climate Center, San Luis Obispo Polytech station. Period of record 1927-2019).

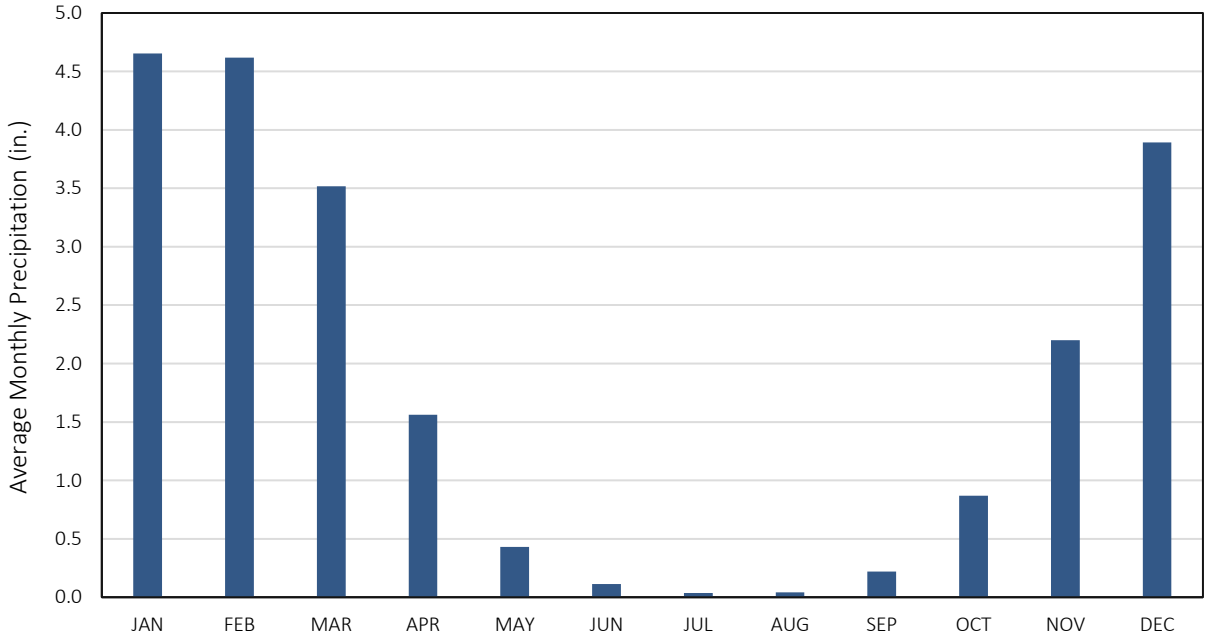


Figure 3-2. Monthly precipitation in the vicinity of Camp San Luis Obispo (Data Source: Western Regional Climate Center, San Luis Obispo Polytech station).

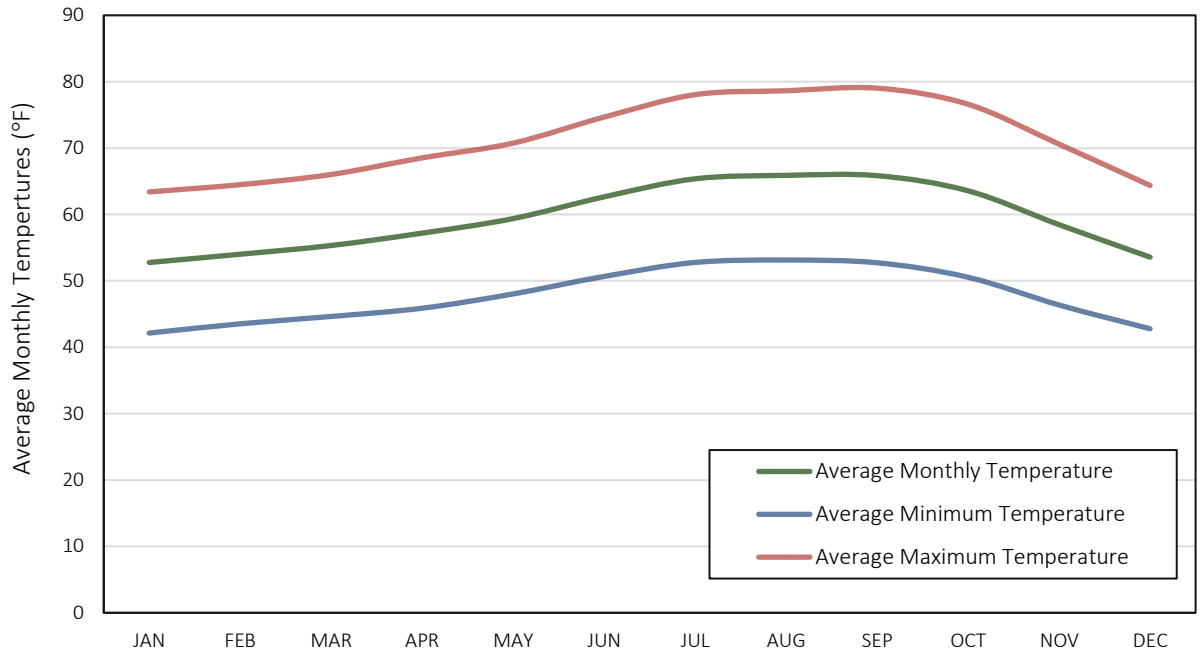


Figure 3-3. Average monthly temperatures in the vicinity of Camp San Luis Obispo (Data Source: Western Regional Climate Center, San Luis Obispo Polytech station).

3.2.3 Wildland Fire Regime

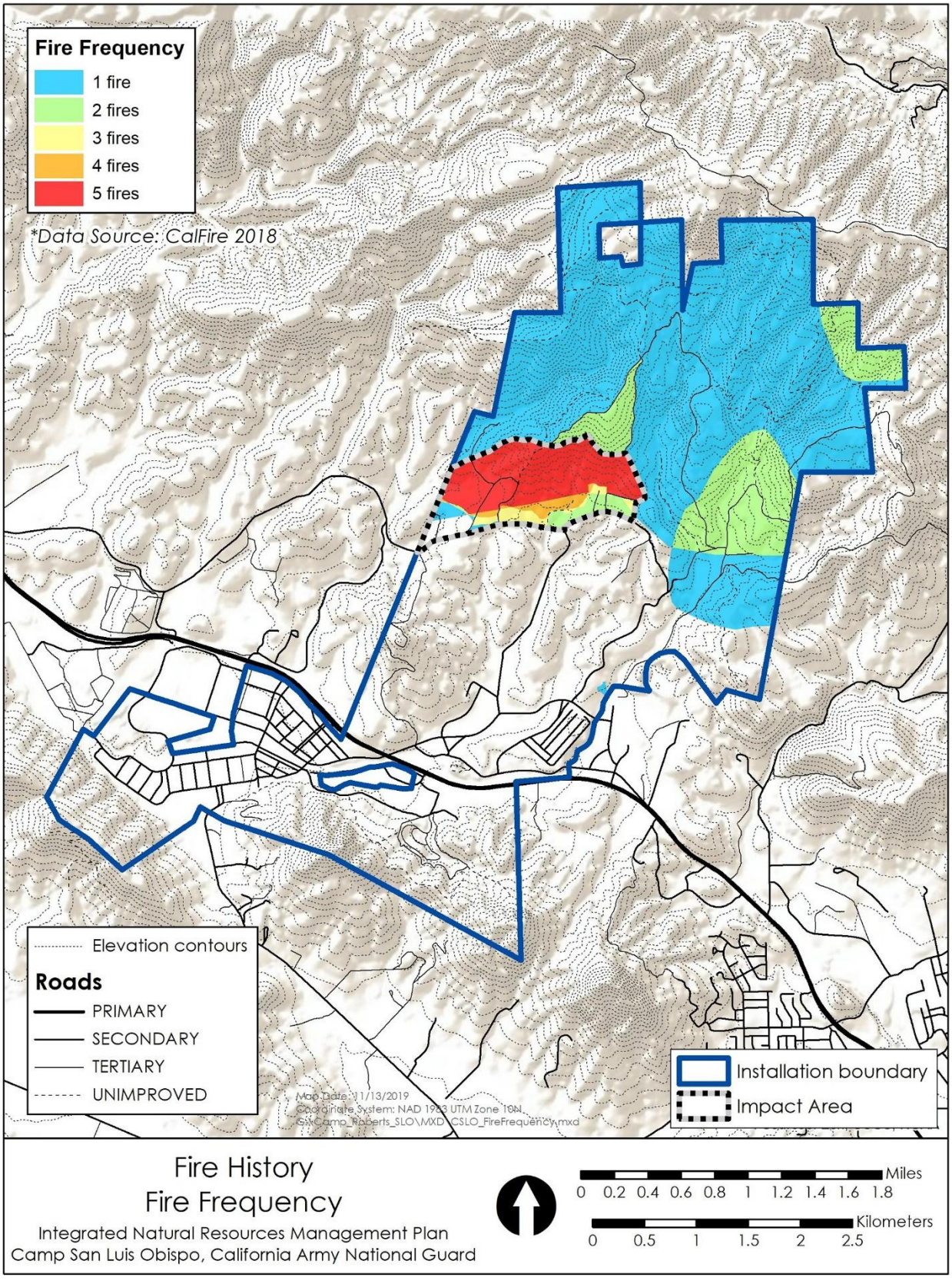
CSLO is in a high fire risk region of the Central Coast (CFCCA 2018), and training activities involve actions that increase that risk. CSLO's natural resources, operations schedule, and training landscape are vulnerable to extremes in fire regime. An IWFMP (CA ARNG 2015) addresses the wildland fire risks and hazards of both CSLO and Camp Roberts.

Current Conditions

For most years on record, CSLO has experienced fewer than 500 ac of wildland and prescribed fires (Table 3-1), most of which are confined to the impact area (Map 3-2). Even though training activities occur year-round at CSLO, they tend to only trigger fires during warmer and drier parts of the year. The recorded fire frequency for CSLO is depicted on Map 3-2, covering the period 1939-2018. The map is compiled from CalFire records; however, those records may be incomplete.

Wildland fuel classifications are derived from vegetation maps, and vegetation was last mapped at CSLO in 2007 (Woolf 2007). Fuel classifications from outside CSLO boundaries can be derived from a national fuel database called LANDFIRE.[1]

[1] See www.landfire.org.



Map 3-2. Fire frequency, 1939-2018.

Table 3-1. Known fire history for Camp San Luis Obispo, 1996-2019 (Data Source: CalFire fire records [1939-2018]).

Calendar Year	No. of Fires	Total Acres Burned	Impact Area Acres	Wildland Fire (W) Acres Burned	Prescribed Fire (P) Acres Burned	No. of Fires 1000+ Acres (W/P)
1939	1	24	0	24	-	0
1941	1	418	0	418	-	0
1994	1	2369	224	2369	0	1/0
2005	1	379	312	0	379	0
2007	1	309	309	0	309	0
2015	1	266	266	0	266	0
2017	1	254	254	254	0	0
2018	1	2	0	2	0	0

Light flashy fuels dominate much of the installation and they can produce rapidly expanding fires on dry and windy days. Fuel conditions are frequently very dry, with average one-hour fuel moisture (fine fuels) of 4 percent and 97th percentile average moisture of 1 percent.

The IWFMP (Appendix I) provides in depth documentation of all prescribed and wildfire data and management plans. Policy, land management planning, wildland fire area and characteristics, operational guidance, monitoring and evaluation, as well as program implementation are all addressed within the IWFMP.

3.2.4 Climate Change

Future climate change scenarios and impacts relative to CSLO are estimated from modeling for climate impacts to Camp Roberts. USACE's Climate Change Assessment Tool was utilized for running these models. CSLO and CR are both located within the California Central Coast and as such, are assumed to have similar climate impact predictions. The climate exposure assessments and data visualizations presented address eight climate change impact issues that have relevance to Army installation operations and planning: drought, coastal flooding, riverine flooding, heat, energy demand, wildfires, land degradation, and historical extreme weather. These impacts are represented using specific indicators as shown and described further in Figure 3-4. Indicators and impacts are presented for the current time period (based on a 30-year average from 1950 to 2005), for the 2050 future period (based on the 30-year average from 2035 to 2064), and the 2085 future period (based on 30-year average from 2070 to 2099).

Details on how the Climate Assessment Tool works can be found in the Army Climate Resilience Handbook (USACE 2020). The following is a breakdown and summary of indicator weights for each climate change impact in the four projected scenarios. Implications of these projections and management actions to address climate change are discussed in *Section 5.1.1 Climate Change*.

Wildfire

According to the USACE Climate Change Assessment Tool, predictions show that an increase in wildfire will likely be due to flash drought and fuel abundance. Flash drought is the average number of times per year in which rapid-onset drought occurs, characterized by a sharp drop in precipitation over a three-

month period. They can lead to unexpected water shortages, but contribute to wildfire risk and excess heat stress. Continuous drought is counted as a single drought episode.

Fuel abundance refers to a greater share of the installation and adjoining lands in native vegetation-areas that are not agriculture and ornamental vegetation. The indicator measures the abundance of fuel in the installation and within 1-mile of the border to serve as an ignition source or which can carry fire to an installation.

Drought

Drought predictions indicate mean annual runoff and aridity are the largest contributing factors to future conditions. Runoff is anticipated to increase due to more intense storm events. A high aridity score indicates that the area is becoming more arid due to a decrease in precipitation relative to potential evapotranspiration.

Coastal Flooding

CSLO is not located within a climate change scenario that would be effected by coastal flooding or sea-level rise.

Riverine Flooding

Increase in flooding will likely be due to extreme precipitation days, indicating a greater exposure due to increases in flood risk and extreme behavior. This is the average annual number of days that precipitation in a future scenario is greater than what would have been considered an extreme precipitation day historically (the historic period 1% annual chance event storm).

The second highest indicator is maximum one day precipitation, creating a greater exposure due to increases in flood risk. The maximum one-day precipitation is the average annual maximum 1-day precipitation amount and is a measure of precipitation intensity.

Heat

Heat is closely correlated with wildfire and drought and is a projected increase in temperature. Hotter temperatures and greater heat stress exposures are the biggest threat within this indicator. The value of the annual 5-day maximum temperature is a measure of the 5-day hottest period.

Energy Demand

The projected increase in temperatures will result in an increase in energy demand. All four scenarios indicate that maximum five-day temperatures are a high influence, followed by days over 95°F. Five-day maximum temperature indicators and meanings are described as above in *Heat.* Days above 95°F is expected to increase.

Historical Extreme Conditions

Historical extreme conditions are mostly indicated by history of drought frequency, indicating a greater drought risk. Historical drought frequency is the percent of weeks in the historic period when any part of an installation was categorized as in severe, extreme, or exceptional drought as determined by the National Integrated Drought Information System (NIDIS) Gridded Annual US Drought Monitor data.

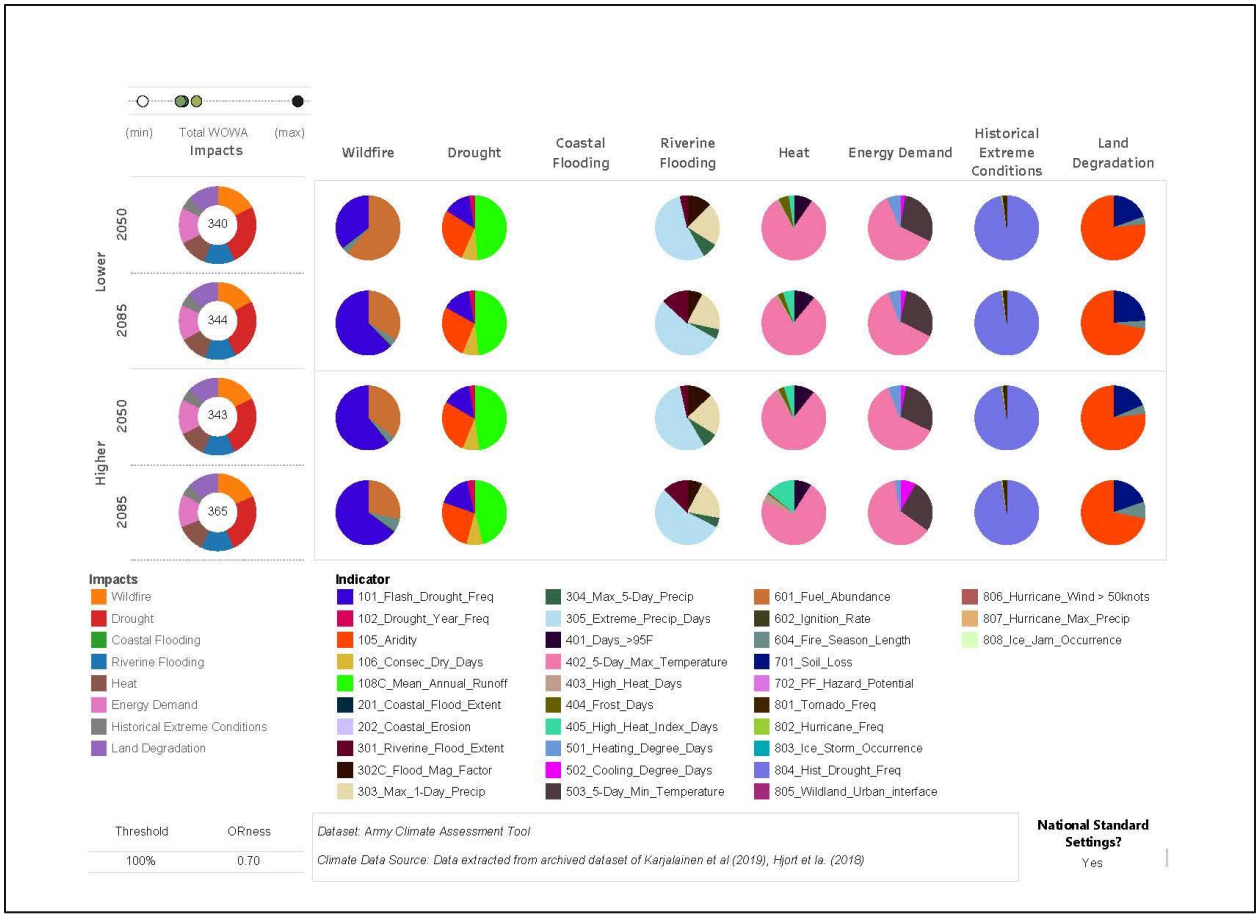


Figure 3-4. Projected climate change impacts and indictors (Data source: Army Climate Assessment Tool, 2021).

Land Degradation

Land degradation will likely be due to aridity, and to a much lesser extent, soil loss and fire season length. With the likelihood of limited precipitation causing a long-term reduction in water availability in the area, it is logical that aridity is the highest indicator as it plays into soil loss and fire season length.

3.3 Physical Setting

3.3.1 Geology and Geomorphic Features

CSLO is located on the northeastern flank of the Los Osos Valley. Complex faulting of the Los Osos fault zone has tilted the landscape such that the lowest elevations are along Chorro Creek in the southwest end of the installation just over 200 ft above mean sea level (amsl), while the northeast corner of the Camp registers elevations over 2,000 ft amsl.

Along the southern edge of the installation, Cerro Romauldo and a section of Chumash Peak partially occur on CSLO and make up the fifth and sixth of the “nine sisters” of the Los Osos Valley, respectively. The nine sisters are remaining plugs of volcanic activity, or morros, that extruded through the sedimentary and metamorphic rocks of the valley approximately 25 million years ago. Morro Rock in

Morro Bay is the first of these felsic dacite volcanic plugs and the group of nine ends at the lowest morro of Islay Hill in southeast San Luis Obispo. Cerro Romauldo peak is the third highest of the nine sisters at 1,306 ft amsl. Its steepness, elevation, and volcanic rock composition lead to some unique plant assemblages compared to the rest of the property.

Another geologic setting present at CSLO which favors unusual plant assemblages are the serpentine soil ridges that occur in spots near the southwestern tip, central, and northeastern areas of the Camp. Serpentine soils are rich in magnesium and other heavy metals which lead to very poor nitrogen uptake of plants. California is known for serpentine soils and the endemic plants that are capable of surviving in the harsh environment of these soils. Also, metals associated with serpentine soils continue to be mined, although less than historical activity.

Most of the southern half of CSLO is underlain by the Franciscan Complex. This unit is composed of sedimentary and metasedimentary marine sediments deformed by the faulting in the valley and the past presence at a subduction zone. Small units of volcanic rocks associated with this complex also occur in this part of the Camp. In much of the northern half of CSLO, the geologic history at the surface is much more recent, with Quaternary rockslide deposits forming continental sedimentary layers and a small area of Miocene marine sedimentary rocks at the eastern edge of the Camp.

3.3.2 Mineral Resources

Four inactive chromium mines exist in the northern portion of CSLO (Primera, La Trinidad, Pick and Shovel, and New London). The chromium deposits were mined in the late 1800s, as well as during and after World War I and during World War II. Both open pit and underground mining operations were practiced (USDA 1994).

3.3.3 Soils and Ecological Sites

Soils

Soil types define and constrain the potential growth of many plant communities. Soils are living systems that cycle nutrients supporting native plants and wildlife, including nitrogen and carbon cycling. Understanding soil capability and soil health is fundamental to land use management. Soil properties affect construction, water retention, flood potential, moisture and nutrient availability, and the distribution and productivity of many plant communities as well as their resilience to disturbance.

The USDA's Natural Resources Conservation Service (NRCS) completed soil surveys for San Luis Obispo County in 1983 (Soil Conservation Service 1983). Soils of the region mostly formed in place except for those alluvial types near streams. Serpentine soils are abundant in this region. Soils on CSLO may be grouped into three main categories based on parent material and geomorphic position: (1) valley bottoms, (2) intermediate hills, and (3) steeper hills and mountains. Soils in the valley bottoms of the Camp are generally Cropley and Salinas soils that were formed on mixed alluvium from sedimentary rock sources. Soils on the intermediate hills are generally Los Osos, Lodo, and Diablo soils that were formed on residual material weathered from sedimentary rocks. Soils on the steeper mountains are generally rock outcrop or Obispo and Henneke soils and were formed in material weathered from serpentine rock (Soil Conservation Service 1978, 1983). Soil loss is a critical component of soil conservation and while several factors determine how erosive a soil is (i.e. slope, vegetative cover), generally soils high in clay have low

erodibility, sandy loams have moderate erodibility, and soils high in silt have high erodiblity (Rennard et. Al. 1997). The soils of CSLO are depicted on Map 3-3. Complete soil descriptions and a current soil map for CSLO may be accessed digitally at the University of California (UC) Davis California Soil Resource Lab website.

Ecological Sites

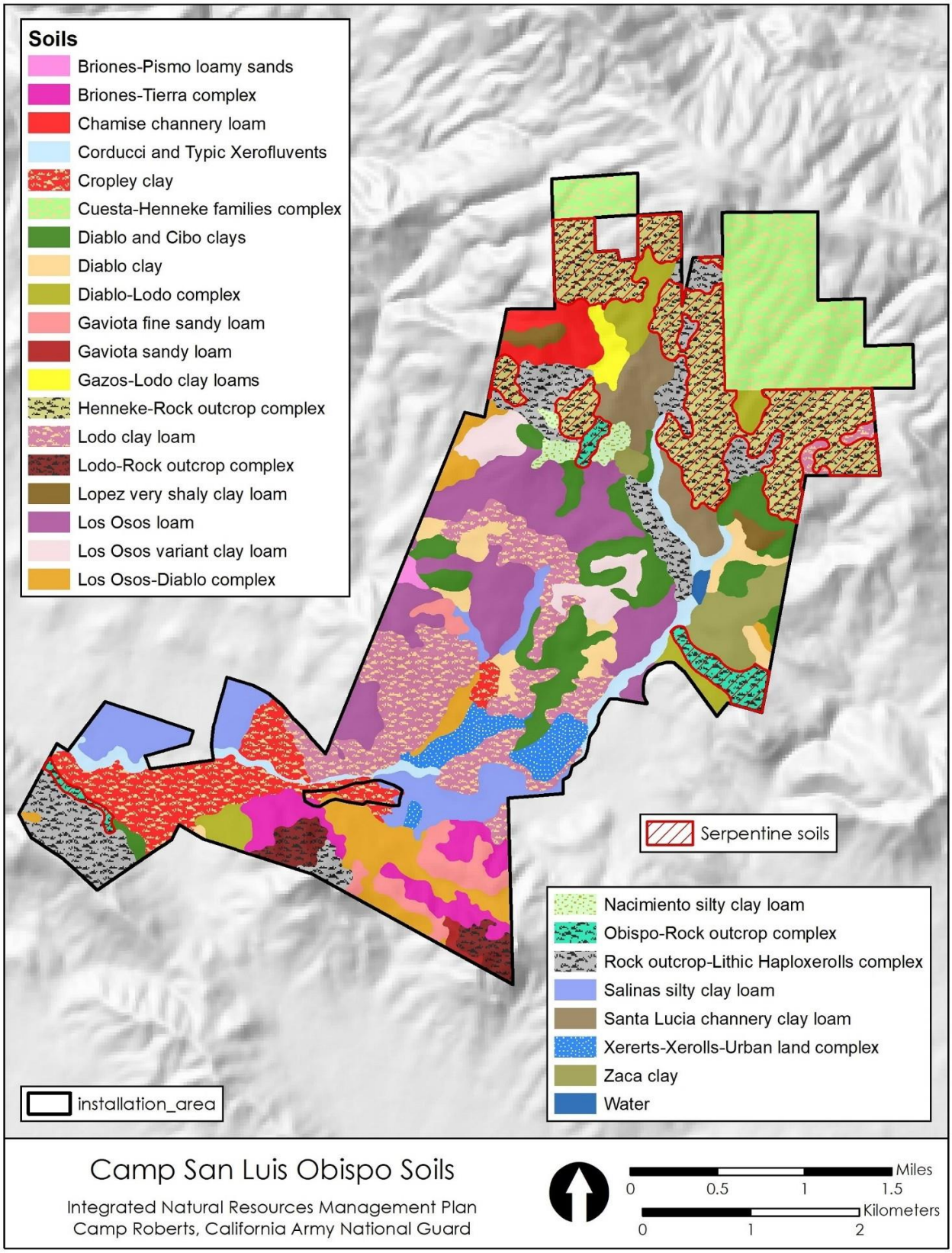
The variations among plant communities present across the landscape are classified into units called Ecological Sites (ES; NRCS 2019). An ES is defined as having specific characteristics that differ from other units in their ability to produce distinctive kinds of vegetation communities. ESs are defined based on characteristics of soil, vegetation, hydrology, and topography.

There are 16 ESs at CSLO, including soil complexes with more than one component ES (Table 3-2, Map 3-3).

Table 3-2. Ecological Sites of Camp San Luis Obispo.

ECOSITES	COMPONENT SOILS	TOTAL ACRES AT CSLO
Clayey	Cropley clay, Diablo and Cibo clays, Diablo clay, Nacimiento silty clay loam, Zaca clay	1,041.7
Clayey; Shallow Fine Loamy*	Diablo-Lodo complex	155.1
Fine Loamy	Los Osos variant clay loam	111.5
Fine Loamy Bottom	Salinas silty clay loam	294.4
Fine Loamy Serpentine	Henneke-Rock outcrop complex	669.0
Fine Loamy; Shallow Fine Loamy*	Gazos-Lodo clay loams	38.5
Loamy Claypan	Los Osos loam	514.1
Loamy Claypan; Clayey*	Los Osos-Diablo complex	234.4
North Slope Gravelly Fine Loamy	Santa Lucia channery clay loam, Briones-Tierra complex	158.5
Sandy; Coarse Loamy Claypan*	Briones-Tierra complex	161.5
Sandy; Shallow Sandy*	Briones-Pismo loamy sands	11.1
Shallow Clayey Serpentine	Obispo-Rock outcrop complex	91.7
Shallow Coarse Loamy	Gaviota fine sandy loam	132.9
Shallow Fine Loamy	Lodo-Rock outcrop complex, Lodo clay loam,	662.9
Shallow Gravely Fine Loamy	Lopez very shaly clay loam	40.3
Terrace	Chamise channery loam	92.7
Undefined: no Ecological Sites defined for these soil types.	Corducci and Typic Xerofluvents, Cuesta-Henneke families complex, Rock outcrop-Lithic Haploxerolls complex, Xererts-Xerolls-Urban land complex	1,227.5

*These soil mapping units are comprised of more than one Ecological Site.



Map 3-3. Soils of Camp San Luis Obispo.

3.3.4 Watersheds and Water Resources

A majority of CSLO is located within the Morro Bay Watershed (46,598 ac), also known as the Estero Bay Hydrologic Unit by the State Water Resources Board and the Central Coastal Watershed (USGS Hydrologic Unit No. 18060006; Map 3-4, Map 3-5). The Morro Bay Watershed is composed of two major sub-watersheds: Chorro and Los Osos Creeks. CSLO is located within the Chorro Creek sub-watershed which can be further divided into five smaller-scale watersheds: Chorro Creek, Dairy Creek, Poison Oak Creek, Pennington Creek, and Stenner Creek (Radian International 2000). These creeks and their tributaries total 44.46 miles (71.5 km) of waterways on the installation. Many of the tributaries are dry throughout most of the year but sustain significant water flow during rain events.

Chorro Creek

Chorro Creek is the largest watershed and the primary perennial water drainage on CSLO and accounts for about 60 percent of the total land area draining into Morro Bay estuary. Nearly all surface water that drains from CSLO eventually flows into the estuary via Chorro Creek, draining approximately 27,670 ac (11,197 hectares [ha]). It is estimated that 743 million gallons per year drain into Chorro Creek (Radian International 2000) by way of Dairy Creek, Pennington Creek, and Poison Oak Creek. Some of these intermittent tributaries of Upper Chorro Creek have suffered erosion at road crossings or in areas previously mined for chromite and nickel. A report to the RWQCB indicated that the Chorro Creek watershed contributes 86 percent of the total sediment delivered to Morro Bay, approximately 60,689 tons (TetraTech 1998). Chorro Creek headwaters originate in the northern portion of the installation and empty into Chorro Reservoir. The reservoir empties into the mainstem of Chorro Creek which flows through the training areas and the cantonment area before exiting the installation and heading to Morro Bay. Chorro Creek and its tributaries are surrounded by CSLO training lands used for grazing.

Dairy Creek

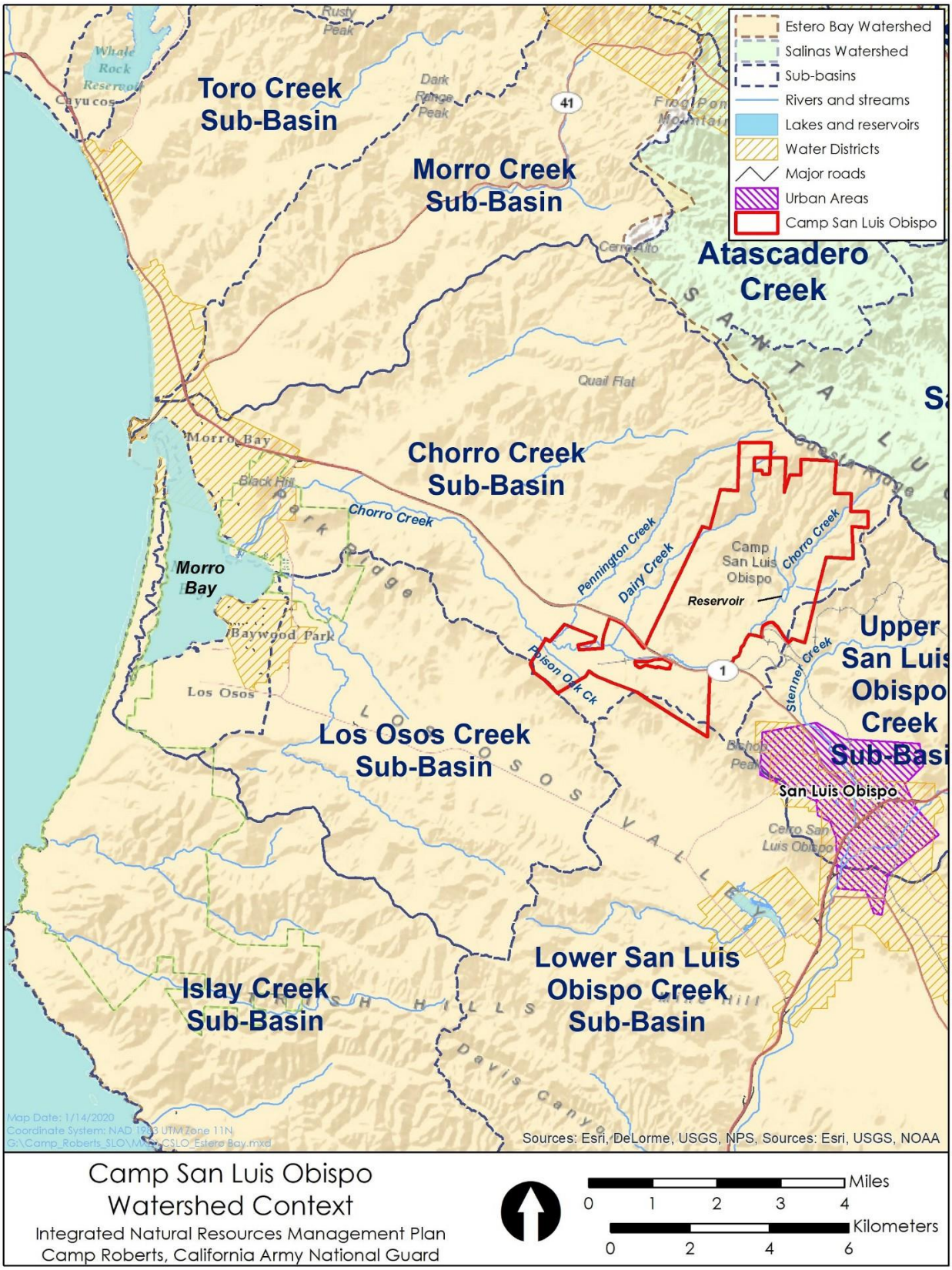
Dairy Creek is a perennial stream that drains a minor part of CSLO's western boundary (~676 ac). It flows through El Chorro Regional Park, then reenters the Camp in the Cantonment Area before entering Chorro Creek. There are also deeply carved intermittent drainages in low-lying areas. The watershed is predominately utilized as rangeland for beef cattle operations, and most is publicly owned. Besides CSLO, other landowners are the County of San Luis Obispo, the USFS, and CalPoly.

Pennington Creek

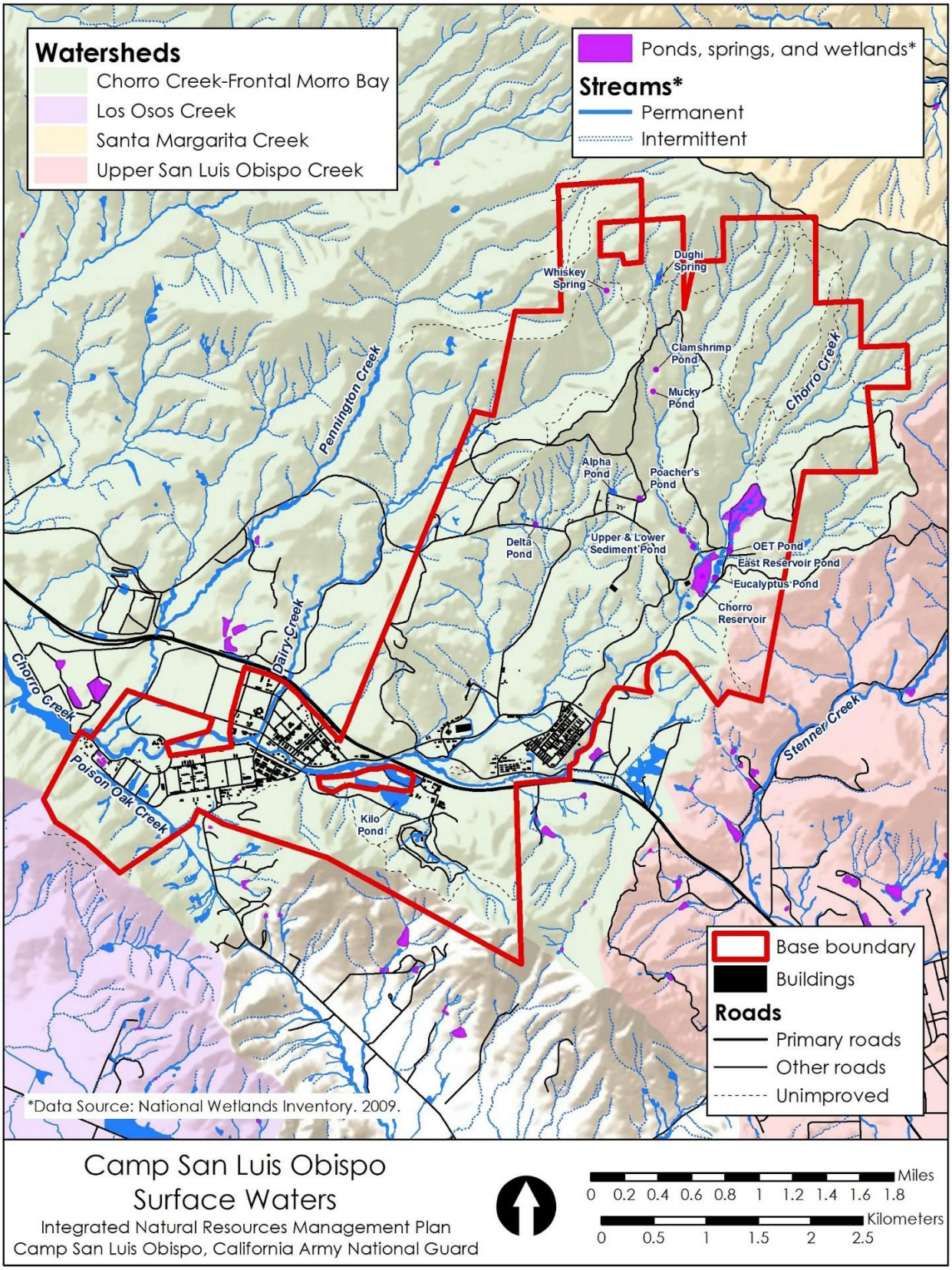
Pennington Creek intermittently collects surface water from the northwest hills of CSLO before running through adjacent neighboring properties. It drains approximately 2,048 ac (828 ha) in a southwesterly direction through Cuesta College, then reenters CSLO in the extreme southwest corner of the property before flowing into Chorro Creek. An unnamed ditch that runs parallel to Pennington Creek in the southwest portion of the camp drains the majority of the O'Sullivan Helipad into Chorro Creek. The watershed is predominantly utilized as parkland and beef cattle rangeland owned by Cal Poly and others.

Poison Oak Creek

Poison Oak Creek is intermittent and drains the southern portion of the Camp, an estimated 376 ac (152 ha) near Sutter Avenue Landfill.



Map 3-4. Watershed context of Camp San Luis Obispo.



Map 3-5. Surface waters and wetlands of Camp San Luis Obispo.

Stenner Creek

A small area of eastern CSLO (near the CMC's East Facility) contains headwater drainages of Stenner Creek which leads to Avila Bay via San Luis Obispo Creek. Stenner Creek is a perennial stream capturing runoff from 33 ha (82 ac) of CSLO. Stenner Creek is the only drainage on CSLO that is not part of the Chorro Creek Watershed.

Other Surface Waters

CSLO has a total of 9.72 ac (3.9 ha) of ponds and reservoirs (palustrine, open water) located throughout the installation. CSLO's ponds and reservoirs were artificially created for sediment control and water storage. These sites include sediment basins, stockwater ponds and other ponds. Several of these sediment basins and ponds are fenced to exclude livestock.

Chorro Reservoir

Chorro Reservoir is located on the eastern side of the Installation and is owned by the Department of General Services and operated by CMC. Chorro Reservoir was built in 1941 to regulate water imported from the Salinas Reservoir. Sediment basins above the reservoir were constructed in later years to trap much of the sediment released into the Upper Chorro Creek watershed, thereby preventing sedimentation and water quality impacts to Morro Bay. Chorro Reservoir stores water for urban use, natural ecosystem benefit, downstream riparian habitat, and ground water maintenance.

The CMC operates a sewage treatment plant fed by the Reservoir, serving CSLO, Cuesta College, and the County Operations Center. Whale Rock Reservoir near Cayucos also supplies water to CSLO, the CMC, City of San Luis Obispo, CalPoly, Cuesta College, and the County Operations Center. Up to 110 acre-feet per year (AFY) of Whale Rock water is available via Chorro Reservoir and the CMC Water Treatment Plant (San Luis Obispo Inland Area Plans pg. 249). CSLO owns a portion of the water rights from the Chorro Reservoir.

Ponds

The following is a summary of the records and activities related to some of the major on-site ponds. Permanent wetlands include Dughi Spring, Mucky Pond, Whiskey Spring, and OET Pond. Seasonal wetland ponds include Alpha, Clamshrimp, Eucalyptus, and Poacher's ponds. Certain ponds were established as sediment basins to slow flood runoff and watershed sedimentation, such as Upper Sediment Pond and Lower Sediment Pond.

See Map 3-5 for pond locations.

Whiskey Spring. Whiskey Spring is situated at the headwaters of Dairy Creek in Training Area U. It discharges directly into a small pool that drains down a steep slope into Dairy Creek and may serve as a link between Dairy Creek and Chorro Creek. Whiskey spring is located in the northern portion of the installation and is exposed to few impacts due to its isolation. This pond is an important breeding pond for the California red-legged frog (CRLF; *Rana draytonii*).

Dughi Spring. Dughi Spring is located in the northern part of CSLO and formerly consisted of two small pools in an open pasture. The spring was developed in years past for stockwater. After a 1994 wildfire, pools at Dughi Spring gradually filled with sediment. On September 28, 2007 habitat enhancement activities involving sediment and vegetation removal took place in the larger pool at Dughi Spring. In addition, Dughi Spring and approximately 4 ac were fenced to exclude cattle. This project created more

open water and increased the water depth; thereby providing improved year-round habitat for the red-legged frog, which have been observed regularly at the site since habitat enhancement activities took place.

Mucky Pond. Mucky Pond is located south of Dughi Spring in the central portion of CSLO. In 1995, Mucky pond was approximately 141 ft in diameter and 4 ft deep in the center. In December 1994 cattle were excluded when a fence was constructed around the pond. Run-off from the 1994 forest fire resulted in accumulation of sediments, completely filling it and vegetation establishing such that no water was present by 1999.

As detailed in BO # 1-8-99-F-86, habitat enhancement activities occurred at Mucky Pond in 2011 by re-aligning the perimeter fence to bisect the pond and removing approximately 10 cubic yards of soil and vegetation. Soil and vegetation were removed again in 2018. This pond is available to cattle, and cattle disturbance was anticipated to keep encroaching vegetation at bay. Ongoing management of cattle grazing is necessary to ensure project goals are met. To date, no CRLF have been observed since habitat enhancement efforts took place.

Eucalyptus Pond. This is a relatively shallow (2-3 ft at the deepest) detention basin, located adjacent to Chorro Creek Reservoir. A dense band of tules, or bulrush (*Scirpus acutus*), are prevalent around the margin. California red- legged frog adults and tadpoles have been identified within this pond. This pond has been the focus of bullfrog removal efforts.

Upper Sediment Pond. According to the 2004 report by USDA Animal and Plant Health Inspection Service (APHIS) Wildlife Services, the basin is approximately 300 ft long and ranges from 50 to 90 ft wide. The depth is approximately 20 ft deep in the middle but tapers at each end to approximately 6 ft. The margins of the basin are heavily vegetated with tules along the northern, eastern, and southern boundaries. Arroyo willow is also present along the pond margins, which provides good habitat structure compared to Eucalyptus Pond. The western side of the sediment pond consists of a steeply sloping rock cliff and there is limited soil for emergent vegetation to establish. Both bullfrogs and California red-legged frog have been observed in this pond. Several sunfish (*Micropterus* sp. and *Lepomis* sp.) and southwestern pond turtles (*Actinemys pallida*) have also been observed. Access to the pond occurs primarily along the southern bank and at selective locations along the northeastern edge.

Lower Sediment Pond. On the west fork of Chorro Creek, inflow from the Upper Sediment Pond occurs via a spillway at the north end and outflow occurs at the south end through a concrete erosion protection channel and culvert that flows under Water Plant Road into Chorro Reservoir. Similar to the upper sediment pond, this area is dominated by a thick band of tules along the northern, eastern, and southern boundaries. Steep rocky slopes are found along the western margin of the pond.

OET Pond. OET pond is at the intersection of Water Plant Road and Bog Thistle Road. It is an oval body of water 400 ft long by 150 ft wide, completely surrounded by cattails in a band about 25 ft wide. Arroyo willow is also part of the vegetative band around this pond. A culvert flows under Bog Thistle Road and into Chorro Reservoir and is the only outlet for water within this pond. Significant numbers of California red-legged frog and bullfrog have been recorded (USGS 2004).

Groundwater Basin

Groundwater supply includes CSLO wells drawing on the Chorro Valley Groundwater Basin, underlying primarily the southern portion of CSLO and those areas adjacent to Chorro Creek along Highway One. Water storage is replenished by stream percolation, precipitation, return flow of excess water applied for irrigation and other uses, and septic tank infiltration.

3.3.5 Surface Water Quality

The primary water quality concerns confronting local water bodies are sedimentation, nutrient enrichment, bacterial contamination, and heavy metals. Several related problems, including habitat loss and degradation, and excessive freshwater diversion exacerbate these water quality concerns. When a California water body is assessed and/or listed as impaired by the EPA and State Water Resources Control Board (SWRCB), it is placed on the CWA Section 303(d) list. See Table 3-3 for creek health for Chorro, Dairy, Pennington, and Stenner Creeks. Chorro Creek is listed as impaired waters under the federal CWA Section 303(d) for sediment and nutrients (biostimulatory substances). In 2002, Dairy Creek was listed on California's Section 303(d) list of impaired waters for dissolved oxygen and fecal coliform. Pennington Creek and Stenner Creek are listed for fecal coliform bacteria. Chorro Creek supports adequate environmental base flows to support steelhead trout, due to the fact that it has perennial flow conditions (Stillwater Sciences 2013).

Table 3-3. Creek health by beneficial use impairment (SWRCB 2016).

CREEK NAME	303D LISTED/TOTAL MAXIMUM DAILY LOADS	POTENTIAL POLLUTION SOURCES
Chorro Creek (Perennial)	Yes, on 303d list for E. coli, fecal coliform, nutrients, and sediment. Approved EPA Total Maximum Daily Load (TMDL) for pathogens and sediment, 2004, nutrients in 2005.	Erosion/Siltation, Grazing-Related Sources, Highway/Road/ Bridge Construction, Land Development
Dairy Creek (Ephemeral)	Yes, on 303d list for fecal coliform, nutrients (low dissolved oxygen). Approved EPA TMDL for pathogens and low dissolved oxygen, 2004.	Grazing related sources
Pennington Creek (Ephemeral)	Yes, on 303d list for fecal coliform. TMDL for estimated date of completion 2027.	Unknown
Stenner Creek (Ephemeral)	Fecal coliform EPA approved TMDL 2005.	Domestic Animals/Livestock, Natural Sources, Urban Runoff/Storm Sewers.

3.3.6 Floodplains and Flooding

Floodplains provide groundwater recharge and capture sediment from upstream, reducing its delivery to freshwater and marine habitats. Throughout the Central Coast Hydrologic Region, flooding is a significant issue. Exposure to a 500-year flood event threatens one in three residents, and more than 310 sensitive species (California Water Plan Update [State of California 2019]).

Remnants of the natural floodplain-riparian-wetland community complexes include coast live oak forest and mixed riparian woodland and scrub. Debris flows occur during most major storms, particularly when wildland fires of the previous season have reduced vegetation in the upper watershed. Much of the

historical floodplain area of Chorro Valley has been modified by levees to support farming. Flood-related projects totaling $280 million in the Central Coast Hydrologic Region have been proposed. No formal delineation of 100- or 500-year flood risks exist for CSLO.

3.4 Vegetation Communities and Wildlife Habitat

3.4.1 Regional Floristic Province

Floristically, CSLO occurs within the Central Western California Province (Hickman 1993; Baldwin et al. 2012), which extends from the northern edge of Marin County southward into Santa Barbara County, and is bounded to the west by the Pacific Ocean, and the San Joaquin Valley to the east. Within this province, the CSLO property lies in the Outer South Coast Ranges. This subdivision contains the Sierra de Salinas, the Santa Lucia Mountains, and the San Rafael Mountains to the crest of the Santa Ynez Mountains in the Transverse Ranges, Ventura County. CSLO is on the outer (coastal) portion of the Santa Lucia Mountains.

Floral Diversity

The area of San Luis Obispo County and CSLO are species rich in part due to their Mediterranean climate moderated by fog. Fog is significant to flora because it reduces water loss by transpiration and contributes to soil/plant moisture by fog drip. Serpentine soils in the region also contribute to the high levels of endemic plant species found on CSLO.

A total of 527 species of plants have been recorded at CSLO, representing 80 different families (Appendix D). Of these, 412 species are native to California and 115 are exotic; 70 non-native species are listed by California Invasive Plant Council (Cal-IPC). Plant species at CSLO include 124 monocots, more than half of which (70) are grasses, and 403 dicots; the largest dicot family is the Asteraceae (Sunflower Family) with 80 species.

Lichens are grouped with flora but are not plants; they consist of an algal and fungal species. CSLO has an unusually rich documentation of its lichen flora with 25 different species observed; all of which are native to California (INRMP 2011). They play a critical role in breaking down bedrock and leaf litter as well as contributing to soil health through nitrogen fixation.

3.4.2 Vegetation Community Distribution and Condition

The vegetation of CSLO was mapped in 2007 using a combination of sources for classifying vegetation communities:

- CDFW's List of California Terrestrial Natural Communities (California Department of Fish and Game [CDFG] 2003),
- the National Vegetation Classification System (NVCS) data collected at CSLO in 2007 by the Center for Environmental Management of Military Lands (Woolf 2007),
- plant community descriptions as published in the Manual of California Vegetation 2nd Edition (MCV2; Sawyer et al. 2009).

Vegetation was classified by the dominant plant species in the topmost layers (trees/shrubs/herbaceous) of the vegetated canopy. Current nomenclature uses the term 'alliance' to designate the dominant species for a given patch (or 'stand') of vegetation. For example, a stand that is dominated by California

sagebrush (*Artemisia californica*) is classified as belonging to the 'Artemisia Californica Shrubland Alliance.' Within the NVCS, alliances are part of a hierarchical classification as follows. Table 3-4 shows the NVCS hierarchy for the *Artemisia Californica* Shrubland Alliance as an example.

For this plan, the alliances identified in the 2007 mapping efforts have been updated to the currently accepted NVCS nomenclature as described by the MCV2 (Sawyer et al. 2009) and the Manual of California Vegetation (MCV) Online database (MCV Online [CNPS 2020]).[2] It should be noted that while the 2007 mapping distinguished between woodlands (open stands of trees) and forests (closed stands), the MCV2 does not separate tree alliances in this way. Therefore, the tree-dominated alliances described below present the total acreages wherever the 2007 map described woodlands and forests for the same dominant species. Where applicable, the difference and relative areas of woodlands and forests will be discussed in more detail elsewhere.

Table 3-4. NVCS classification hierarchy for the Artemisia Californica Shrubland Alliance (CNPS 2020).

- Formation Class (e.g. Mesomorphic Shrub and Herb Vegetation (Shrubland and Grassland)
  - Formation Subclass (e.g. Mediterranean Scrub and Grassland)
    - Formation (e.g. Mediterranean Scrub)
      - Division (e.g. California Scrub)
        - Macrogroup (e.g. California Coastal Scrub)
          - Group (e.g. Central and South Coastal Californian coastal sage scrub)
            - Alliance (e.g. Artemisia Californica Shrubland Alliance)
              - Association*

*If other sub-dominant species are present an alliance can be further sub-divided. The vegetation at CSLO was not mapped to this level of detail, so associations are not discussed here except for some special circumstances described below.

The mapping effort identified 18 distinct plant communities, or alliances, plus five other cover types (developed areas, open water, etc.) at CSLO (Table 3-5). Grasslands cover approximately 51 percent of the CSLO, and chaparral covers approximately 18 percent, with smaller areas of oak woodlands, sage scrub, and riparian scrub and woodlands. Map 3-6 shows the vegetation communities.

[2] Available at: https://vegetation.cnps.org/.

Table 3-5. Vegetation communities of Camp San Luis Obispo.

Vegetation Community [Macrogroup/Group]	Alliances & Associations	Area (ac)	% of Total
California Annual and Perennial Grassland		**2,892.7**	**51.2**
Mediterranean California naturalized annual and perennial grassland	**Wild Oats and Annual Brome Grasslands** *Avena* spp. - *Bromus* spp. Herbaceous Semi-Natural Alliance	2,408.3	42.6
	Bristly Oxtongue Stands[1] *Picris echiodes* Herbaceous Semi-Natural Stands	130.8	2.3
California Perennial Grassland	**Needle Grass-Melic Grass Grassland** *Nassella* spp.-*Melica* spp. Herbaceous Alliance *Nassella pulchra* Association[2,4]	353.6	6.3
California Coastal Scrub		**245.3**	**4.3**
Central and south coastal California seral scrub	**Black Sage Scrub** *Salvia mellifera* Shrubland Alliance	170.9	3.0
	California Sagebrush Scrub *Artemisia californica* Shrubland Alliance	69.4	1.2
Central and South Coastal Californian coastal sage scrub	**California Buckwheat Scrub** *Eriogonum fasciculatum* Shrubland Alliance: *Hesperoyucca whipplei* Association[2]	5.0	0.1
Vancouverian Coastal Dune and Bluff		**7.6**	**0.1**
California Coastal evergreen bluff and dune scrub	**Coyote Brush Scrub** *Baccharis pilularis* Shrubland Alliance	7.6	0.1
California Chaparral		**1,038.2**	**18.5**
Californian xeric chaparral	**Buck Brush Ceanothus Chaparral** *Ceanothus cuneatus* Shrubland Alliance	983.9	17.5
	Serpentine Manzanita Chaparral[3] *Arctostaphylos obispoensis* Shrubland Alliance	10.6	0.2
	Chamise chaparral *Adenostoma fasciculatum* Shrubland Alliance	4.2	0.1
Californian pre-montane chaparral	**Chaparral Whitethorn Chaparral** *Ceanothus leucodermis* Shrubland Alliance	39.5	0.7
California Forest and Woodland		**685.5**	**12.2**
Californian broadleaf forest and woodland	**Coast Live Oak Woodland** *Quercus agrifolia* Woodland Alliance	483.3	8.6
Californian evergreen coniferous forest and woodland	**Sargent Cypress Woodland**[4] *Hesperocyparis sargentii* Woodland Alliance	202.2	3.6
Introduced North American Mediterranean Woodland and Forest		**27.2**	**0.5**
Introduced North American Mediterranean woodland and forest	**Eucalyptus-Tree of Heaven-Black Locust Groves** *Eucalyptus-Ailanthus altissima-Robinia pseudoacacia* Woodland Semi-Natural Alliance: *Eucalyptus* spp. Association	27.2	0.5
Southwestern North American Riparian, Flooded and Swamp Forest		**123.9**	**2.2**
Southwestern North American riparian/wash scrub	**Arroyo willow thickets** *Salix lasiolepis* Shrubland Alliance	61.2	1.1

Vegetation Community [Macrogroup/Group]	Alliances & Associations	Area (ac)	% of Total
Southwestern North American riparian evergreen and deciduous woodland	**California Sycamore Woodlands**[4] *Platanus racemosa* Woodland Alliance	60.5	1.1
	American Elm Woodland[3] *Ulmus americana* Woodland Alliance	2.2	0.0
Other Cover Types		**627.9**	**11.1**
Restoration Area	**Restoration Project**	10.7	0.2
General Agriculture	**Cultivated/Crop**	106.2	1.9
Orchards and Vineyards	**Walnut Orchard** *(not a natural woodland)*	11.6	0.2
Water	**Water**	7.9	0.1
Urban	**Urban/Developed**	491.5	8.7
	Total	**5,638.0**	-

[1]*Picris echioides* is not a described alliance or association in the current MCV On-line database. Because it includes many of the same component species as the more broadly mapped non-native grasslands, it is included here as a component of the naturalized annual and perennial grasslands Macrogroup/Group.

[2]These types were designated in the Woolf 2007 vegetation map as alliances. However, they have since been re-classified by the MCV On-line database as associations under more broadly defined alliances.

[3]These alliances mapped in 2007 are not described alliances or associations in the current MCV On-line database. They have been placed in the Macrogroup and Group headings which seem most appropriate based upon relationships with other, described NVCS alliances mapped at CSLO.

[4] Natural Communities with ranks of S1-S3 are considered Sensitive Natural Communities

3.4.2.1 California Annual and Perennial Grasslands

Three types of grasslands occur at CSLO, Valley Needlegrass Grasslands, Non-Native Grasslands, and Non-Native Grassland-Broadleaf-dominated (Table 3-6). Together these communities cover approximately 2,893 ac (1,171 ha), or 51.2 percent of CSLO. Grasslands generally occur on the gentle exposed upland slopes with well drained mineral soils containing little to no organic matter, and in the deep lower slopes of the lowlands. These soils come from a wide variety of both hydric and non-hydric soil series. The shallower soils are typically dominated by filaree (*Erodium* sp.) or other low growing nonnative forbs. Deeper soils, with higher water holding capacity, are dominated by wild oats and other tall annual grasses. The most common soil series containing grasslands in CSLO includes the Obispo-Rock outcrop complex, Los Osos loam, Diablo and Cibo clays, Lodo clay loams.

Grassland habitats are relied on by many sensitive plant and animal species which overlap with oak woodlands. Overall, grassland species of birds are the group which has shown the steepest decline in abundance over the last 30 years with over half of breeding individuals gone across the United States (Rosenberg et al. 2019). Various other species of special concern also rely on grasslands, primarily for forage. Species commonly found in CSLO grasslands include western meadowlark (*Sturnella neglects*), grasshopper sparrow (*Ammodramus savannarum*), red-tailed hawk (*Buteo jamaicensis*), California ground squirrel (*Spermophilus beechyi*), coyote (*Canis latrans*), and gopher snake (*Pituophis catenifer catenifer*).

Table 3-6. Overview of California Annual and Perennial Grassland vegetation communities at CSLO.

California Annual and Perennial Grassland Macrogroup	
Mediterranean California Naturalized Annual and Perennial Grassland Group (2,539 ac)	
Wild Oats and Annual Brome Grasslands *Avena* spp. - *Bromus* spp. Herbaceous Semi-Natural Alliance (MCV On-line 2019)	Equivalent Nomenclatures: (Holland) Non-Native Grasslands [42200], (MCV) California Annual Grasslands, (MCV2) Annual Brome Grassland Semi-Natural Herbaceous Stands Rarity Rankings: None
Bristly Oxtongue Stands *Picris echiodes* Herbaceous Semi-Natural Stands Alliance (Woolf 2007):	Equivalent Nomenclatures: (Holland) Non-Native Grasslands-Broadleaf Dominated [42210], (MCV) California Annual Grasslands, (MVC2) Bristly Oxtongue Semi-Natural Herbaceous Stands* Rarity Rankings: None
California Perennial Grassland Group (354 ac)	
Needle grass - Melic grass Grassland *Nassella* spp.-*Melica* spp. Herbaceous Alliance (MCV On-line 2019):	Equivalent Nomenclatures: (Holland) Valley Needlegrass Grassland [42110], (MCV) Valley Needlegrass, (MCV2) Purple Needlegrass Grassland Rarity Rankings: G4S4
***Nassella pulchra* Association**	

*Not a described MCV2 alliance.

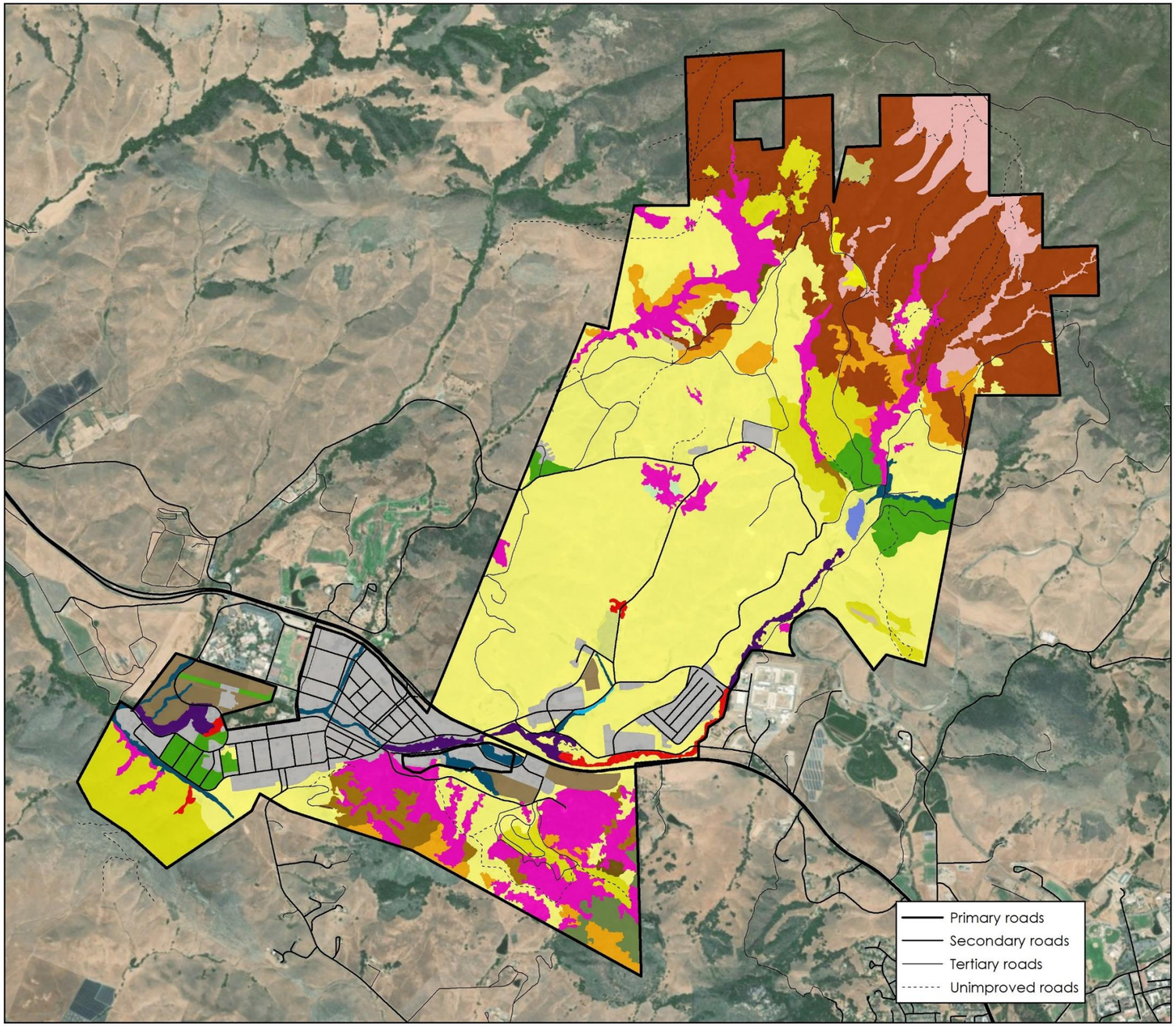
MCV = Manual of California Vegetation; MCV2 = Manual of California Vegetation 2nd Edition

3.4.2.2 California Coastal Scrub

Coastal scrub covers only 253 ac (102 ha) of CSLO and is dominated by shrub species typical of coastal sage scrubs elsewhere in the region. CSLO's location in the Santa Lucian Range places it in the Central Lucian Coastal Scrub community (Holland 1986). This community occurs at elevations below 3,900 ft (1,200 m) on exposed, often south-facing slopes with shallow, rocky soils. Typical soils are alluvial or colluvial derived and shallow.

These alliances include a highly variable mix of species and can include shrubs characteristic of coastal scrubs, such California buckwheat (*Eriogonum fasciculatum*), sticky monkeyflower (*Diplacus aurantiacus*), sawtoothed goldenbush (*Hazardia squarrosa*), and coffeeberry (*Rhamnus* spp.). Native grasses such as needlegrass and blue wild rye (*Elymus glaucus*) occur on the spaces between shrubs, as do a variety of native forbs and non-native grasses.

Coastal scrub is not a widespread habitat type at CSLO, but many wildlife species utilize it, including western fence lizard (*Sceloporus occidentalis*), woodland alligator lizard (*Elgaria multicarinata multicarinata*), wrentit (*Chamaea fasciata*), California thrasher (*Toxostoma redivivum*), orange-crowned warbler (*Oreothlypis celata*), brush rabbit (*Sylvilagus bachmani*), California mouse (*Peromyscus californicus*), western spotted skunk (*Spilogale gracilis*), and gray fox (*Urocyon cinereoargenteus*).



Camp San Luis Obispo Vegetation Communities

Integrated Natural Resources Management Plan
Camp San Luis Obispo, California Army National Guard

Vegetation Communities

California Annual and Perennial Grassland
- Needlegrass-Melic Grass Grassland: *Nassella pulchra* Association Alliance
- Wild Oats and Annual Brome Grasslands
- Bristly Oxtongue Stands

California Coastal Scrub
- Black Sage Scrub
- California Sagebrush Scrub
- California Buckwheat Scrub: *Heseroyucca whipplei* Association

Vancouverian Coastal Dune and Bluff
- Coyote Brush Scrub

California Chaparral
- Buck Brush Ceanothus Chaparral
- Serpentine Manzanita Chaparral
- Chamise Chaparral
- Chaparral Whitethorn Chaparral

California Forest and Woodland
- Coast Live Oak Woodland
- Sargent Cypress Woodland

Introduced North American Woodland and Forest
- Eucalyptus-Tree of Heaven-Black Locust Groves: *Eucalyptus* spp. Association

Southwestern North American Riparian, Flooded and Swamp Forest
- Arroyo Willow Thickets
- California Sycamore Woodland
- American Elm Woodland

Other Cover Types
- Walnut Orchard
- Restoration Project
- Cultivated/Crop
- Water
- Urban

Miles
0 0.2 0.4 0.6 0.8 1 1.2
Kilometers
0 0.5 1 1.5 2

Map 3-6. Vegetation communities of Camp San Luis Obispo.

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Table 3-7. Overview of California Coastal Scrub vegetation communities at CSLO.

California Coastal Scrub Macrogroup	
Central and South Coastal California Seral Scrub Group (240 ac)	
Black Sage Scrub *Salvia mellifera* Shrubland Alliance (MCV On-line 2019):	Equivalent Nomenclatures: (Holland) Diablan sage scrub [32600], (MCV) Black sage series, (MCV2) *Salvia mellifera* Shrubland Alliance. Rarity Rankings: G4S4
California Sagebrush Scrub *Artemisia californica* Shrubland Alliance (MCV On-line 2019):	Equivalent Nomenclatures: (Holland) Diablan Sage Scrub [32600], (MCV) California Sagebrush Series, (MCV2) *Artemisia californica* Shrubland Alliance. Rarity Rankings: G5S5
Central and South Coastal California Coastal Sage Scrub Group (5 ac)	
California Buckwheat Scrub *Eriogonum fasciculatum* Shrubland Alliance (MCV On-line 2019):	Equivalent Nomenclatures: (Holland) Central Lucian Coastal Scrub [32200], (MCV) California buckwheat series, (MCV2) *Eriogonum fasciculatum* shrubland alliance Rarity Rankings: G5S5
***Hesperoyucca whipplei* Association**	

MCV = Manual of California Vegetation; MCV2 = Manual of California Vegetation 2nd Edition

3.4.2.3 Vancouverian Coastal Dune and Scrub

Vancouverian Coastal Dune and Scrub covers only 8 ac (3 ha) of CSLO (Woolf 2007) () and is dominated by coyote brush (*Baccharis pilularis*). This community occurs at elevations below 4,900 ft (1,500 m) on stream sides, terraces, open slopes and ridges. Soils vary from sandy to clayey.

Table 3-8. Overview of Vancouverian Coastal Dune and Bluff vegetation communities at CSLO.

Vancouverian Coastal Dune and Scrub Macrogroup	
California Coastal Evergreen Bluff and Dune Scrub Group (8 ac)	
Coyote Brush Scrub *Baccharis pilularis* Shrubland Alliance (MCV On-line 2019)	Equivalent Nomenclatures: Holland) Diablan Sage Scrub [32600], (MCV) Coyote Brush Series, (MCV2) Baccharis pilularis Shrubland Alliance Rarity Rankings: G5S5

MCV = Manual of California Vegetation; MCV2 = Manual of California Vegetation 2nd Edition

There is only one alliance at CSLO in this macrogroup, where other common shrub species such as California sagebrush and California buckwheat occur with the dominant coyote brush. Native grasses such as needlegrass and blue wild rye may occur in the spaces between shrubs, as do a variety of native forbs and non-native grasses.

Wildlife species which may utilize coyote brush include western fence lizard, woodland alligator lizard, California towhee (*Melozone crissalis*), wrentit, California thrasher, orange-crowned warbler, brush rabbit, California mouse, and coyote.

3.4.2.4 California Chaparral

The chaparral shrublands at CSLO occurs on 1,038 ac(420 ha) in the north end of the base, with a small amount in the southeast corner. Chaparral occurs at elevations up to 5,906 ft (1,800 m) in a mosaic with coastal scrubs and grasslands. Topography varies from slopes to ridgetops, outcrops, alluvial fans, on variable aspects. Typical soils can be shallow to deep, coarse textured over colluvium or varied bedrock. On mesic slopes it is replaced by woodlands, and by sage scrub on drier slopes.

The chaparral communities at CSLO are primarily comprised of a single alliance, the Buck Brush Ceanothus Alliance. However, the composition of chaparral at CSLO is variable and may include any of the following species which may be prominent in certain areas (Table 3-9): manzanita species (*Arctostaphylos* sp.), chamise (*Adenostoma fasciculatum*), hollyleaf cherry (*Prunus ilicifolia*), toyon (*Heteromeles arbutifolia*), and other ceanothus species (Woolf et al. 2007). Poison oak (*Toxicodendron diversilobum*), California peony (*Paeonia californica*), fiesta flower (*Pholistoma auritum*), bedstraw (*Galium* sp.), and annual grasses also occur in chaparral.

Table 3-9. Overview of chaparral vegetation communities at CSLO.

California Chaparral Macrogroup	
Californian Xeric Chaparral Group (999 ac)	
Buck Brush Ceanothus Chaparral *Ceanothus cuneatus* Shrubland Alliance MCV On-line 2019)	Equivalent Nomenclatures: (Holland) Buck brush chaparral [37810], (MCV) Wedgeleaf ceanothus series, (MCV2) *Ceanothus cuneatus* shrubland alliance Rarity Rankings: G4S4
Serpentine Manzanita Chaparral* *Arctostaphylos obispoensis* Shrubland Alliance (MCV On-line 2019):	Equivalent Nomenclatures: (Holland) Northern mixed chaparral [37810], (MCV) not treated, (MCV2) not treated Rarity Rankings: none (*A. obispoensis* is a CNPS 4.3 sensitive species)
Chamise Chaparral *Adenostoma fasciculatum* Shrubland Alliance (MCV On-line 2019)	*Equivalent Nomenclatures*: (Holland) Chamise Chaparral [37200], (MCV) Chamise Series, (MCV2) *Adenostoma Fasciculatum* Shrubland Alliance Rarity Rankings: G5S5
Californian Pre-montane Chaparral Group (40 ac)	
Chaparral Whitethorn Chaparral *Ceanothus leucodermis* Shrubland Alliance (MCV On-line 2019):	Equivalent Nomenclatures: (Holland) Whitethorn chaparral [37532], (MCV) Chaparral whitethorn series, (MCV2) *Ceanothus leucodermis* shrubland alliance Rarity Rankings: G4S4

*Not a described MCV2 alliance.

MCV = Manual of California Vegetation; MCV2 = Manual of California Vegetation 2nd Edition.

Many wildlife species utilize chaparral habitats, including western fence lizard, southern alligator lizard (*Elgaria multicarinata*), wrentit, California thrasher, orange-crowned warbler, Costa's hummingbird (*Calypte costa*), black-tailed deer (*Odocoileus hemionus columbianus*), brush rabbit, California mouse, western spotted skunk, gray fox, and gopher snake.

3.4.2.5 California Forest and Woodland

Upland woodlands and forests cover approximately 685 ac (277 ha) of CSLO (Table 3-10).

Table 3-10. Overview of California Forest and Woodland vegetation communities at Camp San Luis Obispo.

California Forest and Woodland Macrogroup	
Californian Broadleaf Forest and Woodland Group (483 ac)	
Coast Live Oak Woodland *Quercus agrifolia* Woodland Alliance (MCV On-line 2019)	Equivalent Nomenclatures: (Holland) Coast Live Oak Woodland [71160], (MCV) Coast Live Oak Series, (MCV2) *Quercus agrifolia* Woodland Alliance Rarity Rankings: G5S4
Californian Evergreen Coniferous Forest and Woodland Group (202 ac)	
Sargent Cypress Woodland *Hesperocyparis sargentii* Woodland Alliance (MCV On-line 2019)	Equivalent Nomenclatures: (Holland) Northern Interior Cypress Forest [83220], (MCV) Sargent cypress series, (MCV2) Sargent Cypress Woodland Rarity Rankings: G3S3.2

MCV = Manual of California Vegetation; MCV2 = Manual of California Vegetation 2nd Edition.

At CSLO closed canopy oak forest dominated by coast live oak (*Q. agrifolia*) covers 473 ac (192 ha), located primarily in the south end of the Camp and along the upland slopes of intermittent stream drainages in the north end. There is a single 10-ac (4-ha) stand of open coast live oak woodland in the south. The coast live oak woodlands are often geographically placed between grassland and scrub communities, on north facing slopes, and along the ephemeral drainages found in the northern hills. Most of the coastal oak woodland at CSLO is composed of medium to large trees with few seedlings and saplings.

Coast live oak is the dominant tree species while tanbark oak (*Lithocarpus densiflorus*) and Pacific madrone occur occasionally. Some oak woodlands have a significant grassland cover under and among the trees. Where the trees grow farther apart, there is a transition to chaparral or to herbaceous communities, with the understory being composed of the same species that characterize the adjacent community.

Where the trees form a closed canopy, an understory of shade tolerant shrubs, ferns, and herbs varies from dense to sparse cover. In mesic sites, typical understory mixtures are shade tolerant plants such as poison-oak, California blackberry (*Rubus ursinus*), creeping snowberry (*Symphoricarpos mollis*), toyon, and herbaceous plants such as bracken fern (*Pteridium aquilinum*), California polypody (*Polypodium californicum*), fiesta flower, and miner's lettuce (*Claytonia perfoliata*) (USDA 1994). Where the habitat integrates with coastal scrub, typical understory species are sticky monkeyflower, coyote brush, and California sagebrush.

Wildlife species which utilize coast live oak woodlands include many focal avian species as well as all the game bird species at CSLO. California quail (*Callipepla californica*), oak titmouse (*Baeolophus inornatus*), acorn woodpecker (*Melanerpes formicivorus*), red-breasted sapsucker (*Sphyrapicus ruber*), , wild turkey (*Meleagris gallopavo*), California ground squirrel, black-tailed deer (*Odocoileus hemionus columbianus*),

dusky footed woodrat (*Neotoma fuscipes*), mice (*Peromyscus* and *Reithrodontomys* spp.), and California voles are typical species of coast live oak woodlands.

The most serious threat to coast live oaks and other red oaks in California is sudden oak death syndrome (SODS) (Steinberg 2002). The primary pathogen responsible for SODS is *Phytophora ramorum*, a water mold. SODS has reached epidemic proportions in coastal regions of northern and central California and is particularly virulent on California's central coast. SODS is known to occur in San Luis Obispo County and in close proximity to CSLO (California Oak Mortality Task Force 2019). Bark and ambrosia beetles (Scolytidae) have been associated with infected trees and may be vectors for the fungal pathogens.

Stands of Sargent cypress occur in upper elevations in the northern portion of CSLO, covering 202 ac (82 ha). Dominant species within this community are Sargent cypress and foothill pine (*Pinus sabiniana*). Much of this community was burned during a 1994 wildfire. As a consequence, the trees are relatively young and have a higher density than would likely occur in a more mature stand. Common understory species include buck brush ceanothus, chamise, and other chaparral shrub species. At its lower limits, this vegetation type integrates with coast live oak woodland.

Wildlife species which use this community include Cooper's hawk (*Accipiter cooperi*), olive-sided flycatcher (*Contopus cooperi*), raccoon (*Procyon lotor*), California slender salamander (*Batrachoseps attenuates*), ensatina (*Ensatina eschscholtzii*), and cavity-nesting birds such as northern flicker (*Colaptes auratus*).

3.4.2.6 Introduced North American Mediterranean Woodland and Forest

Several stands (27 ac [11 ha]; Table 3-11) of eucalyptus trees (*Eucalyptus* sp.) occur at the south end of CSLO, surrounded and underlain by non-native grasslands. The largest stand of eucalyptus occurs along Chorro Creek north of SR 1.

Table 3-11. Overview of Introduced North American Mediterranean Woodland and Forest vegetation communities at Camp San Luis Obispo.

Introduced North American Mediterranean Woodland and Forest Macrogroup	
Introduced North American Mediterranean Woodland and Forest Group (27 ac)	
Eucalyptus-Tree of Heaven-Black Locust Groves *Eucalyptus-Ailanthus altissima- Robinia pseudoacacia* Woodland Semi-Natural Alliance (MCV On-line 2019):	Equivalent Nomenclatures: (Holland) Eucalyptus Woodland [79100], (MCV) Eucalyptus series, (MCV2) Eucalyptus Semi-Natural Woodland Stands Rarity Rankings: None
***Eucalyptus* spp. Association**	

MCV = Manual of California Vegetation; MCV2 = Manual of California Vegetation 2nd Edition.

Eucalyptus woodlands occur at elevations of 0-984 ft (0-300 m) and are naturalized in uplands and stream courses. Understories of Eucalyptus are usually very low in diversity due to the allelopathic effects of the chemicals in the leaves and debris (Sawyer et al. 2009). Eucalyptus are non-native and tend to suppress the growth of native vegetation that provides resources to wildlife around them. Still, some wildlife utilizes Eucalyptus woodland as breeding habitat, such as Anna's hummingbird (Calypte anna) and red-tailed hawk, or foraging habitat for species such as red- breasted sapsucker.

3.4.2.7 Southwestern North American Riparian, Flooded and Swamp Forest

Riparian scrubs and woodlands cover approximately 124 ac (50 ha) (1.1%) of CSLO (Table 3-12) along the Chorro, Pennington, and Dairy Creeks (and several smaller stream courses). These communities occur on flood plains having very well-drained deep alluvium sandy soils containing gravel and cobbles. The soil series most commonly associated with riparian community types includes the Riverwash series directly in and adjacent to the streambeds and the Metz and Sorrento Series occurring in the floodplains. Riparian soils typically have moderate to low erosion potentials with permanent moisture at depth.

Table 3-12. Riparian scrubs and woodlands at Camp San Luis Obispo.

Southwestern North American Riparian, Flooded and Swamp Forest	
Southwestern North American Riparian/Wash Scrub Group (61 ac)	
Arroyo willow thickets *Salix lasiolepis* Shrubland Alliance (MCV On-line 2019)	Equivalent Nomenclatures: (Holland) Central Coast Riparian Scrub [63200] (MCV) Arroyo willow series, (MCV2) *Salix lasiolepis* temporarily flooded shrubland alliance Rarity Rankings: G4S4
Southwestern North American Riparian Evergreen and Deciduous Woodland Group (61 ac)	
California Sycamore Woodlands *Platanus racemosa* Woodland Alliance (MCV On-line 2019)	Equivalent Nomenclatures: (Holland) Central Coast Cottonwood–Sycamore Riparian Forest [61210], (MCV) California sycamore series, (MCV2) *Platanus racemosa* temporarily flooded woodland alliance Rarity Rankings: G3S3
American Elm Woodland* *Ulmus americana* Woodland Alliance (MCV On-line 2019)	Equivalent Nomenclatures: (Holland) not treated, (MCV) not treated, (MCV2) not treated Rarity Rankings: N/A

*Not a described MCV2 alliance.

MCV = Manual of California Vegetation; MCV2 = Manual of California Vegetation 2nd Edition.

The riparian scrub community on CSLO is dominated by arroyo willows (*Salix lasiolepis*). Arroyo willows grow as either tall shrubs or small trees up to 8 m tall in seasonally or intermittently flooded areas (Sawyer et al. 2009). This plant community occurs on stream banks and benches, slope seeps, and stringers along drainages at elevations up to 7,119 ft (2,170 m). Typical soils are fine- grained sand and gravel bars. Other species that may occur in this community are mulefat, coyote brush, elderberry (*Sambucus* sp.), and mugwort, as well as a variety of native and non-native grasses and forbs.

The riparian forest community of CSLO is dominated by California sycamore, with a variable mix of red willows (*Salix laevigata*), arroyo willow, coast live oak, and Fremont cottonwood (*Populus fremontii*). The understory is comprised of sticky monkeyflower, rushes (*Juncus* sp.), cattails (*Typha* spp.), cape ivy (*Delairea ordorata*), periwinkle (*Vinca major*), and castor bean (*Ricinus communis*).

A single stand of American elm (*Ulmus americana*) occurs along Kern Road.

Many wildlife species depend upon riparian communities as a source of food, shelter, or perennial water. Many species are also endemic to this community type and cannot occur without it. The least Bell's vireo (*Vireo bellii pusillus*), a state- and federally-listed endangered species, has potential to occur in the riparian

woodlands. A number of other wildlife species depend upon the riparian habitats at CSLO, including Pacific chorus frog (*Pseudacris regilla*), southwestern pond turtle, wood duck (*Aix sponsa*), red-shouldered hawk (*Buteo lineatus*), golden eagle (*Aquila chrysaetos*), wild turkey, California quail, Nuttall's and downy woodpeckers (*Dryobates nuttallii*, *D. pubescens*), yellow warbler (*Setophaga petechia*), yellow-breasted chat (*Icteria virens*), Bewick's wren (*Thryomanes bewickii*), spotted towhee (*Pipilo maculatus*), raccoon, Virginia opossum (*Didelphis virgin*iana), and long-tailed weasel (*Mustela frenata*).

3.4.2.8 Wetlands and Aquatic Areas

Several wetland and aquatic areas are present at CSLO but were not included as part of the vegetation mapping. As detailed in Section 3.3.4 Wetlands and Water Resources, CSLO has 44.46 mi (71.5 km) of drainages and 9.72 ac (3.9 ha) of surface waters in which meadows and seeps, marshes, and aquatic communities occur. Although no discrete mapping or area summaries are available for these types it is important to note their presence as they provide unique habitat for plants and wildlife. Wildlife species that commonly occur in wetland and aquatic areas include the black phoebe (*Sayornis nigricans*), mallard duck (*Anas platyrhynchos*), red-winged blackbirds (*Agelaius phoeniceus*), black-tailed deer, and multiple amphibians.

Meadows and Seeps

Meadows and seeps (not dominated by grasses) generally have a simple structure consisting of a layer of herbaceous plants. They occur on areas at or below springs or seeps where water is at or near the surface most of the growing season. Shrub or tree layers are usually absent or very sparse; however, they may be an important feature of the meadow edge. Within the herbaceous plant community, a microstructure is frequently present (USDA 1994). Some species reach heights of only a few inches while others may grow to over 3 ft (0.9 m) tall. Herbaceous canopy cover is usually dense (60–100%). Plants occurring in wet meadows on CSLO include spikerush (*Eleocharis* spp.), sedges (*Carex* spp.), salt grass (*Distichlis spicata*), and the endangered Chorro Creek bog thistle (*Cirsium fontinale* var. *obispoense*). Invasive species such as teasel (*Dipsacus sativus*), sow thistle (*Sonchus* ssp.), and bristly ox-tongue occur occasionally and, at times, become locally abundant.

Marshes

Freshwater marshes are characterized by erect, rooted herbaceous hydrophytes. At CSLO this community type occurs in patches in or adjacent to creeks, sediment basins, ponds and the Chorro Creek reservoir. The dominant vegetation generally consists of perennial plants up to 6 ft tall. The marshes are flooded frequently enough so that the roots of the vegetation grow in an anaerobic environment. Common plant species in these areas include cattails and bulrushes (*Scirpus* spp.).

Aquatic Communities

The aquatic communities of CSLO consist of both intermittent and perennial streams, ponds, and reservoirs. Aquatic areas are key components of the ecosystem and are important wildlife habitats. Four streams (Chorro Creek, Dairy Creek, Poison Oak Creek, and Pennington Creek) traverse CSLO. There are also numerous intermittent drainages that are dry throughout most of the year but sustain significant water flow during storms.

Most of CSLO's ponds and reservoirs were artificially created for water use and for sediment trapping. These sites include sediment basins, stockwater ponds, and other ponds built in the Upper Chorro Creek

basin. Some of these ponds are now partially fenced to exclude livestock. Some ponds contain emergent wetland vegetation and wetland species along the receding water line or low water edge, and these species are discussed in detail in the proceeding marsh section.

3.4.2.9 Other Cover Types

Urban

There are approximately 492 ac (199 ha) of developed lands at CSLO (not counting roads, which are not delineated in the vegetation map), primarily in the cantonment area. These areas are either paved or are otherwise maintained in an unvegetated condition. Wildlife use of developed areas is minimal and may include such species as California scrub jay (*Aphelocoma californica*), northern mockingbird (*Mimus polyglottos*), house finch (*Haemorhous mexicanus*), rock pigeon (*Columba livia*), raccoon, opossum, and striped skunk.

Cropland

There are approximately 106 ac (43 ha) of cropland at CSLO; dry land oat production has been a past operation as well as an old walnut tree (*Juglans regia*) orchard. This anthropogenic habitat is used by many species, such as coyote, multiple species of blackbird including the state threatened tricolored blackbird (*Agelaius tricolor*), long-billed curlew (*Numenius americanus*), and birds of prey such as American kestrel (*Falco sparverius*) and northern harrier (*Circus hudsonius*).

3.4.3 Invasive Plant Species

Federal and/or state agencies classify non-native plants as invasive or noxious when they require control or eradication to prevent habitat degradation or crop damage. These species pose a serious long-term threat to many plant communities found on CSLO. Many of these species have the ability to completely change the structure and diversity of vegetation communities, often making habitats unsuitable to native wildlife or plants over time. Some of the ways that non-native plant species can change ecosystem dynamics is by altering soil nitrogen cycling, out-competing natives for water, and increasing fire frequency by creating excessive fuel. Sensitive species are particularly at risk of extirpation by these non-native plants.

EO 13112 established federal agency responsibilities for the identification and management of invasive species and restricts the introduction of exotic organisms of all kinds into natural ecosystems, plants, and wildlife. The order stipulates that actions will be taken to prevent the introduction of invasive species, monitor for their presence, and respond rapidly to eliminate them. The DoD subsequently issued a memorandum of compliance with this EO.

Lists of noxious or invasive weeds are maintained by federal and state agencies as well as other non-governmental organizations, including non-profits and advocacy groups. The U.S. Department of Agriculture and California Department of Food and Agriculture (CDFA) noxious weed programs emphasize weeds that are threats to agriculture, including rangeland. The Cal-IPC maintains lists that emphasize non-native plants that threaten the biotic integrity of wildlands and native ecosystems (Cal-IPC 2006). Additionally, San Luis Obispo and Monterey Counties also have noxious weed lists prioritizing species for eradication and control (Monterey County 2021; San Luis Obispo County 2002).

There are 70 non-native plant species recorded at CSLO that are considered invasive or noxious, 67 of which are listed by the CDFA or Cal-IPC; this list is presented in Appendix E. The CDFA's list includes a total

of 17 species that have been observed at CSLO. Of those, false brome is the only species on CDFA's List A. This designation calls for its eradication, containment, or entry refusal. Of the 70 invasive species at CSLO on the Cal-IPC list, nine are rated as "High." The "High" rating is for species having severe ecological impacts, moderate to high dispersal rates and a widespread distribution. A total of 32 out of the 70 non-native plant species have been given a "Moderate" rating by Cal-IPC. This means, although they can have substantial effects on biological communities and can have widespread distribution, their ability to become established is directly related to the degree of disturbance. Furthermore, 23 of the 70 non-native plant species have been given a "Limited" rating by Cal-IPC. A limited ranking is given to a species with minor ecological impacts, low to moderate rates of invasion, and limited distribution; but can be locally persistent and problematic.

Eight invasive species have been identified as having the highest priority for removal at CSLO. These are listed in Table 3-13 below.

Table 3-13. Invasive Plant Species at Camp San Luis Obispo.

Scientific Name	Common Name	Potential for Concern
Arundo donax	arundo	It tends to overwhelm riparian and wetland habitats and a potential to lower the water table due to high transpiration rates
Carthamus lanatus	woolly distaff thistle	It has an ability to form dense populations outcompeting desirable rangeland and grassland species and its potential to injure grazing animals. Considered the worst coastal range weed in San Luis Obispo County.
Centaurea solstitialis	yellow starthistle	It has a highly competitive nature coming from its ability to produce allelopathic chemicals enabling it to outcompete native vegetation. It depletes soil moisture reserves in annual grasslands and interferes with grazing.
Cortaderia selloana	Uruguayan pampas grass	It has an ability to spread quickly by colonizing bare ground rapidly and other areas without fertilization. It also has the potential to invade sensitive riparian and wetland habitats
Delairea ordorata	cape ivy	It is toxic to wildlife and its highly invasive nature which forms dense mats of vegetation in riparian areas and wetlands outcompeting native vegetation.
Foeniculum vulgare	wild fennel	It has an ability to drastically alter the composition and structure of multiple different plant communities including grassland, coastal scrub, riparian, and wetland communities
Lepidium latifolium	perennial pepperweed	It has an aggressive growth nature that forms dense monospecific colonies excluding an abundant and diverse amount of native riparian & wetland plant species
Tamarix ramosissima	tamarisk	It has an ability to dramatically change soil geomorphology, groundwater availability, soil chemistry, fire frequency, plant community composition, and native wildlife diversity in riparian and wetland habitats.

Both feathertop grass (*Pennisetum villosum*) and purple top vervain (*Verbena bonarensis*) are listed on the Cal-IPC "Watch" list meaning these species have been assessed as posing a high risk of becoming invasive in the future in California. The remaining four out of 70 nonnative species are not listed by CDFA or Cal-IPC but are included in Appendix E because of their presence or potential to occur in federally endangered Chorro Creek bog thistle habitat or due to their undesirable qualities from a grazing perspective. The woolly distaff thistle (*Carthamus lanatus*) is considered to be the worst coastal range weed in San Luis Obispo County by the County Agricultural Commissioner (USDA 1994).

Invasive weeds at CSLO generally tend to be worse along disturbed areas that have been impacted by developments, grazing, drainage alterations, and training activities. While there are a number of stands of non-native eucalyptus species on the installation, they generally function well as windbreaks, provide habitat for raptors and other birds, and are not expected to rapidly increase in distribution.

Several of the plant communities that occur at CSLO are adversely affected by invasive species. These include CDFW Sensitive Natural Communities: Needle Grass-Melic Grassland, California Sycamore Woodland, and Sargent Cypress Woodland. Invasive plant species at CSLO also have the potential to negatively impact riparian and aquatic habitat for the threatened California red-legged frog and SCCC steelhead.

3.5 Fish and Wildlife

The different habitat types on CSLO are home to a variety of wildlife and are key to ecosystem biodiversity. Numerous biological surveys have documented many common and special status species of mammals, birds, reptiles, amphibians, insects, and fish on CSLO (see Appendix D). A brief description of different species and relative abundance is described below.

3.5.1 General Fish and Wildlife

Invertebrates

Currently there are 93 invertebrate species have been recorded at CSLO, although comprehensive surveys have not been conducted in over ten years (Appendix D). Eight species of mollusks have been recorded, including five Gastropoda (snails and limpets) and three Bivalvia (clams) and two species of Crustacea have been recorded.

Insects make up the bulk of the invertebrates on CSLO with 85 species recorded, including 25 flies (Diptera), 18 beetles (Coleoptera), 15 caddisflies (Trichoptera), ten true bugs (Hemiptera), seven mayflies (Ephemeroptera), three dragonflies and damselflies (Odonata), and three stoneflies (Plecoptera). Most of the insects currently identified at CSLO are either aquatic (water boatmen, backswimmers, water striders, etc.), or associated with aquatic habitats (water midges, mayflies, dragonflies). Records for terrestrial insects include deer flies, and horse flies.

Given the variety of habitats available for insects at CSLO, focused surveys for terrestrial invertebrates would likely record a much greater assortment of species such as butterflies, grasshoppers, beetles, and others.

Fish

Eight fish species have been recorded at CSLO (Appendix D) including the federally threatened SCCC steelhead. This species is described in *Section 3.6.1.2: South-Central California Coast Steelhead* in greater detail. There are five non-native predatory fish on CSLO, identified in Table 3-14. Two native fish; prickly sculpin (*Cottus asper*) and threespine stickleback (*Gasterosteus aculeatus microcephalus*) are wide ranging on the west coast.

Reptiles and Amphibians

A total of 19 species of herpetofauna have been recorded at CSLO including five toads and frogs (Order Anura), three salamanders (Order Caudata), three lizards (Order Squamata: Suborder Lacertilia), seven snakes (Order Squamata: Suborder Serpentes), and one turtle (Order Testudines) (Appendix D). There are five species of special status reptiles on CSLO as well as the federally threatened California red-legged frog which is described in further detail in *Section 3.6.1.3: California Red-legged Frog*. Amphibian and reptile fauna are plentiful on CLSO due to the presence of various different habitats and perennial water sources. One species is a serious aquatic invasive species, the American bullfrog (*Lithobates catesbieanus*).

Birds

Birds play many important ecological roles and are one of the most visible components of animal communities. At CSLO, 129 bird species have been identified and recorded based on surveys conducted since 1993 (Appendix D). This amounts to just over one-quarter of the total bird diversity recorded in San Luis Obispo County.[3] Bird species found on CSLO include neotropical migrants (birds that winter in South America and nest in North America) and resident (non-migratory) species. The upland and aquatic habitats of CSLO provide important foraging and resting spots for migrants, as well as habitat for breeding.

Mammals

Thirty-five species of mammals have been recorded at CSLO, eight of which are bats (Appendix D). Mammal species occurring on CSLO are common in the region. Carnivores include the coyote, gray fox, mountain lion (*Felis concolor*), and bobcat (*Felis rufus*). Large grazer/browsers include the black-tailed deer. Numerous rodents and lagomorphs form a rich prey base. In addition, there are three species of mammal which are introduced in the area (Virginia opossum, feral pigs [*Sus scrofa*], and house cat [*Felis catus*]).

3.5.2 Pollinators

Pollinators on CSLO consist of various types of species such as bees, butterflies, moths, flies, beetles, birds, and bats. While no pollinator specific surveys have been completed on CSLO, a review of other species lists indicates the diversity of pollinator species present on the installation. Pollinator diversity on Camp San Luis Obispo is directly correlated with the diversity of vegetation and plant communities on the installation. Management for pollinator species is accomplished primarily through the protection and management of associated habitats and compliance with pest management regulation (DoD 4150.07 DoD Pest Management Programs May 2008, DoD 4715.03 March 2011).

3.5.3 Invasive and Feral Animals

There are nine invasive or feral vertebrate species known to occur at CSLO, five fish species, one amphibian species, one bird species, and two mammal species. Table 3-14 lists invasive species at CSLO, their management priority, and their potential for concern at CSLO. Management for these and other invasive species is discussed in Chapter 4.

[3] Note that nomenclature for birds is consistent with that of the American Ornithological Union except with regard to their convention for capitalizing all bird names.

Table 3-14. Invasive or Pest Species Present at Camp San Luis Obispo.

Scientific Name	Common Name	CSLO Priority	Potential for Concern
Fish			
Gambusia affinis	western mosquitofish	Medium—monitor, control	Compete and prey on fish and amphibian eggs and larvae–including SCCC steelhead and CRLF.
Lepomis macrochirus	bluegill	Low—monitor	Compete and prey on fish and amphibian eggs and larvae–including SCCC steelhead and CRLF.
Micropterus salmoides	largemouth bass	Low—monitor	Compete and prey on fish and amphibian eggs and larvae–including SCCC steelhead and CRLF.
Rhinichthys osculus	speckled dace	Medium—monitor, control	Compete and prey on fish and amphibian eggs and larvae–including SCCC steelhead and CRLF.
Ptychocheilus grandis	Sacramento pike minnow	High—monitor, control	Compete and prey on fish and amphibian eggs and larvae–including SCCC steelhead and CRLF.
Reptiles and Amphibians			
Lithobates catesbeianus	bullfrog	High—monitor, control	Bullfrogs have an opportunistic omnivore diet throughout their life, both as tadpoles and adults. They have a competitive advantage over native frogs due to their larger size, generalized food habits, and extended breeding season. Bullfrogs prey on native species larvae, including CRLF.
Birds			
Molothrus ater	Brown-headed Cowbird	High—monitor, control	Although native to North America, the brown-headed cowbird is detrimental to a variety of songbirds because of their successful ability to parasitize nests of other birds, destroying eggs and young of other bird species.
Mammals			
Spermophilus beecheyi	California ground squirrel	High—monitor, control	This species can be a serious rangeland, agricultural, and built environment pest if populations become dense or widespread. Overpopulation is a considerable concern at CSLO.
Sus scrofa	feral pig	Low	Pig activity can disrupt and prevent the regeneration of almost every sensitive natural community and species at CSLO due to rooting and grubbing in wet soil.

Invasive fish species are found in Chorro Creek, Chorro Reservoir, and Upper and Lower Sediment Basins. Their presence can lead to the decline of native fish and amphibian species due to habitat competition and predation. Of particular concern is the pikeminnow because of its known predation on steelhead and CRLF. Pikeminnnow control has been identified as a priority action in the Morro Bay watershed (MBNEP 2012).

Bullfrogs are typically found near the water's edge in almost all freshwater aquatic habitat in California including at CSLO. In addition to concerns discussed in Table 3-14, bullfrogs have also been linked to the decline of the CDFW Species of Special Concern southwestern pond turtle.

Brown-headed cowbirds are native; however, they are opportunistic nest parasites that lay their eggs in other birds' nests. This species lays its egg in the nest of a host, allowing the foster parents to incubate and brood the cowbird fledglings. Often cowbird fledglings push host fledglings out of the nest. Brown

headed cowbirds can adversely affect many species, especially neotropical migrant passerines (Jensen and Estrada 1999).

The California ground squirrel is a native species on CSLO that is considered a pest because its burrowing activities can adversely affect structures, ranges and training operations, and exacerbate erosion.

3.6 Special Status Species

The following section describes special-status species that are known to occur or have the potential to occur at CSLO. A description of the various special status species classifications or laws that protect specific species are provided below.

Federal

The ESA (16 U.S. Government Code 1531-1544), administered by USFWS and NMFS, protects federally listed endangered and threatened plants and wildlife and critical habitat. Specific ESA definitions are as follows:

- *Endangered species*. Any species in danger of extinction throughout all or a significant portion of its range.
- *Threatened species.* Any species likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.
- *Critical Habitat.* Specific areas found to be essential to the conservation of a threatened or endangered species and which may require special management considerations or protection.
- *Candidate species.* Any species for which the USFWS has sufficient information on their biological status and threats to propose them as threatened or endangered.

State

The CESA (CFG Code 2050 et. Seq.), the California Native Plant Protection Act (CFG Code 1900 et seq.; NPPA), and the California Natural Community Conservation Planning Act (CFG Code § 2800 et seq), administered by CDFW, protect and enhance wildlife resources, native plant species, and natural communities of California. Specific State listing definitions are as follows:

- *Endangered species.* A native species or subspecies of bird, mammal, fish, amphibian, reptile, or plant which is in serious danger of becoming extinct throughout all, or a significant portion, of its range due to one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, or disease.
- *Threatened species.* A native species or subspecies of bird, mammal, fish, amphibian, reptile, or plant, that although not presently threatened with extinction, is likely to become an endangered species in the foreseeable future in the absence of special protection and management efforts.
- *Candidate species.* A native species or subspecies of bird, mammal, fish, amphibian, reptile, or plant that the CDFW commission has formally noticed as being under the review by CDFW for listing.
- *Rare.* Species, subspecies, or varieties of plants, although not presently threatened with extinction, are in such small numbers throughout their range that they may become endangered

if the present environment worsens (CFG Code § 1901). Rare plant species include species designated by the California Native Plant Society (CNPS) to have a California Rare Plant Rank (CRPR) of 1A, 1B, 2A, 2B, 3, and 4. These rankings area as follows:

- *1A.* Plants that are presumed extirpated from California or extinct.
- *1B.* Plants that are rare, threatened, or endangered in California and elsewhere. Plants in this rank meet the definitions of CESA and are eligible for state listing.
- *2A.* Plants that are presumed extirpated in California, but are more common elsewhere in their range. Plants in this rank meet the definitions of CESA and are eligible for state listing.
- *2B.* Plants that are rare, threatened, or endangered in California, but are more common elsewhere. Plants in this rank meet the definitions of CESA and are eligible for state listing.
- *3.* Plants about which more information is needed. Information on these plants is lacking, making it difficult to assign them to an existing rank or reject them. Many of the plants in this rank meet the definitions of CESA and are eligible for state listing.
- *4.* Plants of limited distribution or infrequent throughout a broader area in California, and their vulnerability or susceptibility to threat appears low. Plants in this rank should be monitored regularly.

Each ranking is further broken down into the following threat rank:

- *.1* - Seriously threatened in California (over 80% of occurrences threatened/high degree and immediacy of threat)
- *.2* – Moderately threatened in California (20-80% occurrences threatened/moderate degree of immediacy of threat)
- *.3* - Not very endangered in California (<20% of occurrences threatened/low degree and immediacy of threat or no current threats known)

- *Fully protected.* Species that may not be taken or possessed at any time, and no license or permits may be issued for their take except when necessary for scientific purposes.
- *California species of special concern.* Species, subspecies, or distinct population of an animal native to California that exhibits declining population levels, limited ranges, and/or experience continuing threats that make them vulnerable to extinction.

Global and State (NatureServe)

The NatureServe conservation status system was originally developed by the Nature Conservancy and serves as a ranking system for the relative impairment of flora and fauna species. It includes a global ranking system (G rank), describing the rank for a taxon over it entire distribution and a state rank (S rank), describing the rank for the taxon over its state distribution. There is also a "T" rank describing the global rank for a subspecies or variety which is attached to the "G" rank.

- Rankings are as follows:
  - *G1 or T1 or S1.* Critically imperiled.
  - *G2 or T2 or S2.* Imperiled.
  - *G3 or S3.* Vulnerable to extirpation or extinction.
  - *G4 or S4*. Apparently secure.
  - *G5 or S5*. Demonstrably widespread, abundant, and secure.

DoD

The DoD has identified plant and animal species on military installations that if listed, could have a significant impact on military readiness. These species warrant conservation actions.

- *Species at Risk (SAR).* Plant and animal species that are not yet federally listed as threatened or endangered under the ESA, but that are federally designated as proposed or candidates for listing, are globally ranked G1 or G2 throughout their range, or are birds ranked G3 or have an International Union for Conservation of Nature status of critically endangered, endangered, vulnerable, or near threatened.
- *Mission Sensitive Species (MSS).* Bird species that, if federally listed in the future under the ESA, would have the largest impact to military testing and training missions.

Other

In addition to the above rankings, migratory birds are protected under the MBTA with some even further ranked as Birds of Conservation Concern (BCC) by the USFWS. DoD committed to conservation of BCC under the MOU between the DoD and the USFWS to Promote The Conservation Of Migratory Birds (2006). This MOU was signed pursuant to EO 13186 (17 January 2001) Responsibilities of Federal Agencies to Protect Migratory Birds.[4] Eagles are also protected under the BGEPA. Eagles and BCC list birds designated for the Camp Roberts region are considered special-status species in this INRMP.

Also considered in this document are bat species designated by the Western Bat Working Group (WBWG) as having "high" conservation importance due to overall population declines. The California State Wildlife Action Plan (SWAP) also identifies species in California that have a higher conservation need and should be considered when developing conservation or management plans.

Special-Status Species Accounts

Various surveys conducted since the 1990s have identified 57 special-status plant and animal species that are known or have the potential to occur on the CSLO installation. Of these species, eight are state or federally listed as threatened or endangered, and 49 are special status or sensitive plant, fish, and wildlife species. General information on the status, distribution, and habitat requirements of federal and state listed species are discussed below and summarized in Table 3-15. Other special status species known to occur or likely to occur on CSLO are discussed below and summarized in Table 3-16.

3.6.1 Federal and State Listed Species

Eight species with Federal or State listing as threatened or endangered are known to occur or have potential to occur at Camp San Luis Obispo (Table 3-16). Detailed descriptions of these species are provided below.

[4] The current version of the BCC list (USFWS 2008) is available at https://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php.

Table 3-15. Federal and State listed species occurring or with potential to occur at Camp San Luis Obispo.

Common Name	Scientific Name	Listing Status	Status at CSLO
Plants			
Chorro Creek bog thistle	*Cirsium fontinale var. obispoense*	FE, SE, CNPS 1B.2	Known to occur
Fish			
south-central California coast steelhead	*Oncorhynchus mykiss irideus*	FT, CSSC	Known to occur
Amphibians			
California red-legged frog	*Rana draytonii*	FT, CSSC	Known to occur
Birds			
California condor	*Gymnogyps californianus*	FE, SE	Potential to occur*
least Bell's vireo	*Vireo bellii pusillus*	FE, SE	Potential to occur†
Swainson's hawk	*Buteo swainsoni*	ST	Potential to occur*
tricolored blackbird	*Agelaius tricolor*	ST, MSS	Potential to occur†
bald eagle	*Haliaeetus leucocephalus*	FDR, SE	Potential to occur*

Listing Status:

CNPS 1B.2 = California Rare Plant Rank. 1B-Plants rare, threatened, or endangered in California and elsewhere; 0.2 Plants are moderately threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat);
FC = Federal Candidate; **FDR** = Federal Delisted (Recovered) [Protected]; **FE** = Federal Endangered; **FT** = Federal Threatened;
SE = State Endangered; **ST** = State Threatened; **CSSC** = California Species of Special Concern; **MSS** = Mission Sensitive Species

* Incidental sightings of these species foraging within or flying over CSLO have been reported, but they are not known to nest there.

† The species has been documented in close proximity to CSLO and suitable habitat is known to occur there.

3.6.1.1 Chorro Creek Bog Thistle

Federally Endangered, State Endangered

The Chorro Creek bog thistle (*Cirsium fontinale* var. *obispoense*) is a short-lived perennial plant that is endemic to California, currently occurring only in San Luis Obispo County. This species is listed as Endangered at the Federal and State level. Criteria are provided for down listing in the 1998 recovery plan. The Chorro Creek bog thistle was first observed at CSLO in 1993 and since then measures have been taken to support the conservation of this species and its habitat (CA ARNG 2011). Most populations are south, west and north of the City of San Luis Obispo; there is also one isolated occurrence near San Simeon to the northwest (USFWS 2007). When listed in 1994, the species was thought to occur in only nine locations with a population estimated at less than 3,000 individuals, now the species is thought to be in up to 21 locations with a high likelihood that additional occurrences are still unknown on private lands (Kofron and Havlik 2016).

This species occurs in seeps, streams, drainages, and other wetland areas at elevations below 380 m. The Chorro Creek bog thistle has a strong affinity to serpentine endemic, where soils tend to have very low calcium/magnesium ratios and high levels of chromium and nickel, when compared to other soils. It is limited in distribution throughout its range to serpentine soil and rock. Chorro Creek bog thistle also appears to colonize bare or sparsely vegetated ground and to prefer open, hummocky areas for seedling establishment (Harding Lawson Associates 1999).

The leaves of this Aster are densely cobwebby often with velvety hairs and longer spines of cauline leaves. The inflorescence of this species is a tight composite flower head frequently nodding downward when in

bloom and more erect when fruiting. Flowering typically occurs between February and July; however, the Chorro Creek bog thistle can bloom as late as August and September when wetter conditions persist later in the year (Jepson Online 2019; CNPS 2019). When drought conditions occur, the species may have reduced vigor limiting the success of flowering.

These plants generally live for two to three years allowing the herb to develop large basal rosettes up to 3 ft (1 m) wide and flowering stalks nearly 6 ft (2 m) tall. Individual populations can vary significantly from year to year due to the short lifespan and habitat conditions of the plant that may fluctuate with seasonal rainfall. This species is threatened by grazing, land development, and water diversions or modifications; the species is also potentially impacted by foot traffic, recreation activities, and competition from non-native plants. A seed-head weevil (*Rhinocyllus conicus*) was introduced to several sites in San Luis Obispo County in the early 1980s to control invasive species of thistles. These weevils have been observed feeding on Chorro Creek bog thistle on CSLO; however, population-level effects and whether control is needed are not yet known.

Status at Camp San Luis Obispo – Known to Occur

At CSLO Chorro Creek bog thistle occurs at seeps adjacent to a tributary of Chorro Creek (USFWS 2015), where annual surveys from 1994 to 2016 have documented substantial annual variation in numbers of individuals, ranging from a low of 643 individuals to a high of 4,664. At CSLO the population is currently protected from human-induced threats (e.g. cattle grazing, development, water diversions or draw downs, and road maintenance). The most recent population census was conducted in 2020, resulting in documentation of 3,249 individuals (CA ARNG 2021).

Controlled cattle grazing in Chorro Creek bog thistle habitat was introduced in 1997 to control several species of plants that were becoming dense, including native bulrushes and spikerushes, and invasive grasses. The total number of Chorro Creek bog thistle increased by 68 percent after the controlled grazing. However, the number of established plants decreased. The population of Chorro Creek bog thistle on CSLO appears stable but remains threatened by dense vegetation in and near the habitat.

3.6.1.2 South-Central California Coast Steelhead

The SCCC steelhead is a federally threatened species (USFWS 1998b), as well as a CSSC. Steelhead are the anadromous, i.e. ocean-going form, of the species *Oncorhynchus mykiss*.

Federally Threatened, CDFW Species of Special Concern

First listed in 1997, the SCCC steelhead DPS is one of ten Distinct Population Segments (DPS) currently designated as federally threatened (NMFS 2019). The DPS of the south-central California coast population, of which CSLO is a part, extends from the Pajaro River in the north, to (but not including) the Santa Maria River in the south. Across its range within the DPS, steelhead numbers have declined precipitously from estimated annual runs totaling 27,000 adults around 1900, to below 5,000 adults in 1965, to several thousand total adults, with a large degree variability year to year (Busby et al. 1996, Good et al. 2005, Williams et al. 2011 as cited in NMFS 2013). The NMFS (2013) attributed the decline in steelhead trout to loss of freshwater and estuarine habitat, periodic poor ocean conditions, and a variety of land-use, flood control and water management practices impacting sedimentation and hydrologic processes which create and sustain essential steelhead habitats.

Juveniles develop initially in freshwater for one to two years before emigrating to the ocean where they sexually mature and then return as four to five-year- old adults to reproduce in freshwater rivers and streams. During spawning, females will excavate a nest in gravelly fast flowing and well-oxygenated streambeds wherein she deposits eggs (NMFS 2013). After spending the first year or two in rivers, steelhead typically reside in marine waters for two to three years prior to returning to their natal stream, to spawn as four or five year olds, and can spawn more than once before they die. Steelhead adults in the south- central California coast DPS enter rivers from late November through March, with spawning occurring from January through April. NMFS (2013) states that because steelhead employ several different life-history strategies that utilize all portions of a river system, they effectively serve as an indicator species, providing a measure of the health of their watersheds.

Breeding habitat for the steelhead trout in the SCCC steelhead DPS consists of low-gradient, gravel bedded channels with sparse riparian vegetation (Cuthbert et al. 2013, 2014a, 2014b). Flow regimes determine migratory access to and from spawning and rearing areas for steelhead. Spawning areas tend to be selected based on flow regime, water quality parameters, substrate size, and groundwater upwelling (Spence et al. 1996). During spawning migrations, adequate flows and depths of water must be present to allow passage over barriers and provide the adequate resting ponds needed to reach spawning sites. Chorro Creek and its tributaries provide habitat to the SCCC steelhead DPS at CSLO.

Habitat loss and degradation of habitat quality threaten steelhead populations. Interruption of the water regime through water extraction and blockage of fish passage as a result of dams have contributed to the decline of steelhead. Introduction of silt from erosion associated with fire, existing roads, or other hillside activities can degrade steelhead-spawning beds and smother developing eggs, contributing further to the decline of the steelhead.

Critical Habitat

In February 2000, NMFS issued a final rule to designate critical habitat for 19 populations of steelhead in Washington, Oregon, Idaho, and California (65 Federal Register [Fed. Reg.] 7764 [16 February 2000]). On 30 April 2002, the U.S. District Court for the District of Columbia approved NMFS's consent decree withdrawing the 2000 CH designation for steelhead. In December 2004, NMFS re-proposed CH for seven DPSs of Pacific salmon and steelhead, including the SCCC steelhead DPS (69 Fed. Reg. 71879 [10 December 2004]). This DPS, which includes CSLO, occurs in the geographic region north of the City of Santa Maria in Santa Barbara County extending northward to (and including the Pajaro River and its tributaries) in Santa Cruz County. CSLO was exempted from the proposed CH designation (71 Federal Register 52523 [September 2, 2005]), in accordance with the ESA (16 U.S.C. § 4[a][3]) because CSLO had prepared a qualifying INRMP.

Status at Camp San Luis Obispo – Known to Occur

SCCC steelhead have been documented in Chorro Creek above and below Chorro Reservoir, with the steelhead above the reservoir presumed landlocked (NMFS 2008, CA ARNG Land Condition Tend Analysis [LCTA] database 2008b). SCCC steelhead surveys were conducted between 2008 and 2010 in portions of the Chorro Creek main stem and counts ranged from 341 individuals to 1,235 individuals, and length measurements spanned from 33 millimeters to 311 millimeters. The average density of SCCC steelhead was 94 individuals per mile of pool habitat (Halligan and Otte, 2011). Additionally, multiple snorkel surveys were conducted in July and August 2017 which yielded 691 SCCC steelhead observations and December

2017 which yielded 870 SCCC steelhead observations in Chorro Creek. They are also found in an unnamed tributary near the USPFO (known as USPFO Creek), Pennington Creek, Poison Oak Creek, and Dairy Creek.

The Chorro Creek watershed is recognized for providing a higher potential for steelhead recovery than other watersheds in the steelhead DPS. This is largely due to perennial and continuous flows in the mainstem Chorro downstream of the Waste Water Treatment Plant that provides year-round migratory connectivity to Morro Bay, good riparian canopy, moderate summer water temperatures, suitable winter rearing habitat, and a relatively small urban footprint. However, the presence of an invasive population of Sacramento pikeminnow (*Ptychocheilus grandis*) inhibits steelhead recovery by reducing juvenile abundance and survival through predation and competition for food and habitat. Pikeminnow are regularly observed in Chorro Creek and have been documented to prey on steelhead based on stomach analysis (Halligan and Otte 2011). A DNA analysis of pikeminnow stomach contents in 2017 and 2018 found that 18% of pikeminnow samples contained positive detections for steelhead (Stillwater Sciences 2018). A Sacramento Pikeminnow Management Plan was developed in 2017 to benefit steelhead and partial implementation of this plan for the past four years has resulted in a substantial increase in juvenile steelhead (Stillwater Sciences 2021).

3.6.1.3 California Red-legged Frog

Federally Threatened, CDFW Species of Special Concern, CDFW Fully Protected

The federally threatened California red-legged frog is the largest native frog in the western United States (Wright and Wright cited in USFWS 2002). Adult females have longer body lengths than males 13.7 versus 11.4 cm (5.4 versus 4.5 inches). The posterior abdomen and hind legs of adults are often red or salmon pink, and the back has small black flecks and larger irregular dark blotches on a brown, gray, olive, or reddish-brown background color. Adults also have ridges of skin along the back called dorsolateral folds. Larvae range from 1.5 to 7.9 cm (0.6 to 3.1 inches) in length, and the background color of the body is dark brown or olive with darker spots (USFWS 2002).

The California red-legged frog is known to occur in isolated localities in the Sierra Nevada, North Coast, and north Transverse Ranges and along the western portion of the state from Marin County southward to northern Los Angeles County. It is believed that the California red-legged frog has been nearly extirpated from the southern Transverse and Peninsular ranges of southern California. California red-legged frogs are semiaquatic, usually found associated with permanent water including springs, ponds, lakes, reservoirs, and streams. This species prefers aquatic habitats associated with woodlands and those having dense riparian vegetation (Page et al. 1995).

Breeding occurs during the wet season (November–April), and most females deposit egg masses in March, averaging 2,000 eggs per mass, on emergent vegetation so that the masses float on the surface of the water (USFWS 2002). Eggs hatch in 6 to 14 days, depending on water temperatures. Larvae typically metamorphose between July and September, 3.5 to 7 months after eggs are laid. Sexual maturity is reached at 2 years of age by males and 3 years of age by females. Adults may live 8 to 10 years, although the average life span is probably much lower due to predation. Adult California red-legged frogs feed on Pacific chorus frogs, California mice (*Peromyscus californicus*), and invertebrates such as insects and mollusks. Larvae are thought to be algal grazers (USFWS 2002).

Hayes and Tennant (1985) found juvenile frogs to be active diurnally and nocturnally, whereas adult frogs were largely nocturnal. The season of activity for the California red-legged frog tends to vary with the

local climate (Storer 1925); individuals from coastal populations, which rarely experience low temperature extremes because of moderating maritime effect, are rarely inactive.

During periods of wet weather, some California red-legged frogs move through upland habitats. Evidence from marked and radio-tagged frogs in San Luis Obispo County showed that some individuals moved approximately 1.6 km (1 mile) through uplands in the course of a wet season. Frogs have been observed to disperse by making point-to-point movements instead of using migration corridors (Scott and Rathbun 1998 in USFWS 2002). Dispersing California red- legged frogs in northern Santa Cruz County traveled 0.4–3.0 km (0.2-1.8 miles) without apparent regard for topography, vegetation types, or riparian corridors (Bulger 1998 in USFWS 2002). California red-legged frogs have also been encountered living in streams more than 3 km from breeding sites and have been found up to 30 m (100 ft) from water in adjacent riparian vegetation (Rathburn et al. 1993 in USFWS 2002).

Factors that have contributed to declining California red-legged frog populations include degradation and loss of habitat through agriculture, urbanization, mining, overgrazing in riparian and aquatic habitats, recreation, timber harvesting, nonnative plants, impoundments, water diversions, degraded water quality, and introduced predators.

Critical Habitat

In September 2000, the USFWS proposed to designate CH for the California red-legged frog, which included CSLO (65 Fed. Reg. 54892 [11 September 2000]) and in March 2001, per section 4(b)(2) of the ESA, the USFWS concurred that the benefits of excluding CSLO from CH outweighed the benefits of including it (66 Fed. Reg. 14639 [13 March 2001]).

In November 2005, the USFWS again proposed designating CH for California red-legged frog which included CSLO (70 Fed. Reg. 66905 [03 November 2005]). In April 2006, the USFWS exempted CSLO from CH pursuant to section 4(a)(3) of the ESA because CSLO had an INRMP that detailed conservation efforts that would provide benefits to CRLF (71 Fed. Reg. 19244 [13 April 2006]),

In September 2008, the USFWS determined that the previous CH exemption was not valid because the CSLO INRMP was not USFWS-approved (73 Fed. Reg. 53492 [16 September 2008]). In March 2010, the USFWS excluded CSLO lands from CH per section 4(b)(2) due to potential impacts on national security (75 Fed. Reg. 12816 [17 March 2010]).

Status at Camp San Luis Obispo – Known to Occur

In 1992 and 1993 an aquatic inventory at CSLO documented California red- legged frog at three locations (USFWS 2015). Subsequent annual surveys have occurred in 31 designated survey sites in various habitats throughout the installation. To date there has been 105 monitoring events with a total of 2,381 adult and juvenile CRLF observed. Breeding has been documented at 11 sites, including Whiskey Spring, Dughi Spring, Mucky Pond, Eucalyptus Pond, the lower sediment pond on the west fork of Chorro Creek, an unnamed tributary of Chorro Creek near San Benito Road, and an unnamed tributary of Chorro Creek near the USPFO.

3.6.1.4 California Condor

Federal Endangered, State Endangered

With a wingspan just over 9 ft (2.8 m) the California condor (*Gymnogyps californianus*) is unmistakable and the largest soaring landbird in North America (Finklestein et al 2015). The condor was listed as Federally Endangered in 1967 and State Endangered in 1971. Environmental contaminants (DDT), shooting, and lead poisoning from scavenging on shot carcasses led to the decline of this species from most of its West Coast (Baja to British Columbia) range by 1940. In 1987 fewer than 30 condors remained, and all were in captivity at the San Diego and Los Angeles zoos. The first captive bred California condor chick was hatched by the San Diego Zoo in 1988, and by 2020 the global population of the California condor had reached 485, with 312 wild and 173 captive individuals (Ventana Wildlife Society [VWS] 2020). The population of California condors is still slowly increasing, thanks to intensive management efforts, but serious threats to the recovery of this species remain. The majority of the wild individuals live in California, and one of their primary foraging areas, Elkhorn-Carrizo, is in northeastern San Luis Obispo County (Finklestein et al. 2015). Most recently 101 wild Condors lived in the Central Coast Ranges of California, this population is managed by the VWS in addition to USFWS (VWS 2020).

Condors are carrion feeders that rely on the presence of other scavengers (e.g., common ravens [Corvus corax], turkey vultures [Cathartes aura], or golden eagles) to locate carcasses from the air (NatureServe Explorer 2008). Their diet consists largely of medium to large sized mammals, including cattle, sheep, deer, coyotes, and bobcats (Snyder and Schmitt 2002). A ban on lead ammunition went into full effect in July 2019 to ensure condors do not ingest spent ammunition as they scavenge hunters' game remains.

Condors are diurnal, typically leaving roost sites 3–5 hours after sunrise and returning 2–5 hours before sunset (Palmer 1988). Condors reach sexual maturity between five and seven years of age, are monogamous once paired, and possibly mate for life (Alsop 2001). Adults do not breed every year and when they do, they lay one egg, typically between the last week of January and the first week of April (Snyder and Schmitt 2002). Both parents participate in incubation of the egg, which lasts approximately 53–60 days, and both parents also share the responsibilities of rearing the hatchling. The chick is totally dependent on the parents for approximately one year (Snyder and Schmitt 2002).

Captive-bred condors have been released at four locations in California, one in Arizona, and one in Baja California, Mexico (Zoological Society of San Diego 2009). Threats to California Condors include shooting, lead poisoning (from lead bullets in carcasses they eat), and collision with human-made objects (e.g., power lines) (USFWS 2009a).

Critical Habitat

In September 1976, CH was designated for the California condor (41 Fed. Reg. 41914 [24 September 1976]). CSLO is not located within designated CH for this species.

Status at Camp San Luis Obispo - Potential to Occur

California condors soar great distances to forage and are known to explore potential new foraging areas. Three wild California condors roosted less than six miles west of CSLO for multiple days as recently as 2018. USFWS GPS transmitter data shows that condor activity regularly occurs near the CSLO installation, but consistent use of installation resources is not evident (USGS 2021).

3.6.1.5 Least Bell's Vireo

Federal Endangered, State Endangered

The least Bell's vireo (*Vireo bellii pusillus*) is the westernmost of four subspecies of Bell's vireo. They are grayish-green with pale yellow sides, have a pale eye ring, and one to two faint wing bars. The least Bell's vireo is a neotropical migrant, arriving from Mexico in late March to April and departing in the fall (Alsop 2001). Historically, least Bell's vireos were common throughout riparian woodlands in the Central Valley and low elevation river valleys in southern California and northern Baja California, Mexico (USFWS 1998b).

The least Bell's vireo was listed as State Endangered in 1980 and Federally Endangered in 1986. By the time the species was federally listed, it had been extirpated from the Central Valley and numbered just 300 pairs statewide. Populations were restricted to three localities in Monterey, San Benito, and Inyo Counties and small populations in southern California and northwestern Baja California. By 1996, least Bell's vireo numbers had increased six-fold, and the taxon is expanding into its historic range (USFWS 1998b). Nesting vireos have recolonized areas in Ventura, San Bernardino, and Santa Clara Counties (Kus 2002). A pair of least Bell's vireos nested at the San Joaquin River National Wildlife Refuge in the Central Valley in 2005 and 2006. This is the first time that this vireo has nested in the Central Valley in over 60 years (USFWS 2006). A small and scattered group of least Bell's vireos continues to inconsistently breed in the Central Valley, for example a single pair is known to have nested in Contra Costa County in 2020 (eBird 2020).

Preferred habitats of this vireo range from semiarid scrub found bordering streams with sufficient surface or groundwater to permit growth of dense stands of willows, saltcedar (Tamarisk sp.), honey mesquite (Prosopis sp.), or other shrubby forms of vegetation. When feeding, the vireo is often found foraging within shrubby thickets in and adjacent to water courses, often seen utilizing all vertical strata within the forest as well as adjacent chaparral and oak woodlands. Nests are usually found in riparian habitat, typically near the edge of thickets, suspended approximately 3.3 ft (1 m) above ground in shrubs or trees (Hensley 1950; Kus et al. 2010).

The decline of least Bell's vireos is a result of their extreme vulnerability to cowbird parasitism in combination with habitat loss and degradation. The introduction of exotic plant species into riparian habitats increases habitat fragmentation and may decrease suitable nesting habitat (Kus 2002). Data on direct causes of mortality are not available, but predation has been identified. Because these vireos build their nests 1–5 ft (0.3–1.5 m) above the ground (Gray and Greaves 1984), they are accessible to a variety of terrestrial nest predators (Franzreb 1987).

Critical Habitat

Final CH was designated for least Bell's vireo in 1994 (59 Fed. Reg. 4845 [02 February 1994]). CSLO is not located within designated CH for this species.

Status at Camp San Luis Obispo–Potential to Occur

Although this species has not been identified on the installation since 1995, there have been several recent records of species occurrences in the surrounding area. A USFWS protocol survey and habitat analysis was completed for the least Bell's vireo in 2020, and although no least Bell's vireos were observed, the survey concluded that ample suitable habitat exists for the species on the installation.

3.6.1.6 Swainson's Hawk

State Threatened

The Swainson's hawk (*Buteo swainsoni*) is a medium sized hawk with a stout body, broad wings, and a long rounded tail. This migratory buteo of open spaces was once one of the most common hawks in the West, including California (Bechard et al. 2010). While it remains common in some parts of its range, in California it now only nests in the Central Valley and a few other locations, a result of a more than 90% decline in most of the state. Swainson's hawk breeds and forages in grasslands, shrublands, and small open woodlands. Nests are built in trees located within such a habitat matrix, often along stream courses or patches of open woodland. Typical nest trees include willows, black locusts, junipers, oaks, and cottonwoods.

Fire suppression, reduced grazing, vegetation changes and increased human populations have converted some areas away from appropriate habitat for Swainson's hawks in much of their breeding range, which historically extends from northern Mexico to eastern Alaska and from California to western Illinois. Shooting, poisoning, harassment and changes to agricultural practices also threaten the species in its wintering grounds as far south as Argentina.

Status at Camp San Luis Obispo– Potential to Occur

While the Swainson's hawk was once common in coastal California, today they are not often found breeding as far west as San Luis Obispo County (Zeiner et al. 1990a). However, appropriate habitat for Swainson's hawk remains across the Central California Coastal Ranges region and a pair has nested approximately 25 miles from the installation, near Shandon, for at least the last six years including 2020 (eBird 2020). Swainson's hawks have been observed perched or soaring over CSLO on several occasions. When seen, it is often flying above and passing through the area, but it has been known to roost or forage in the grasslands, oak savannahs and sometimes after fires.

3.6.1.7 Tricolored Blackbird

State Threatened, Mission Sensitive Species

The tricolored blackbird (*Agelaius tricolor*) is a medium sized passerine found in wetland and agricultural habitats. The plumage of adult males is glossy black with bright red and white wing bands. Tricolored blackbirds are highly social and nest in various types of wetland habitats in dense breeding colonies. This species was once the most abundant bird species in the Central Valley and in the coastal wetlands between Santa Barbara and San Diego (Grinnell 1915; UC Davis 2019). The current population of tricolored blackbirds remains 99% within California and is centered within the central valley, though scattered populations occur from Washington to Baja California. In California the tricolored blackbird population has declined over 95% from its estimated abundance in the first half of the 20th century, leading to its listing as State Threatened in 2018.

The key driver of species decline is the reduction in wetlands in California due to water diversion, draining, agriculture and development (UC Davis 2019). With declines in wetland habitat across their breeding range, some populations of tricolored blackbird have switched to annual and perennial row crops in the Central Valley. This shift in breeding habitat brings new threat to the species, such as harvest of crops before chicks fledge, pesticides, conversion of these crop types to tree crops and predation by cattle egrets are newer threats to the largest populations of tricolored blackbirds in California (Riparian Habitat Joint Venture 2004; UC Davis 2019).

Status at Camp San Luis Obispo– Potential to Occur

CSLO is well within the current and historical range of the tricolored blackbird. The area around the Camp such as Los Osos Valley is often home to a fairly large wintering population of the species (eBird 2020). This species is very likely to occur at CSLO during the non-breeding season. The tricolored blackbird is an itinerant breeder, populations "pop up" in new areas and disappear from others every year, so if appropriate habitat exists it could also be used during the breeding season (Hamilton 1998; Beedy et al. 2018).

3.6.1.8 Bald Eagle

Bald eagles (*Haliaeetus leucocephalus*) are the second largest North American bird of prey (only the California condor is larger). Adult bald eagles are readily identifiable by their white heads and tails adjacent to their dark brown bodies and wings. Juvenile bald eagles are dark brown with white mottling and can be confused with juvenile and adult golden eagles (Buehler 2000).

Federal Delisted (Recovered) [Protected], State Endangered, CDFW Fully Protected, BGEPA

Its steep decline in the mid-20th century in America created lasting conservation concern for the species, though it has dramatically recovered and was removed from the federal Endangered Species List in 2007. In California bald eagles are still making a comeback, and the last decade has seen many new nests in central and southern California. Bald eagles are now a permanent resident and uncommon winter migrant in the State (Zeiner et al. 1990a; Fink et al. 2018). The overall population size of bald eagles along the Central Coast is still low, but increases in the winter and during migration, as bald eagles are much more abundant to the north. Bald eagles nest near water, as their primary food sources are fish, small mammals and carrion (Buehler 2000).

Their nests are very large stick platforms constructed in one of the taller and more conspicuous trees in an area. Bald eagles are sensitive to nearby disturbance and avoid foraging where disturbance is likely and build their nests way from high levels of activity. The bald eagle breeding season lasts from spring to fall. Nest construction begins one to three months before egg laying, though nests can be reused for many years once complete (Buehler 2020). One to three eggs are then laid and hatch after around 35 days. Eight to fourteen weeks later juveniles begin to take their first flights. Juvenile bald eagles take approximately 4.5 years to reach adulthood and mature plumage and could be mistaken for golden eagles in their first years. Under good circumstances, this species can live into its late 20's (Johnsgard 1990).

Status at Camp San Luis Obispo– Potential to Occur

Roosting or foraging bald eagles could arrive at CSLO from Lake Nacimiento, where many both winter and breed, or from areas north and south along the Salinas River. A pair recently nested in San Luis Obispo. The ponds and lakes within and adjacent to CSLO attract migrating and wintering eagles (Fink et al. 2018) and they have been observed flying over the installation on various occasions. Bald eagles could potentially nest on CSLO as their range expands and the species continues to recover.

3.6.2 Special Status Species

3.6.2.1 Special Status Plant Species

There are currently 25 special status plant species known to occur at CSLO (**Error! Reference source not found.**6). The federally and state endangered Chorro Creek bog thistle is described in *Section 4.7.2.1*. Descriptions for species which carry a CNPS sensitivity status of 1 or 2 are provided below. Species with CNPS statuses of 3 or 4 have been included in **Error! Reference source not found.**6 so that their status may be tracked in the CSLO's plants database. However, detailed descriptions are not provided here.

Congdon's Tarplant

CNPS 1B.1

Congdon's tarplant (*Centromadia parryi* ssp. *congdonii*) is an annual herbaceous plant that normally occurs in grasslands. At CSLO, Congdon's tarplant has been documented in ruderal grassland along a roadside in the southwestern part of the post.

Jones' Tidytips

CNPS 1B.2

Jones' tidytips (*Layia jonesii*) is an annual herbaceous plant that occurs in clay rocky soils on serpentine substrate in chaparral and grasslands. This plant is frequently found in pastures and on grassy slopes up to 152 m (500 ft). At CSLO, Jones' tidytips is found mainly in serpentine chaparral.

California Groundsel

CNPS 2B.2

California groundsel (*Senecio aphanactis*) is an annual herbaceous plant that occurs in chaparral, cismontane woodland, and coastal scrub, sometimes on alkaline soil. At CSLO, California groundsel has only been found in two small patches in the central-eastern part of the Camp.

Dwarf Soaproot

CNPS 1B.2

Dwarf soaproot (*Chlorogalum pomeridianum* var. *minus*) is a perennial herbaceous plant that occurs in serpentine soils in chaparral, coastal scrub, and grassland at CSLO. At CSLO, dwarf soaproot has been found only in the vicinity of Guard Hill.

Most Beautiful Jewel-Flower

CNPS 1B.2

Most beautiful jewel-flower (*Streptanthus albidus* ssp. *peramoenus*) is an annual herbaceous plant that occurs in serpentine substrate in chaparral, grasslands, and oak woodlands. To date, at CSLO, most beautiful jewel-flower has only been found in serpentine chaparral.

San Luis Obispo Serpentine Dudleya

CNPS 1B.2

San Luis Obispo serpentine dudleya (*Dudleya abramsii* ssp. *bettinae*) is a perennial herbaceous plant that occurs in serpentine soils in chaparral, coastal scrub, and grassland habitats at CSLO. This plant's distribution on CSLO is limited to Guard Hill and areas south of SR 1 and locally abundant on the first ridge west of Cerro Romauldo.

San Luis Obispo Dudleya

CNPS 1B.3

San Luis Obispo dudleya (*Dudleya abramsii* ssp. *murina*) is a perennial herbaceous plant that occurs on serpentine outcrops in serpentine chaparral and coastal scrub

Table 3-16. Special status plant species at Camp San Luis Obispo.

Scientific Name	Common Name	Growth Form	Habitat	Blooming Period	CNPS Status	NatureServe Status
Family Asteraceae						
Centromadia parryi ssp. *congdonii*	Congdon's tarplant	AH	Valley Grassland Arid West: Occurs usually in wetlands, occasionally in non-wetlands. Mountains, Valleys and Coast: Equally likely to occur in wetlands and non-wetlands	May-Oct	1B.1	G3T1T2/S1S2
Layia jonesii	Jones' tidytips	AH	Chaparral, Valley Grassland Serpentine affinity: 3.5 (broad endemic / strong indicator).	Mar-May	1B.2	G2/S2
Grindelia hirsutula var. *maritima*	coastal gumweed	PH	Coastal Plant Communities including: Valley Grassland, Northern Coastal Scrub, Coastal Sage Scrub Wetlands: Occurs usually in wetlands, occasionally in non-wetlands. Serpentine affinity: 1.7 (weak indicator)	Jun-Sep	3.2	G5T1Q/S1
Senecio aphanactis	California groundsel	AH	Foothill Woodland, Northern Coastal Scrub, Coastal Sage Scrub	Jan-Apr	2B.2	G3/S2
Family Agavaceae						
Chlorogalum pomeridianum var. *minus*	dwarf soaproot	PH (bulb)	Chaparral Serpentine affinity: 6.1 (strict endemic)	May-Aug	1B.2	G5T3/S3
Family Apiaceae						
Lomatium parvifolium	coastal biscuitroot	AH	Chaparral, Closed-cone Pine Forest Serpentine affinity: 3.3 (strong indicator)	Jan-Jun	4.2	G3/S3
Sanicula hoffmannii	Hoffmann's snakeroot	AH	Chaparral, Mixed Evergreen Forest, Northern Coastal Scrub, Coastal Sage Scrub Serpentine affinity: 1.8 (weak indicator).	Mar-May	4.3	G3/S3
Family Brassicaceae						
Streptanthus albidus ssp. *peramoenus*	most beautiful jewel-flower	AH	Chaparral, Valley Grassland, Foothill Woodland Serpentine affinity: 4.3 (broad endemic / strong indicator)	Apr-Sep	1B.2	G2T2/S2
Family Convolvulaceae						
Calystegia subacaulis ssp. *episcopalis*	Cambria morning-glory	PH (rhizome)	Chaparral, Foothill Woodland	Apr-Jun	4.2	G3T1T2/S1S2

Scientific Name	Common Name	Growth Form	Habitat	Blooming Period	CNPS Status	NatureServe Status
Family Crassulaceae						
Dudleya abramsii ssp. *bettinae*	San Luis Obispo serpentine dudleya	PH	Chaparral, Valley Grassland, Coastal Sage Scrub Serpentine affinity: 6.2 (strict endemic)	May-Jul	1B.2	G4T2/S2
Dudleya abramsii ssp. *murina*	San Luis Obispo dudleya	PH	Chaparral, Valley Grassland, Coastal Sage Scrub Serpentine affinity: 6.2 (strict endemic)	May-Jun	1B.3	G4T2/S2
Dudleya blochmaniae ssp. *blochmaniae*	Blochman's dudleya	PH	Coastal Plant Communities including: Valley Grassland, Coastal Sage Scrub Serpentine affinity: 3.2 (strong indicator)	Apr-Jun	1B.1	G3T2/S2
Family Cyperaceae						
Carex obispoensis	San Luis Obispo sedge	perennial grass-like herb (rhizomatous)	Coastal Prairie, Chaparral, Coastal Sage Scrub, Closed-cone Pine Forest, Valley Grassland Occurs usually in wetlands, occasionally in non-wetlands. Serpentine affinity: 4.9 (broad endemic)	Apr-Jun	1B.2	G3?/S3?
Family Ericaceae						
Arctostaphylos obispoensis	serpentine manzanita	SH	Closed-cone Pine Forest	Feb-Jun	4.3	G4T3/S3
Family Liliaceae						
Calochortus clavatus ssp. *clavatus*	Club-Haired Mariposa Lily	PH (bulb)	Chaparral, Valley Grassland, Foothill Woodland	May-Jun	4.3	G4T3/S3
Calochortus obispoensis	San Luis Mariposa Lily	PH (bulb)	Chaparral, Valley Grassland, Coastal Sage Scrub	May-Jul	1B.2	G2/S2
Family Malvaceae						
Sidalceae hickmanii ssp. *anomala*	Cuesta Pass checkerbloom	PH	Closed-cone Pine Forest Serpentine affinity: 5.6 (strict endemic)	May-Jun	1B.2	G3T1/S1
Family Orobanchaceae						
Castilleja densiflora ssp. *obispoensis*	Obispo Indian Paintbrush	AH	Coastal Grassland	Mar-Jun	1B.2	G5T2/S2
Family Polygonaceae						
Chorizanthe breweri	Brewer's spineflower	AH	Chaparral, Foothill Woodland, Coastal Sage Scrub, Closed-cone Pine Forest Serpentine affinity: 5.4 (broad endemic)	Apr-Aug	1B.3	G3/S3
Chorizanthe palmeri	Palmer's spineflower	AH	Chaparral, Valley Grassland, Foothill Woodland Serpentine affinity: 4.9 (broad endemic)	Apr-Aug	4.2	G4/S4

Scientific Name	Common Name	Growth Form	Habitat	Blooming Period	CNPS Status	NatureServe Status
Family Pteridaceae						
Aspidotis carlotta-halliae	Carlotta hall's lace fern	Fern	Foothill Woodland, Chaparral	NA	4.2	G3/S3
Family Rhamnaceae						
Ceanothus cuneatus ssp. *fascicularis*	Sedgeleaf buck brush	SH	Sandy substrates, coastal Chaparral	Feb-Apr	4.2	G5T4/S4
Ceanothus rigidus (formerly *Ceanothus cuneatus* ssp. *rigidus*)	Monterey ceanothus	SH	Northern Coastal Scrub, Coastal Sage Scrub, Closed-cone Pine Forest	Mar-Apr	4.2	G4/S4
Family Rosaceae						
Horkelia cuneate var. *sericea* (formerly *Horkelia cumeata* ssp. *sericea*)	Kellogg's horkelia	PH	Northern Coastal Scrub, Coastal Sage Scrub, Closed-cone Pine Forest	Feb-Jul	1B.1	G4T1?/S1?
Family Rubiaceae						
Galium cliftonsmithii	Santa Barbara bedstraw	PH	Foothill Woodland	May-Jul	4.3	G4/S4

Growth Form:

MO: Moss; AH: Annual herb; PH: Perennial herb; SH: Shrub; TR: Tree

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habitats in San Luis Obispo County. At CSLO, the San Luis Obispo dudleya is found on rock outcrops in serpentine chaparral north of SR 1.

Blochman's Dudleya

CNPS 1B.1

Blochman's dudleya (*Dudleya blochmaniae* ssp. *blochmaniae*) is a perennial herbaceous plant that occurs in clay rocky soil on serpentine substrate in grasslands and coastal sage scrub. At CSLO, Blochman's dudleya can be found throughout the post on serpentine rock outcrops in grasslands and in serpentine chaparral.

San Luis Obispo Sedge

CNPS 1B.2

San Luis Obispo sedge (*Carex obispoensis*) is a perennial, rhizomatous plant that occurs in coastal prairies, chaparral, coastal sage scrub, closed-cone pine forest, and valley grassland. It occurs in both wetlands and non-wetlands, often on serpentine soils. It is known to occur at elevations of 30–2,690 ft amsl (10-820 m) (CNPS 2011; California Natural Diversity Database [CNDDB] 2019b). At CSLO, San Luis Obispo sedge has been found in the vicinity of Pick and Shovel Mine.

San Luis Mariposa Lily

CNPS 1B.2

San Luis mariposa lily (*Calochortus obispoensis*) is a perennial herbaceous plant which grows from a bulb in chaparral, coastal sage scrub, and valley grassland, often on serpentine soils. It occurs at elevations of 160-2,395 ft (50-730 m) (CNPS 2011; CNDDB 2019b). At CSLO, San Luis mariposa lily has been documented in various locations in the northern part of the post and on serpentine chaparral in the eastern-central part of the post.

Cuesta Pass Checkerbloom

CNPS 1B.2

Cuesta Pass checkerbloom (*Sidalcea hickmanii* ssp. *anomala*) is a perennial herbaceous plant that occurs in serpentine soils in closed cone coniferous forest habitats. At CSLO, Cuesta Pass checkerbloom has been documented just below Primera Mine in the northern part of the post. The plant became established after a wildland fire and is slowly decreasing as successional chaparral occupies the area.

Obispo Indian Paintbrush

CNPS 1B.2

Obispo Indian paintbrush (*Castilleja densiflora* ssp. *obispoensis*) is an annual herbaceous plant that inhabits grasslands, meadows, and seeps (sometimes in serpentine substrates) at elevations of 33–1,312 ft (10–400 m) in San Luis Obispo County (CNPS 2011; CNDDB 2019b). At CSLO, Obispo Indian paintbrush has been found in grasslands in the central part of the installation.

Brewer's Spineflower

CNPS 1B.3

Brewer's spineflower (*Chorizanthe breweri*) is an annual herbaceous plant that occurs in serpentine soils in chaparral, coastal scrub, and oak woodland in southwest San Luis Obispo County. Brewer's spineflower is abundant throughout the northern portion of CSLO and is commonly found in serpentine chaparral throughout the post.

Kellogg's Horkelia

CNPS 1B.1

Kellogg's horkelia (*Horkelia cuneata* ssp. *sericea*) is a perennial herbaceous plant that occurs in sandy or gravelly openings closed-cone coniferous forest, maritime chaparral,

coastal dunes, and coastal scrub from coastal Santa Barbara County to northern Marin County. Kellogg's horkelia occurs in two small patches at the south end of CSLO.

3.6.2.2 Special Status Fish and Wildlife Species

CSLO is home to 25 special status wildlife species. **Error! Reference source not found.** lists special status w ildlife species and their listing status.

Invertebrates

Monarch Butterfly

Federal Candidate Species

Monarch butterfly (*Danaus plexippus*), is currently listed as a candidate species by the USFWS and is slated to be listed under the ESA in 2024. In North America there are generally two distinct monarch populations, the eastern group which migrates to wintering areas in Mexico and Florida, and the western group which migrates to wintering areas in the central and southern California coast. The western monarch butterfly population has declined by more than 99 percent since the 1980s. An estimated 4.5 million monarchs overwintered on the California coast in the 1980s, whereas in 2020, the population estimate for migratory overwintering monarchs was less than 2,000 butterflies. This extreme population decline is due to multiple stressors across the monarch's range, including the loss and degradation of overwintering groves; pesticide use, particularly insecticides; loss of breeding and migratory habitat; climate change; parasites and disease.

Historically, the majority of western monarchs spent the winter in forested groves near the coast from Mendocino County, California, south into northern Baja California, Mexico. In recent years, monarchs have not clustered in the southern-most part of their overwintering range, and they are likely year-round residents in some areas of the coast. This resident phenomenon is plausibly due to a combination of climate change, and an abundance of residential-planted non-native, evergreen tropical milkweed that is available for monarchs year-round. Migratory western monarchs leave the overwintering groves in mid-winter to early-spring. Throughout the spring and summer, monarchs breed, lay their eggs on milkweed, and migrate across multiple generations within California and other states west of the Rocky Mountains.

Camp San Luis Obispo is located within the Priority 1 early breeding zone of California (Xerxes Society 2021). Focused monarch butterfly surveys were completed on CSLO in 2020 and 2021. An assessment of overwintering habitat on CSLO found that one grove of blue gum eucalyptus (*Eucalyptus globulus*) offered potential overwintering habitat, however no overwintering monarchs were observed (Althouse and Meade 2020). A natal habitat assessment and breeding monarch survey were completed on CSLO in 2021 (Althouse and Meade). Low density narrow-leaved milkweed (*Asclepias fascicularis*) was detected on CSLO and no breeding monarchs were observed. Removing non-native milkweed, planting native, insecticide-free milkweed and nectaring plants and avoiding the use of pesticide which affect insects near plants that monarchs could use for reproduction, foraging or wintering would benefit this species at CSLO.

Reptiles and Amphibians

Southwestern Pond Turtle

DoD SAR, CDFW Species of Special Concern

The southwestern pond turtle *(Actinemys pallida*) is diurnal and aquatic; typically active between February and November. The southwestern pond turtle is small- to medium- sized, and is dark brown, black, or olive colored. Its diet is quite broad consisting of aquatic plants, various invertebrates, worms, frog and salamander eggs and larvae, crayfish, carrion, and occasionally frogs and fish (Calherps 2019a). It lays its eggs in the banks of creeks and can nest up to 0.5 mile (0.8 km) in adjacent uplands if suitable habitat exists. Hatchlings then migrate to the water where they require areas of shallow water with dense vegetation.

This species can be found throughout California west of the Sierra-Cascade crest and is absent from desert regions, except along the Mojave River and some of its tributaries. The species is associated with permanent or nearly permanent water in a wide variety of habitat types (CWHR 2019). The Chorro Creek Reservoir supports the largest population of southwestern pond turtles at CSLO (Page et al. 1995; Scott and Harker 1998). The southwestern pond turtle is identified as a Focal Species for conservation in the California Wildlife Action Plan.

Northern California Legless Lizard

CDFW Species of Special Concern

The northern California legless lizard (*Anniella pulchra*) is a shiny, secretive lizard that occurs in suitable habitats in the Coast Ranges from Contra Costa County in the north to Ventura County in the south, as well as more southern scattered locations (Calherps 2020). It may be found in moist warm loose soil with plant cover. This includes sparsely vegetated areas of beach dunes, chaparral, pine-oak woodlands, and stream terraces with sycamores, cottonwoods, or oaks. Leaf litter under trees and bushes in sunny areas often indicate suitable habitat. They are found in areas with loose organic soils or where there is plenty of leaf litter. Legless lizards eat insect larvae, small adult insects, and spiders (Stebbins 1954). Live young are born in the fall.

California Newt

California Species of Special Concern

The California newt (*Taricha torosa*), also called the coast range newt and orange-bellied newt, is a species endemic to California. It is found in valley-foothill woodlands, coastal scrub, chaparral, and annual grassland habitat. This species requires slow-moving or stagnant water for breeding near these upland habitats and feed on various insects within the leaf litter of shrubs and trees. It is semiaquatic as an adult. The California newt can be found along the coast from Mendocino County to San Diego County.

Two-Striped Garter Snake

CDFW Species of Special Concern

The two-striped garter snake (*Thamnophis hammondii*) is a highly aquatic species generally associated with permanent freshwater streams with good water quality. This species often prefers streams with rocky beds and riparian growth where it can bask during the day. It feeds primarily on fish, amphibians, and amphibian larvae. The two-striped garter snake occurs along the coast from Monterey County south to Baja California.

South Coast Garter Snake

CDFW Species of Special Concern

The south coast garter snake (*Thamnophis sirtalis* spp.) is known from scattered localities from the Santa Clara River Valley in Ventura County south to the vicinity of San Pasqual in San Diego County. It is restricted to marsh and upland habitats near permanent water with good strips of riparian vegetation where adequate prey and refuge can be found (Jennings and Hayes 1994).

Birds

Grasshopper Sparrow

CDFW Species of Special Concern

Grasshopper sparrows (*Ammodramus savannarum*) occur in open grassland habitats with scattered shrubs. They nest on the ground in small depressions at the base of clumps of grasses or forbs. Grasshopper sparrows forage on the ground for insects primarily, but also for seeds. This species is a summer resident and breeder in portions of the western half of the state. It sometimes winters in California, mostly along the southern coast (Zeiner et al. 1990a). A secretive bird with a high affinity for specific quality grasslands, this species is difficult to monitor, but has declined in much of the country including California. Prairies, other native or non-native grasslands, and agricultural grassland habitats replaced by urbanization, forest, shrubland, and other crops has eliminated habitat for the species (Grinnell and Miller 1944). The grasshopper sparrow weaves a grass nest on the ground in tall grass habitat that isn't too dense, or short grass habitat that is dense enough. The grasshopper sparrow is a partial migrant, and often spends the non-breeding seasons in areas as close as Arizona, or areas further away, such as Mexico and El Salvador. Areas of the Los Osos Valley and SR 1 corridor have the correct grass and other habitat characteristics for the species, allowing them to breed and winter in the local vicinity of CSLO.

Golden Eagle

USFWS Bird of Conservation Concern, BGEPA, CDFW Fully Protected

Golden eagles (*Aquila chrysaetos)* occur primarily in rolling foothills, mountainous areas, sage- juniper flats, and deserts. Cliffs and large trees are used for nesting and cover. Golden eagles primarily eat rabbits, hares, and rodents, and hunt for them by soaring high above open terrain. This species breeds throughout California except for the Central Valley, where it only occurs during the winter (Zeiner et al. 1990a).

Short-Eared Owl

CDFW Species of Special Concern

The short-eared owl (*Asio flammeus*), one of the most widely distributed owls in the world, is found in open areas such as meadows, marshes, grasslands, dunes, and irrigated areas. It glides over these open areas close to the ground and preys on small mammals, birds, reptiles, and amphibians. They are mostly active at dawn and dusk, at night, and on cloudy days, they tend to roost on the ground but occasionally in trees. This species nests on the ground in small depressions and requires dense vegetation such as tall grasses and shrubs for cover and protection of the nest site. The short-eared owl is a widespread winter migrant that occurs primarily in the Central Valley and western Sierra Nevada foothills, and along the coast of California. It is usually found wintering closer to the coast than CSLO. It occurs year-round in and occasionally breeds in portions of northern California, which are at the southern edge of its globe- spanning northern, as well as Hawaii, parts of South America and other islands, breeding range (Zeiner et al. 1990a).

Long-Eared Owl

CDFW Species of Special Concern

The long-eared owl (*Asio otus*) is found in riparian or woodland habitats. This medium sized owl is noticeably tall and thin and roosts in trees during the day, and forages in open areas at night. This owl requires densely vegetated woodlands for nesting and roosting and feeds on various rodents, vertebrates, and birds. This species is notable for roosting in groups during the non- breeding season. Breeding habitat requires a combination of these features: woodland such as riparian, conifer or oak for nest placement, and daytime roosting with open spaces or adjacent to open habitat (Grinnell and Miller 1944). This species is a winter visitor in the Central Valley and desert areas in the southeastern portion of the state. It is a resident east of the Sierra Nevada/Cascade crest, around San Francisco Bay, along a portion of the Central Coast, and in spotty locations in southern California (Zeiner et al. 1990a). The long-eared owl breeds and winters sparsely in the mountains around the Los Osos Valley, but is not recorded at CSLO.

Western Burrowing Owl

CDFW Species of Special Concern, Mission Sensitive Species

The western burrowing owl (*Athene cunicularia hypugaea*) is the only owl species in North America to breed in burrows in the ground. The species uses prairie dog or ground squirrel burrows and stands alert on a small rise during breeding (approximately April 15 to July 15), while during the non-breeding season they are more widely dispersed but continue to roost in burrows and spend much time on the ground in vegetation short enough to provide visibility of the surrounding area.

Burrowing owls are unlikely to breed at CSLO, because the Los Osos Valley is not in their current breeding range but disperse widely across the region of the Camp between fall and spring. Cleared areas such as construction sites can attract wintering burrowing owls, and the potential for wintering owls to roost in uncovered pipes, boreholes and similar structures should be considered. There are published California protocol survey methods for wintering burrowing owls.

Costa's Hummingbird

USFWS Bird of Conservation Concern

The desert hummingbird of the far southwest, the small Costa's hummingbird (*Calypte costa)* also spends time in the shrublands of the coast. Males of the species have an impressive flared gorget that shines iridescent purple. A small portion of the Costa's hummingbird population is resident in coastal shrublands and breeds in spring, but another segment of the population resides in these habitats during summer, then returns to the eastern Sierran valleys and the Sonoran and Colorado deserts to breed in the winter (Baltosser and Scott 1996). Costa's hummingbirds require intact native coastal shrubland for wintering and some breeding purposes, as Anna's hummingbird tends to replace it in areas with development or altered vegetation.

Northern Harrier

CDFW Species of Special Concern

The northern harrier *(Circus hudsonius)* occurs in a variety of open habitats including grasslands, meadows, and rangelands. This slender raptor forages by flying low over grasslands, shrublands and wetlands including vernal pools. The sexually dimorphic species (males are light gray, females are brown) nests on the ground, usually in dense vegetation in undisturbed areas (Grinnell and Miller 1944). It most frequently nests in shrubby vegetation in emergent wetlands and marshes or along rivers or lakes, but it may also nest in grassland, grain fields, or on

sagebrush flats away from water. It forages for small mammals, birds, small reptiles, and frogs by flying low or hovering over open areas and diving down to catch prey. The northern harrier is a year-round resident in the Modoc Plateau, Central Valley, and along the coast, and is a winter resident or migrant throughout the rest of California except for heavily wooded areas of the Sierra Nevada and Cascade Ranges (Zeiner et al. 1990a). The northern harrier breeds and winters in the Los Osos Valley, and is recorded at CSLO.

White-Tailed Kite

CDFW Fully Protected

White-tailed kites (*Elanus leucurus*) are found in herbaceous and other open habitats and are rarely found far from agricultural areas. It nests near the top of trees with dense canopy cover and feeds primarily on voles and other diurnal mammals by hovering and then swooping down on its prey. This species occurs in coastal and valley lowlands west of the Sierra Nevada (Zeiner et al. 1990a).

Yellow Breasted Chat

CDFW Species of Special Concern

The yellow-breasted chat *(Icteria virens)* is found in valley foothill riparian and desert habitats. It requires thick riparian vegetation near watercourses for nesting, cover, and feeding. Yellow-breasted chats feed on insects, spiders, berries, and other fruit. This species is an uncommon summer resident and migrant throughout the Klamath Mountains and the Cascade Range, western Sierra Nevada Foothills, and along the coast from San Francisco south to Baja California (Zeiner et al. 1990a). The yellow-breasted chat is an aberrant warbler with a strong affinity for thickets. It is typically very secretive within its dense habitat, but during the breeding season will occasionally perch above the thicket layer and sing a distinctly loud, variable and eventually repetitive song (Grinnell and Miller 1944). Likely never as common as yellow warbler in most regions, it has undergone a similar but more extreme decline in much of California. The yellow-breasted chat is likely an annual breeder at CSLO and certainly passes through during migration. It largely nests in riparian thickets and benefits from increases in this habitat and the removal of brown-headed cowbirds.

Loggerhead Shrike

CDFW Species of Special Concern

Loggerhead shrikes (*Lanius ludovicianus*) occur in open habitats with short vegetation including grasslands, old orchards, mowed roadsides, cemeteries, golf courses, agricultural fields, riparian areas, and open woodlands (Yosef 1996). Nests are built in trees or shrubs with dense foliage and usually are hidden well. This species feeds primarily on large insects, but also eats small mammals, birds, reptiles, amphibians, fish, and carrion. It often skewers its prey on a wire barb or thorn to feed on or to store for later feeding. The loggerhead shrike is a common resident throughout most of the state except in the Sierra Nevada and northwest California (Zeiner et al. 1990a).

Purple Martin

CDFW Species of Special Concern

The largest swallow in North America, the purple martin (*Progne subis*) is a well-known and gregarious backyard migrant in much of the east of the country, where it has nested almost entirely in human built “purple martin houses” for over a century. In the west, by comparison, the species has declined from most human-populated and agricultural areas, and still nests in tree cavities, often in montane forests (Grinnell and Miller 1944). The arrival of non-native European Starlings, also cavity nesters, played a role in their disappearance from most human populated areas of the west. Both the eastern and western groups of the species migrate to South

America in the winter. Purple martins inhabit valley-foothill woodland, montane woodland, coniferous, and riparian habitats. It hunts for insects by gliding above the ground. The purple martin is a summer migrant throughout the Coast Ranges, Klamath Mountains and Cascade Range, and western Sierra Nevada foothills (Zeiner et al. 1990a). In central coastal California small numbers of purple martins appear to now be confined to the coastal ranges and breed in conifer forest and sycamore. Purple martins were once present but likely never very common in the Western Transverse Range valleys.

Long-Billed Curlew

USFWS Bird of Conservation Concern

The largest shorebird in North America, the long-billed curlew (*Numenius americanus)* is dependent on relatively undisturbed open short-grass habitats for breeding (Dugger and Dugger 2002). Loss of this habitat across its range is concerning for the species. Long-billed curlews use similar habitats, as well as coastal areas, wetlands and agricultural fields for foraging during the non-breeding season. In the area around CSLO large flocks of long-billed curlew congregate in the non-breeding season, potentially arriving from their closest breeding areas in the Central Valley and the Bay Area.

Yellow Warbler

USFWS Bird of Conservation Concern, CDFW Species of Special Concern

Yellow warblers (*Setophaga petechial)* breed in riparian woodland, montane chaparral, and in brushy areas within open ponderosa pine and mixed conifer habitats. It forages for insects in the upper canopy of deciduous woodlands and nests in the dense understory vegetation. This species is a summer resident throughout mountainous areas of California (Zeiner et al. 1990a). The "sweet-sweet-I'm so sweet" song of the yellow warbler is a familiar riparian area refrain in the spring and early summer across the United States. This species was locally common in the Salinas Valley and across California in the 1940s (Grinnell and Miller 1944) but is nearly extirpated from the Central Valley and has declined moderately across much of the rest of the state. It has come back rapidly in Southern California, benefitting from habitat restoration and brown-headed cowbird trapping to reduce impacts to least Bell's vireo. The yellow warbler nests at CSLO in riparian willows, cottonwood, and assorted shrubs, usually between May and June. This species responds rapidly and positively to management that would also positively benefit least Bell's vireo.

Mammals

Pallid Bat

CDFW Species of Special Concern; Western Bat Working Group (High)

The pallid bat (*Antrozous pallidus)* can be found in a variety of habitats including grasslands, shrublands, and woodlands but are most common in open, dry habitats with rocky ledges for roosting. This is a resident species that occurs throughout the entire state. Pallid bats are unusual in that they forage almost entirely on ground dwelling species, primarily invertebrates but sometimes small lizards and rodents. The pallid bat is included on the CDFW's Special Animals List (CDFW 2020) as a CSSC and a Western Bat Working Group species of high priority.

Townsend's Big-Eared Bat

CDFW Species of Special Concern; Western Bat Working Group (High)

The Townsend's big-eared bat (*Corynorhinus townsendii)* is an uncommon resident found in all habitat types except for subalpine and alpine areas and requires caves, tunnels, mines, or other human-made structures for roosting. This bat feeds primarily on moths but will eat a variety of soft-bodied insects. This species occurs throughout the state. Townsend's big-eared bat is included on the CDFW's Special Animals List (CDFW 2020) as a CSSC and a Western Bat Working Group species of high priority.

Western Red Bat

Western Bat Working Group (High)

Western red bats (*Lasiurus blossevillii)* are widespread throughout much of western North America; they are relatively common in some parts of California, occurring west of the Pacific Crest from Shasta County to the Mexican border, excluding desert habitats. This nocturnal species is primarily solitary; coming together only to mate (August-September) and migrate (Spring/Fall). Western red bats typically roost in trees and sometimes in shrubs; the species is closely associated with cottonwoods in riparian areas below 6,500 ft. They feed on a variety of insects along forest edges, in small clearings, or around lights where prey may gather. Like most bat species, western red bats have two foraging peaks, the first one to two hours after sunset and the second just before sunrise (CDFW 1990). This species has a slow and erratic foraging flight pattern feeding at ground level to the above treetops. Western red bats hibernate, though it is not known exactly where; it is possible they may burrow into leaf litter or dense grass. In addition to suitable trees and cover for roosting/hibernating along with plentiful insects for foraging, western red bats also require access to water. The species appears to have declined throughout its range primarily due to the loss of lowland riparian forests due to human influences (Bat Conservation International 2013). The western red bat is included on the CDFW's Special Animals List (CDFW 2020) and is a Western Bat Working Group species of high priority.

Yuma Myotis

Western Bat Working Group (Low-Medium)

The Yuma myotis (*Myotis yumanensis*) bat is a common resident found in open forests and woodlands near water. It feeds on small flying insects and roost in caves, mines, crevices, or buildings. This species occurs throughout California except for the Mojave Desert region. The Yuma myotis is included on the CDFW's Special Animals List (CDFW 2020) and is a Western Bat Working Group species of low-medium priority.

Monterey Dusky-Footed Woodrat

CDFW Species of Special Concern

The Monterey dusky-footed woodrat (*Neotoma macrotis luciana)* is found in forests of moderate canopy, moderate to dense understory, as well as chaparral habitats. This species requires an abundance of plant material with which it builds conspicuous stick nests. These nests are usually located at the base of an oak tree or in the tree canopy. The dusky footed woodrat occurs throughout the Coast Ranges and the western Sierra Nevada Range.

Table 3-17. Special Status Wildlife Species at Camp San Luis Obispo.

Scientific Name	Common Name	Special Status	NatureServe Status
Invertebrates			
Danaus plexippus	Monarch butterfly	FCS	G4T2T3/S2S3
Reptiles and Amphibians			
*Actinemys pallida**	southwestern pond turtle	CSSC/SAR	G3G4/S3
Anniella pulchra	northern California legless lizard	CSSC	G3/S3
Taricha torosa	Coast Range newt	CSSC	G4/S4
Thamnophis hammondii	two-striped garter snake	CSSC	G4/S3S4
Thamnophis sirtalis spp.	south coast garter snake	CSSC	G5T1T2/S1S2
Birds			
Ammodramus savannarum	grasshopper sparrow	CSSC	G5/S3
Aquila chrysaetos	golden eagle	BCC, FP	G5/S3
Asio flammeus	short-eared owl	CSSC	G5/S3
Asio otus	long-eared owl	CSSC	G5/S3?
Athene cunicularia hypugaea	western burrowing owl	BCC, CSSC, MSS	G4/S3
Calypte costa	Costa's hummingbird	BCC	G5/S4
Circus hudsonius	northern harrier	CSSC	G5/S3
Elanus leucurus	white-tailed kite	FP	G5/S3S4
Icteria virens	yellow-breasted chat	CSSC	G5/S3
Lanius ludovicianus	loggerhead shrike	BCC, CSSC	G4/S4
Numenius americanus	long-billed curlew	BCC	G5/S2
Progne subis	purple martin	CSSC	G5/S3
Setophaga petechia	yellow warbler	BCC, CSSC	G5/S3S4
Mammals			
Antrozous pallidus	pallid bat	CSSC, WBWG-H	G5/S3
Corynorhinus townsendii	Townsend's big-eared bat	CSSC, WBWG-H	G3G4/S2
Lasiurus blossevillii	western red bat	WBWG-H	G5/S3
Myotis yumanensis saturatus	Yuma myotis	WBWG-LM	G4/S4
Neotoma macrotis luciana	Monterey dusky-footed woodrat	CSSC	G5T3/S3
Taxidea taxus	American badger	CSSC	G5/S3

*Naming conventions are according to the Society for the Study of Amphibians and Reptiles (2017), which has *Actinemys pallida* (southwestern pond turtle). The DoD SARs Lists identified *Clemmys marmorata pallida* (southwestern pond turtle) as Imperiled; this INRMP therefore treats *A. pallida* as a DoD SAR.*

Listing Status:

FCS = USFWS Candidate Species; **BCC** = USFWS Bird of Conservation Concern; **CSSC** = CDFW Species of Special Concern; **FP** = CDFW Fully Protected Species; **SAR** = DoD Species at Risk; **MSS** = Mission Sensitive Species; **WBWG** = Western Bat Working Group (**H** = High Priority; **LM** = Low-Medium Priority).

American Badger

CDFW Species of Special Concern

American badgers (*Taxidea taxus)* are heavy-bodied, short-legged, aggressive mammalian carnivores with long fore claws, variable fur and a short bushy tail. The species is solitary and found in a wide-range of habitats including croplands, desert, grassland, savannah, and shrubland/chaparral, generally preferring open areas. When inactive, badgers remain underground in burrows they can readily create with their long claws. Prey primarily includes small rodents they captured by digging them out of their burrows. They also hunt ground squirrels, pocket gophers, kangaroo rats, prairie dogs and mice, and occasionally insects, snakes, lizards and birds. Its range is wide, covering much of the Western United States and the Midwest, as well as southern parts of Canada and a large portion of Mexico (Cannings and Hammerson 1994). Populations of this species in California have declined drastically in the 20th century. Although this species has few natural enemies, it is in decline throughout much of its range. Continued threats include impacts related to agricultural and urban development, direct and secondary poisoning, as well as shooting and trapping for control (Sullivan 1996).

4.0 Natural Resources Management Strategy

4.1 Management with an Ecosystem Approach

This chapter analyzes the context and trend of each resource on the CSLO installation in relation to DoD policies to "conserve the environment for mission sustainability" and consistency with INRMP policy. Goals and objectives are presented for each resource and have been designed to enhance and maintain resources, align with DoD guidelines and comply with relevant laws and regulations.

> *Ecosystem-based management implements a multiple species approach consistent with the ESA; uses an adaptive approach to manage natural resources; evaluates and forms local/regional partnerships benefitting INRMP goals and objectives; uses the best available scientific information in decision- making and adaptive management; fosters long-term sustainability of ecosystem services (DoDI 4715.03).*

The activities in the sections below reflect CSLO's current approaches to ecosystem health and provision of ecosystem services as required for INRMPs. An ecosystem approach aligns with the need for climate adaptation at a landscape and regional scale. All DoD installation shall utilize tools to assess the potential impacts of climate change to natural resources, and when not in conflict with mission objectives, take steps to implement adaptive management to ensure the long-term sustainability of those resources. In this chapter, climate resilience is integrated into subject matter areas within this broad framework: (1) Ensure the wildland fire regime is sustained as far as possible within the range of natural community resilience; (2) Promote soil health and its relation to long-term carbon sequestration; (3) Restore woody and herbaceous perennials where they have been impacted at every opportunity; (4) Restore large habitat patches and connectivity of patches, including watersheds and floodplains to reduce future effects of extreme drought/flood cycles; and (5) Act at effective scale through with watershed, Army Compatible Use Buffer (ACUB), and INRMP regional partners.

The following sections include a general discussion of current management strategies for each resource area and goals and objectives are identified for ongoing and future management actions on the installation. Actions to achieve goals and objectives are broken down into conservation projects and conservation measures which are listed in Appendices A and B, respectively. Conservation measures are a broad category of policies, procedures, and actions necessary to address day to day activities for each resource area. Conservation measures are actions that are routinely implemented and do not require extraneous time or funding and are critical in benefitting natural resources or offsetting potential adverse impacts. Conservation projects are actions that CA ARNG currently implements or plans to implement in the future and will ultimately result in a benefit to the natural resource. In many cases, conservation projects are funding dependent and require contracted services. Funding requirement, project recurrence, and estimated implementation schedule is defined for each project in the Project Implementation Table (Appendix A). Conservation measures and conservation projects are identified in appendices to provide resource managers a quick reference to management actions and also allow for greater ease in completing annual reviews and project programming.

4.2 Soil Resources

Soil types define and constrain the potential growth of many plant communities. Soils are living systems that cycle nutrients supporting native plants and wildlife, including nitrogen and carbon cycling. Understanding soil capability and soil health is fundamental to land use management. Soil properties affect construction, water retention, flood potential, moisture and nutrient availability, and the distribution and productivity of many plant communities as well as their resilience to disturbance (Ehleringer 1985; Smith et al. 1995; Hamerlynck et al. 2002).

Soil quality initiatives are increasing in California and in federal agencies. Healthy soils are a critical component of productive and resilient ecosystems. Targeted improvement in soil quality is seen as one path towards climate adaptation. Degraded soils store less carbon, contributing to climate change, and are also less drought tolerant which make them more vulnerable to climate change.

Soil conservation includes a combination of practices such as surface stabilization, de-compaction, protection of nutrient and carbon cycling, and other ecosystem functions that soils provide, and that maximize the capability for soils to self-recover after disturbance. Prescribed grazing has been identified as one vehicle to improving soil quality on annual rangelands as these areas are easily degraded by overuse and poor grazing practices. Short-term, high-intensity grazing has been shown to improve soil health in rangelands as grazers enhance the structural diversity of rangelands, which influences floral and faunal diversity and nutrient cycling (Rook and Tallowin 2003). Grazing management that involves appropriate stocking rates, livestock rotation, grazing intensity, and pasture rest result in more productive grassland ecosystems because of healthy soils (NRCS 2016).

Erosion control and soil conservation are important water resource conservation issues. Sediment accumulation resulting from erosion affects surface water quality and aquatic organisms. Sedimentation of waters in the Morro Bay watershed has been identified as the number one priority regarding improving watershed health (MBNEP 2012). In 2016, the MBNEP completed a road erosion repair project along 11.4 miles of dirt roads on CSLO, CalPoly, and United States Forest Service lands. Approximately 2.3 miles of road and 18 sites, including ten stream crossings, one spring, and seven road drainage discharge points were treated on CSLO which resulted in an estimated 570 cubic yards reduction in sediment per year (1,495 cubic yards per decade). Ongoing maintenance and use of proper grading techniques (i.e. outsloping and use of rolling dips) is critical to controlling erosion in the upper watershed.

Impacts to soils are managed cooperatively by the Environmental Directorate, ITAM, and Land, Rehabilitation and Maintenance (LRAM) through training site regulation, best practices and the CA ARNG site approval process, whereby avoidance and minimization measures, and conservation measures, are considered under NEPA and CEQA. Any project that may disturb the soil (such as digging, grading,

stockpiling, dumping, staging, or establishing a laydown area) must go through a screening process to receive a site approval. Erosion control structures such as check dams, hardened crossings, hardened/graveled firing points and other BMPs are used to secure loose soils and reduce erosion potential.

Goal: *Conserve soil productivity, nutrient and carbon functioning, water quality, and plant and wildlife habitat through effective conservation practices.*

Objective 1: *Reduce or eliminate areas of barren soil by maintaining adequate vegetative cover.*

Objective 2: *Use proper grading techniques and BMPs to control and prevent erosion.*

4.3 Watershed and Water Resources

This section addresses watershed health, surface water quality and groundwater resource supply. The protection and management of water resources as habitat is described under *Section 4.5: Vegetation and Wildlife Habitat*, and under *Section 4.6: Fish and Wildlife* for individual special status aquatic species

CSLO is in the Morro Bay Planning Area of the San Luis Obispo County Integrated Regional Water Management (IRWM) Plan. The IRWM Plan was developed to manage the various water resources within the county in an integrated fashion, including major watersheds; groundwater basins and springs; and wetlands and ecosystems. Issues in the Morro Bay area include availability and reliability of State Water from year to year, and drought impacts to groundwater supplies and groundwater quality due to high nitrate levels and saltwater intrusion. Regional planning integration and direction is to improve infrastructure interconnections to increase reliability in dry years; and to establish and maintain sustainable groundwater and watershed management practices.

The California Water Plan Update (California Department of Water Resources 2018) provides a summary of current status and challenges of water use and management in the Central Coast Hydrologic Region. The 27 resource management strategies may be summarized as: reduce water demand; improve operational efficiency and transfers; increase water supply; improve water quality; practice resource stewardship; and improve flood management.

Effective and thoughtful water conservation strategies provide multiple benefits to watershed health. Reduction in non-point source pollution and soil stabilization techniques improves water quality. Conservation strategies such as reduced consumption through drought-tolerant landscaping, rainwater catchment and re-use, and grey water harvesting improve overall water supply. Stormwater management techniques to reduce runoff and increase percolation augments groundwater resources, recharges the aquifer, and increases stream flow levels for aquatic wildlife. Retaining healthy riparian and wetland habitats reduces flood risk by slowing flows and stabilizing soils and contributes to biodiversity. Implementation of a multi-faceted water conservation strategy enhances the ecological function and resiliency of water resources and the watershed.

As described in Chapter 3, water resources on CSLO consist of 9.72 acres of ponds and reservoirs and 44.46 miles of perennial and ephemeral waterways. CSLO comprises 11% of the Chorro Creek Watershed, including the headwaters to Chorro Creek. This gives the CA ARNG a unique opportunity to contribute to water conservation and water resources management.

CSLO successfully manages its surface and groundwater resources in compliance with state and federal law and EO, and in collaboration with its local partners. For project activities that are better undertaken on a watershed basis, such as fish passage enhancement, aquatic invasive species control, creek restoration, stormwater management, and basin monitoring, CA ARNG has partnered with several agencies; CDFW, Morro Bay National Estuary Program (MBNEP), California Conservation Corps (CCC), Creek Lands Conservation (CLC), and the San Luis Coastal Resource Conservation District (SLCRCD). The San Luis Obispo County Watershed Management Plan (Resource Conservation District 2014) identified high priority data gaps for future management of the watersheds that include CSLO. They include key groundwater percolation areas, tributary health analysis, and groundwater basin health analysis.

Goal: *Ensure a reliable, safe and sustainable water supply. Protect surface and groundwater resources and enhance as practicable.*

Objective 1: *Practice water conservation techniques throughout the installation.*

Objective 2: *Reduce pollutant and sediment loading into wetlands and waterways.*

Objective 3: *Slow runoff rates and increase percolation of stormwater to aid in groundwater re-charge.*

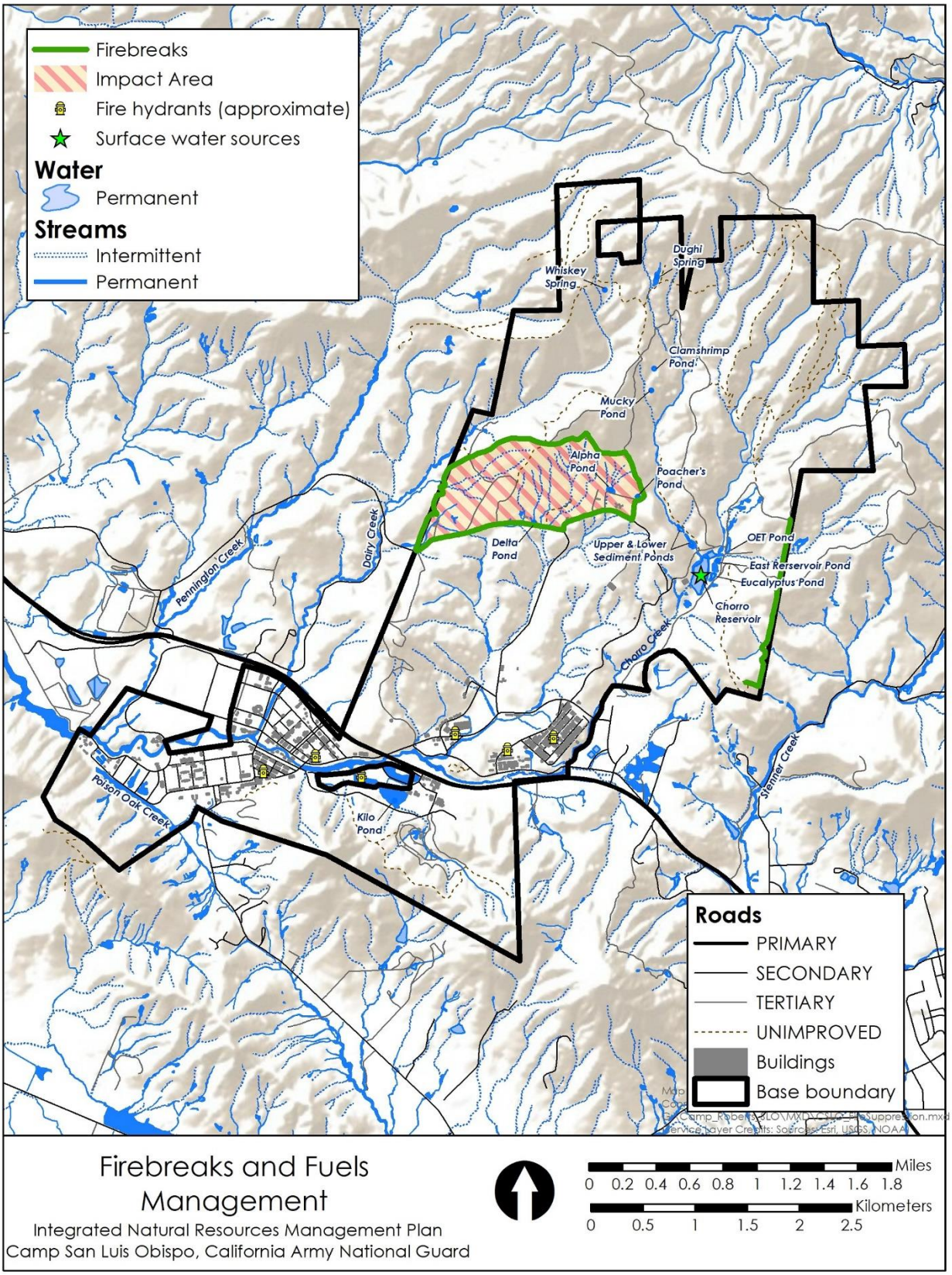
Objective 4. *Align water management on CSLO with regional water management strategies.*

4.4 Wildland Fire

It is required under the Army's Wildland Fire Policy to consider a comprehensive, integrated strategy for fire management to achieve ecosystem sustainability, to incorporate mitigation, burned-area rehabilitation, and fuels reduction and restoration activities that contribute to ecosystem management. Remaining unassessed are vulnerabilities to soil health, soil loss, drought, and the adaptation of specific plant communities to fire regime beyond their tolerance range for natural recovery. Problem fire regimes include short- interval fires in shrublands, and large watershed-scale fires affecting riparian values or water quality. The annual burning of the training lands and the network of firebreaks has reduced the potential for fire to escape off the installation and improved the controllability of ignitions; so, planning for the resilience of soils and vegetation health becomes a management need. Prescribed fire can be a management tool in this regard, as it has been in the past for meeting habitat objectives.

Fire is a natural component of California ecosystems with many habitats requiring fire for renewed growth and seed germination. Fires create new habitat by creating open spaces, thinning and clearing forest debris, returning nutrients to the soil, and killing disease and harmful insects (Pausas and Keeley 2019). If timed properly, prescribed burning can be used to control invasive plants, thin overgrown vegetation, and enhance overall biodiversity (Block et. Al. 2016).

Under climate change, hazardous fuel conditions are expected to increase, and regional fire season is expected to lengthen. The risk of unplanned ignitions will increase with military training pressure, alongside human population and increased activities in the region.



Map 4-1. Firefighting infrastructure features at Camp San Luis Obispo.

Per Army wildland fire guidance (March 15, 2021) and AR 200-1 Chapter 4, Section 3.d.12 Wildland Fire Management, the CA ARNG Headquarters Environmental Division has developed an Integrated Wildland Fire Management Plan (IWFMP) for Camp Roberts and CSLO (CA ARNG 2015). This plan is currently being updated to align with the new 2021 Wildland Fire Policy Guidance and its anticipated for completion in March 2022. An IWFMP is a strategic document that guides the full range of fire management related decisions, consistent with interagency Federal Wildland Fire Policy (USDA & U.S. Department of the Interior 2009), which was adopted by the DoD through DoDI 6055.06. DoD states that responses to wildfire shall be conducted in a manner that preserves health, safety, and air quality; protects facilities; and facilitates the health and maintenance of natural systems. This management shall reduce the potential for wildfires, function as an ecosystem- based management tool, and integrate applicable state and local permit and reporting requirements (DoDI 4715.03).

There are also external partners and stakeholders in wildland fire management. These include other agencies and departments, nearby private landowners and communities who may be affected by fire and smoke from CSLO, and also may be the source of burns coming onto CSLO. The USFS, Los Padres National Forest is an owner of neighboring property and an expected cooperator in efforts to reduce landscape fire risk.

In cooperation with CalFire, the CA ARNG conducts prescribed burning at CSLO. Prescribed fire is used preemptively before fire season to manage vegetative fuels and during suppression to control active fires. Prescribed burning is also used to manage vegetation to allow troop training and enhance habitat. Averaging 250 acres annually, the burns usually take place in grasslands. They are conducted by CalFire in compliance with requirements of the San Luis Obispo County Air Pollution Control District.

> *Installations with unimproved grounds that present a wildfire hazard and/or installations that utilize prescribed burns as a land management tool will develop and implement an IWFMP that is compliant and integral with the INRMP, the installations' existing fire and emergency services program plan(s), and the ICRMP (AR 200-1).*

Goal: *Promote the natural role of fire in the CSLO ecosystem and prescribed fire as an ecosystem-based management tool.*

Objective 1: *Reduce wildfire potential using appropriate management practices such as prescribed burning and firebreak/fuelbreak maintenance.*

Objective 2: *Improve integration of wildland fire planning and ecosystem objectives to restore resilient and healthy ecosystem processes.*

4.5 Vegetation and Wildlife Habitat

Vegetation and wildlife habitat management is a critical component of overall natural resource management on the installation. Vegetation is managed for its full native ecosystem functions including realistic and sustainable military training opportunities. Fire regime management, clean water, soil conservation, carbon sequestration, and habitat for protected fish and wildlife are important vegetation function that are regulatory as well as stewardship needs. Management considerations should be prioritized at the local level, even while the threats may be driven or exacerbated by larger scale conditions such as climate change, urban development, annual grass and forb invasion, or wildland fire regime that stresses natural community resilience.

As described in Chapter 3, each vegetation community offers habitat to a variety of wildlife species and contributes unique functions and benefits to the ecosystem. The CA ARNG manages vegetation to conserve native ecosystem values and ensure disturbance processes take place within the tolerance range of the resource to recover without long-term degradation or loss. Specific vegetation management activities include: buffering and fencing of sensitive habitats; protecting vulnerable periods; treating vegetation fuel loads through prescribed fire, livestock grazing, and mechanical treatment; habitat enhancement; firebreaks and fuel break maintenance; invasive plant control; environmental awareness briefings; and vegetation condition monitoring for adaptive management. Vegetation communities are addressed separately in the following sections as each community requires different management strategies.

4.5.1 General Vegetation, Grasslands, and Shrublands

Grasslands are a focus for their potential to sequester carbon, especially long-term carbon storage through soil humus development (CARB 2019) and offer an avenue to combat climate change. Native perennial grasslands should be preserved at every opportunity for their benefit to fire management (higher fuel moisture longer in the season, and natural spacing), long-term soil carbon storage potential, and other benefits. Prescribed grazing is a recommended tool for climate adaptation (CARB 2019).

Goal: *Conserve and enhance the ecological integrity of each vegetation community to promote its beneficial functions such as wildlife support, food webs, biodiversity, watershed protection, productivity, and nutrient/carbon storage and cycling.*

Objective 1: *Reduce threats to native vegetation.*

Objective 2: *Restore and enhance native vegetation communities and promote their resilience.*

4.5.2 Forest and Woodlands

Forest and woodland areas are some of the most ecologically valuable vegetation communities and play an important role in producing oxygen, storing carbon, purifying water, conserving soil, and cycling nutrients. Oak woodlands have higher levels of biodiversity than most other terrestrial ecosystems in California (Bernhardt and Swiecki 2001).

Climate change is likely to increase the amplitude of drought and flood extremes in this region, and further drying of some streams. The riparian corridors of CSLO are important for thermal refuge and shading of streams, inputs of organic matter, and protective filtering capacity from overland runoff. Climate change impacts to riparian corridors would narrow stream corridors and wetland zones, reducing the benefits conferred from intact riparian areas. Targeted restoration practices may enhance riparian adaptation and provide “hotspot” opportunities for offsetting climate impacts (Capon et al. 2013).

Riparian areas are dynamic ecosystems, driven primarily by flood events, which help revitalize them by depositing new sediment, and by opening the site for new growth, both vegetatively and by seed. In order to preserve sensitive habitat and promote healthy stream stabilization, riparian areas should remain undisturbed and natural flood events should be unhindered and encouraged. It is important to preserve riparian areas not only for their biological integrity, but also to prevent catastrophic flooding, erosion, and to act as a natural fuel break for fighting fire.

Goal: *Protect and maintain coast live oak and riparian woodlands and their natural ecosystem roles such as wildlife habitat, migration corridors, watershed function, thermal cover, and carbon sequestration.*

Objective 1: *Prevent loss and degradation of oak and riparian woodlands.*

Objective 2: *Encourage native tree recruitment and forest and woodland regeneration.*

Objective 3: *Prevent the spread of SODS disease in coast live oak, a deadly arboreal disease caused by an invasive plant pathogen from Europe, P. ramorum.*

4.5.3 Native Trees

Native trees are essential elements of the ecosystem at CSLO. They provide habitat for wildlife and other plants, are an important wildlife food source, prevent erosion, contribute to nutrient cycling, and provide an aesthetic viewshed for CSLO. Trees also provide cover and concealment for military training activities.

Current CSLO native tree management requirements have been derived from the previous CSLO Tree Policy (CSLO 2009) and local San Luis Obispo County Ordinance (San Luis Obispo County 2021).

Goal: *Protect native trees to preserve both the ecological and mission-critical benefits they provide to CSLO.*

Objective: *Ensure replacement and protection of existing native trees.*

4.5.4 Wetlands and Aquatic Habitat

Wetlands are crucial to the protection and maintenance of living resources, since they provide essential breeding, spawning, nesting, and wintering grounds for numerous wildlife species. Wetlands store water and minimize flooding. They filter sediments, excess nutrients, and other impurities from water as it is stored. Aquatic vegetation found in wetlands protects soils from eroding and provide food and cover for wildlife. Wetlands also provide habitat for micro and macro invertebrates that use or break down nutrients and contaminants. Wetlands management and protection is an essential component of ecosystem management. Research has shown that buffering wetlands from 50 to 150 feet (15 m to 45 m) is necessary to protect wetlands from human disturbance (Castelle et. al. 1992).

Most streams and aquatic habitats on CSLO are protected as waters of the U.S. and waters of the State and fall under the jurisdiction of USACE, RWQCB, and CDFW. Additionally, wetlands and waters are protected under EO 11990 (Protection of Wetlands). Consultation with the USACE, RWQCB, and CDFW is necessary for activities such as filling, dredging, or otherwise altering a waterway or riparian and aquatic vegetation.

Goal: *Preserve and enhance wetland and aquatic habitat and the ecosystem services they provide such as fish and wildlife habitat, water quality improvement, flood control, and groundwater replenishment.*

Objective 1: *Protect wetland and aquatic habitat.*

Objective 2*: Restore and enhance wetland and aquatic habitat.*

4.5.5 Constructed Habitats

Roads act as prime habitats and corridors for invasive plants and can contribute significantly to the spread and establishment of invasive species (Meunier and Lavoie 2012). Transportation and utility corridors provide routes for the introduction and spread of invasive plants by way of seeds and other propagules transported by vehicular traffic (California Invasive Plant Council [Cal-IPC] 2012). Construction and maintenance activities can also introduce or spread invasive plants through project materials and ground disturbance.

Refer to *Section 5.4: Developed Areas, Landscape and Grounds.*

4.5.6 Invasive Plants

EO 13112 defines invasive species as a non-native species likely to cause economic or environmental harm or harm to human health. It directs all federal agencies to address invasive species concerns by refraining from actions likely to increase invasive species problems. The Plant Protection Act of 2000 (Pub. L. 106-224, Title IV) prohibits introducing any animal, plant, or material considered harmful to this country's agriculture. The USDA Plant Protection and Quarantine Division is the enforcement authority for this Act. The Act consolidated and modernized all major statutes pertaining to plant protection and quarantine (Federal Noxious Weed Act, Plant Quarantine Act). AR 200-1 specifies management practices to control the establishment and spread of invasive species.

CSLO has prioritized the control of specific invasive plants based on their invasiveness, ability to disrupt native habitat, and their impacts on sensitive species and training activities. The following invasive plants are those whose control is of the highest priority: cape ivy, pampass grass, arundo, Russian thistle, mustard, and yellow and purple starthistle. Invasive species, especially the aquatic and riparian species, have the potential to migrate onto CSLO from adjacent properties. The CA ARNG is a participant in the MOU for the San Luis Obispo County WMA to coordinate the activities necessary to prevent the introduction, establishment, and spread of noxious weeds in San Luis Obispo County.

The CA ARNG controls invasive plants to sustain land available for military training, improve habitat, and provide for health and safety. CA ARNG uses its Statewide IPMP as a framework for invasive plant control policies in accordance with AR 200-1 and DoDI 4150.7. Integrated pest management utilizes both non-chemical and chemical control to suppress or prevent non-native species from exceeding an acceptable population or damage threshold. Emphasis is placed on minimizing environmental disruption. Integrated pest management strategies depend on surveillance to identify the need for control and to monitor the effectiveness of management efforts (CA ARNG 2005). Physical, cultural, biological, and chemical components of integrated pest management are considered or may be used to manage invasive plant species on CSLO.

Invasive plant control at CSLO is a cooperative effort between Environmental Directorate, ITAM, and partners such as the Weed Management Area (WMA) of San Luis Obispo County, MBNEP, the San Luis Obispo County Agricultural Commissioner’s Office and the CCC. CSLO works closely with its partners and the Cal-IPC to ensure the most efficient and up to date use of control methods.

Goal: *Use integrated pest management strategies to control the spread and introduction of invasive plants to protect natural resources, improve habitat, sustain land available for military training, and provide for health and safety.*

Objective 1: *Control or eradicate existing invasive populations to prevent further spread throughout the installation.*

Objective 2: *Prevent and control new introductions of invasive plants.*

4.6 Fish and Wildlife

Species management is an important component of the overall ecosystem management strategy on Camp San Luis Obispo. In this INRMP, a habitat-first approach is taken to manage fish and wildlife populations, consistent with DoD policy to facilitate a shift from single species to multi species approached. Combining this approach with regional partnerships and the use of indicator or management focus species ensures conservation approaches take place at an appropriate scale. Ecosystem-wide management of sensitive resources requires mutual cooperation of regional land managers, regulators and scientific groups, which facilitates cost-efficiencies and prioritization of work toward common goals.

This section has been broken down into a discussion of general fish and wildlife species and populations and pollinators. Although management for general fish and wildlife species will also benefit pollinators, the specific ecological function of pollinators warrants a specific and separate management strategy. Management for invasive and feral animals is also discussed here.

4.6.1 General Fish and Wildlife

Invertebrates

Invertebrate conservation is critical as these species constitute a significant portion of the food web and are the main food source for many wildlife species. They also facilitate decomposition and nutrient cycling. The ecosystem level benefits of invertebrates are becoming much more appreciated considering recent well-documented declines. Many are pollinators, such as bees, butterflies, moths, flies, and beetles. Some are pathogenic, and carry disease for humans, wildlife, or trees. Invertebrate conservation occurs primarily through management of their habitat and pesticide use.

> *According to AR 200-1, management of resources on Army properties should: (a) Promote biodiversity and ecosystem sustainability consistent with the mission and INRMP objectives. (b) Manage flora and fauna consistent with accepted scientific principles and in accordance with applicable laws and regulations, and…for conservation of indigenous flora and fauna. (c) Manage habitat to conserve and enhance existing flora and fauna consistent with the Army goal to conserve, protect, and sustain biological diversity while supporting the accomplishment of the military mission.*

Fish

Fish are important components of freshwater ecosystems and often serve as biological indicators of stream health. Anadromous fish are particularly important for nutrient transport from one system to another. Waterways, and thus fish that reside in them, are impacted by surrounding land uses. Chorro Creek is the main waterway on CSLO and management of that resource directly impacts the vitality and productivity of various fish species found within CSLO.

Reptiles and Amphibians

Reptiles and amphibians are both important members of aquatic and terrestrial habitats. CSLO is home to a variety of herpetofauna due to the diverse wetland and upland habitats that exists on the installation. Protections offered to wetland, aquatic, and riparian areas on CSLO benefit multiple herpetofauna species. Amphibians are good indicators of wetland conditions and changes to their populations often indicate a decrease in overall ecosystem health. Herpetofauna are among the most imperiled species on Earth and are threatened by habitat loss and degradation, invasive species, contaminants, disease, and climate change. CSLO routinely follows guidelines and conservation recommendations established by the DoD Partners in Amphibian Conservation (PARC) network, USFWS, and other herpetofauna conservation groups.

Birds

Military lands provide some of the best remaining habitats for migratory and resident birds. DoD recognizes that bird conservation is a critical component of natural resource management and sustaining the military mission. Resident bird species perform important ecological roles in their communities year-round and serve as good indicators of local habitat health, as migratory species can be affected by both local habitat quality and the quality of habitats in their winter range. Birds fill a variety of ecological roles (e.g., seed dispersers, pollinators, insect predators, and food for other species) and their declines signal a broad deterioration in overall ecosystem health (Evans 1995).

Virtually all birds found at CSLO throughout the year are protected under the MBTA, which provides protection for most non-game native birds, whether or not they migrate. The MBTA authorizes incidental take of migratory birds by military readiness activities, however CSLO considers potential impacts to migratory birds and minimizes or avoids impacts whenever possible. CSLO also implements land management and migratory bird conservation in accordance with the ESA, BGEPA, EO 13186 ("Responsibilities of Federal Agencies to Protect Migratory Birds," 10 January 2001), and the MOU between DoD and USFWS ("Promote the Conservation of Migratory Birds," 31 July 2006) while providing the greatest flexibility to the installation's training mission.

The goals and objectives detailed below follow Partners in Flight (PIF) guidance and other relevant bird conservation plans. The DoD PIF program is intended to assist military installations with establishing programs to sustain and enhance the military mission by maintaining healthy landscapes and training lands through proactive, habitat- based conservation and management strategies. The DoD PIF program also works beyond installation boundaries to facilitate cooperative partnerships, determine current status of migratory birds and causes of population fluctuations, identify and maintain priority habitats for migratory birds, and proactively manage DoD lands to prevent the listing of additional birds as threatened or endangered. By identifying species of concern and managing habitats for those species, future listings can be minimized or eliminated.

An in-depth discussion of migratory bird management on CA ARNG lands is included in Appendix H.

Mammals

A diverse population of mammals can be found on CSLO. Small mammals and rodents offer a rich prey base for raptors and larger predatory mammals. Contributing to the mammal diversity on the installation are species commonly associated with urban areas such as raccoons and opossums as well as species associated with rural landscapes such as deer and bobcats.

Of particular management concern at CSLO are bats. Eight bat species have been documented on the installation. Bats can eat their body weight in flying insects in a single night. Some are pollinators. Certain of these insectivorous creatures migrate to warmer areas to winter. Others are winter residents in rock and tree hollows and in structures where temperature and humidity are favorable. They roost by day in tree cavities, rocky caves, and eaves or attics of wooden buildings.

Management of bat populations at CSLO is primarily achieved through management of their habitat elements. The following measures currently in effect promote the protection of bats: environmental review prior to proceeding with application of pesticides/herbicides and any pest management activities involving bats; surveys are conducted in and around buildings and bridges proposed for demolition and replacement; roosting bat buffers are implemented when and where necessary; and bat exclusion replacement structures are established for impacted bat roosts; and .

Threats to bats are generally from intrusion or destruction of roost sites and degradation of water sources and foraging habitat. Bats currently use CSLO for both roosting and foraging. Of particular concern is bat roosting in dilapidated buildings slated for demolition. As a result, protection and mitigation of roosting and foraging sites, water sources and food supply are keys to management of healthy bat populations.

Management of fish and wildlife species is an important component of the overall ecosystem management strategy on CSLO. In this INRMP, a habitat-first approach is taken to manage fish and wildlife populations, consistent with DoD policy to facilitate a shift from single species to multi species approached. Combining this approach with regional partnerships and the use of indicator or management focus species ensures conservation approaches take place at an appropriate scale.

> *Pursuant to DoDI 4715.03, each INRMP shall maintain a relevant and updated baseline list of plant and animal species located at each installation for all pertinent taxonomic and regionally important groups.*

Goal: *Conserve the natural ecological role of native fish and wildlife populations on CSLO.*

Objective 1: *Protect fish and wildlife species and their habitats on CSLO.*

Objective 2: *Assess fish and wildlife status and trends. Maintain accurate and up-to-date records on fish and wildlife distribution and abundance to aid in future management decisions. 9632147*

4.6.2 Pollinators

Pollinators aid reproduction in over 75 percent of flowering plants and contribute significantly to the U.S. economy. Causes of decline include habitat loss, fragmentation, and alteration; “pathogen spillover;” interspecific competition among bees; changes in plant community composition with the spread of invasive plants; genetically modified crops; non- synchronous changes in pollinator and plant phenology; and pesticide use (DoD 2018). Proactive conservation of declining pollinator species may help reduce the likelihood of future listings under the ESA and associated regulatory requirements.

Of particular concern to pollinators and the plants that depend on them are impacts from climate change. As warmer temperatures arrive earlier in the season, there can be a mismatch between when plants flower and when pollinators arrive, and this disconnect resonates across entire ecosystems impacting everything from forage availability to biodiversity. Inefficient pollination directly influences plant

population dynamics; and this can indirectly influence other species that rely on fruits or seeds that require successful pollination. The consequences of this phenomenon will likely be subtle at first; however, overtime the impacts could be widespread with varying degrees of severity.

The DoD participates in the North American Pollinator Protection Campaign (NAPPC) and has established a policy (Office of the Under Secretary of Defense Acquisitions, Technology and Logistics, Sept 2014) to use BMPs specifically to protect populations and habitat of pollinators and to coordinate with partners on pollinator concerns. Working cooperatively with agencies and non-governmental organizations, such as the USFWS, BLM, EPA, P2, and Bat Conservation International would enhance knowledge of pollinator abundance on CSLO and guide future management.

Management for pollinators on CSLO occurs primarily through management of natural vegetation communities. Landscapes in developed areas also offer opportunities to benefit local pollinators. Adherence to DoD directives and Pollinator Partnership guidance further protect pollinator species on the installation and inform management decisions. Pollinator management has become more of a focus area on CSLO as the benefits of pollinators have become better understood. The rich diversity in CSLO vegetation offers ample opportunity to enhance pollinator productivity.

Goal: *Conserve pollinator populations and their habitat on CSLO.*

Objective 1: *Improve understanding of pollinator use on CSLO.*

Objective 2: *Protect and enhance pollinator habitat.*

4.6.3 Invasive and Feral Animals

Invasive and feral animal control at CSLO is focused primarily on protecting natural resources, enhancing habitats, sustaining viable military training land, and improving human health and safety. CSLO staff work collaboratively with various partners to achieve these goals. The Statewide IPMP is used as a framework for control policies in accordance with AR 200-1 and DoDI 4150.7. The IPMP is intended to ensure that the most up-to-date, effective, environmentally sound, and least hazardous combination of methods is used to control each invasive species and that all applicable laws and regulations are followed. Monitoring in combination with control efforts provide for increased natural resources protection and improved habitat while also sustaining training lands.

CSLO has prioritized the control of specific pest species based on their ability to disrupt habitat, their impact on sensitive species and training activities, and the potential risk they pose to human health. As detailed in Chapter 3, several pest species occur on the installation, however active control only occurs for ground squirrels, Sacramento pikeminnow, bullfrogs, and feral cats. Control efforts for other pest species will occur if deemed necessary.

Ground squirrels are a considerable pest species on CSLO and occur with such abundance that their burrow systems undermine roads and buildings and contribute to soil erosion in the training areas. An integrated ground squirrel abatement plan was developed in 2017 which details various abatement methods and priority treatment areas on the installation. A BO for ground squirrel control was issued in 2020 which identifies conservation measures to avoid adverse impacts to CRLF.

Bullfrog control has occurred on and off since 2000. Current bullfrog removal efforts are focused in known CRLF breeding ponds as bullfrogs are documented predators of CRLF. Sacramento pikeminnow are also a known predator of CRLF and steelhead. Active eradication efforts have been on-going throughout the Chorro Creek watershed. CSLO used to be home to a sizeable feral cat population, but an educational outreach program and trapping and removal of feral cats successfully eliminated the problem to date.

Goal: *Control existing populations and prevent the spread and further introduction of invasive species and pests.*

Objective: *Follow IPM and pest control guidelines to control invasive and feral animals.*

4.7 Threatened and Endangered Species

Federally and state-listed threatened and endangered species are a prominent concern at CSLO. Maintaining current management plans and survey information on threatened and endangered species at CSLO is mandated by AR 200-1, DODI 4715.03, and DODM 4715.03 and is important for maintaining the military mission.

Compliance with the ESA is met through informal and formal USFWS and NMFS Section 7 consultation. Consultation requirements of the ESA have been met on both programmatic (base-wide) and project-by-project basis for a variety of actions on CSLO. To date, USFWS has issued ten BOs and seven informal consultations and NMFS has issued one BO and four informal consultations (Appendix F). The following sections outline conservation and management actions for each listed species on CSLO. Relevant conservation actions identified in consultation documents have also been incorporated.

4.7.1 Chorro Creek Bog Thistle

In 1994, the CA ARNG designated approximately 10 ac (4 ha) as a protected Chorro Creek bog thistle habitat area. This area is located in cattle grazing pasture 5b. Annual monitoring for the bog thistle was initiated in 1994 and by 1997 monitoring showed a decrease in the number of individual bog thistle plants, especially seedlings. The CA ARNG consulted with USFWS and CDFW and in 1998, initiated a limited grazing program to reduce competing vegetation.

Monitoring data from 1998 through 2002 indicated that, although there was an initial increase in Chorro Creek bog thistle seedlings with livestock grazing, plants reaching reproductive stage were decreasing. In order to preserve a viable seedbank, annual grazing was suspended in 2003 in preference to short- term, intensive grazing every few years. This change in management allowed for both seedling establishment and reproduction.

Chorro Creek bog thistle monitoring occurs every other year and information on population status and habitat conditions guide management actions. Currently the CA ARNG allows grazing on an invitation only basis within the entire fenced pasture that encompasses the Chorro Creek bog thistle population. The CA ARNG proposes to continue using limited cattle grazing as a management tool in compliance with the existing BO. The management activities and conservation measures identified in consultation documents are incorporated below.

Goal: *Promote conservation and Chorro Creek bog thistle species recovery on CSLO.*

Objective: *Protect Chorro Creek bog thistle plants and enhance habitat.*

4.7.2 South-Central California Coast Steelhead

The Chorro Creek watershed is an important resource for resilience of the SCCC steelhead population in San Luis Obispo County. It has several resiliency factors that provide a higher potential for SCCC steelhead recovery than other watersheds in the SCCC steelhead DPS. Such resiliency factors include perennial and continuous flows in the main stem downstream of the Wastewater Treatment Plant that provides year-round migratory connectivity to a productive estuary (Morro Bay), good riparian canopy, moderate summer water temperatures, suitable winter rearing habitat, and a relatively small urban footprint (Stillwater 2017).

Ongoing conservation efforts for SCCC steelhead are occurring in the Morro Bay and Chorro Creek watershed among non-governmental organizations, CSLO, the CCC, CDFW, and NMFS. The 2013 SCCC Steelhead Recovery Plan describes threats specific to the Chorro Creek watershed, which identifies agricultural development, ground water extraction, dams and surface water diversions, and urban and agricultural effluents (NMFS 2013). The recovery plan for SCCC steelhead (NMFS 2013) calls for the management of specific water quality and quantity actions to enhance habitat for the species. The CDFW locally implements the 1996 Steelhead Management Plan which focuses on the restoration and management of SCCC steelhead populations through improving degraded habitat and access to historic habitat, review angling regulations and management, maintaining or improving hatchery runs, and developing or facilitating research on SCCC steelhead biological and habitat requirements.

Climate change and its expected changes in temperature and precipitation have the potential to alter fire regime, flow regime, and floodplain function. Rising temperatures, alterations in the frequency and intensity of droughts, as well as rainfall patterns present potential challenges to maintaining habitat quality for the SCCC steelhead. SCCC steelhead will likely be exposed to higher water temperatures and more flow variability (Wade et al. 2013). Thus, identification and prioritization of cool water refugia is needed throughout core watersheds in the DPS for cataloging and protection (NMFS 2011). Moreover, hotter and longer drought periods could weaken vegetation, creating enhanced risks of wildland fire damage. Large fires have closed access to several regional watersheds, reduced recruitment of logs to streams, and increased sedimentation thus reducing habitat quality (NMFS 2018). Fire can also remove large wood elements that shade instream cover for all life stages of steelhead and cause extensive sedimentation and smothering of substrates after rains (Thompson et al. 2008, 2012). Fish passage must be addressed on a broad and coordinated scale to allow juvenile outmigration and adult steelhead to access high quality habitat in the upper main stems and tributaries of core watersheds (NMFS 2013).

An Endangered Species Management Component (ESMC) for steelhead was developed in 2019 (Central Coast Salmon Enhancement and Terra Verde Environmental Consulting 2019) which detailed overall

management of steelhead on CSLO. Many of the identified conservation actions overlap with management for other sensitive species and aquatic resources. Conservation measures and steelhead conservation projects identified in the ESMC are detailed below.

Goal: *Promote the recovery, long-term health and resilience of the SCCC steelhead on CSLO.*

Objective 1: *Protect SCCC steelhead and its habitat on CSLO.*

Objective 2: *Enhance steelhead habitat on CSLO.*

4.7.3 California Red-Legged Frog

Although CSLO is exempted from CH designation, the installation is located within the boundaries of Estero Bay core area 22 of the Central Coast recovery unit (USFWS 2002) indicating the high value habitat that exists in and around CSLO. CSLO contains suitable breeding and non-breeding habitat for CRLF and they have been identified throughout the installation in creeks, ponds, reservoirs, seeps, grassland and riparian habitats. The 2002 CRLF Recovery Plan (USFWS 2002) identifies the following as key actions for species recovery: 1. Protecting known populations and reestablishing historical populations, 2. Protecting suitable habitat, corridors, and core areas, 3. Developing and implementing management plans for preserved habitat, occupied watersheds, and core areas, 4. Developing land use guidelines, 5. Gathering biological and ecological data necessary for conservation of the species, 6. Monitoring existing populations and conducting surveys for new populations, and 7. Establishing and outreach program.

Management of the species largely consists of management of CRLF habitat, with a focus on wetland and aquatic areas. The CA ARNG continues to conduct annual monitoring surveys in various types of CRLF habitat and documents habitat conditions to guide future management actions. Habitat enhancement activities have occurred at several ponds in an effort to improve habitat for all CRLF life forms. Four ponds (Mucky, Dughi, Poachers, and Delta) have been partially fenced to structure grazing in such a way that only half a pond is accessible to cattle, thus allowing wetland vegetation to establish in the fenced portion of the pond and provide forage and protective cover for juvenile and adult CRLF. The portion of the ponds available to cattle are subject to disturbance and retain open water areas suitable for CRLF breeding.

The CA ARNG continues annual monitoring of CRLF and documents habitat conditions for all life forms. Protective measures have been identified for activities occurring on the installation and are routinely implemented. Previous management plans and USFWS consultations outline protective measures that have been incorporated into this document and are detailed below.

Goal: *Promote the recovery, long-term health, and resilience of the California red-legged frog on CSLO.*

Objective 1: *Protect California red-legged frogs and their habitat on CSLO.*

Objective 2: *Enhance California red-legged frog habitat on CSLO.*

4.7.4 California Condor

The California condor has not been observed at CSLO since 2000. In May 2018, several condors were observed approximately five miles west of the installation. CSLO is located within the historic range of the condor however, current condor populations are concentrated north and south of the installation. USFWS condor transmitter data shows that most of the condor activity near CSLO is from individuals from the recovery population at Hopper Mountain National Wildlife Refuge Complex, located approximately 150 miles south of the installation (USGS 2021). Current regional management is focused on promoting the breeding success of wild condors and on captive breeding efforts to supplement the wild population. Additional condor release sites are located in San Simeon (40 miles north of CSLO), Big Sur (140 miles north of CSLO) and Pinnacles National Park (110 miles northeast of CSLO) While condors do not regularly occur on CSLO, increasing population levels could result in an increase in condor presence on CSLO in the future.

The California condor and its potential presence at CSLO is presented in environmental briefings for soldiers, tenants, contractors, and visitors. Natural resources staff work with partners for the conservation and management of the California condor in and around CSLO and continue to build new partnerships. Current partnerships include PIF, and the VWS. Establishing cooperative agreements with local agencies and monitoring for potential ingestion pathways of toxins from CSLO are ongoing efforts.

Goal: *Promote the conservation of California condors on CSLO.*

Objective: *Protect the California condor and its habitat on CSLO.*

4.7.5 Least Bell's Vireo

Least Bell's vireo has not been observed at CSLO since spring of 1995 in very dense willowy shrubs of an unnamed tributary of Chorro Creek. Starting in 2009 sightings of least Bell's vireo and the eastern subspecies of Bell's vireo have been recorded multiple times in Los Osos and Montana de Oro State Park about 5.6 miles (9 km) and 8.7 miles (14 km) west of the Camp respectively (eBird 2020). The closest known breeding population of least Bell's vireo is along the Santa Maria River, 26 miles (42 km) south of CSLO (Agee pers. comm. 2021).

Current management strategies for least Bell's vireo are focused on habitat restoration, monitoring, and the removal of brown-headed cowbirds from occupied habitats (USFWS 2006). Management of LBVI on CSLO consists primarily of general bird protection and protection of riparian habitat. The CA ARNG proposes to continue conducting USFWS protocol surveys and should LBVI occur on the installation, a more intensive management plan will be developed.

Goal: *Promote conservation and recovery of least Bell's vireo on CSLO.*

Objective: *Conserve and enhance least Bell's vireo habitat on CSLO.*

4.7.6 Swainson's Hawk

The primary issues currently facing Swainson's hawks in California vary somewhat with each population (Bechard 2010). The largest population of Swainson's hawks in California, located in the Central Valley relies on the small numbers of tall trees that often grow near streams for nest sites and on preferred

kinds of agriculture, such as alfalfa, for foraging area (Bloom 1980; Estep 1989). Development and agricultural consolidation which removes trees and changes to crop types such as wheat remove habitat for the hawk. While Swainson's hawks no longer have a substantial population in the Central Coast Ranges, there are many more trees and potential nest sites, and a matrix of agriculture and open land still occur for potential breeding habitat (Bloom 1980).

Due to the lack of occurrence data on CSLO, the CA ARNG does not directly manage Swainson's hawk. However, management of other bird species and habitats will also benefit the Swainson's hawk such as preactivity surveys and protective buffers. Other beneficial measures in place are those that protect large trees in riparian areas (all trees in riparian areas can be important nesting locations: cottonwood, sycamore, willow and oak are common nest trees in California [Bloom 1980]). Should the Swainson's hawk occur regularly at CSLO, more detailed conservation measures will be developed.

Goal: *Promote the conservation of Swainson's hawk on CSLO.*

Objective: *Protect Swainson's hawk and its habitat on CSLO.*

4.7.7 Tricolored Blackbird

Wintering tricolored blackbirds are known to occur near CSLO and have the potential to utilize habitat on the installation. Thick stands of emergent wetland vegetation at the reservoirs and sediment basins offer suitable nesting habitat for the species.

Although suitable habitat for the tricolored blackbird exists on CSLO, nesting colonies have not been observed on the installation. Due to the lack of occurrence data on CSLO, the CA ARNG does not directly manage the tricolored blackbird. However, management of other bird species and measures to protect wetland habitats will also benefit the tricolored blackbird. Should the tricolored blackbird be observedat CSLO, more detailed conservation measures will be developed.

Goal: *Promote the conservation of tricolored blackbird on CSLO.*

Objective: *Protect the tricolored bird and its habitat on CSLO.*

4.7.8 Bald Eagle

Bald eagles continue to recover and establish territory in the San Luis Obispo area. Numerous bald eagles have been observed flying over CSLO. Foraging and nesting habitat occurs on the installation, potentially offering habitat for

Current management for the state endangered bald eagle at CSLO is focused on minimizing disturbance and mortality for eagles that nest, roost or pass through the Camp. Bald eagles have not been recorded breeding at CSLO, so no formal management for the species has been undertaken. If bald eagles become breeding species at CSLO, more detailed conservation measures would be developed and implemented.

Goal: *Promote the conservation of bald eagles and their habitat on CSLO.*

Objective: *Protect bald eagles and their habitat on CSLO.*

4.8 Special Status Species

The DoDI 4715.03 states that the DoD shall, to the best of its ability, implement conservation and management efforts to further the conservation of state-listed species when such action is practicable and does not conflict with legal authority, military mission, or operational capabilities. CA ARNG recognizes that it is prudent to protect rare species as a proactive strategy to prevent future Federal listings. As described in Section 3.6, special status species are not listed under State or Federal ESA, but have been designated by other agencies and organizations as species with increased conservation concern.

These lists serve as watch lists for species that may be deserving of formal listing. CSSC status applies to animals not listed under the federal ESA or CESA, but which nonetheless: (1) are declining at a rate that could result in listing, or (2) historically occurred in low numbers and known threats to their persistence remain. All California Species of Special Concern can be found on the CNDDB, a highly valuable repository of rare plant and animal information maintained by the Habitat Conservation Division of CDFW. The primary function of the CNDDB is to provide the most current information available on the state's most imperiled elements of natural diversity and to provide tool to analyze these data (Bittman 2001).

AR 200-1 addresses SARs as follows: (a) In accordance with ACSIM guidance, manage [SARs] and habitats to prevent listing that could affect military readiness. (b) Program and plan for environmental conservation critical funding for designated Army SARs and coordinate Real Property Services funding opportunities for other SARs. (c) Incorporate SARs management in the INRMP. (d) Implement management plans for SARs to include, but not limited to, survey, monitoring, habitat enhancement, and protection.

The 2008 BCC is the USFWS's effort to carry out the mandate of the 1988 amendment to the Fish and Wildlife Conservation Act that requires the USFWS to "identify species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the [ESA] of 1973" (USFWS 2015). Bird species considered for the BCC include nongame birds; gamebirds without hunting seasons; subsistence-hunted nongame birds in Alaska; and ESA candidate, proposed, and recently delisted species. The BCC includes some non-MBTA- protected species because their conservation status and efforts are of concern to the USFWS (2015). Currently there are ten birds recorded at CSLO that are on the 2008 BCC list: bald eagle, burrowing owl, Costa's hummingbird, golden eagle, loggerhead shrike, long-billed curlew, peregrine falcon, Swainson's hawk, yellow warbler, and yellow-billed magpie. Of these ten, the Costa's hummingbird, long-billed curlew, peregrine falcon, and yellow-billed magpie four have no other sensitivity designations aside from BCC. The DoD PIF has also identified MSS that warrant enhanced conservation efforts as these species would have a greater impact on military activities if they are to become listed. Two MSS occur or have the potential to occur on CSLO; tricolored blackbird and Western burrowing owl.

Special status bats are those designated as "yellow" or "red" by the WBWG. "Yellow" designation is considered a level of concern that should warrant closer evaluation, more research, and conservation actions of the species and potential threats. A lack of meaningful information is a major obstacle in adequately assessing these species' status. "Red" designation represents those species considered highest priority for funding, planning, and conservation actions. These species are imperiled or are at high risk of imperilment. Information about status and threats to most species could result in effective conservation actions being implemented.

There are 25 plants, one invertebrate, five reptiles and amphibians, 13 birds, and six mammal species considered sensitive that occur or are likely to occur at CSLO. Management for special status species often overlaps with management for habitats and threatened and endangered species. Camp San Luis Obispo follows guidelines identified in species specific conservation or management plans produced by PARC, PIF, WBWG, and others. Many of the conservation actions for the monarch butterfly are addressed in section 4.6.2.1 Pollinator Management as those actions also benefit other pollinator species. Similarly, management actions for sensitive bat and bird species are addressed primarily in Section 4.6.1.1 General Fish and Wildlife Management. CAEV focuses on special status species during project review and documents observations for future management decisions.

Goal: *Provide for the conservation, enhancement, and protection of special status species as a proactive strategy to prevent federal and state listings.*

Objective 1: *Determine special status species distribution and abundance on CSLO to aid in future management.*

Objective 2: *Protect existing special status species and their habitat on CSLO.*

5.0 Sustainability and Compatible Use

5.1 Sustainability of the Military Mission and the Natural Environment

The purpose of this section is to address how mission requirements are met while meeting natural resources compliance responsibilities. A successfully implemented INRMP will meet two basic purposes: (1) It will ensure the sustainability of natural resources at an installation, and (2) it will ensure no net loss of the capability of installation lands to support the DoD mission.

5.1.1 Climate Change

The effects of a changing climate are currently and will continue to be a national security issue, impacting Department of Army installations, operational plans, and overall missions. The Army recently released a memo directing installations to plan for energy and climate resilience efforts by identifying the installation's vulnerability to climate-related risks and threats. This memo is consistent with DoD guidance per 10 USC § 2864 (Master plans for major military installations, April 2020), DoDD 4715.21, and DoDD 5111.13, which require the DoD understand the threat posed by climate change to the national security of the United States and improve the resilience of impacted installations. Assessments under Army Directive 2017-07, Installation Energy and Water Security Policy, also require information about future conditions.

Hotter temperatures have already contributed to reductions of seasonal maximum snowpack and its water content over the past 30-65 years, partially attributed to human-caused climate change. Increased temperatures most strongly affect snowpack water content, snowmelt timing, and the fraction of precipitation falling as snow. The increase in heat and reduction of snow under climate change have amplified recent hydrological droughts in California. Periods of low precipitation from natural variations in the climate system are the primary cause of major hydrological droughts in the Southwest region, particularly in California and the upper Colorado River Basin. Projected hotter temperatures increase probabilities of decadal to multi-decadal mega droughts, which are persistent droughts lasting longer than a decade, even when precipitation increases. Increases in temperature would also contribute to aridification (a potentially permanent change to a drier environment) in much of the Southwest.

Aridity is a long-term reduction in climatic wetness in a region and has significant impacts on soil moisture, vegetation type and density, available water supply, and wildfire risk. This in turn has impacts on air quality, changes in storm frequency, stream bank erosion and gullying, increased dust, protected species stress and potential for more species placed at risk, and spread of invasive species.

Environmental impacts of rising temperatures are likely to include shifts in vegetation communities including rare, threatened, and endangered species they support; increased invasive species; increased vector-borne and zoonotic (animal to human) diseases. Increase in temperatures and drought also contribute to wildfires as there is less moisture in the soil and vegetation. The change in snow-pack melt and shifting rain patterns further exacerbate dry conditions and increase fire risk. Once a fire starts,

warmer temperatures and extensive dry conditions promote wildfire growth and make them harder to put out.

The projected increase in one-day precipitation amounts will contribute to flooding, as over saturation of upper soils layers reduces the ability of the ground to absorb the rainfall and leads to a greater runoff for a given amount of precipitation. The net result of this is higher flood peaks that occur more rapidly, and a reduction in the amount of rainfall that penetrates the sub-surface to the rooting depth of plants.

Direct impacts to CSLO may include increased maintenance costs for roads, utilities, and runways; increased energy costs, reduced live-fire training; reduced water availability and greater competition for limited water resources; reduced training carrying capacity; operational health surveillance and risks; and increased flood control/erosion prevention measures. Other impacts include military personnel safety; temporary or prolonged disruption of military operations or test and training activities due to storm damage; increased maintenance costs, and infrastructure damage.

Managing climate related risks will be critical in sustaining the CSLO installation and maintaining military readiness. The CA ARNG has identified and will continue to implement sound natural resources strategies and adaptive management that provide benefits to the ecosystem and training abilities, regardless of how climate changes occur. Strategies to combat climate change have been incorporated into management actions for natural resources on CSLO.

Goal: *Combat the implications of climate change by promoting landscape resiliency and reducing fossil fuel dependency.*

Objective: *Integrate climate adaptation strategies into natural resource management.*

5.1.2 Encroachment Partnering

Encroachment has emerged in recent years as a major issue for the DoD as population growth continues near military installations. Encroachment refers to all external influences threatening or constraining training activities required for force readiness. Such encroachment stems from (1) environmental (2) social (such as urban sprawl), and (3) economic (such as changing land values) influences. Impacts include, but are not limited to, restrictions on available training locations; restrictions on available times and duration for testing and training; reduced effectiveness of testing and training activities; and restrictions on weapons systems, equipment, and munitions used during testing and training. From an environmental perspective, the loss of natural habitats through development on areas adjacent to military installations can negatively impact the biodiversity on military lands.

Healthy, sustainable ecosystems support realism in military training by providing unencumbered open space and buffers, stable and productive soils, clear air, clean water, and a range of natural cover and environmental conditions available for the indefinite future.

As part of the 2003 DoD Authorization Act, the Army developed the ACUB program. This program allows acquisition of development rights or fee title for the establishment of conservation easements on adjoining installation properties to protect training lands from encroachment. Funded up to 75% by DoD, acquisitions are accomplished through a partnership agreement between DoD, a public or private conservation organization, and the private property owner.

The regional importance of CSLO to the county, local communities, and federal and state natural resource agencies is reflected in a strong history of cooperation and partnership projects, and strong regional planning framework for conservation (described in Chapter 2).

The CA ARNG continues to successfully participate in the ACUB program. To date, CSLO, working with the Land Conservancy of San Luis Obispo, has encumbered over 1,150 ac of neighboring lands. Active ARNG Directorate ACUB cooperative agreements are managed by the ARNG G-9.

Goal: *Sustain military readiness and installation biodiversity by proactive encroachment planning.*

Objective: *Continue to participate in the ACUB program.*

5.2 Outdoor Recreation and Environmental Awareness

The Sikes Act requires that DoD lands shall be available to the public and DoD employees for enjoyment and use of suitable land and waters whenever possible and not in conflict with the mission.

Outdoor recreation opportunities at CSLO include camping in the R.V. park, a picnic area at Fort Merriam, and hiking (limited to certain areas only). Hiking activities are highly regulated and usually occur during public outreach events.

Presently, hunting and fishing are not allowed on CSLO because they are incompatible with the training mission and small size of the training site. If CA ARNG determines that a limited hunting program is warranted, Environmental Directorate will coordinate with CDFW to manage game populations to achieve countywide population objectives. Should a public access fishing program be proposed, formal consultation will occur with NMFS to insure no effect to SCCC steelhead.

Goal: *Improve the quality of life for soldiers training at CSLO, staff, and the local community by providing compatible natural resource–based recreational opportunities.*

Objective: *Plan and promote recreational opportunities when consistent with the military mission and sound ecosystem management principles.*

5.3 Livestock Grazing and Agricultural Outlease

5.3.1 Livestock Grazing Outlease

Grazing outleases are permitted under the Sikes Act and AR 200-1 where these provide a direct benefit to the mission and environmental goals. The grazing program must be “compatible with mission operations and support conservation compliance, sustainability, and natural resources stewardship.” It must be compatible with the installation INRMP (16 U.S.C. 670a).

The primary purpose of the livestock grazing outlease at CSLO is to improve fire-safety of training lands for mission activities. Grazing is used to reduce fine fuel load (dead grass litter), thereby reducing hazardous fuels and the potential for uncontrollable fire spread rates. Livestock grazing is also used for ecological benefit to remove unwanted vegetation in habitat of federally listed species.

The CSLO Grazing Lease is a five-year term and contains provisions concerning stray livestock, dead livestock and animal health, the supplying of salt and supplements, overgrazing, and fencing. A maximum carrying capacity of 2,216 animal unit months are currently available for cattle grazing. This is determined by the amount of Residual Dry Matter (RDM) on the pastures at the beginning of the growing season. The RDM is assessed by CAEV, DPTS, or other training land manager (i.e. ITAM), and they will determine carrying capacity. The biologist and/or land assessor will work with the grazing lessee. Cattle grazing is managed in pastures throughout CSLO, except in the northern part of the installation (northern halves of training areas U and X) because of the rugged terrain. The pastures constitute approximately 2,514 ac (1,017 ha) and are depicted in Map 5-1.

Rangeland management practice improved with an off-creek stock water development project in 2007, which set up twelve 400-gallon troughs away from wetlands. Three natural springs are developed to deliver water to three 2,500-gallon tanks that in turn supply water to four of the twelve troughs. The remaining troughs are supplied from the existing CSLO water distribution system. This water development was completed via funding from the MBNEP and SLCRCD to reduce non-point source pollution from livestock access to streams and streambanks.

Along with the fencing and water development, in 2007 CSLO adopted a rotational grazing plan. The plan is based on forage availability and the movement of livestock from pasture to pasture triggered by use levels over the course of the grazing season. Livestock are restricted to a single pasture for as long as an adequate amount of forage is present or to achieve certain management goals. Forage quality, recovery, and production are dependent on the timing and amount of rain. Once a certain amount of forage has been removed, the livestock are moved to another pasture. Rotational grazing is practiced by utilizing natural barriers, fencing, and cattle grates to create paddocks, and by placing water and salt to attract livestock use.

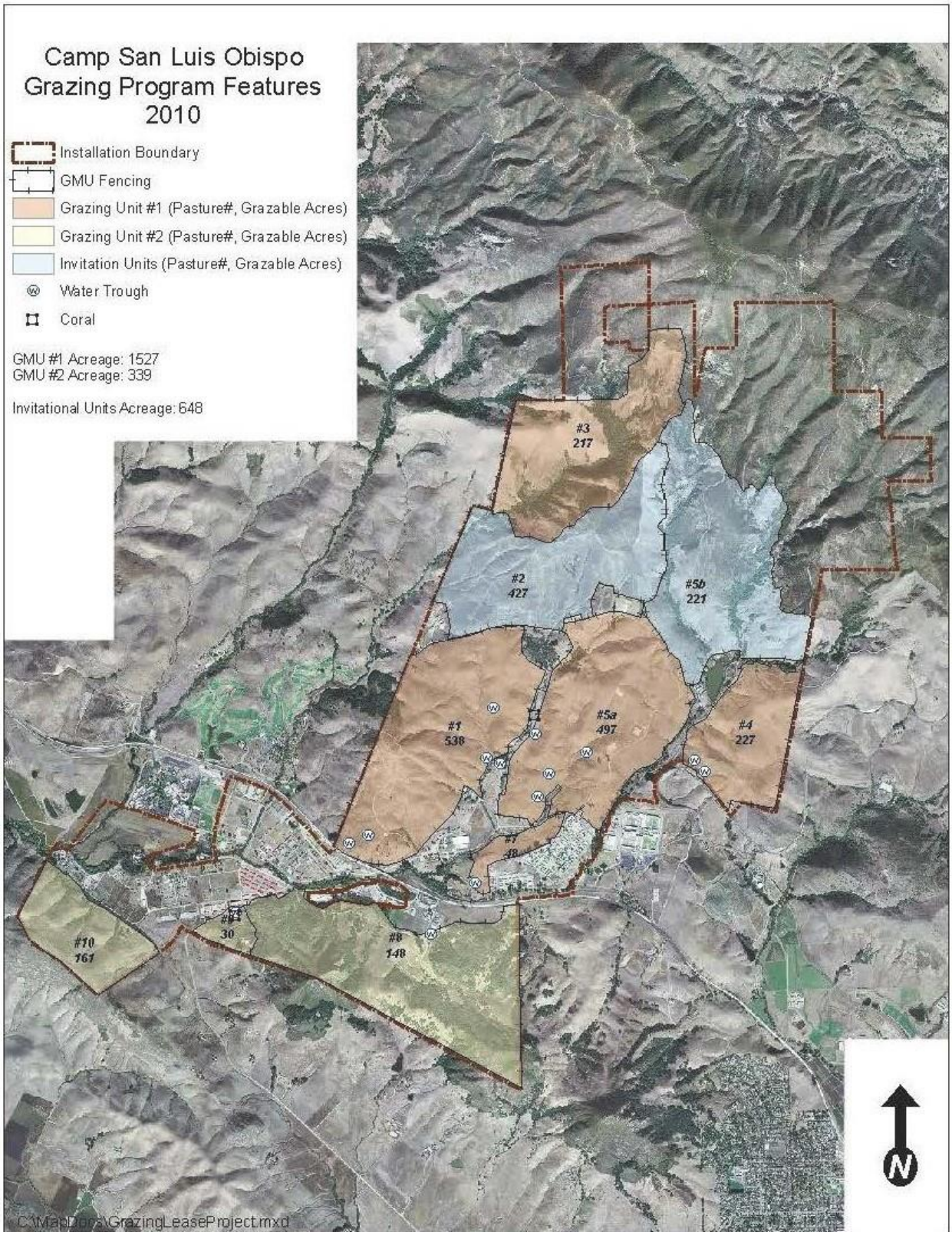
Management of day to day grazing operations is the responsibility of DPOTS as grazing activities require coordination with military training activities. However, grazing is also utilized as a habitat management tool on CSLO. Periodic, high intensity, short-duration maintenance grazing within the riparian and wetland enclosures has been found to enhance conditions for both California red-legged frog and Chorro Creek bog thistle. Grazing in CCBT habitat is by “invitation only” at the discretion of the DPTS and CAEV staff. CAEV routinely coordinates with DPOTS and the grazing lessee to implement grazing as a resource management tool.

Goal: *Align the grazing program to benefit the military mission and the health and sustainability of training lands.*

Objective: *Manage grazing to support ecological processes and fuel load reduction.*

5.3.2 Agriculture Outlease

Agricultural outleases are permitted under the Sikes Act and AR 200-1 when they are “compatible with mission operations and support conservation compliance, sustainability, and natural resources stewardship.” The growing of crops “shall be addressed in and compatible with the INRMP and be consistent with long-term ecosystem-based management goals that place ecological sustainability objectives above revenue optimization goals” (DoDI 4715.03).



Map 5-1. Camp San Luis Obispo Grazing Pastures (USFWS 2015).

Cultivation of dryland hay has occurred on CSLO since approximately 1980. Tilling and seedbed preparation takes place in November or December, and a hay mix has typically been planted in late December to early January. Hay is harvested in late May and the fields are cultivated during the summer to discourage weed growth, particularly yellow starthistle. Annual hay yields vary from 1.5 to 2.0 tons per ac (1,360 to 1,814 kilograms per 0.4 ha), depending on rainfall. Soil fertilization is accomplished through crop rotation with nitrogen-fixing legumes such as lima beans. Approximately 25 ac (10 ha) of legumes are planted in May of each year with harvest occurring in October. The legume crop yields approximately 7.5 tons per year (Tartaglia, pers. comm.).

A 10-ft (3-m) buffer is maintained between tilled land and the adjacent riparian area. Due to the low potential for erosion at this site, this buffer is an exception to the standard 100-ft (30-m) buffer applied to sensitive areas at CSLO.

Goal: *Align the agricultural outlease program to benefit the military mission and the health and sustainability of training lands.*

Objective: *Manage agricultural outleasing with other uses and sustainable land use.*

5.4 Developed Areas, Landscape and Grounds

Landscaped areas are situated throughout developed areas on post and involve actions such as annual mowing, irrigation, fertilization, cultivation, seeding, spraying, pruning, trimming; weed, dust and erosion control; drainage, planting for landscape effect, and other intensive practices. Landscaped areas supply many ecosystem benefits for people and can as well play a secondary but important beneficial role in other ecosystem functions including for wildlife. Besides landscaped grounds, these areas may include windbreaks, hedgerows, visual screens, roadsides, rooftops, and road medians. These areas can provide a biosecurity buffer, assist climate adaptation, regulate flooding, resist non-native species invasion, reduce the threat of mortality due to roadkill or powerline kill, and provide aesthetic value.

Construction and maintenance activities occur on buildings, roads, utilities, and other infrastructure on a routine basis. Current Army guidance promotes sustainable practices regarding building construction and upgrades, reusable energy consumption, and water conservation strategies to incorporate as current practices on Army installations. Such practices minimize adverse effects on the natural environment.

Goal: *Enhance the role developed and landscaped habitats play in water quality, declining wild species, native pollinators, the health of wetlands and waterways, and other natural communities.*

Objective: *Incorporate innovation and best science in decisions about construction and its connection to natural resource sustainability. Utilize low-impact design and green infrastructure approaches to improve natural resource function and value while improving ecosystem services.*

5.5 Beneficial Partnerships and Collaborative Planning

It is DoD's policy to promote collaborative partnerships and integration of INRMP activities with external stakeholders, including consistency with state and regional natural resources plans. Coordinating with partner agencies is a guiding principle of ecosystem management for federal agencies (DoDI 4715.03).

CSLO continues to enhance resource management capabilities through effective partnerships. An array of multiple partnerships are needed, from local to regional to national, to effectively implement the ecosystem framework of an INRMP. CSLO has a legacy of participating and benefitting from these collaborative efforts for several decades. These partnerships have included the USFWS, USACE, USDA, NRCS, NMFS, CDFW, Cal Fire, CCC, RCD, MBNEP, SLO Climate Coalition, Cal Poly, and other universities.

Goal: *Regularly engage in cooperative resources planning partnerships to create regional conservation, ecosystem-based solutions of mutual benefit.*

Objective: *Participate in regional conservation and ecosystem planning efforts, in collaboration with other governmental agencies and non-governmental organizations.*

5.6 NEPA and CEQA Compliance

Compliance with NEPA requires federal agencies to consider and document the potential environmental effects of federal actions. The Army's guidance for implementing NEPA is contained in Environmental Analysis of Army Actions (AR 200-2), 32 C.F.R. Part 651 (2002). Similarly, CEQA also requires environmental documentation of actions that are state funded or occur on state property. Because the CA ARNG acts as both a federal and state agency, it must comply with the requirements of both acts. However, CEQA most often applies to CSLO as it is state property. Actions subject to NEPA/CEQA include virtually all activities undertaken, funded, or supported by the federal/state government.

NEPA specifies three types of environmental documentation (note: the CEQA equivalent documents, which are prepared jointly with the NEPA document, immediately follow the NEPA document types in italics): the Categorical Exclusion (CX) (Categorical Exemption); the Environmental Assessment (EA) (Initial Study [IS]); and the Environmental Impact Statement (EIS) (Environmental Impact Report [EIR]). For clarity, the following paragraph describes only the NEPA documents.

All projects and training activities near sensitive resources are reviewed by CAEV prior to implementation. Project proponents submit a project information packet (PIP) that contains information on project details and training requests are reviewed and approved via the Range Facility Management Support System (RFMSS). Potential environmental impacts per NEPA and CEQA guidelines are determined and mitigation measures to offset impacts are documented in an Environmental Determination (ED) before a project or training may proceed.

Goal: *Apply NEPA and CEQA requirements and policies to enhance mission-related use and conservation of natural resources.*

Objective: *Continue to assess the environmental consequences of proposed actions using the existing CA ARNG integrated NEPA/CEQA process.*

5.7 Law Enforcement

Major areas of concern that can adversely affect natural resources on CSLO include trespassing for recreational purposes, illegal dumping, speeding, poaching, and removal of cultural resources from the training site. Illegal trespass for recreation is a major concern for both natural resources and military

training. Areas of CSLO near the northern boundary have become popular with mountain bikers and horseback riders who use trails established by trainers for dismounted maneuver. Use of these trails by bikers and horseback riders causes erosion and can adversely affect sensitive natural areas such as Whiskey Springs. Likewise, trespassing on military lands is hazardous to the perpetrator due to the natural hazards as well as the surface danger zones from the ranges (2011 CLSO INRMP). Poaching occasionally occurs on CSLO even though the installation does not have a hunting program. A similar issue of concern is the illegal removal of archeological resources by looters (2011 CLSO INRMP).

Observations of illegal activities are documented and reported to the installation and the proper authorities are contacted. Impacts to natural resources are assessed and appropriate mitigation measures are identified when applicable.

Goal: *Provide for enforcement of natural resources laws and regulations by professionally trained personnel, taking proper safety and security measures.*

Objective: *Ensure that installation users practice environmental stewardship in accordance with AR 200-1 and CA ARNG Regulation 200-1 (CSLO Regulation 350-1).*

5.8 Training of Natural Resources Personnel

Training of CA ARNG natural resources personnel is an important aspect of the ARNG G-9. Recognizing the need for personnel to have up to date knowledge of technical and policy issues, NGB provides annual funding to all states. Staff training focuses on both technical and policy training. Technical training occurs at a variety of venues including government training centers, universities, and nonprofit and private organizations.

Policy training occurs primarily through the annual Programming Guidance Course held by the NGB. This workshop provides updates on current and emerging National Guard and Army policy, as well as discussions of funding and regulatory issues. Further policy training is also provided in-house through dissemination of important information at staff meetings and electronic training courses (2011 CSLO INRMP).

Goal: *Continue to improve the success of natural resources management activities through professional development and training.*

Objective: *Continue to provide professionally trained personnel for enforcement of conservation laws and regulations.*

6.0 INRMP Implementation

6.1 Successful Implementation

Formal adoption of an INRMP by the State Guard Adjutant General and the Chief, ARNG I&E constitutes a commitment to seek funding and execute, projects and activities in accordance with timeframes identified in the INRMP. The INRMP is implemented by (DoDM 4715.03 CH-2):

- Programming projects by actively requesting and using funds in support of INRMP strategic goals and objectives.
- Ensuring that sufficient numbers of professionally trained natural resources personnel are available to perform the tasks required by the INRMP.
- Coordinating feedback on INRMP effectiveness from the USFWS and CDFW each year.
- Documenting specific INRMP annual accomplishments.
- Evaluating the effectiveness of past and current management activities and adapting those activities as needed.

This INRMP will become effective upon the acceptance and signatory release described in *Section 6.3: Responsibilities and Staffing*. As this plan serves as a formal structuring and integration of the existing natural resources management program, existing projects, activities, and plans have been incorporated into the INRMP and the Project Implementation Table (Appendix A), which is to be updated each year in collaboration with internal and external stakeholders and partners. The projects are scheduled by looking ahead five years, and by their priority ranking.

Priorities identified in this INRMP will generally determine the order of implementation. Future work identified will be implemented as funding becomes available. The Environmental Directorate will determine what projects and activities are appropriate to initiate, given funding, at any particular time. The INRMP is meant to be flexible, dynamic, and adaptable to the immediate and emergent needs of natural resources management and the ARNG mission. Programming for INRMP implementation generally occurs in one- to three-year budget cycles; this is how the DoD allocates resources and links INRMP objectives to budgets and execution.

> *ARNG-IEZ INRMP policy requires that INRMPs include a "Project Table, with all natural resources projects and the goals/objectives they support for the next five fiscal years." The Table summarizes the INRMP's "[s]pecific natural resource management goals, objectives, and projects with an implementation schedule" (ARNG-IEZ Memorandum, 20 March 2019).*

6.2 Funding and Project Implementation Sources

The Army views natural resource investments as a means of supporting its military mission. "Army organizations will make prudent investments in environmental initiatives that support mission accomplishment, enhance readiness, reduce future funding needs, prevent or mitigate pollution, improve compliance, and reduce the overall cost of compliance with applicable environmental requirements" (AR 200-1).

Funding for INRMP implementation is not limited to environmental funds. Responsibility for funding natural resource management activities is outlined in the Army Sustainable Range/Installation Environmental Responsibilities Matrix, and is clarified in Memorandum, NGB-ARI, 17 APR 06: Clarification of Funding Responsibilities.

Implementation and execution of the INRMP are shared responsibilities among those stakeholders that use or have a land management responsibility for ARNG installations. Regardless of funding source, all State ARNG natural resources management projects must be included in the INRMP Project Implementation Table (Appendix A). Some work is funded by project proponents or ARNG tenants, others through general operations and maintenance funds.

In order to implement the various research, surveys, and programs necessary to fulfill the INRMP goals and objectives, funding must be identified and acquired. There are several avenues of funding available, beyond the ARNG operational budgets that allow the inclusion of additional projects or activities to assist the Environmental Directorate in their beyond-compliance stewardship endeavors. The Environmental Directorate must continually assess the priority and level of budgetary needs to fulfill regulatory requirements and to sustain overall program goals. These funding sources are discussed below in general terms, as this process is dynamic and is dependent on the INRMP's continuously developing program.

DoD Legacy Funds

The Legacy Resource Management Program (LRMP) was enacted in 1990 to provide financial assistance to military natural and cultural resources management. The program assists with protection and enhancement of natural resources while supporting military readiness. Legacy projects may involve regional ecosystem management initiatives, habitat preservation efforts, archaeological investigations, invasive species control, and/or monitoring, and predicting migratory patterns of bird and other animals.

Special Initiatives

The DoD or Army may establish special initiatives to fund natural resource projects. Funding is generally available only for a limited number of projects.

Contractor Support

Contractors give CSLO access to a wide variety of specialties and fields. This includes CEQA and NEPA review and documentation for large projects, vegetation surveys, species surveys, invasive species management, grounds maintenance, management plans, and similar activities.

Memoranda of Understanding

MOUs can provide valuable services to CSLO that benefit both sustainability of the military mission and natural resources management.

Memoranda of Agreement/Cooperative Agreements

Cooperative Agreements are legal relationships between the Army and States, local governments, institutions of higher education, hospitals, non-profit organizations or individuals. The responsibility for awarding grants and cooperative agreements is vested in the head of each DoD Component that has such authority (32 C.F.R. § 21.210). Priority shall be given for the procurement of INRMP implementation and enforcement services to Federal and State agencies having responsibility for the conservation or management of fish and wildlife in accordance with the Sikes Act (DoDI 4715.03).

The CSLO has implemented an ACUB agreement in this regard.

Cooperative Ecosystem Studies Units

The Cooperative Ecosystem Studies Units (CESU) program is a working collaboration among federal agencies, universities, state agencies, non- governmental organizations, and other nonfederal institutional partners. The CESU National Network provides multidisciplinary research, technical assistance, and education to resource and environmental managers. Although the overall program is overseen by the U.S. Department of the Interior, one of the participating agencies is DoD.

University Assistance

Universities are an excellent source of research assistance. CSLO has used several universities in the past to help with specialized needs (particularly natural resources research), such as California State University Fresno and the UC Berkeley. Work with these two universities was accomplished through CESU.

Use of Volunteers

Installations may use appropriate partnerships and volunteers to enhance natural resources conservation programs, when practicable, in accordance with DoDI 1100.21 ("Voluntary Services in the Department of Defense," March 11, 2002, as amended). Work shall be performed under the direction of Federal employees and, when practicable, under the direction of professionally trained natural resources personnel.

6.3 Responsibilities and Staffing

The Sikes Act specifically requires that there be "sufficient numbers of professionally trained natural resources management and natural resources enforcement personnel to be available and assigned responsibility" to implement an INRMP. The responsibility for implementation of INRMPs is shared at many levels among different command elements between Sacramento and San Luis Obispo. The defined roles of various parties ensure that the programming of work takes place that is necessary to establish and support an integrated natural resources program consistent with legislative requirements, DoD policy, and stewardship. *Section 1.3.2: Roles and Responsibilities* describes some of the high-level ARNG roles in INRMP execution.

6.4 Sikes Act Coordination

Both internal and external coordination requirements are contained in the Sikes Act.

Internal Coordination

Internal stakeholders are, at a minimum, all those with roles described in *Section 1.3.2: Roles and Responsibilities*. Natural resources managers are to engage internal stakeholders (e.g. operations and training, public works, planners) in developing, reviewing and updating the INRMP to ensure goals, objectives, and actions are in line with mission requirements; to identify potential project conflicts or opportunities for cooperative program implementation; to establish specific goals and measurable objectives for all elements of the INRMP, pursuant to the Sikes Act (as amended [16 U.S.C. § 670(a)(1)(B)]); and to establish installation-specific objectives and measure progress toward achieving those objectives, as appropriate.

External Coordination

The CA ARNG will engage USFWS and the CDFW in scoping, designing, preparing, and periodically reviewing the INRMP. Consistent with the Sikes-Tripartite MOU, a field office reviews the INRMP and provides preliminary agreement concerning the conservation, protection, and management of fish, wildlife, and plant resources. The parties review the INRMP for technical adequacy of the content and to secure mutual agreement from all signatories. Installations will consult with federally recognized Indian tribes, where tribal treaty rights, sacred sites, burial sites, or other rights to natural and cultural resources may be affected (DoD 4715.03).

Signatures

A compliant plan must include documentation evidencing mutual agreement. Mutual agreement is attained when the INRMP is signed by each of the individuals listed below:

- The USFWS regional director or their designee.
- CDFW director or their designee.
- State Military Service representative (The Adjutant General).
- ARNG Directorate (ARNG I&E Chief).

6.5 INRMP Review

The Sikes Act and Army policy (AR 200-1) requires that the INRMP establish specific goals and measurable objectives for all components of the INRMP, and that metrics be established to measure progress towards achieving the objectives. In order to assess and document progress and determine if an INRMP Update or Revision is necessary, the INRMP is reviewed annually. Annual reviews are completed in cooperation with internal partners (i.e. DPW, ITAM, DPTMS) as well as external partners (USFWS, CDFW, and NMFS).

As detailed in the 2019 ARNG G-9 INRMP policy guidance and DoDI 4715.03 (2018), annual reviews address the considerations in the Annual Review Template (Table 6-1) and include an update to the Project Implementation Table (Appendix A). Annual reviews are documented in a memorandum for record which includes the names and offices of all attendees, responses to the Annual Review Template

(Table 6-1), and whether an Update or Revision is necessary. A copy of the memorandum for record and the update project table is forwarded to ARNG I&E at the end of each fiscal year.

Table 6-1. Annual Review Template.

INRMP Project Implementation	
1	Are INRMP projects, including follow-up inventorying and monitoring work, properly identified, developed, and submitted for funding?
2	Has project funding been received, obligated, and expended?
3	What projects have been completed and do they meet expected objectives?
4	What new projects are proposed?
Federal ESA Listed Species and Critical Habitat	
1	Are conservation efforts effective?
2	Does the INRMP provide conservation benefits necessary to preclude USFWS Critical Habitat designation?
3	Are Species at Risk identified and are steps being undertaken to preclude listing?
Partnerships Effectiveness	
1	Has the INRMP review team (State ARNG, USFWS, ARNG I&E, and the State Wildlife Agency) been effective in ensuring the INRMP's implementation?
2	Are other partnerships needed to meet the INRMP goals?
3	Have other partnerships been effectively used to meet INRMP goals?
4	Are internal stakeholders (training, facilities, etc.) effectively coordinating projects?
Fish and Wildlife Management and Public Use	
1	Are public recreational opportunities such as hunting, fishing, and wildlife viewing available to soldiers and employees?
2	Are public recreational opportunities such as hunting, fishing, and wildlife viewing available to the public?
3	Does the INRMP and site offer opportunities or facilities for disabled sportsmen?
Team Adequacy	
1	Is the State ARNG's natural resources team adequately resourced to fully implement the INRMP?
2	Is the State ARNG's natural resources team adequately trained to fully implement the INRMP?

Annual reviews are tracked and reported in the annual AEDB-EQ data submission. AEDB-EQ submission are due by the end of the 4th fiscal quarter (September 30) of each year. Per the requirements of the Sikes Act, DoD compiles this information and provides a report to Congress on INRMP status and implementation.

In addition to annual reviews, each INRMP must be reviewed for Operation and Effect at least once every five years by the state ARNG, USFWS, State Wildlife Agency and ARNG I&E. This comprehensive review assesses whether the INRMP is being implemented effectively and contributing to the conservation and rehabilitation of natural resources on ARNG lands. Specific guidelines for five year reviews are detailed in the 2019 ARNG G-9 INRMP policy guidance which ultimately results in an INRMP Update or Revision and new signature page.

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Appendix A. Project Implementation Table

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Management Area	Section/ Project	Project	Implementation Date	Implementation Method	Frequency
Soil Resources	4.2. Soil Resources				
	Goal: Conserve soil productivity, nutrient and carbon functioning, water quality, and plant and wildlife habitat through effective conservation practices.				
	Objective 1: Reduce or eliminate areas of barren soil by maintaining adequate vegetative cover.				
	•	Conduct a post-wide evaluation to determine the erosivity of soils on the installation to guide vegetation and soil management strategies.	2024	C	Once
	•	Prepare an updated Prescribed Grazing Plan to include multiple objectives and to improve soil conditions.	2025	C	Once
	Objective 2: Use proper grading techniques and BMPs to control and prevent erosion.				
	•	Continue to participate in partnership grant opportunities to implement the MBNEP CCMP.	ongoing	IH	As needed
Watershed and Water Resources	4.3 Watershed and Water Resources				
	Goal: Ensure a reliable, safe and sustainable water supply. Protect surface and groundwater resources and enhance as practicable.				
	Objective 1: Practice water conservation techniques throughout the installation.				
	•	Re-vegetate landscaped areas with native, drought-tolerant vegetation.	2023	C	As needed
	•	Install rain catchment and grey water systems to supply landscape irrigation where needed.	2024	C	As needed
	•	Work with watershed partners to prioritize CSLO locations for water supply enhancement and conservation projects for watershed health.	Ongoing	IH	As needed
	Objective 2: Reduce pollutant and sediment loading into wetlands and waterways.				
	•	Conduct an annual assessment of unpaved roads to determine erosion potential.	2023	IH	Annually
	•	Conduct an assessment of stormwater structures and culvert conditions and determine erosion and flood risk; identify priority treatment areas.	2022	IH	Once
	Objective 3: Slow runoff rates and increase percolation of stormwater to aid in groundwater re-charge.				
	•	Implement LID projects and strategies to slow stormwater runoff, enhance stream flow, and augment groundwater resources.	TBD	IH	As needed
	Objective 4: Align water management on CSLO with regional water management strategies.				
	•	Routinely engage with other IRWM stakeholders to stay current on watershed objectives and participate in development and updates of local water management plans.	Ongoing	IH	As needed
Wildland Fire	4.4 Wildland Fire				
	Goal: Promote the natural role of fire in the CSLO ecosystem and prescribed fire as an ecosystem-based management tool.				
	Objective 1: Reduce wildfire potential using appropriate management practices such as prescribed burning and firebreak/fuelbreak maintenance.				

Management Area	Section/ Project	Project	Implementation Date	Implementation Method	Frequency
Wildland Fire	•	Maintain accurate burn records; map and retain GIS data on burn plots, dates and acreages	Ongoing	IH	Annually
	Objective 2: Improve integration of wildland fire planning and ecosystem objectives to restore resilient and healthy ecosystem processes.				
	•	Review and update the IWFMP annually and ensure it is certified as current by the Installation Commander. Annual reviews will be documented in an MFR and appended to the IWFMP as required by updated Army policy.	2022	IH/C	2 years/5 years
	•	Attend appropriate wildland fire trainings and obtain NWCG qualifications for ENV staff involved with wildland fire planning and/or implementation.	2022	IH	Annually
Vegetation and Wildlife Habitat	**4.5.1 General Vegetation , Grasslands, and Shrublands Vegetation and Wildlife Habitat**				
	Goal: Conserve and enhance the ecological integrity of each vegetation community to promote its beneficial functions such as wildlife support, food webs, biodiversity, watershed protection, productivity, and nutrient/carbon storage and cycling.				
	Objective 1: Reduce threats to native vegetation.				
	•	Control invasive species to prevent degradation of native plant communities.	2022	C	Annually
	•	Work with local universities and organizations to develop sustainable grazing practices	2024	C	Once
	•	Conduct vegetation surveys every five years and update data and maps accordingly.	2022	IH/C	5 years
	Objective 2: Restore and enhance native vegetation communities and promote their resilience.				
	•	Install fencing, signage, and Siebert stakes around sensitive resources or degraded areas needing rehabilitation.	Ongoing	C	As needed
	•	Conduct an assessment of fuel conditions in relation to desired community composition and desired fire regime. Design prescribed fire treatments for ecological benefit to reduce any threat to the community.	2024	C	Once
	•	Develop multiple restoration plant palettes for a range of vegetation communities and beneficial functions and conditions, such as erosion control, fire resilience, soil building, native pollinators, invasion-resistance, or enhanced carbon storage.	2023	IH	Once
	•	Update the Prescribed Grazing Plan to achieve multiple objectives and guidance beyond minimum Residual Dry Matter. Consider things such as fire control, carbon offset, soil quality, pollinator support, protection of sensitive species, and invasive control.	2023	C	Once
	4.5.2 Forest and Woodlands				
	Goal: Protect and maintain coast live oak and riparian woodlands and their natural ecosystem roles such as wildlife habitat, migration corridors, watershed function, thermal cover, and carbon sequestration.				
	Objective 1: Prevent loss and degradation of oak and riparian woodlands.				
	•	Install and maintain riparian fencing to control cattle activity in riparian habitat.	Ongoing	IH/C	As needed

Management Area	Section/ Project	Project	Implementation Date	Implementation Method	Frequency
Vegetation and Wildlife Habitat		• Remove non-native trees and control other invasive species in forests and woodlands.	2022	C	Annually
		• Conduct routine surveys of riparian habitats to document and assess habitat quality and identify areas in need of habitat enhancement activities.	2022	IH	Annually
		• Restore, maintain, and enhance riparian corridors with native vegetation that will improve bank stability and structure and biological productivity.	Ongoing	IH/C	As needed
		Objective 2: Encourage native tree recruitment and forest and woodland regeneration.			
		• Plant acorns at every chance and promote sapling growth where possible to aid in oak regeneration.	2022	IH	Annually
		• Install fencing or tree tubes around saplings to protect young trees from browsers.	Ongoing	IH	As needed
		4.5.3 Native Trees			
		Goal: Protect native trees to preserve both the ecological and mission-critical benefits they provide to CSLO.			
		Objective: Ensure replacement and protection of existing native trees.			
		• Collect local acorns and propagate as needed. Maintain seedlings for re-vegetation efforts.	2022	IH	Ongoing
		4.5.4 Wetland and Aquatic Habitat			
		Goal: Preserve wetland and aquatic habitat and the ecosystem services they provide such as fish and wildlife habitat, water quality improvement, flood control, and groundwater replenishment.			
		Objective 1: Protect wetland and aquatic habitat.			
		• Repair eroded roads, trails, firebreaks and other areas to prevent sedimentation of wetlands and aquatic areas on CSLO.	Ongoing	IH/C	As needed
		• Work with local watershed partners to implement projects that would improve water quality, habitat, and flood control of Chorro and Dairy creeks.	Ongoing	IH	As needed
		• Work with local watershed partners to create and maintain off-creek water sources for cattle.	2025	IH	As needed
		Objective 2: Restore and enhance wetland and aquatic habitat.			
		• Remove nonnative and invasive species	Ongoing	C	Annually
		• Implement controlled grazing and bulrush removal to prevent overgrowth of emergent vegetation in springs.	Ongoing	IH	Annually
		4.5.6 Invasive Plants			
		Goal: Use integrated pest management strategies to control the spread and introduction of invasive plants to protect natural resources, improve habitat, sustain land available for military training, and provide for health and safety.			
		Objective 1: Control or eradicate existing invasive populations to prevent further spread throughout the installation.			

Management Area	Section/ Project	Project	Implementation Date	Implementation Method	Frequency
Vegetation and Wildlife Habitat	•	Develop a rapid response plan for immediate invasive control actions	2023	IH	Once
	•	Map and maintain a geodatabase of invasive plant populations.	2022	IH/C	Annually
	Objective 2: Prevent and control new introductions of invasive plants.				
	•	Review the IPMP every year and update every five years.	2022	IH/C	1 year/5 years
	•	Develop an invasive species control plan for CSLO that identified invasive weed control priorities, strategies, methods, and tools. Update annually.	2023	IH/C	Annually
	•	Identify areas occupied by special status species, mission critical areas, or areas that are currently lacking invasion to keep clear of pest plants.	2023	IH	2 years
Fish and Wildlife	**4.6.1 General Fish and Wildlife**				
	Goal: Conserve the natural ecological role of native fish and wildlife populations on CSLO.				
	Objective 1: Protect fish and wildlife species and their habitats on CSLO.				
	•	Control invasive plant and animal species	2022	C	Annually
	•	Conduct annual monitoring of culverts and stream crossings and ensure functionality is retained.	2023	IH	Annually
	•	Develop a comprehensive Bird Management Program that details survey and monitoring protocols and best management practices for nesting birds.	2023	IH/C	Once
	•	Retrofit power structures to protect raptors and other large birds when possible.	Ongoing	IH/C	As needed
	•	Develop a comprehensive Bat Management Program that details survey and monitoring protocols, best management practices for bats occurring in buildings, mitigation strategies and habitat enhancement.	2024	C	Once
	•	Purchase and install bat boxes at every opportunity.	Ongoing	IH	As needed
	•	Participate in regional partnerships and working groups that focus on wildlife conservation.	Ongoing	IH	Annually
	•	Perform targeted planning level surveys for invertebrates, herpetofauna, birds, mammals, and fish at CSLO.	2022	C	Annually
	•	Routinely monitor fish and wildlife populations on the installation.	2022	IH/C	Annually
	•	Map habitat values for each group of animals so habitat elements may be protected.	2023	IH/C	2 years
	Objective 2: Assess fish and wildlife status and trends. Maintain accurate and up-to-date records on fish and wildlife distribution and abundance to aid in future management decisions.				
	•	Contribute survey data to community, regional, state, and federal databases and tracking systems (i.e. ebird, inaturalist, HerpMapper)	Ongoing	IH	Annually
	•	Maintain accurate and user-friendly databases.	Ongoing	IH	Annually

Management Area	Section/ Project	Project	Implementation Date	Implementation Method	Frequency
Fish and Wildlife		• Work with regional universities or educational organizations to assist in identification of species or in surveys at CSLO.	2023	IH	Annually
		• Utilize new technology to conduct or assist with biological surveys and monitoring when available.	2023	IH	As needed
		• Participate in DoD Partners for Amphibian and Reptile Conservation (PARC) and Partners in Flight (PIF).	Ongoing	IH	Annually
		• Supplement annual bird surveys with Christmas bird counts or other annual counts.	2022	IH	Annually
	4.6.2 Pollinators				
	Goal: Conserve pollinator populations and their habitat on CSLO.				
	Objective 1: Improve understanding of pollinator use on CSLO.				
		• Conduct a pollinator inventory. Establish the baseline conditions of pollinators, the plants that depend on them, and the benefits they provide.	2023	C	Once
		• Develop a pollinator monitoring program and conduct routine monitoring.	2024	C	Once/as determined
		• Actively participate in pollinator partnerships and other local pollinator conservation organizations.	Ongoing	IH	Annually
	Objective 2: Protect and enhance pollinator habitat.				
		• Plant pollinator friendly gardens whenever possible and use gardens as an opportunity for education and outreach.	Ongoing	IH/C	As needed
		• Develop habitat appropriate pollinator plant mixes for revegetation projects.	2023	IH	Once
	4.6.3 Invasive and Feral Animals				
	Goal: Control existing populations and prevent the spread and further introduction of invasive species and pests.				
	Objective: Follow IPM and pest control guidelines to control invasive and feral animals.				
		• Continue bullfrog eradication efforts	2022	C	Annually
		• Implement Sacramento pikeminnow and non-native fish eradication efforts	2022	C	Annually
		• Remove feral cats from the installation and prevent entry and development of new feral cat populations.	Ongoing	IH	As needed
		• Educate installation users about the ecological impact of feral cats	Ongoing	IH	As needed
	4.7.1 Chorro Creek Bog Thistle				
	Goal: Promote conservation of Chorro Creek bog thistle and species recovery on CSLO.				
	Objective: Protect Chorro Creek bog thistle plants and enhance habitat.				

Management Area	Section/ Project	Project	Implementation Date	Implementation Method	Frequency
Threatened and Endangered Species		• Conduct routine monitoring of Chorro Creek bog thistle. Maintain accurate records of occurrences to determine population trends and guide future management.	2022	C	2 years
		• Install and maintain exclusion fencing and Seibert stakes.	Ongoing	IH/C	As needed
		• Conduct periodic grazing within the Chorro Creek bog thistle- occupied habitat to reduce plant competition. The number of cattle as well as the duration and timing of grazing will be adapted to provide for the greatest benefit and least negative effect to the Chorro Creek bog thistle.	Ongoing	IH	As needed
		• Collaborate with Cal Poly and other agencies to conduct additional monitoring, surveys, or research of Chorro Creek bog thistle.	2022	C	Annually
		• Remove invasive species from Chorro Creek bog thistle habitat.	2022	C	Annually
		4.7.2 South-Central California Coast Steelhead			
		Goal: Promote the recovery, long-term health and resilience of the SCCC steelhead on CSLO.			
		Objective 1: Protect SCCC steelhead and its habitat.			
		• Conduct an assessment of Chorro Creek and its tributaries to determine quality of habitat for steelhead.	2023	C	Once
		• Conduct a complete SCCC steelhead census in coordination with CDFW's Coastal Monitoring Program with partner agencies.	2024	C	Once
		• Continue to control pikeminnow and other invasive species.	2022	C	Annually
		• Control invasive riparian and aquatic plants.	2022	C	Annually
		• Identify and prioritize strategies to stabilize soils and reduce sediment input into waterways.	2023	IH/C	Once
		• Implement soil stabilization strategies as prioritized.	2024	IH/C	As needed
		Objective 2: Enhance steelhead habitat on CSLO.			
		• Rehabilitate and enhance riparian habitat along stream corridors to improve soil stabilization and provide shade and cover for aquatic species.	Ongoing	IH/C	As needed
		• Identify and prioritize water conservation strategies on the installation that would reduce water demand and increase stream flow.	2023	IH/C	Once
		• Implement water conservation strategies as prioritized.	2024	IH/C	As needed
		• Design, remove, or modify three fish passage barriers. Use partner experience, match funding, and inter-agency coordination to address these barriers.	2027	C	Once
		4.7.3 California Red-legged Frog			
		Goal: Promote the recovery, long-term health, and resilience of the California red-legged frog on CSLO.			
		Objective 1: Protect California red-legged frogs and their habitat on CSLO.			

Management Area	Section/ Project	Project	Implementation Date	Implementation Method	Frequency
Threatened and Endangered Species		• Conduct routine maintenance of habitat restoration and enhancement sites or other suitable CRLF habitat via sediment and vegetation removal and fence repair as permitted in the 2009 BPO.	2023	IH/C	2 years
		• Continue to install and maintain cattle fencing along riparian corridors and wetland habitats.	Ongoing	IH/C	As needed
		• Facilitate development of cattle troughs to reduce cattle impacts to aquatic areas.	2025	C	Once
		• Continue to conduct bullfrog eradication program in compliance with USFWS and CDFW requirements.	2022	C	Annually
		• Conduct non-native fish removal in the sediment ponds and Chorro Creek.	2023	IH/C	Annually
		• Initiate discussions with ACUB partners regarding benefits of protecting California red-legged frog resources on their properties.	2023	IH	As needed
		• Maintain accurate records of CRLF occurrence data to determine population trends and guide future management.	2022	IH	Annually
		• Conduct annual surveys to monitor trends, reproduction, distribution, and habitat status of the California red-legged frog population.	2022	IH/C	Annually
		• Conduct annual evaluations on the condition and health of CRLF habitat. Identify locations for habitat enhancement opportunities.	2022	IH	Annually
	Objective 2: Enhance California red-legged frog habitat on CSLO.				
		• Revise and update the current annual monitoring strategy and data analysis methodology to determine trends more effectively in the CRLF population and shifts in habitat conditions and use.	2022	C	Once
	4.7.4 California Condor				
	Goal: Promote the conservation of California condors on CSLO.				
	Objective: Protect the California condor and its habitat on CSLO.				
		• Continue to work with the VWS, USFWS and other non-governmental organizations and agencies which actively promote the recovery of the California condor.	Ongoing	IH	As needed
		• Contribute to science-based, unified data reporting by partners in cooperation with USFWS.	Ongoing	IH	As needed
		• Promote the use of non-lead ammunition across the region through education of personnel and the regional community, as well as endorsement or other promotion of lead-free events and ammunition giveaways.	Ongoing	IH	As needed
	4.7.5 Least Bell's Vireo				
	Goal: Promote conservation and recovery of least Bell's vireo on CSLO.				
	Objective: Conserve and enhance least Bell's vireo habitat on CSLO.				
		• Conduct USFWS protocol surveys for least Bell's vireo to determine presence/absence at CSLO.	2022	IH	2 years

Management Area	Section/ Project	Project	Implementation Date	Implementation Method	Frequency
Threatened and Endangered Species		• Enhance riparian habitat as detailed in the draft USFWS LBVI habitat restoration plan, to include non-native plant removal, planting of native trees, installation of pig fencing, and restoration of areas disturbed by feral pigs in areas of mid to high quality LBVI habitat.	2023	IH/C	As needed
	4.7.6 Swainson's Hawk				
	Goal: Promote the conservation of Swainson's hawk on CSLO.				
	Objective: Protect Swainson's hawk and its habitat on CSLO.				
		• Retrofit powerpoles and powerlines at every opportunity to reduce the risk of electrocution and line strikes.	Ongoing	IH	As needed
	4.7.7 Tricolored Blackbird				
	Goal: Promote conservation of tricolored blackbird on CSLO.				
	Objective 1: Protect the tricolored bird and its habitat on CSLO				
		• Conduct focused surveys annually to detect presence of breeding colonies on CSLO.	2022	IH	Annually
	4.7.8 Bald Eagle				
	Goal: Promote conservation of bald eagles and their habitat on CSLO.				
	Objective: Protect bald eagles and their habitat on CSLO.				
		• Conduct surveys of suitable nesting habitats during the winter months.	2022	IH	Annually
		• Develop an Eagle Protection Plan if bald eagles are observed roosting or nesting in CSLO.	TBD	C	Once
		• Retrofit powerpoles and powerlines at every opportunity to reduce the risk of electrocution and line strikes.	Ongoing	IH	As needed
Special Status Species	4.8 Special Status Species				
	Goal: Provide for the conservation, enhancement, and protection of special status species as a proactive strategy to prevent federal and state listings.				
	Objective 1: Determine special status species distribution and abundance on CSLO to aid in future management.				
		• Conduct focused surveys and habitat assessments for special status species on CSLO.	2022	C	Annually
		• Report milkweed and monarch observations from all life stages, including breeding butterflies, to the Monarch Milkweed Mapper or via the project portal in the iNaturalist smartphone app.	2022	IH	Annually
		• Maintain accurate and up to date records and GIS data on special status species occurring on CSLO.	2022	IH	Annually
		• Submit special status species occurrence information to the CDFW CNDDB and the local CDFW office on a routine basis.	2022	IH	Annually
	Objective 2: Protect existing special status species and their habitat on CSLO.				

Management Area	Section/ Project	Project	Implementation Date	Implementation Method	Frequency
		• Install floating structures (i.e. wood, logs) in reservoirs and sediment basins to improve basking habitat for southwestern pond turtles.	2023	IH	Once
		• Enhance monarch butterfly foraging and breeding habitat by planting native, insecticide-free early emerging milkweed species (*Aesclepias californica, A. vestita, A. eriocarpa, A. cordifolia, A. erosa*).	2023	IH	Annually
		• Control invasive plant and animal species.	2022	C	Annually
Climate Change	5.1.1 Climate Change				
	Goal: Combat the implications of climate change by promoting landscape resiliency and reducing fossil fuel dependency.				
	Objective: Integrate climate adaptation strategies into natural resource management.				
		• Continue to incorporate climate resiliency into management actions for all natural resources management on CSLO.	Ongoing	IH/C	Annually
		• Participate in the San Luis Obispo Climate Coalition to align management actions with regional efforts	2022	IH	Annually
Encroachment Partnering	5.1.2 Encroachment Partnering				
	Goal: Sustain military readiness and installation biodiversity by proactive encroachment planning.				
	Objective: Continue to participate in the ACUB program.				
		• Continue to identify mutual objectives with neighboring and regional agencies and landowners for land conservation to prevent development of critical open areas.	Ongoing	IH	As needed
		• Provide accurate information and recommendations based on the land's condition to range managers and trainers.	Ongoing	IH	As needed
		• Conduct environmental outreach events for the public (such as Earth Day), nonmilitary training site users such as school/community groups.	2022	IH	Annually
Outdoor Recreation and Environmental Awareness	5.2 Outdoor Recreation and Environmental Awareness				
	Goal: Improve the quality of life for soldiers training at CSLO, staff, and the local community by providing compatible natural resource–based recreational opportunities.				
	Objective: Plan and promote recreational opportunities when consistent with the military mission and sound ecosystem management principles.				
		• Identify potential sites for a wildlife viewing area on CSLO consistent with and to support DoD's commitment to the Watchable Wildlife Program	2025	IH	Once
		• Host recreational hiking events, bird surveys, and wildflower tours or other public events to enjoy CSLO natural resources when possible.	2022	IH	Annually
	5.3.1 Livestock Grazing Outlease				
	Goal: Align the grazing program to benefit the military mission and the health and sustainability of training lands.				

Management Area	Section/ Project	Project	Implementation Date	Implementation Method	Frequency
Agricultural and Grazing Outlease	**Objective:** Manage grazing to support ecological processes and fuel load reduction.				
	• Add standards to achieve vegetative fuel management objectives of the IWFMP, and support for prescribed fire.		2026	IH	Once
	• Maintain existing riparian, boundary, and cross fencing and continue to fence aquatic and riparian sites - providing the fencing is compatible with training		Ongoing	IH/C	As needed
	• Continue to manage access to wetlands and riparian areas with fencing, to achieve the desired vegetation and soil condition for the recovery of listed species.		Ongoing	IH/C	As needed
	• Develop a Rangeland Management Plan to guide future grazing practices. The plan should have a multi-benefit goal of training land sustainability, natural resource management, and fuel load reduction.		2024	C	Once
	• Work with CalPoly, MNEP, RCD, at every opportunity to improve rangeland infrastructure and grazing practices.		TBD	IH	As needed
Developed Areas, Landscape, and Grounds	**5.4 Developed Areas, Landscape and Grounds**				
	Goal: Enhance the role developed and landscaped habitats play in water quality, declining wild species, native pollinators, the health of wetlands and waterways, and other natural communities.				
	Objective: Incorporate innovation and best science in decisions about construction and its connection to natural resource sustainability. Utilize low-impact design and green infrastructure approaches to improve natural resource function and value while improving ecosystem services.				
	• Develop a revised planting list for horticultural species at CSLO that includes regionally appropriate species that comply with the Presidential Memorandum to conserve and protect water resources, use locally adapted native plants, avoid using invasive species, and minimize the use of pesticides and supplemental watering		2023	IH	Once
	• Collaborate with local watershed partners to identify opportunities, obtain funding and implement various water management projects on CSLO.		TBD	IH	As needed
	• Develop an installation-wide water plan that includes measurable objectives, defined methods and implementation timelines for improving efficient water use and conservation in the landscape and encouraging innovative techniques and technologies.		2026	C	Once
Support for NEPA and CEQA Compliance	**5.6 NEPA and CEQA Compliance**				
	Goal: Apply NEPA and CEQA requirements and policies to enhance mission-related use and conservation of natural resources.				
	Objective: Continue to assess the environmental consequences of proposed actions using the existing CA ARNG integrated NEPA/CEQA process.				
	• Continue utilizing the Project Information Packet (PIP) process to facilitate environmental review.		2022	IH	Annually
	• Continue to implement NEPA/CEQA programmatically for ongoing actions to avoid unnecessary project delay.		2022	IH	Annually

Management Area	Section/ Project	Project	Implementation Date	Implementation Method	Frequency
	•	Update the PIP submittal form and/or portal for greater ease of use and enhanced transparency and communication with project proponents.	2024	IH/C	Once
	•	Make available to project planners updated GIS maps of sensitive resources to assist in project planning.	2022	IH	Once
Training of Natural Resources Personnel	5.8 Training Natural Resources Personnel				
	Goal: Continue to improve the success of natural resources management activities through professional development and training.				
	Objective: Continue to provide professionally trained personnel for enforcement of conservation laws and regulations.				
	•	Ensure environmental staff receive ongoing training and professional development through attendance at workshops, classes, training, and conferences.	2022	IH	Annually

IH: In House
C: Contract
TBD: To Be Determined

Appendix B. Conservation Measures

Management Area	Conservation Measure
Soil Resources	**4.2 Soil Resources**
	Goal: Conserve soil productivity, nutrient and carbon functioning, water quality, and plant and wildlife habitat through effective conservation practices.
	Objective 1: Reduce or eliminate areas of barren soil by maintaining adequate vegetative cover.
	• Re-vegetate recently disturbed or burned areas with native seed.
	• Communicate regularly with the cattle rancher to ensure rotational grazing is being implemented.
	Objective 2: Use proper grading techniques and BMPs to control and prevent erosion.
	• Locate physically intensive land disturbing military activities on the least erodible soils and backfill any military training excavations.
	• Install BMPs where necessary to eliminate erosion potential.
Watershed and Water Resources	**4.3 Watershed and Water Resources**
	Goal: Ensure a reliable, safe and sustainable water supply. Protect surface and groundwater resources and enhance as practicable.
	Objective 1: Practice water conservation techniques throughout the installation.
	• Educate installation users on water conservation and benefits.
	• Ensure that watershed assessments and management plans are integrated with the installation master plan, and other plans.
	• Maintain compliance with water quality laws and regulations.
	Objective 2: Reduce pollutant and sediment loading into wetlands and waterways.
	• Implement BMPs to eliminate or minimize nonpoint sources of water pollution.
	• Ensure agricultural leases contain soil and water conservation and pollution prevention measures.
	• Promote use of rolling dips and outsloping during trail maintenance to reduce erosion potential.
	• Implement a 100 ft (30 m) buffer from the edge of aquatic or wetland habitats to reduce impacts to wetlands.
	• Implement waterway buffers that extend to the outer edge of riparian vegetation.
	Objective 3: Slow runoff rates and increase percolation of stormwater to aid in groundwater re-charge.
	• Promote Low Impact Development (LID) strategies in project design.
	Objective 4: Align water management on CSLO with regional water management strategies.
	• Ensure CAEV staff stay current on regional water management efforts.
Wildland Fire	**4.4 Wildland Fire**
	Goal: Promote the natural role of fire in the CSLO ecosystem and prescribed fire as an ecosystem-based management tool.
	Objective 1: Reduce wildfire potential using appropriate management practices such as prescribed burning and firebreak/fuelbreak maintenance.
	• Follow guidelines for prescribed burns, suppression operations, and other fire management activities as detailed on the IWFMP.
	Objective 2: Improve integration of wildland fire planning and ecosystem objectives to restore resilient and healthy ecosystem processes.

Management Area	Conservation Measure
Wildland Fire	• Conduct biological monitoring of firebreak maintenance within 330 ft (100 m) of occupied CCBT habitat or within the watershed above the population of CCBT.
	• Coordinate with CalFire annually to develop and implement rotating burn plots in shrubland habitat for wildfire management and fire training opportunities.
	• Limit annual burning to no more than 30 percent of the total acreage of any vegetation community, aside from the impact area.
	• Reestablish native vegetation after successfully prescribed burn to minimize erosion and prevent establishment of invasive plant species.
	• Monitor burn areas after prescribed burns for invasive plant seedlings and control as necessary.
	• Install BMPs where necessary after fires to prevent soils from entering waterways and wetlands.
	• When possible, conduct prescribed burning outside of nesting bird season.
	• Conduct post-fire vegetation monitoring and record any changes to vegetation community composition.
	• Maintain adequate buffers around wetlands and waterways during prescribed burns to eliminate erosion and sedimentation potential. Buffers will be determined by CAEV prior to prescribed burning and will be determined based on fuel conditions, season, weather, and slope (EPA 2005). Do not conduct prescribed burning in riparian habitat.
Vegetation and Wildlife Habitat	**4.5.1 General Vegetation, Grasslands, and Shrublands Vegetation and Wildlife Habitat**
	Goal: Conserve and enhance the ecological integrity of each vegetation community to promote its beneficial functions such as wildlife support, food webs, biodiversity, watershed protection, productivity, and nutrient/carbon storage and cycling.
	Objective 1: Reduce threats to native vegetation.
	• Confine road and firebreak maintenance and vegetation trimming to the existing road footprint.
	• Restrict maneuver training to existing trails.
	• Limit unwanted disturbance to native vegetation by reporting locations of broken or damaged cattle fencing to the grazing manager.
	Objective 2: Restore and enhance native vegetation communities and promote their resilience.
	• Rehabilitate or revegetate areas subjected to surface- disturbing activities with native plants to protect areas from erosion and invasion by invasive species.
	• Vegetate with native pollinator friendly species when and where possible.
	• Use locally selected seed stock during revegetation projects when possible.
	• Coordinate with CalFire annually to identify burn plots consistent with IWFMP targets.
	• Conduct post-activity monitoring after training, construction, or maintenance activities to determine level of impacts and revegetate or designate off-limits for rehabilitation as needed.
	4.5.2 Forest and Woodlands
	Goal: Protect and maintain coast live oak and riparian woodlands and their natural ecosystem roles such as wildlife habitat, migration corridors, watershed function, thermal cover, and carbon sequestration.
	Objective 1: Prevent loss and degradation of oak and riparian woodlands.
	• Restrict military use or large training events in oak woodlands to reduce impacts to oak roots, understory plants and leaf litter decomposition.
	• Restrict grazing and other high impact activities in riparian areas. Military training activities shall be restricted to dismounted activities. No ground disturbing activities are allowed within riparian areas
	• Restrict vehicle movement to designated roads and trails in riparian zones.
	• Employ erosion control BMPs for road maintenance and construction activities to reduce direct and indirect impacts on riparian areas.

Management Area	Conservation Measure	
Vegetation and Wildlife Habitat	• Comply with Native Tree Management guidelines and requirements (*Section 4.5.3 Native Tree Management*) for all damaged or removed oak or riparian trees.	
	• Conduct environmental awareness briefings to installation users that details the ecological importance of forests and woodlands.	
	Objective 2: Encourage native tree recruitment and forest and woodland regeneration.	
	• Allow snags and logs to subsist to provide wildlife habitat and nutrient cycling through decomposition.	
	Objective 3: Prevent the spread of Sudden Oak Death Syndrome (SODS) disease in coast live oak, a deadly arboreal disease caused by an invasive plant pathogen from Europe, *P. ramorum*.	
	• Disinfect trimming and pruning tools with bleach or other disinfectant to eliminate disease spread.	
	• Conduct pruning or trimming during the dry season as the pathogen spreads via water.	
	• If working in wet conditions, keep equipment on paved or dry surfaces and avoid mud.	
	• Do not remove infested plant debris from site. Chip small material and leave on-site to decompose and use larger pieces for firewood if possible.	
	• Stay up-to-date with online mapping resources showing the pathogen's distribution and proximity to CR.	
	• Remove infected oaks.	
	• Inspect nursery plants and ensure they are disease free prior to planting.	
	4.5.3 Native Trees	
	Goal: Protect native trees to preserve both the ecological and mission-critical benefits they provide to CSLO.	
	Objective: Ensure replacement and protection of existing native trees.	
	• Install exclusionary fencing around native trees in need of protection during military training or construction activities.	
	• Restrict hand digging, mechanical digging, and blade work under the drip line of native trees.	
	• Do not cut, move, or disturb dead and downed logs. This does not apply to downed trees or logs that are blocking roads or trails. No dead and downed logs shall be used for barricades or camouflage.	
	• No native trees will be cut or used as camouflage.	
	• Restrict parking under the drip line of native trees.	
	• Native tree pruning of limbs greater than three (3) inches in diameter must be done by a qualified arborist or by oversight of Environmental or ITAM staff.	
	• To the greatest extent possible, native tree removal should not occur during peak breeding bird season and bat pupping season (generally Feb-March to July-August). If trees are to be removed during this timeframe, bird and bat surveys must be completed prior to tree removal.	
	• Removal of oak trees with a diameter at breast height (DBH) of eight inches or greater or removal of any size riparian tree will be mitigated per the following:	
	1	Any native trees removed for purposes other than disease or safety concerns shall be replaced at a ratio of 3:1 with a monitoring program. Small trees, seedlings, or acorns shall be planted at appropriate densities in areas approved by CAEV.
	2	Trees/seedlings/acorns shall be watered at a frequency to ensure survival.
	3	Plantings shall occur during the appropriate season (i.e. oak acorns should be planted in January or February) within one year of tree removal.
	4	If possible, acorns to be planted as mitigation should be collected from the area where trees are to be removed during October and November.
	5	Trees planted should be monitored for a minimum of five years.
	6	If a 3:1 survivorship ratio (i.e. three surviving trees or seedlings for each tree removed) is not attained by the end of each year, sufficient numbers of additional trees, seedlings, or acorns shall be planted and monitored until the desired success ratio is attained.

Management Area	Conservation Measure	
Vegetation and Wildlife Habitat	7	As part of the monitoring program, the project proponent shall supply an annual monitoring report, which describes actions taken, the number of trees/seedlings/acorns planted, and the number of trees/seedlings/acorns remaining alive at the end of the season.
	4.5.4 Wetland and Aquatic Habitats	
	Goal: Preserve wetland and aquatic habitat and the ecosystem services they provide such as fish and wildlife habitat, water quality improvement, flood control, and groundwater replenishment.	
	Objective 1: Protect wetland and aquatic habitat.	
	• Maintain a 100 ft (30 m) buffer from the edge of wetlands. Activities to occur with the buffer area must be reviewed and approved by CAEV prior to the activity taking place.	
	• Store all hazardous materials at least 100 ft (30 m) from the edge of wetland and aquatic areas, in designated locations, with appropriate containment to avoid accidental spills.	
	• Require all proposed pesticide application activities to be reviewed by the environmental staff for potential impacts on sensitive resources, including wetlands, before they are implemented.	
	• Utilize BMPs to stabilize loose soils and prevent sedimentation of wetland and aquatic areas.	
	• Promote use and implementation of out-sloping, water bar, and other water conveyance techniques during annual trail maintenance activities to reduce erosion and prevent sedimentation of wetlands and waterways.	
	• Routinely engage with the installation and rancher to maintain and install fencing around wetland and aquatic areas to limit cattle access.	
	• Comply with all wetland regulations.	
	• Conduct environmental review of all ground disturbing activities that may impact wetlands and perform pre-activity surveys as needed.	
	Objective 2: Restore and enhance wetland and aquatic habitat.	
	• Maintain off-creek cattle water troughs to reduce cattle impacts to wetland and aquatic areas.	
	• Implement proper grazing practices to reduce nitrate levels in streams, including restrictions on grazing of riparian or aquatic areas.	
	4.5.6 Invasive Plants	
	Goal: Use integrated pest management strategies to control the spread and introduction of invasive plants to protect natural resources, improve habitat, sustain land available for military training, and provide for health and safety.	
	Objective 1: Control or eradicate existing invasive populations to prevent further spread throughout the installation.	
	• All pesticide applications will be applied by a certified pest control applicator and conducted in compliance with the directions on the pesticide label and the IPMP.	
	• Monitor and document treatment areas to ensure re-growth does not occur.	
	• Use chemical treatment methods as a last resort method.	
	• Coordinate with and obtain approval from CAEV before conducting any type of invasive removal in or near riparian or wetland areas to avoid impacts to sensitive species.	
	• Conduct invasive plant removal prior to seed set.	
	• Prioritize invasive plant removal in areas where sensitive and/or listed species occur or have the potential to occur.	
	Objective 2: Prevent and control new introductions of invasive plants.	
	• Require washing of undercarriage or tracks/wheels of tactical or construction vehicles prior to maneuvering or grading in training areas.	
	• Conduct road and firebreak grading activities in or near invasive plant populations prior to seed set.	
	• Coordinate grazing activities to avoid areas of invasive plant populations actively setting seed.	
	• Ensure straw wattles, jute netting, and hay bales are weed free certified prior to use.	
	4.6.1 General Fish and Wildlife	

Management Area	Conservation Measure
Fish and Wildlife	**Goal:** Conserve the natural ecological role of native fish and wildlife populations on CSLO.
	Objective 1: Protect fish and wildlife species and their habitats on CSLO.
	• Conduct environmental review and pre activity surveys of all training, construction, maintenance, and prescribed burn plans for potential adverse effects on fish and wildlife prior to conducting the activity. If impacts will occur, environmental staff will work with the project proponent to minimize impacts by altering or rescheduling the proposed activity.
	• Conduct environmental awareness briefings to installation users that details requirements to protect fish and wildlife and their habitats.
	• Conduct environmental review of proposed pesticide use and evaluate potential adverse impacts to fauna.
	• Install BMPs when and where necessary to reduce sediment loading of waterways.
	• Restrict activities within 100 feet (30 m) from the edge of wetlands and waterways and within riparian habitats.
	• Conduct pre-activity surveys for nesting birds and roosting bats.
	• Obtain appropriate authorization (that is, take permits) from the USFWS before intentionally and directly taking any migratory bird species.
	• To the extent possible, conduct prescribed burns after June 15 (Kershner, personal communication May 27, 2010).
	• Use and maintain nest deterrence on buildings to prevent impacts from cliff swallow (*Petrochelidon pyrrhonota*) nesting prior to nest construction. Constructed nests or nests undergoing construction and up to half built cannot be destroyed (Sandman, personal communication May 4, 2015).
	• Designate appropriate setback buffers around active bird nests. Nesting bird buffers must remain in place until young are no longer reliant on the nest. Buffers are marked in the field and maps of nest buffer locations will be submitted to Range Operations.
	• Promote passive relocation of roosting bats prior to roost disturbance or destruction by creating less hospitable roost environments (i.e. increase light and air circulation) or installing bat exclusion devices (bats can leave, but not return).
	• Designate appropriate setback buffers for maternity bat roosts. Maternity roosts must not be disturbed until young are no longer dependent.
	• During new developments and retrofits, advocate for facility lighting that has less negative impact on bat habitat, such as night-sky compliant lights and lights focused downward as opposed to broadcast lighting.
	• Whenever possible, use targeted application herbicide methods, avoid large-scale broadcast applications, and take precautions to limit off-site movement of herbicides (e.g., drift from wind and discharge from surface water flows).
	Objective 2: Assess fish and wildlife status and trends. Maintain accurate and up-to-date records on fish and wildlife distribution and abundance to aid in future management decisions.
	• Monitor and evaluate effects of military training activities on fish and wildlife populations through pre-activity and opportunistic surveys.
	• Ensure environmental staff remains educated and informed about relevant natural resource laws and regulations.
	• Ensure environmental staff stay current on taxonomic changes to fish and wildlife species.
	• Ensure environmental staff stay current on changes to conservation status of fish and wildlife species
	4.6.2 Pollinators
	Goal: Conserve pollinator populations and their habitat on CSLO.
	Objective 1: Improve understanding of pollinator use on CSLO.
	• Document incidental pollinator observations at every chance.
	Objective 2: Protect and enhance pollinator habitat.
	• Conduct landscape maintenance activities to avoid bloom periods of plants whenever possible.
	• Do not apply herbicide on blooming plants, unless those plants are invasive species. Herbicide application should be targeted and not broad application. Implement mechanical plant removal rather than herbicide use whenever possible.

Management Area	Conservation Measure
Fish and Wildlife	• Screen all classes of pesticides for pollinator risk to avoid harmful applications, including biological pesticides such as *Bacillus thuringiensis.*
	• Avoid the use of neonicotinoids or other systemic insecticides, including coated seeds, any time of the year in monarch and other pollinator habitat due to their ecosystem persistence, systemic nature, and toxicity.
	• Avoid the use of soil fumigants.
	• Consider non-chemical weed control techniques, when feasible (Cal-IPC non chemical BMPs).
	• Apply herbicides during young plant phases, when plants are more responsive to treatment, and when monarchs and other pollinators are less likely to be nectaring on the plants.
	• Separate habitat areas from areas receiving treatment with a pesticide-free spatial buffer and/or evergreen vegetative buffer of coniferous, non-flowering trees to capture chemical drift. The appropriate monarch and pollinator habitat spatial buffer size should be a minimum of 40 feet from ground-based pesticide applications, 60 feet from air-blast sprayers, and 125 feet from any systemic insecticide applications or seed-treated plants.
	• Revegetate barren or degraded areas with native pollinator friendly plants.
	• Work with post-construction and facility maintenance personnel to establish and promote pollinator-friendly plants and landscapes during construction and maintenance activities.
	• Coordinate with local bee-keepers to relocate bee colonies instead of eradicating colonies.
	• Educate installation users about the benefits of pollinators.
	4.6.3 Invasive and Feral Animals
	Goal: Control existing populations and prevent the spread and further introduction of invasive species and pests.
	Objective: Follow IPM and pest control guidelines to control invasive and feral animals.
	• Monitor and document pest species populations and identify priority control actions.
	• Review DPW scopes of work for ground squirrel control to ensure it identifies guidelines in the squirrel abatement plan.
	• Conduct periodic surveys for signs of feral pig.
Threatened and Endangered Species	**4.7.1 Chorro Creek Bog Thistle**
	Goal: Promote conservation of Chorro Creek bog thistle and species recovery on CSLO.
	Objective: Protect Chorro Creek bog thistle plants and enhance habitat.
	• Prohibit vehicles within Chorro Creek bog thistle-occupied habitat. Use of vehicles for maintenance and natural resource activities within 330 ft (100 m) of Chorro Creek bog thistle occupied habitat shall be restricted to existing roads and firebreaks, and no off- road use of vehicles will be allowed.
	• Projects occurring within 330 ft (100 m) of Chorro Creek bog thistle-occupied habitat shall be reviewed by the Environmental Directorate approval and monitored by a qualified biologist.
	• Restrict training activities within Chorro Creek bog thistle-occupied habitat. Any military training activities proposed within Chorro Creek bog thistle-occupied habitat will undergo environmental review.
	• Keep foot traffic during fencing, monitoring and natural resource management activities at the minimum necessary to conduct the activities.
	• No more than ten individuals shall conduct monitoring or other natural resource management activities within Chorro Creek bog thistle occupied habitat at any one time.
	4.7.2 South-Central California Coast Steelhead
	Goal: Promote the recovery, long-term health and resilience of the SCCC steelhead on CSLO.
	Objective 1: Protect SCCC steelhead and its habitat on CSLO.
	• Do not locate soakage pits, field mess facilities, field shower points, decontamination points, laundry points, and water purification points within 100 ft (30 m) of the edge of surface waters or streambeds.
	• Prohibit portable latrines and hazardous materials within 100 ft (30m) of the edge of surface water or streambeds.
	• Limit training activities in riparian, aquatic, or wetland areas.

Management Area	Conservation Measure
Threatened and Endangered Species	• Projects involving work in aquatic sites will occur outside the SCCC steelhead spawning season (November to April).
	• Projects involving work in riparian sites should occur outside the SCCC steelhead spawning season (November to April). If work must be undertaken during spawning season, appropriate protective measures will be implemented.
	• Stream crossing locations for pedestrian troop maneuvers shall be surveyed for environmental impacts prior to the training event. If impacts may occur, alternate stream crossing locations will be identified.
	• Vehicles shall not be driven or equipment operated in wetted portions of a stream without prior review and approval from CAEV.
	• Maintain adequate buffers around wetlands and waterways during prescribed burns to eliminate erosion and sedimentation potential. Buffers will be determined by CAEV prior to prescribed burning and will be determined based on fuel conditions, season, weather, and slope (EPA 2005). Do not conduct prescribed burning in riparian habitat.
	• Install BMPs in disturbed areas or areas of loose soil to eliminate erosion potential.
	• Revegetate barren soils with native seed and plant stock.
	• Repair and maintain cattle fencing along riparian corridors.
	• Conduct environmental awareness training for installation users that details the biology and life history of steelhead.
	Objective 2: Enhance steelhead habitat on CSLO.
	• Continue current riparian management such as maintaining riparian buffers, limiting the types of training activities that may occur within riparian areas, and restricting ground disturbing activities.
	• Leave downed woody debris in place whenever possible to increase protective cover for SCCC steelhead.
	4.7.3 California Red-legged Frog
	Goal: Promote the recovery, long-term health, and resilience of the California red-legged frog on CSLO.
	Objective 1: Protect California red-legged frogs and their habitat.
	• Establish 100 ft (30 m) buffers from the edge of wetlands and waterways that prohibit any activity without prior environmental approval.
	• Prohibit portable latrines within 100 ft (30 m) of the edge of surface water or streambeds.
	• Limit off-road vehicle traffic during the wet season when CRLF are dispersing to breeding sites.
	• Prohibit the use of any herbicide or pesticide within 300 ft (90 m) of the edge of wetland or aquatic habitat.
	• Schedule activities involving work in riparian and aquatic sites outside of the California red-legged frog breeding season (November through April).
	• Ensure survey materials and equipment are decontaminated prior to use in CRLF habitat to eliminate spread of chytrid fungus.
	• Per USFWS recommendation, test any dead CRLF for amphibian disease.
	• Conduct environmental awareness training for users of the installation.
	Objective 2: Enhance California red-legged frog habitat on CSLO.
	• Maintain cattle exclusion fencing around surface waters and riparian corridors that are used by CRLF.
	4.7.4 California Condor
	Goal: Promote the conservation of California condors on CSLO.
	Objective: Protect the California condor and its habitat on CSLO.
	• If a condor is observed foraging or roosting within a project or training area, activities that may adversely affect the condor will cease until a CA ARNG biologist has determined that the condor has vacated the area on its own.
	• Any animal carcass found within training areas of active use that could potentially attract a foraging condor with be removed or transferred to a location on post where there is no threat of death or harassment by military activities.
	• No trash shall be left in the training areas.

Management Area	Conservation Measure
Threatened and Endangered Species	• Conduct environmental awareness training to users of the installation.
	• Ensure Environmental staff stays current on condor occurrences in the area and continue communication and collaborate with VWS and other agencies and organizations.
	4.7.5 Least Bell's Vireo
	Goal: Promote conservation and recovery of least Bell's vireo on CSLO.
	Objective: Conserve and enhance least Bell's vireo habitat on CSLO.
	• Restrict activities in riparian habitat. Activities may only occur after review and approval by CAEV.
	• Conduct a nesting bird survey for LBVI for any action occurring within 100 ft (30 m) of suitable riparian habitat. Conduct a nesting bird survey for LBVI for any use of heavy equipment or noise-generating activities within 300 ft (90 m) of suitable habitat. If nesting least Bell's vireo are detected, USFWS will be contacted and a 300 -350 ft (90 m to 106 m) buffer will be established for any activity until young are no longer reliant on the nest.
	• Removal of non-native trees and control of invasive species in suitable LBVI habitat will occur outside of the LBVI breeding season.
	• CA ARNG will record any least Bell's vireo observation gathered during pre-activity or opportunistic surveys and information will be reported to USFWS and CDFW.
	• If nesting LBVI are documented on CSLO, USFWS will be contacted to discuss appropriate buffer distances for prescribed burns. Once determined, buffer distances will be incorporated into annual burn plans.
	• Conduct environmental awareness training to users of the installation.
	• Ensure Environmental staff stays current on LBVI occurrences in the area and continues communication and collaboration with USFWS.
	4.7.6 Swainson's Hawk
	Goal: Promote the conservation of Swainson's hawk on CSLO.
	Objective: Protect Swainson's hawk and its habitat on CSLO.
	• Conduct pre-activity surveys for actions that may have the potential to impact Swainson's hawk.
	• Implement appropriate setback buffers for any Swainson's hawk observed on CSLO.
	• Record any sightings and report information to CDFW.
	• Check local occurrence data regularly to stay up to date on species presence in the area.
	4.7.7 Tricolored Blackbird
	Goal: Promote conservation of tricolored blackbird on CSLO.
	Objective: Protect the tricolored bird and its habitat on CSLO
	• Restrict activities within 100 feet (30m) from the edge of wetland habitats.
	• Conduct pre-activity surveys for actions that may impact the tricolored blackbird.
	• Implement appropriate setback buffers for nesting colonies on CSLO.
	• Check local occurrence data regularly to stay up to date on species presence in the area.
	• Record any sightings and report info to CDFW.
	4.7.8 Bald Eagle
	Goal: Promote conservation of bald eagles and their habitat on CSLO.
	Objective: Protect bald eagles and their habitat on CSLO.
	• Record any bald eagle observations gathered during pre-activity or opportunistic surveys.
	• Implement a protective buffer if bald eagles are observed nesting on CSLO.
	• Check local occurrence data regularly to stay up to date on species presence in the area.
	• Record any nesting observations and report info to CDFW via the California Natural Diversity Database (CNDDB).
	4.8 Special Status Species

Management Area	Conservation Measure
Special Status Species	**Goal:** Provide for the conservation, enhancement, and protection of special status species as a proactive strategy to prevent federal and state listings.
	Objective 1: Determine special status species distribution and abundance on CSLO to aid in future management.
	• Conduct pre-activity surveys for any activity that may impact sensitive species and work with the project proponent to alter the activity or establish appropriate mitigation measures.
	Objective 2: Protect existing special status species and their habitat on CSLO.
	• Schedule mowing and vegetation management activities to occur outside the bloom period of sensitive annual plants.
	• Restrict prescribed burning, mowing, and weed whacking activities within a 50 ft (15 m) buffer around serpentine outcrops to protect sensitive endemic plants.
	• Remove tropical milkweed that is detected, and replace it with native, insecticide-free milkweed and native, insecticide-free nectar plants appropriate for the location.
	• Do not permit planting of non-native tropical milkweed to minimize the spread of the pathogen *Ophryocystis elektroscirrha* (OE). OE can build up on tropical milkweed and infect monarchs, because these plants are evergreen and do not die back in the winter. OE can be lethal to monarchs.
	• Conduct management activities such as pesticide application, mowing, burning, and grazing in monarch breeding and migratory habitat outside of the timeframe when monarchs are likely to be present (1 Nov to 1 April).
	• Conduct environmental awareness briefings to installation users that describes special status species and their habitat on the installation.
	• Ensure Environmental staff stay updated on agency decisions, published material, and meetings that change the listing status of species.
Sustainability of the Military Mission and the Natural Environment	**5.1.1 Climate Change**
	Goal: Combat the implications of climate change by promoting landscape resiliency and reducing fossil fuel dependency.
	Objective: Integrate climate adaptation strategies into natural resource management.
	• Continue to incorporate climate resiliency into management actions for all natural resources management on CSLO.
	5.1.2 Encroachment Partnering
	Goal: Sustain military readiness and installation biodiversity by proactive encroachment planning.
	Objective: Continue to participate in the ACUB program.
	• Continue to identify mutual objectives with neighboring and regional agencies and landowners for land conservation to prevent development of critical open spaces.
Outdoor Recreation and Environmental Awareness	**5.2 Outdoor Recreation and Environmental Awareness**
	Goal: Improve the quality of life for soldiers training at CSLO, staff, and the local community by providing compatible natural resource–based recreational opportunities.
	Objective: Plan and promote recreational opportunities when consistent with the military mission and sound ecosystem management principles.
	• Develop site-specific guidelines for recreational activities to reduce or eliminate impacts on natural resources.
	• Educate users about environmental resources on the installation.
	• Prevent public and military intrusion into sensitive areas via signage and fencing when necessary.
	5.3.1 Livestock Grazing Outlease
	Goal: Align the grazing program to benefit the military mission and the health and sustainability of training lands.
	Objective: Manage grazing to support ecological processes and fuel load reduction.

Management Area	Conservation Measure
Livestock Grazing and Agricultural Outlease	• Continue using Residual Dry Matter (RDM) (mulch) standards to manage grazing. CSLO ENV staff will collect RDM samples annually. Retain a minimum of 500-800 pounds per acre (227-363 kilograms per 0.4 ha) of RDM of palatable forage species at the end of each season.
	• Distribute salt/supplements throughout the leased pasture to facilitate optimal distribution of livestock. Do not place salt/supplements within 0.25 mile (0.4 km) of any riparian area, watering source, or surfaced road.
	• Continue to practice rotational grazing.
	• Refrain from grazing or moving cattle through populations of invasive plants while they are setting seed or when fruit is ripened.
	• Communicate with the rancher on a regular basis and obtain regular updates on pasture use and grazing intensity.
	• Conduct annual monitoring of fences and water troughs to ensure their functionality.
	• Review the grazing lease and update when necessary.
	5.3.2 Agriculture Outlease
	Goal: Align the agricultural outlease program to benefit the military mission and the health and sustainability of training lands.
	Objective 1: Manage agricultural outleasing with other uses and sustainable land use.
	• Protect adjoining riparian habitats along Pennington Creek through maintenance of the current 10-ft (3-m) buffer from the edge of the waterway. No planting, cultivation, or application of pesticides shall occur within this area.
	• Minimize the use of herbicides and pesticides through the use of IPM practices.
	• Conduct environmental review of the agricultural license (and renewal) to ensure compliance with NEPA/CEQA and the INRMP requirements (e.g., inclusion of IPM practices and buffer).
Developed Areas, Landscape, and Grounds	**5.4 Developed Areas, Landscape and Grounds**
	Goal: Enhance the role developed and landscaped habitats play in water quality, declining wild species, native pollinators, the health of wetlands and waterways, and other natural communities.
	Objective: Incorporate innovation and best science in decisions about construction and its connection to natural resource sustainability. Utilize low-impact design and green infrastructure approaches to improve natural resource function and value while improving ecosystem services.
	• Incorporate principles and objectives from the IPMP. Strive to reduce reliance on chemical means of invasive species control, per DoDI 4150.07.
	• Integrate consideration of natural and cultural resources early in the planning process through early coordination with environmental staff.
	• Utilize invasive control BMPs to minimize introduction and spread of noxious species.
	• Design buildings and utility infrastructure to reduce bird and bat nesting potential.
	• Do not use invasive species in landscaping or land rehabilitation and management projects (EO 13112). All plants on the Cal-IPC Invasive Plant Inventory (2006) and all non-native grasses (except those used for turf/lawns or those included in the approved plant list) are unacceptable for landscaped areas.
	• Landscape with native, drought tolerant, pollinator and wildlife friendly plants at every opportunity.
	• Reduce the use of grass as a groundcover except for recreational or ceremonial purposes
	• Pursue and conduct training in sustainability for engineers, construction and design professionals, contracting and natural resource personnel.
	• Maximize use of rainwater runoff from buildings and surface flow for landscape irrigation and other non-potable uses. Recycle wastewater for use in the landscape and habitat restoration. Reduce water use in the landscape with smart irrigation practices.
	• Promote the use of permeable hardscape, which can be used in large parking facilities and other areas using existing technology. Bio-swales can be combined with permeable surfacing to filter and direct any excess water during a heavy rain event.

Management Area	Conservation Measure
	• Encourage planting three trees for every landscaped tree removed during construction projects in cantonment areas.
Beneficial Partnerships and Collaborative Planning	**5.5 Beneficial Partnerships and Collaborative Planning**
	Goal: Regularly engage in cooperative resources planning partnerships to create regional conservation, ecosystem-based solutions of mutual benefit.
	Objective: Participate in regional conservation and ecosystem planning efforts, in collaboration with other governmental agencies and non-governmental organizations.
	• Continue to seek partnerships with other institutions, organizations, and researchers to study distribution and habitat needs of plant and wildlife populations that may be affected by climate change and other regional or migratory pathway concerns.
	• Continue existing partnerships and participating in areas pertinent to DoD ecosystem management objectives (per DoDI 4715.03).
	• Continue the use of Cooperative Agreements to achieve natural resources management objectives, especially natural resource management research of mutual interest.
NEPA and CEQA Compliance	**5.6 NEPA and CEQA Compliance**
	Goal: Apply NEPA and CEQA requirements and policies to enhance mission-related use and conservation of natural resources.
	Objective: Continue to assess the environmental consequences of proposed actions using the existing CA ARNG integrated NEPA/CEQA process.
	• Ensure environmental staff stay up to date on NEPA and CEQA regulations and guidance.
Law Enforcement	**5.7 Law Enforcement**
	Goal: Provide for enforcement of natural resources laws and regulations by professionally trained personnel, taking proper safety and security measures.
	Objective: Ensure that installation users practice environmental stewardship in accordance with AR 200-1 and CA ARNG Regulation 200-1 (CSLO Regulation 350-1).
	• Provide environmental briefings to all installation users.
	• Reports environmental damage or noncompliance to Range Operations for investigation.
	• Maintain effective working relationships with federal and state agencies to resolve non-compliance issues efficiently.
Training of Natural Resources Personnel	**5.8 Training of Natural Resources Personnel**
	Goal: Continue to improve the success of natural resources management activities through professional development and training.
	Objective: Continue to provide professionally trained personnel for enforcement of conservation laws and regulations.
	• Ensure environmental staff stays current on available training opportunities.

Appendix C. ITAM Annual Workplan

Project	Project Description	FY22 Status
Tactical Concealment Enhancement	Continuation of native oak tree propagation and planting program to maintain concealment training opportunities at Camp San Luis Obispo. Program goal is to establish tree vegetative cover to meet concealment requirements within the training areas. Project aim is to successfully plant approximately 200 trees annually. Native Coast Live Oak Trees are purchased as saplings from a local nursery. These oak saplings are planted at Camp San Luis Obispo by LRAM staff during the winter months. Each oak sapling is planted within a gopher basket to provide root establishment and protects the roots from rodents and ground squirrel predation. Each oak sapling is watered once a month during summer for establishment. A	NGB/DA Approved
On-demand Maneuver Trail Maintenance	Situational maneuver trail maintenance grading or other required repair as needed at Camp San Luis Obispo. The maintenance of these trails may include grading, out-sloping, compacting, berm removal, installation of rolling dips/water bars/diversion ditches. This activity may include hardening of the trail with appropriate sized aggregate to provide all season access to the training areas. The CAARNG LRAM Program trail standards are aimed at producing efficient, low-cost, low impact trails that have a minimal effect on the stream of a watershed. Approximately 29 miles of trails require maintenance annually.	NGB/DA NOT Approved
Vegetation Management Control on Maneuver Trails	Mowing and tree trimming to remove unwanted vegetation along 29 miles of maneuver trail edges. These efforts greatly increase line of site around this trail network. Removal of vegetation allows the heavy equipment operator unobstructed access to implement trail maintenance erosion control standards.	NGB/DA NOT Approved
Maneuver Land Rehabilitation	Situational maneuver land rehabilitation as needed to include erosion and sediment control, grading and other repair activities. Other treatments may include reseeding or hydro-seeding to establish ground cover and some spraying of herbicides to reduce impeding noxious weeds. Approximately 40 acres of maneuver land require maintenance annually.	NGB/DA Approved
Maintenance of Bivouac Sites	Maintain existing Training Area bivouac sites. These bivouac sites may require grading/ripping efforts to return to a stable slope/grade. Other treatments may include mowing, spraying of herbicides, reseeding or hydro-seeding to establish ground cover. Approximately 50 acres require maintenance annually.	NGB/DA Approved

Appendix D. Species Lists

D.1 Plant Species Recorded at Camp San Luis Obispo

Scientific Name	Common Name	Cal-IPC Rating	Status	CRPR	SAR Status
LICHENS					
Family Blasteniaceae					
Caloplaca luteominia var. *bolanderi*	lichen	-	-	-	-
Caloplaca luteominia var. *lutominea*	lichen	-	-	-	-
Family Candelariaceae					
Candelariella aurella	hidden goldspeck lichen	-	-	-	-
Family Cladoniaceae					
Cladonia spp.	lichen	-	-	-	-
Cladonia chlorophaea	cup lichen	-	-	-	-
Family Collemataceae					
Collema furfuraceum	jelly lichen	-	-	-	-
Leptogium californicum	California skin lichen	-	-	-	-
Family Graphidaceae					
Xanthoria spp.	lichen	-	-	-	-
Family Hymeneliaceae					
Aspicilia calcarea	lichen	-	-	-	-
Family Lecanoraceae					
Lecanora spp.	rim lichens	-	-	-	-
Family Lecideaceae					
Lecidea spp.	disk lichens	-	-	-	-
Family Parmeliaceae					
Flavoparmelia caperata	common greenshield lichen	-	-	-	-
Flavopunctelia flaventior	flavopunctelia lichen	-	-	-	-
Parmotrema chinense	Chinese parmotrema lichen	-	-	-	-
Punctelia ulophylla	punctelia lichen	-	-	-	-
Xanthoparmelia spp.	rock shield lichen	-	-	-	-
Family Physciaceae					
Physcia spp.	physcia lichen	-	-	-	-
Physcia adscendens	rosette lichen	-	-	-	-
Physcia aipola	hoary rosette lichen	-	-	-	-
Physcia tribacia	rosette lichen	-	-	-	-
Physconia isidiigera	frosted lichen	-	-	-	-
Family Ramalinaceae					
Niebla spp.	lichen	-	-	-	-
Ramalina farinacea	fairnose catilage lichen	-	-	-	-
Ramalina leptocarpha	lichen	-	-	-	-
Family Thelotremataceae					
Diploschistes gypsaceus	lichen	-	-	-	-
Family Aytoniaceae					
Asterella bolanderi	liverwort	-	-	-	-

Scientific Name	Common Name	Cal-IPC Rating	Status	CRPR	SAR Status
Family Fossombroniaceae					
Fossombronia longiseta	liverwort	-	-	-	-
Family Porellaceae					
Porella cordaeana	liverwort	-	-	-	-
Family Ricciaceae					
Riccia nigrella	black crystalwort	-	-	-	-
Riccia sorocarpa	liverwort	-	-	-	-
MOSSES					
Family Bartramiaceae					
Anacolia baueri	Bauer's anacolia moss	-	-	-	-
Bartramia scticta	bartramia moss	-	-	-	-
Family Brachytheciaceae					
Brachythecium fendleri	Fendler's brachythecium moss	-	-	-	-
Homalothecium arenarnium	sandwort homalothecium moss	-	-	-	-
Scleropodium cespitans	low scleropodium moss	-	-	-	-
Scleropodium touretti	Touret's scleropodium moss	-	-	-	-
Family Bryaceae					
Bryum argenteum	silver moss	-	-	-	-
Family Fabroniaceae					
Fabronia pusilla	silver hair moss	-	-	-	-
Family Fissidentaceae					
Fissidens crispus	moss	-	-	-	-
Fissidens curvatus	moss	-	-	-	-
Family Grimmiaceae					
Grimmia laevigata	grimmia dry rock moss	-	-	-	-
Grimmia ovalis	oval dry rock moss	-	-	-	-
Grimmia trichophylla	grimmia dry rock moss	-	-	-	-
Family Lecuodontaceae					
Alsia californica	California alsia moss	-	-	-	-
Family Leskeaceae					
Claopodium whippleanum	Whipple's claopodium moss	-	-	-	-
Family Pottiaceae					
Hennediella stanfordensis	moss	-	-	-	-
Syntichia pagorum	moss	-	-	-	-
Syntichia princeps	moss	-	-	-	-
Tortula atrovirens	moss	-	-	-	-
FERNS					
Family Polypodiaceae					
Polypodium spp.	polypody	-	-	-	-
Polypodium californicum	California polypody	-	-	-	-
Polypodium calirhiza	nested polypody	-	-	-	-
Family Selaginellaceae					
Selaginella bigelovii	Bigelow's moss-fern	-	-	-	-
Family Dennstaedtiaceae					
Pteridium aquilinum	Bracken Fern	-	-	-	-
Family Dryopteridaceae					
Dryopteris arguta	wood fern	-	-	-	-
Family Pteridaceae					
Adiantum jordanii	California maidenhair fern	-	-	-	-

Scientific Name	Common Name	Cal-IPC Rating	Status	CRPR	SAR Status
Aspidotis californica	California lacefern	-	-	-	-
Aspidotis carlotta-halliae	tufted lacefern	-	-	-	-
Myriopteris covillei	Coville's lip fern	-	-	-	-
Pellaea andromedifolia	coffee fern	-	-	-	-
Pellaea mucronata var. *mucronata*	bird's foot fern	-	-	-	-
Pentagramma triangularis ssp. *triangularis*	goldback fern	-	-	-	-
MONOCOTS					
Family Amaryllidaceae					
*Amaryllis belladonna**	naked ladies	-	-	-	-
Family Araceae					
Lemna minuta	duckweed	-	-	-	-
Family Asphodelaceae					
*Asphodelus fistulosus**	onionweed	M	-	-	-
Family Equisetaceae					
Equisetum laevigatum	smooth scouring rush	-	-	-	-
Equisetum telmateia ssp. *braunii*	giant horsetail	-	-	-	-
Family Juncaceae					
Juncus balticus	wire rush, baltic rush	-	-	-	-
Juncus bufonius	common toad rush	-	-	-	-
Juncus bufonius var. *bufonius*	toad rush	-	-	-	-
Juncus bufonius var. *congestus*	clustered toad rush	-	-	-	-
Juncus patens	spreading rush	-	-	-	-
Juncus phaeocephalus	brown-headed rush	-	-	-	-
Juncus phaeocephalus var. *phaeocephalus*	brown-headed rush	-	-	-	-
Juncus xiphioides	irisleaf rush	-	-	-	-
Luzula comosa	common wood rush	-	-	-	-
Luzula subsessilis	short-stalked wood-rush	-	-	-	-
Family Cyperaceae					
Carex obispoensis	San Luis Obispo sedge	-	-	1B.2	G3?/S3?
Carex serratodens	bifid sedge	-	-	-	-
Carex spissa	San Diego sedge	-	-	-	-
Cyperus eragrostis	nutsedge, galingale	-	-	-	-
Cyperus involucratus	umbrella sedge	-	-	-	-
Cyperus niger	nutsedge, galingale	-	-	-	-
Eleocharis spp.	spike-rush	-	-	-	-
Eleocharis macrostachya	common spike-rush	-	-	-	-
Eleocharis parishii	Parish's spike-rush	-	-	-	-
Isolepis cernuus	low club rush	-	-	-	-
Schoenoplectus acutus var *occidentalis*	common tule, viscid bulrush	-	-	-	-
Schoenoplectus americanus	three-square	-	-	-	-
Scripus microcarpus	small-fruited bullrush	-	-	-	-
Family Agavaceae					
Chlorogalum pomeridianum	common soap plant	-	-	-	-
Chlorogalum pomeridianum var. *minus*	dwarf soap plant	-	-	1B.2	G5T3/S3
Hesperoyucca whipplei [*Yucca whipplei*]	our lord's candle	-	-	-	-
Family Alliaceae					
Allium haematochiton	redskin onion	-	-	-	-
Family Iridaceae					
Sisyrinchium bellum	blue-eyed grass	-	-	-	-

Scientific Name	Common Name	Cal-IPC Rating	Status	CRPR	SAR Status
Family Liliaceae					
Calochortus albus	white glove lily, fairy lantern	-	-	-	-
Calochortus argillosus	clay mariposa lily	-	-	-	-
Calochortus argillosus venustus	clay mariposa lily/ butterfly mariposa lily	-	-	-	-
Calochortus catalinae	Catalina mariposa lily	-	-	4.2	G3G4/S3S4
Calochortus clavatus ssp. *clavatus*	club-haired mariposa lily	-	-	4.3	-
Calochortus obispoensis	San Luis mariposa lily	-	-	1B.2	G2/S2
Calochortus simulans	San Luis Obispo mariposa lily	-	-	1B.3	-
Calochortus venustus	butterfly mariposa lily	-	-	-	-
Calochortus venustus argilosus	butterfly mariposa lily	-	-	-	-
Fritillaria agrestis	stink bells	-	-	4.2	G3/S3
Fritillaria biflora var. *biflora*	chocolate lily	-	-	-	-
Lilium pardalinum ssp. *pardalinum*	leopard lily	-	-	-	-
Family Melanthiaceae					
Toxicoscordion fremontii	Fremont's star lily	-	-	-	-
Family Orchidaceae					
Epipactis gigantea	stream orchid	-	-	-	-
Family Poaceae					
Agrostis pallens	San Diego bent grass	-	-	-	-
*Aira caryophyllea**	silvery hair-grass	-	-	-	-
*Arundo donax**	giant reed, arundo	H	-	-	-
*Avena barbata**	slender wild oats	M	-	-	-
*Avena fatua**	wild oats	M	-	-	-
*Brachypodium distachyon**	false brome	M	-	-	-
*Briza minor**	small quaking grass	-	-	-	-
Bromus carinatus	California brome	-	-	-	-
Bromus carinatus var. *carinatus*	California brome	-	-	-	-
*Bromus catharticus**	rescue brome	-	-	-	-
*Bromus diandrus**	ripgut brome	M	-	-	-
*Bromus hordeaceus**	soft chess brome	L	-	-	-
*Bromus madritensis**	foxtail brome	-	-	-	-
Bromus madritensis subsp. *madritensis**	foxtail chess	-	-	-	-
Bromus madritensis subsp. *rubens**	red brome	H	-	-	-
*Bromus sterilis**	poverty brome	-	-	-	-
*Bromus tectorum**	cheatgrass, downy brome	H	-	-	-
*Cortaderia selloana**	pampas grass	H	-	-	-
*Cynodon dactylon**	Bermuda grass	M	-	-	-
*Cynosura echinatus**	dogtail grass	M	-	-	-
Danthonia californica	oatgrass	-	-	-	-
Deschampsia danthonioides	annual hairgrass	-	-	-	-
*Desmarzeria rigida**	ferngrass	-	-	-	-
Distichlis spicata	saltgrass	-	-	-	-
Elymus condensatus	giant wildrye	-	-	-	-
Elymus condensatus	giant ryegrass	-	-	-	-
Elymus elymoides	squirreltail	-	-	-	-
Elymus elymoides var. *elymoides*	squirreltail	-	-	-	-
Elymus glaucus	blue wildrye	-	-	-	-
Elymus glaucus subsp. *glaucus*	blue wildrye	-	-	-	-

Scientific Name	Common Name	Cal-IPC Rating	Status	CRPR	SAR Status
Elymus multisetus	big squirreltail	-	-	-	-
*Festuca bromoides**	six-week fescue	-	-	-	-
Festuca microstachys	small fescue	-	-	-	-
*Festuca myuros**	rattail fescue	M	-	-	-
Festuca octoflora	sixweeks fescue	-	-	-	-
*Festuca perrenis**	Italian ryegrass	M	-	-	-
*Gastridium phleoides**	nit grass	-	-	-	-
Hordeum brachyantherum	meadow barley	-	-	-	-
Hordeum brachyantherum subsp. *brachyantherum*	meadow barley	-	-	-	-
Hordeum brachyantherum subsp. *californicum*	California meadow barley	-	-	-	-
Hordeum intercedens	bobtail barley	-	-	3.2	G3G4/S3S4
Hordeum jubatum	foxtail barley	-	-	-	-
Hordeum marinum subsp. *gussoneanum**	Mediterranean barley	M	-	-	-
*Hordeum murinum**	foxtail barley	M	-	-	-
Hordeum murinum subsp. *leporinum*	hare barley	-	-	-	-
*Hordeum vulgare**	common barley	-	-	-	-
Koeleria macrantha	bristly junegrass	-	-	-	-
*Lamarckia aurea**	goldentop	-	-	-	-
Melica imperfecta	smallflower melic grass	-	-	-	-
Melica spp.	melic grass	-	-	-	-
Melica torreyana	Torrey's melica	-	-	-	-
Muhlenbergia rigens	deergrass	-	-	-	-
*Pennisetum setaceum**	fountain grass	M	-	-	-
*Pennisetum villosum**	feathertop fountaingrass	-	-	-	-
*Phalaris aquatica**	Harding grass	M	-	-	-
Phalaris arundinacea	reed canary-grass	-	-	-	-
*Phalaris minor**	Mediterranean canary-grass	-	-	-	-
*Phalaris paradoxa**	hood canary-grass	-	-	-	-
*Phleum pratense**	common timothy	-	-	-	-
*Poa annua**	annual bluegrass	-	-	-	-
*Poa pratensis**	Kentucky bluegrass	L	-	-	-
Poa secunda subsp. *secunda*	one-sided bluegrass	-	-	-	-
*Polypogon interruptus**	ditch beardgrass	-	-	-	-
*Polypogon monspeliensis**	annual beardgrass	L	-	-	-
Polypogon viridis [*Agrostis viridis*]*	water beard grass	-	-	-	-
*Setaria viridis**	green bristlegrass	-	-	-	-
Stipa cernua	nodding needlegrass	-	-	-	-
Stipa lepida	foothill needlegrass	-	-	-	-
Stipa milacea var. *miliacea**	smilograss	L	-	-	-
Stipa pulchra	purple needlegrass	-	-	-	-
Family Potamogetonaceae					
Stuckenia pectinata	Sago pondweed	-	-	-	-
Family Themidaceae					
Bloomeria crocea	common goldenstar	-	-	-	-
Dichelostemma capitatum subsp. *capitatum*	blue dicks	-	-	-	-
Family Typhaceae					
Typha spp.	cat-tail	-	-	-	-
Typha domingensis	narrow-leaved cat-tail	-	-	-	-

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Typha latifolia	broad-leaved cat-tail	-	-	-	-
Family Zannichelliaceae					
Zannichellia palustris	horned pondweed	-	-	-	-
DICOTS					
Family Adoxaceae					
Sambucus nigra subsp. *caerulea*	blue elderberry	-	-	-	-
Family Aizoaceae					
*Carpobrotus chilensis**	sea fig	M	-	-	-
Family Anacardiaceae					
*Schinus molle**	Peruvian pepper tree	L	-	-	-
Toxicodendron diversilobum	western poison oak	-	-	-	-
Family Apiaceae					
Apiastrum angustifolium	wild celery	-	-	-	-
Apium graveolens	celery, smallage	-	-	-	-
Berula erecta	cut-leaved water parsnip	-	-	-	-
*Conium maculatum**	poison hemlock	M	-	-	-
Daucus pusillus	rattlesnake weed	-	-	-	-
*Foeniculum vulgare**	sweet fennel	H	-	-	-
Lomatium caruifolium var. *caruifolium**	coast parsnip	H	-	-	-
Lomatium dasycarpum ssp. *dasycarpum*	wollyfruit desertparsley	-	-	-	-
Lomatium parvifolium	small-leaved parsnip	-	-	4.2	G3/S3
Lomatium utriculatum	common lomatium	-	-	-	-
Perideridia pringlei	adobe yampah	-	-	-	-
Sanicula arctopoides	footsteps on spring	-	-	-	-
Sanicula arguta	sharp-toothed sanicle	-	-	-	-
Sanicula bipinnata	poison sanicle	-	-	-	-
Sanicula crassicaulis	Pacific sanicle, gambleweed	-	-	-	-
Sanicula hoffmanii	Hoffman's sanicle	-	-	-	-
Sanicula laciniata	coast sanicle	-	-	-	-
Scandix pecten-veneris	Shepherd's needle	-	-	-	-
Torilis nodosa	knotted hedge parsley	-	-	-	-
Family Apocynaceae					
Apocynum cannabinum	Indian hemp, dogbane	-	-	-	-
Asclepias fascicularis	narrow-leaf milkweed	-	-	-	-
*Vinca major**	periwinkle	M	-	-	-
Family Asteraceae					
Achillea millefolium	common yarrow	-	-	-	-
*Ageratina adenophora**	sticky ageratina	-	-	-	-
Agoseris grandiflora	bigflower agoseris	-	-	-	-
Agoseris heterophylla	annual agoseris	-	-	-	-
*Anthemis cotula**	mayweed, dog fennel	-	-	-	-
Artemisia californica	California sagebrush	-	-	-	-
Artemisia douglasiana	mugwort	-	-	-	-
Baccharis glutinosa	Douglas' baccharis	-	-	-	-
Baccharis pilularis	coyote brush	-	-	-	-
*Carduus pycnocephalus**	Italian thistle	M	-	-	-
*Carthamus lanatus**	wooly distaff thistle	M	-	-	-
*Centaurea calcitrapa**	purple star thistle	M	-	-	-
*Centaurea iberica**	Iberian knapweed	-	-	-	-

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*Centaurea melitensis**	tocalote	M	-	-	-
*Centaurea solstitialis**	yellow star thistle	H	-	-	-
Centromadia parryi	pappose tarweed	-	-	-	-
Centromadia parryi ssp. *congdonii*	Congdon's tarplant	-	-	1B.1	G3T1T2/S1S2
Matricaria discoidea	pineapple weed	-	-	-	-
*Cichorium intybus**	chicory	-	-	-	-
Cirsium fontinale var. *obispoense*†	Chorro Creek bog thistle	-	FE, SE	1B.2	G2T2/S2
Cirsium occidentale var. *venustum*	Venus' thistle	-	-	-	-
*Cirsium vulgare**	bull thistle	M	-	-	-
Corethrogyne filaginifolia	California aster	-	-	-	-
Corethrogyne filaginifolia var. *filaginifolia*	common sandaster	-	-	-	-
*Cotula coronopifolia**	brass buttons	L	-	-	-
Deinandra fasciclata [*Hemizonia fasciculata*]	fascicled tarweed	-	-	-	-
Deinandra increscens subsp. *increscens* [*Hemizonia increscens*]	tarweed, tarplant	-	-	-	-
Deinandra pentactis [*Hemizonia pentactis*]	Salinas River tarplant	-	-	-	-
Delairea odorata [*Senecio mikanioides*]*	cape ivy	H	-	-	-
Ericameria arborescens	golden fleece	-	-	-	-
*Erigeron bonariensis**	flax-leaved horseweed	-	-	-	-
Erigeron canadensis	common horseweed	-	-	-	-
Erigeron foliosus var. *foliosus*	common leafy fleabane daisy	-	-	-	-
Eriophyllum confertiflorum var. *confertiflorum*	golden-yarrow	-	-	-	-
Eurybia radulina	rough leaved aster	-	-	-	-
Gamochaeta purpurea	Purple cudweed	-	-	-	-
Gamochaeta ustulata	Pacific cudweed	-	-	-	-
Grindelia camporum	Great Valley gumplant	-	-	-	-
Grindelia hirsutula var. *maritima*	San Fransisco gum plant	-	-	3.2	G5T1Q/S1
Hazardia squarrosa var. *squarrosa*	sawtoothed goldenbrush	-	-	-	-
Hedypnois rhagadioloides *	Mediterranean crete weed	-	-	-	-
Helenium puberulum	sneezeweed, Bigelow's sneezeweed	-	-	-	-
Helianthus gracilentus	slender sunflower	-	-	-	-
*Helminthotheca echioides**	bristly ox-tongue	L	-	-	-
Hemizonia congesta subsp. *luzulifolia*	hayfield tarweed	-	-	-	-
Hemizonia pentachaeta	Salinas River tarplant	-	-	-	-
Hesperevax sparsiflora	erect hesperevax	-	-	-	-
Heterotheca grandiflora	telegraph weed	-	-	-	-
*Hypochaeris glabra**	smooth cat's-ear	L	-	-	-
*Lactuca saligna**	slender lettuce	-	-	-	-
*Lactuca serriola**	prickly wild lettuce	-	-	-	-
Lagophylla ramosissima	common hareleaf	-	-	-	-
Lasthenia californica	goldfields	-	-	-	-
Lasthenia graciliis	needle goldfields	-	-	-	-
Layia jonesii	Jones' layia	-	-	1B.2	-
Layia platyglossa	tidy tips	-	-	-	-
Logfia filaginoides [*Filago californica*]	California cottonrose	-	-	-	-
Logfia gallica	narrow-leaf cottonrose	-	-	-	-
Madia exigua	threadstem tarweed	-	-	-	-
Madia gracilis	slender tarweed	-	-	-	-

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Matricaria discoidea (*Chamomilla suaveolens*)	common pineapple weed	-	-	-	-
Micropus californicus	slender cottonweed	-	-	-	-
Microseris douglasii subsp. *douglasii*	Douglas' microseris	-	-	-	-
Psilocarphus chilensis	woolly-heads, woolly marbles	-	-	-	-
Pseudognaphalium bioletti	Bioletit's cudweed	-	-	-	-
Pseudognaphalium californicum	California everlasting	-	-	-	-
*Pseudognaphalium luteo-album**	weedy cudweed	-	-	-	-
Rafinesquia californica	California chicory	-	-	-	-
Senecio aphanactis	chaparral ragwort	-	-	2B.2	G3/S2
*Senecio glomeratus**	cutleaf burnweed	M	-	-	-
*Silybum marianum**	milk thistle	L	-	-	-
Solidago velutina subsp. *californica*	California goldenrod	-	-	-	-
*Soliva sessilis**	common soliva	-	-	-	-
*Sonchus asper**	prickly sow thistle	-	-	-	-
*Sonchus oleraceus**	common sow thistle	-	-	-	-
Stebbinsoseris heterocarpa	derived microseris	-	-	-	-
Stephanomeria cichoriacea	silver rock-lettuce	-	-	-	-
Stephanomeria exigua subsp. *carotifera*	small stephanomeria	-	-	-	-
Symphyotrichum chilense	common California aster	-	-	-	-
*Tragopogon porrifolius**	salsify, oyster plant	-	-	-	-
Uropappus lindleyi	silver puffs	-	-	-	-
Xanthium spinosum	spiny cocklebur	-	-	-	-
Xanthium strumarium	cocklebur	-	-	-	-
Family Berberidaceae					
Berberis pinnata subsp. *pinnata*	California barberry	-	-	-	-
Family Boraginaceae					
Amsinckia menziesii	common fiddleneck	-	-	-	-
Cryptantha clevelandii	Cleveland's cryptantha	-	-	-	-
Eucrypta chrysanthemifolia var. *chrysanthemifolia*	common eucrypta	-	-	-	-
Phacelia ciliata	Great Valley phacelia	-	-	-	-
Phacelia distans	imbricate phacelia	-	-	-	-
Phacelia imbricata subsp. *imbricata*	wide-sepaled roch phacelia	-	-	-	-
Phacelia malvifolia	stinging phacelia	-	-	-	-
Pholistoma membranaceum	white fiestaflower	-	-	-	-
Pholistoma auritum	blue fiesta flower	-	-	-	-
Plagiobothrys nothofulvus	popcorn flower	-	-	-	-
Family Brassicaceae					
*Brassica nigra**	black mustard	M	-	-	-
Cardamine californica	California toothwort	-	-	-	-
Cardamine oligosperma	bittercress	-	-	-	-
Caulanthus anceps	Lemmon's guillenia	-	-	-	-
Caulanthus lasiophyllus	California mustard	-	-	-	-
*Hirschfeldia incana**	shortpod mustard	M	-	-	-
Lepidium nitidum	peppergrass	-	-	-	-
*Lepidum latifolium**	broad leaved peppergrass	H	-	-	-
Nasturtium officinale	watercress	-	-	-	-
*Raphanus sativus**	wild radish	L	-	-	-
*Sinapis arvensis**	charlock	L	-	-	-

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*Sisymbrium officinale**	hedge mustard	-	-	-	-
Streptanthus albidus subsp. *peramoenus*	Metcalf Canyon jewelflower	-	-	1B.2	G2T1/S1
Thysanocarpus curvipes	hairy fringe-pod	-	-	-	-
Thysanocarpus laciniatus	narrow-leaved fringe-pod	-	-	-	-
Turritis glabra	tower mustard	-	-	-	-
Family Cactaceae					
*Opuntia ficus-indica**	mission cactus	-	-	-	-
Family Caprifoliaceae					
Lonicera hispidula	California honeysuckle	-	-	-	-
Symphoricarpos mollis	creeping snowberry	-	-	-	-
Family Caryophyllaceae					
*Cerastium glomeratum**	mouse-eared chickweed	-	-	-	-
Minuartia cismontana	serpentine sandwort	-	-	-	-
*Sagina apetala**	sticky pearlwort	-	-	-	-
Sagina decumbens subsp. *occidentalis*	western pearlwort	-	-	-	-
*Silene gallica**	windmill pink	-	-	-	-
Silene laciniata	Mexican champion	-	-	-	-
Silene laciniata subsp. *laciniata*	cardinal catchfly	-	-	-	-
Spergularia spp.	spurrey	-	-	-	-
*Spergularia bocconi**	sticky sand-spurrey	-	-	-	-
*Spergularia villosa**	hairy sand-spurrey	-	-	-	-
*Stellaria media**	chickweed	-	-	-	-
Family Chenopodiaceae					
Chenopodium californicum	pitseed goosefoot	-	-	-	-
*Dysphania ambrosioides**	Mexican tea	-	-	-	-
*Salsola tragus**	Russian thistle, tumbleweed	L	-	-	-
Family Cleomaceae					
Peritoma arboria	bladderpod	-	-	-	-
Family Convolvulaceae					
Calystegia macrostegia subsp. *cyclostegia*	coast morning glory	-	-	-	-
Calystegia subacaulis subsp. *episcopalis*	hill morning glory	-	-	-	-
*Convolvulus arvensis**	bindweed, orchard morning glory	-	-	-	-
Family Crassulaceae					
Crassula connata	sand pygmy stonecrop	-	-	-	-
Dudleya abramsii subsp. *bettinae*	San Luis Obispo serpentine dudleya	-	-	1B.2	G4T2/S2
Dudleya abramsii subsp. *murina*	San Luis Obispo dudleya	-	-	1B.3	G4T2/S2
Dudleya blochmaniae subsp. *blochmaniae*	Blochmann's liveforever	-	-	1B.1	-
Dudleya laceolata	lance-leaf dudleya	-	-	-	-
Family Cucurbitaceae					
Marah fabacae	California man-root	-	-	-	-
Family Cupressaceae					
Hesperocyparis macrocarpa	Monterey cypress	-	-	1B.1	G1/S1
Hesperocyparis sargentii	Sargent cypress	-	-	-	-
Family Dipsacaceae					
*Dipsacus sativus**	Fuller's teasel	M	-	-	-
Family Ericaceae					
Arctostaphylos obispoensis	Bishop manzanita	-	-	4.3	G3/S3

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Family Euphorbiaceae					
Croton setiger [*Eremocarpus setigerus*]	turkey-mullein	-	-	-	-
Euphorbia serpillifolia subsp. *serpillifolia*	thyme-leaved sandmat	-	-	-	-
*Euphorbia serrata**	saw-toothed spurge	-	-	-	-
Euphorbia spathulata	reticulate-seeded spurge	-	-	-	-
*Ricinus communis**	castor bean	L	-	-	-
Family Fabaceae					
Acmispon americanus var. *americanus* [*Lotus purshianus* var. *purshianus*]	American bird's foot trefoil	-	-	-	-
Acmispon brachycarpus	short-podded lotus	-	-	-	-
Acmispon glaber	deerweed	-	-	-	-
Acmispon glaber var. *glaber*	common deerweed	-	-	-	-
Acmispon junceus var. *junceus*	rush lotus	-	-	-	-
Acmispon maritimus [*Lotus salsuginosus*]	coastal birdsfoot trefoil	-	-	-	-
Acmispon parviflorus	miniature deervetch	-	-	-	-
Acmispon parviflorus [*Lotus micranthus*]	small-flowered lotus	-	-	-	-
Acmispon strigosus	strigose deervetch	-	-	-	-
Acmispon strigosus	Bishop's lotus	-	-	-	-
Acmispon wrangelianus	California lotus	-	-	-	-
Astragalus curtipes	San Luis locoweed	-	-	-	-
Astragalus gambelianus	Gambel's milkvetch	-	-	-	-
Astragalus trichopodus	Santa Barbara milkvetch	-	-	-	-
*Lathyrus odoratus**	common sweet pea	-	-	-	-
Lathyrus vestitus var. *vestitus*	wild pea	-	-	-	-
*Lotus corniculatus**	bird's-foot trefoil	-	-	-	-
Acmispon junceus var. *bioletti*	Biolett's rush lotus	-	-	-	-
Lupinus albifrons	silver lupine	-	-	-	-
Lupinus albifrons var. *albifrons*	silver lupine	-	-	-	-
Lupinus bicolor	miniature lupine	-	-	-	-
Lupinus microcarpus var. *densiflorus*	chick lupine	-	-	-	-
Lupinus succulentus	arroyo lupine	-	-	-	-
*Medicago polymorpha**	California burclover	L	-	-	-
*Melilotus albus**	white sweet-clover	-	-	-	-
*Melilotus indicus**	sourclover	-	-	-	-
Thermopsis californica var. *californica*	false lupine	-	-	-	-
Trifolium spp.	clover	-	-	-	-
Trifolium albopurpureum	dove clover	-	-	-	-
Trifolium bifidum var. *decipiens*	notch-leaved pinole clover	-	-	-	-
*Trifolium campestre**	hop clover	-	-	-	-
Trifolium depauperatum var. *amplectens*	pale sack clover	-	-	-	-
Trifolium depauperatum var. *truncatum*	dwarf sack clover	-	-	-	-
*Trifolium dubium**	shamrock, little hop clover	-	-	-	-
Trifolium fucatum	sour clover	-	-	-	-
*Trifolium hirtum**	rose clover	L	-	-	-
Trifolium microcephalum	miniature clover	-	-	-	-
Trifolium variegatum	variegated clover	-	-	-	-
Trifolium willdenovii	tomcat clover	-	-	-	-
Trifolium wormskioldii	cow clover	-	-	-	-
Vicia spp.	vetch	-	-	-	-

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Vicia hassei	Hasse's vetch	-	-	-	-
*Vicia sativa**	garden vetch	-	-	-	-
Vicia sativa subsp. *sativa**	spring vetch	-	-	-	-
Vicia villosa subsp. *varia**	narrow-leaved vetch	-	-	-	-
Family Fagaceae					
Quercus agrifolia var. *agrifolia*	coast live oak	-	-	-	-
Quercus berberidifolia	scrub oak	-	-	-	-
Quercus durata var. *durata*	leather oak	-	-	-	-
Quercus palmeri	Palmer's oak	-	-	-	-
Family Garryaceae					
Garrya elliptica	coast silktassel	-	-	-	-
Garrya veatchii	canyon silktassel	-	-	-	-
Family Gentianaceae					
Zeltnera exaltata [*Centaurium exaltatum*]	centaury	-	-	-	-
Family Geraniaceae					
*Erodium botrys**	storkbill filaree	-	-	-	-
*Erodium brachycarpum**	short fruit stork's bill	-	-	-	-
*Erodium cicutarium**	redstem filaree	L	-	-	-
*Erodium moschatum**	broadleaf filaree	-	-	-	-
Geranium carolinianum	Carolina geranium	-	-	-	-
*Geranium dissectum**	cut-leaved geranium	L	-	-	-
Family Grossulariaceae					
Ribes malvaceum var. *viridifolium*	chaparral current	-	-	-	-
Ribes speciosum	fuchsia-flowered gooseberry	-	-	-	-
Family Juglandaceae					
Juglans californica	Southern California black walnut	-	-	4.2	G4/S4
Juglans regia	English walnut	-	-	-	-
Family Lamiaceae					
Agastache urticifolia	horse mint	-	-	-	-
Clinopodium douglasii	yerba buena	-	-	-	-
*Marrubium vulgare**	horehound	L	-	-	-
Monardella villosa ssp. *obispoensis*	San Luis Obispo coyote mint	-	-	-	-
Monardella villosa var. *villosa*	coyote mint	-	-	-	-
Pogogyne douglasii	Douglas' pogogyne	-	-	-	-
Pogogyne serpylloides	thyme-leaf pogogyne	-	-	-	-
Salvia columbariae	chia	-	-	-	-
Salvia mellifera	black sage	-	-	-	-
Salvia spathacea	hummingbird sage, crimson sage	-	-	-	-
Scutellaria tuberosa	Dannie's skullcap	-	-	-	-
Stachys ajugoides var. *rigida*	hedge nettle	-	-	-	-
Stachys bullata	California hedge nettle, wood mint	-	-	-	-
Stachys pycnantha	short-spiked hedge nettle	-	-	-	-
Trichostema lanatum	wooly bluecurls	-	-	-	-
Trichostema lanceolatum	vinegarweed	-	-	-	-
Family Lauraceae					
*Cinnamomum camphora**	camphor tree	-	-	-	-
Umbellularia californica	California bay laurel	-	-	-	-

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Family Linaceae					
Hesperolinon micranthum	small-flowered dwarf flax	-	-	-	-
*Linum bienne**	pale flax	-	-	-	-
Family Lythraceae					
Lythrum californicum	California loosestrife	-	-	-	-
*Lythrum hyssopifolia**	hyssop looosestrife	-	-	-	-
Family Malvaceae					
Eremalche parryi	mallow	-	-	-	-
*Malva nicaeensis**	bull mallow	-	-	-	-
*Malva parviflora**	cheeseweed	-	-	-	-
Sidalcea hickmanii subsp. *anomala*	Hickman's sidalcea	-	-	-	-
Sidalcea malviflora	checker bloom	-	-	-	-
Sidalcea malviflora subsp. *laciniata*	dwarf checker bloom	-	-	-	-
Family Montiaceae					
Claytonia exigua subsp. *exigua*	common claytonia	-	-	-	-
Claytonia parviflora subsp. *parviflora*	narrowleaved miner's lettuce	-	-	-	-
Claytonia perfoliata subsp. *perfoliata*	miner’s lettuce	-	-	-	-
Family Myrsinaceae					
Lysimachia arvensis [*Anagallis arvensis*]*	scarlet pimpernel, poor-man's weathervane	-	-	-	-
Family Myrtaceae					
*Eucalyptus camaldulensis**	Red Gum	L	-	-	-
*Eucalyptus globulus**	Blue Gum	L	-	-	-
*Myrtus communis**	Common Myrtle	-	-	-	-
Family Onagraceae					
Clarkia affinis	clarkia	-	-	-	-
Clarkia bottae	Botta's fairyfan	-	-	-	-
Clarkia cylindrica subsp. *cylindrica*	speckled clarkia	-	-	-	-
Clarkia epilibioides	willow herb godetia	-	-	-	-
Clarkia unguiculata	elegant clarkia, canyon clarkia	-	-	-	-
Epilobium spp.	fireweed/willow herb	-	-	-	-
Epilobium canum subsp. *canum*	California fuchsia	-	-	-	-
Epilobum ciliatum subsp. *watsonii*	San Francisco willow-herb	-	-	-	-
Oenothera elata subsp. *hookeri*	Hooker's evening primose	-	-	-	-
Family Orobanchaceae					
Bellardia trixago	Mediterranean lineseed	-	-	-	-
Castilleja affinis subsp. *affinis*	Indian paintbrush	-	-	-	-
Castilleja densiflora subsp. *obispoensis*	owl's clover	-	-	-	-
Castilleja exserta subsp. *exserta*	purple owl's clover	-	-	-	-
Castilleja exserta subsp. *latifolia*	wideleaf Indian paintbrush	-	-	-	-
Castilleja foliolosa	woolly Indian paintbrush	-	-	-	-
Castilleja minor subsp. *spiralis*	annual Indian paint-brush, California threadtorch	-	-	-	-
Orobanche californica subsp. *grandis* [*Aphyllon californicum* subsp. *grande*]	yellow sorrel, creeping wood-sorrel	-	-	-	-
Triphysaria eriantha subsp. *eriantha*	California butter and eggs, johnny-tuck	-	-	-	-
Tryphysaria pusilla	dwarf owl's clover	-	-	-	-
Family Oxalidaceae					
Oxalis pilosa	Pilose Wood-Sorrel	-	-	-	-

Scientific Name	Common Name	Cal-IPC Rating	Status	CRPR	SAR Status
*Oxalis pes-capre**	Bermuda-Buttercup	M	-	-	-
Family Paeoniaceae					
Paeonia californica	California Peony	-	-	-	-
Family Papaveraceae					
Dendromecon rigida	Bush Poppy	-	-	-	-
Eschscholzia californica	California Poppy	-	-	-	-
Platystemon californicus	Cream Cups	-	-	-	-
Family Parnassiaceae					
Parnassia palustris	Marsh Grass Of Parnassus	-	-	-	-
Family Phrymaceae					
Diplacus aurantiacus	Sticky Monkeyflower	-	-	-	-
Erythranthe guttatus	Streamside Monkeyflower	-	-	-	-
Erythranthe microphylla	Small-Leaved Monkeyflower	-	-	-	-
Family Pinaceae					
Pinus coulteri	Coulter Pine	-	-	-	-
Pinus radiata	Monterey Pine	-	-	-	-
Pinus sabiniana	Gray Pine, Foothill Pine	-	-	-	-
Family Plantaginaceae					
Antirrhinum kelloggii	Kellogg's Snapdragon	-	-	-	-
Keckiella corymbosa	Cliff Penstemon	-	-	-	-
Plantago erecta	California Plantain	-	-	-	-
*Plantago lanceolate**	English Plantain	L	-	-	-
*Plantago major**	Common Plantain	-	-	-	-
*Veronica anagallis-aquatica**	Water Speedwell	-	-	-	-
Family Platanaceae					
Platanus racemosa	Western Sycamore	-	-	-	-
Family Polemoniaceae					
Gilia achilleifolia subsp. achilleifolia	California Gilia	-	-	-	-
Leptosiphon parviflorus [Linanthus parviflorus]	Common Babystars	-	-	-	-
Navarretia atractyloides	Rough Navarretia	-	-	-	-
Navarretia hamata	Hooked Navarretia	-	-	-	-
Family Polygalaceae					
Polygala californica	California Milkwort	-	-	-	-
Family Polygonaceae					
Chorizanthe breweri	Brewer's Spineflower	-	-	1B.3	G3/S3
Chorizanthe obovata	Spoonsepal Spineflower	-	-	-	-
Chorizanthe palmeri	Palmer's Spineflower	-	-	4.2	G4/S4
Eriogonum elongatum var. *elongatum*	Wild Buckwheat	-	-	-	-
Eriogonum fasciculatum var. *foliolosum*	California Buckwheat	-	-	-	-
Eriogonum fasciculatum var. *polifolium*	Eastern Mojave Buckwheat	-	-	-	-
Eriogonum parvifolium	Seacliff Buckwheat	-	-	-	-
Polygonum aviculare ssp. *depressum**	Prostrate Knotweed	-	-	-	-
Pterostegia drymarioides	Fairy Mist	-	-	-	-
*Rumex acetosella**	Sheep Sorrel	M	-	-	-
*Rumex conglomeratus**	Clustered Dock, Green Dock	-	-	-	-
*Rumex crispus**	Curly Dock	L	-	-	-
*Rumex kerneri**	Kerner's Dock	-	-	-	-
Family Primulaceae					
Primula clevelandii subsp. *insularis*	Cleveland's shooting star	-	-	-	-

Scientific Name	Common Name	Cal-IPC Rating	Status	CRPR	SAR Status
Primula clevelandii subsp. *patula*	Padre's shooting star	-	-	-	-
Primula clevelandii subsp. *gracilis*	Padre's shooting star	-	-	-	-
Family Ranunculaceae					
Aquilegia eximia	Van Houtte's columbine	-	-	-	-
Clematis lasiantha	pipestem	-	-	-	-
Delphinium parryi subsp. *eastwoodiae*	Eastwood's larkspur	-	-	1B.2	G4T2/S2
Delphinium parryi subsp. *parryi*	Parry's larkspur	-	-	-	-
Ranunculus californicus var. *californicus*	California buttercup	-	-	-	-
Thalictrum fendleri	meadow rue	-	-	-	-
Thalictrum fendleri var. *polycarpum*	Fendler’s meadow rue	-	-	-	-
Family Rhamnaceae					
Ceanothus cuneatus	buck brush	-	-	-	-
Ceanothus cuneatus var. *fascicularis*	sand buckbrush	-	-	4.2	G5T4/S4
Ceanothus cuneatus var. *ramulosus*	coast buckbrush	-	-	-	-
Ceanothus rigidus	Monterey ceanothus	-	-	4.2	G4/S4
Ceanothus foliosus var. *medius*	La Cuesta ceanothus	-	-	-	-
Ceanothus spinosus	greenbark ceanothus	-	-	-	-
Frangula californica	California coffeeberry	-	-	-	-
Rhamnus crocea	spiny redberry	-	-	-	-
Family Rosaceae					
Adenostoma fasiculatum	chamise	-	-	-	-
Aphanes occidentalis	lady's mantle	-	-	-	-
Cercocarpus betuloides var. *betuloides*	mountain mahogany	-	-	-	-
Cotoneaster franchetii	orange cotoneaster	M	-	-	-
Cotoneaster pannosa	woolly cotoneaster	M	-	-	-
Drymocallis glandulosa var. *glandulosa*	sticky cinquefoil	-	-	-	-
Heteromeles arbutifolia	toyon, Christmas berry	-	-	-	-
Holodiscus discolor	oceanspray	-	-	-	-
Horkelia cuneata var. *puberula*	mesa horkelia	-	-	1B.1	G4T1/S1
Horkelia cuneata var. *cuneata*	wedgeleaf horkelia	-	-	-	-
Horkelia cuneata var. *sericea*	Kellogg’s horkelia	-	-	1B.1	G4T1?/S1?
Prunus ilicifolia subsp. *ilicifolia*	holly-leaved cherry	-	-	-	-
Pyracantha angustifolia	narrowleaf firethorn	L	-	-	-
Rosa californica	California wild rose	-	-	-	-
Rosa spithamea	Sonoma rose	-	-	-	-
Rubus ursinus	California blackberry	-	-	-	-
Family Rubiaceae					
Galium andrewsii	Phlox-Leaved Bedstraw	-	-	-	-
Galium andrewsii subsp. *andrewsii*	Andrews' Bedstraw	-	-	-	-
Galium andrewsii subsp. *intermedium*	Phlox-Leaved Bedstraw	-	-	-	-
Galium angustifolium	Narrow-Leaved Bedstraw	-	-	-	-
Galium aparine	Goosegrass	-	-	-	-
Galium californicum	California Bedstraw	-	-	-	-
Galium californicum subsp. *californicum*	California Bedstraw	-	-	-	-
Galium californicum subsp. *flaccidum*	California Bedstraw	-	-	-	-
Galium californicum subsp. *luciense*	Cone Peak Bedstraw	-	-	1B.3	G5T3/S3
Galium cliftonsmithii	Santa Barbara Bedstraw	-	-	4.3	G4/S4
Galium porrigens var. *tenue*	Graceful Bedstraw	-	-	-	-
Galium porrigens var. *porrigens*	Climbing Bedstraw	-	-	-	-

Scientific Name	Common Name	Cal-IPC Rating	Status	CRPR	SAR Status
Family Salicaceae					
Populus fremontii subsp. *fremontii*	Fremont's cottonwood	-	-	-	-
Salix lasiolepis	arroyo willow	-	-	-	-
Salix breweri	Brewer's willow	-	-	-	-
Salix laevigata	red willow	-	-	-	-
Salix lucida subsp. *lasiandra*	shining willow	-	-	-	-
Salix sitchensis	Sitka willow	-	-	-	-
Family Saxifragaceae					
Micranthes californica	California saxifrage	-	-	-	-
Family Scrophulariaceae					
Scrophularia californica	California figwort	-	-	-	-
Family Simaroubaceae					
*Ailanthus altissima**	tree of heaven	M	-	-	-
Family Solanaceae					
*Datura stramonium**	jimson weed, datura	-	-	-	-
*Nicotiana glauca**	tree tobacco	M	-	-	-
Solanum douglasii	Douglas' nightshade	-	-	-	-
Solanum umbelliferum	blue witch nightshade	-	-	-	-
Solanum xantii	purple nightshade	-	-	-	-
Family Tamaricaceae					
*Tamarix ramisissoma**	saltcedar	H	-	-	-
Family Ulmaceae					
*Ulmus americana**	American elm	-	-	-	-
Family Urticaceae					
Hesperocnide tenella	western nettle	-	-	-	-
Urtica dioica subsp. *holsericea*	giant creek nettle	-	-	-	-
Family Verbenaceae					
Verbena bonarensis	purple top vervain	-	-	-	-
Verbena lasiostachys var. *lasiostachys*	western vervain	-	-	-	-
Verbena lasiostachys var. *scabrida*	robust vervain	-	-	-	-
Family Violaceae					
Viola pedunculata	Johnny-jump-up	-	-	-	-
Family Vitaceae					
Vitis californica	California wild grape	-	-	-	-

Notes:

*Denotes species not native to California.

† Denotes a SWAP Focal Species.

Cal-IPC Rating: L = Limited; M = Moderate; H = High

Status: FE = Federal Endangered; SE = State Endangered

CRPR: California Rare Plant Ranks: 1B = Plants rare, threatened, or endangered in California and elsewhere; 2B = Plants rare, threatened, or endangered in California but more common elsewhere; 3 = Plants about which more information is needed (Review List); 4 = Plants of limited distribution (Watch List); 0.2 Plants are moderately threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat);

Threat Ranks: 0.1 = Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat); 0.2 = Moderately threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat); 0.3 = Not very threatened in California (less than 20% of occurrences threatened / low degree and immediacy of threat or no current threats known)

D.2 Macroinvertebrate Species Recorded at Camp San Luis Obispo

Class	Order	Family	Scientific Name	Common Name	Status
Phyllum Mollusca					
Gastropoda	Littorinimorpha	Hydrobiidae	*Pyrgulopsis* sp.	spring snail	-
	Basommatophora	Physidae	*Physella* sp.	pouch snail	-
		Planorbidae	*Gyraulus parvus*	ash gyro	-
			Planorbella subcrenata	ash gyro	-
			Planorbella tennuis	Mexican ram's horn	-
Bivalvia	Sphaeriida	Sphaeriidae	*Pisidium casertanum*	ubiquitous peaclam	-
			Pisidium compressum	ridged-back peaclam	-
			Pisidium insigne	tiny peaclam	-
Phyllum Arthropoda					
Malacostraca	Amphipoda	Hyalellidae	*Hyalella azteca*	amphipod, scud	-
	Decapoda	Cambaridae	*Procambarus clarkii*	red swamp crayfish	-
Insecta	Coleoptera	Dryopidae	*Helichus* sp.	long-toes water beetle	-
			Agabus brevicollis	river beetle	-
			Agabus confertus	river beetle	-
			Deronectes deceptus	river beetle	-
			Hydroporus fortis	river beetle	-
			Hydroporus striatellus	river beetle	-
			Hygrotus sp.	river beetle	-
			Laccophilus decipiens	river beetle	-
		Gyrinidae	*Gyrinus consobrinus*	whirligig beetle	-
		Haliplidae	*Peltodytes simplex*	crawling water beetle	-
		Hydrophilidae	*Anacaena signaticollis*	water scavenger beetle	-
			Berosus fraternus	water scavenger beetle	-
			Berosus infuscatus	water scavenger beetle	-
			Cymbiodyta pacifica	water scavenger beetle	-
			Enochrus conjunctus	water scavenger beetle	-
			Helophorus sp.	water scavenger beetle	-
			Tropisternus californicus	water scavenger beetle	-
		Psephenidae	*Eubrianax edwardsi*	Edward's water penny	-
	Diptera	Blephariceridae	*Agathon doanei*	net-winged midge	-
			Blepharicera jordani	net-winged midge	-
			Blepharicera micheneri	net-winged midge	-
		Ceratopogonidae	*Atrichopogon occidentalis*	biting midge, sand fly	-
		Chironomidae	*Cardiocladius platypus*	water midges, lake flies	-
			Chironomus frommeri	water midges, lake flies	-
			Chironomus matures	water midges, lake flies	-
			Cladopelma sp.	water midges, lake flies	-
			Cricotopus sp. 1	water midges, lake flies	-
			Cricotopus sp. 2	water midges, lake flies	-
			Larsia sequoiaensis	water midges, lake flies	-
			Micropsectra sp.	water midges, lake flies	-
			Polypedilum sp.	water midges, lake flies	-
			Procladius freemani	water midges, lake flies	-
		Dixidae	*Dixa* sp.	dixid midge	-
		Simuliidae	*Simulium argus*	black flies	-
			Simulium canadense	black flies	-

Class	Order	Family	Scientific Name	Common Name	Status
Insecta	Diptera	Simuliidae	*Simulium donovani*	black flies	-
			Simulium piperi	black flies	-
			Simulium virgatum	black flies	-
			Simulium vittatum	black flies	-
		Stratiomyidae	*Odontomyia* sp.	soldier flies	-
		Tabanidae	*Chrysops* sp.	deer fly	-
			Tabanus sp.	horse fly	-
		Tipulidae	*Tipula* sp.	crane fly	-
	Ephemeroptera	Baetidae	*Baetis* sp.	mayfly	-
		Caenidae	*Caenis tardata*	spotted mayfly	-
		Ephemerellidae	*Ephemerella maculata*	blue-winged dun	-
		Heptageniidae	*Epeorus* sp.	flat nymph mayflies	-
		Heptageniidae	*Heptagenia* sp.	flat nymph mayflies	-
		Leptophlebiidae	*Leptophlebia* sp.	flat nymph mayflies	-
		Tricorythidae	*Tricorythodes fallax*	flat nymph mayflies	-
	Hemiptera	Belostomatidae	*Abedus* sp.	giant water bug	-
			Lethocerus americanus	electric light bug	-
		Corixidae	*Corisella inscripta*	water boatmen	-
			Graptocorixa californica	water boatmen	-
		Gelastocoridae	*Gelastocoridae oculatus*	toad bug	-
		Gerridae	*Gerris remigis*	water strider	-
		Mesovelidae	*Mesovelia mulsanti*	water treader	-
		Naucoridae	*Ambrysus californicus/ A. bohartorum*	California creeping water bug	-
		Nepidae	*Ranatra brevicollis*	water scorpion	-
		Notonectidae	*Notonecta kirbyi*	Kirby's backswimmer	-
	Megaloptera	Corydalidae	*Neohermes californicus*	California dobsonfly	-
		Sialidae	*Sialis californica/S. occidens*	California alderfly	-
	Odonata	Coenagrionidae	*Argia moesta*	powdered dancer	-
		Coenagrionidae	*Enallagma civile*	familiar bluet	-
		Libellulidae	*Sympetrum illotum*	dusty skimmer	-
	Plecoptera	Chloroperlidae	*Sweltsa* sp.	stonefly	-
		Nemouridae	*Malenka californica*	stonefly	-
		Perlodidae	*Calineuria californica*	yellow-banded stonefly	-
	Trichoptera	Glossosomatidae	*Agapetus celatus*	caddisfly	-
			Unidentified sp.	caddisfly	-
		Helicopsychidae	*Helicopsyche borealis*	snailshell caddisflies	-
		Hydropsychidae	*Ceratopsyche oslari*	web-spinning caddisfly	-
			Cheumatopsyche mickeli	web-spinning caddisfly	-
			Hydropsyche californica	web-spinning caddisfly	-
		Hydroptilidae	*Hydroptila xera*	web-spinning caddisfly	-
			Ochrotrichia sp.	web-spinning caddisfly	-
		Lepidostomatidae	*Lepidostoma cascadense*	web-spinning caddisfly	-
			Lepidostoma podagrum	web-spinning caddisfly	-
		Leptoceridae	*Oecetis inconspicua*	log cabin caddisworm	-
		Polycentropodidae	*Polycentropus variegatus*	net-spinning caddisfly	-
		Psychomylidae	*Tinodes consuetus*	net-spinning caddisfly	-
		Rhyacophilidae	*Rhacophgila vedra*	free-living caddisfly	-
		Serricostomatidae	*Gumaga griseola*	free-living caddisfly	-

Sources: Page et al. 1994; CAJS-ENV database.

D.3 Fish Species Recorded at Camp San Luis Obispo

Scientific Name	Common Name	Status
Family Centrarchidae (Sunfishes)		
Lepomis macrochirus	Bluegill*	-
Micropterus salmoides	Largemouth bass*	-
Family Cottidae (Sculpins)		
Cottus asper	Prickly sculpin	-
Family Cyprinidae (Cyprinids)		
Ptychocheilus grandis	Sacramento pikeminnow*	-
Rhinichthys osculus	Speckled dace*	-
Family Gasterosteidae (Stickleback)		
Gasterosteus aculeatus microcephalus	Threespine stickleback	-
Family Poecillidae (Live-Bearers)		
Gambusia affinis	Western mosquitofish*	-
Family Salmonidae (Salmon)		
Oncorhynchus mykiss irideus†	coastal steelhead trout	FT, SSC

Sources: Page et al. 1994; Scott and Harker 1999.

Notes:

*Indicates species has been introduced to the central coast of California.

† Denotes a SWAP Focal Species.

Status: FT = Federally Threatened; SSC = Species of Special Concern

D.4 Amphibian Species Recorded at Camp San Luis Obispo

Scientific Name	Common Name	Status
Family Bufonidae (True Toads)		
Anaxyrus boreas	western toad	-
Anaxyrus boreas halophilus	Southern California toad	-
Family Hylidae (Tree Frogs & Allies)		
Pseudacris sierra	Sierran treefrog	-
Family Plethodontidae (Lungless Salamanders)		
Batrachoseps attenuatus	California slender salamander	-
Ensatina eschscholtzii	ensatina	-
Family Ranidae (True Frogs)		
Lithobates catesbeianus	American bullfrog*	-
Rana draytonii†	California red-legged frog	FT, SSC
Family Salamandridae (True Salamanders & Newts)		
Taricha torosa†	California newt	SSC

Sources: Society for the Study of Amphibians and Reptiles 2017; Scott and Harker 1998; Page et al. 1995.

Notes:

*Introduced species.

† Denotes a SWAP Focal Species.

Status: FT = Federally Threatened; SSC = Species of Special Concern

D.5 Reptile Species Recorded at Camp San Luis Obispo

Scientific Name	Common Name	Status
Family Anguidae (Glass & Alligator Lizards)		
Elgaria multicarinata multicarinata	woodland alligator lizard	-
Family Phrynosomatidae (North American Spiny Lizards)		
Sceloporus occidentalis bocourtii	Coast Range fence lizard	-
Family Anniellidae (American Legless Lizards)		
Anniella pulchra†	Northern California legless lizard	SSC
Family Colubridae (Colubrid Snakes)		
Coluber constrictor mormon	western yellow-bellied racer	-
Lampropeltis californiae	California kingsnake	-
Coluber lateralis lateralis	California striped racer	-
Pituophis catenifer catenifer	Pacific gopher snake	-
Thamnophis atratus zaxanthus	Diablo Range garter snake	-
Thamnophis hammondii†	two-striped garter snake	SSC
Thamnophis sirtalis infernalis	California red-sided garter snake	-
Family Emydidae (Box & Water Turtles)		
Actinemys pallida†	southwestern pond turtle	SSC

Sources: Society for the Study of Amphibians and Reptiles 2017; Page et al. 1995; Scott and Harker 1998; CAJS-ENV database.

Notes:

† Denotes a SWAP Focal Species.

Status: SSC = Species of Special Concern

D.6 Bird Species Recorded at Camp San Luis Obispo

Scientific Name	Common Name	Status	CalPIF Focus Species?
ORDER ANSERIFORMES (Ducks, Geese & Waterfowl)			
Family Anatidae (Ducks, Geese, & Swans)			
Aix sponsa	wood duck	-	-
Spatula cyanoptera	cinnamon teal	-	-
Anas platyrhynchos	mallard	-	-
Mereca strepera	gadwall	-	-
Aythya collaris	ring-necked duck	-	-
Branta canadensis	Canada goose	-	-
Bucephala albeola	bufflehead	-	-
Mergus merganser	common merganser	-	-
Oxyura jamaicensis	ruddy duck	-	-
ORDER GALLIFORMES (Guans, Quails, Pheasants & Allies)			
Family Odontophoridae (New World Quail)			
Callipepla californica	California quail	-	-
Family Phasianidae (Pheasants, Grouse & Allies)			
Meleagris gallopavo	wild turkey	-	-
ORDER PODICIPEDIFORMES (Grebes)			
Podicipedidae (grebes)			
Podilymbus podiceps	pied-billed grebe	-	-

Scientific Name	Common Name	Status	CalPIF Focus Species?
ORDER COLUMBIFORMES (Pigeons & Doves			
Family Columbidae (Pigeons & Doves)			
Patagioenas fasciata	band-tailed pigeon	-	Focus—Sierra Nevada
Columba livia	rock pigeon	-	-
Streptoprlia decaocto	Eurasian collared dove	-	-
Zenaida macroura	mourning dove	-	-
ORDER CAPRIMULGIFORMES (Nightjars, Swifts, Hummingbirds & Allies)			
Family Apodidae (Swifts)			
Aeronautes saxatalis	white-throated swift	-	-
Family Trochilidae (Hummingbirds)			
Calypte anna	Anna's hummingbird	-	Focus—Sierra Nevada
Calypte costa	Costa's hummingbird	BCC	Focus—Desert, Coastal Scrub and Chaparral
Selasophorus rufus	rufous hummingbird	-	-
Selasophorus sasin	Allen's hummingbird	-	-
ORDER GRUIFORMES (Limpkin, Cranes, Rails & Allies)			
Family Rallidae (Rails, Coots & Gallinules)			
Fulica americana	American coot	-	-
Porzana carolina	sora	-	-
Rallus limicola	Virginia rail	-	-
ORDER CHARADRIIFORMES (Shorebirds)			
Family Charadriidae (Plovers & Lapwings)			
Charadroius vociferous	killdeer	-	-
Family Scolopacidae (Sandpipers & Allies)			
Numenius americanus†	long-billed curlew	BCC, CDFW WL	-
ORDER SULIFORMES (Cormorants, Frigatebirds, Boobies, Gannets & Anhingas)			
Family Phalacrocoracidae (Cormorants)			
Phalacrocorax auritus	double-crested cormorant	CDFW WL	-
ORDER PELECANIFORMES			
Family Ardeidae (Herons, Egrets, & Bitterns)			
Ardea herodias	great blue heron	-	-
Butorides virescens	green heron	-	-
Ardea alba	great egret	-	-
Egretta thula	snowy egret	-	-
ORDER CATHARTIFORMES (New World Vultures)			
Family Cathartidae (New World Vultures)			
Cathartes aura	turkey vulture	-	-
Gymnogyps californianus†	California condor	FE, SE, CDFW FP	-
ORDER ACCIPITRIFORMES (Osprey, Hawks, Eagles & Kites)			
Family Pandionidae (Osprey)			
Pandion haliaetus	osprey	CDFW WL	-
Family Accipitridae (Hawks, Kites, & Eagles)			
Accipiter cooperii	Cooper's hawk	CDFW WL	-
Accipiter striatus	sharp-shinned hawk	CDFW WL	-
Aquila chrysaetos†	golden eagle	BCC, CDFW FP, CDFW WL	-
Buteo jamaicensis	red-tailed hawk	-	-
Buteo lineatus	red-shouldered hawk	-	-
Buteo swainsoni†	Swainson's hawk	ST, ST	Focus—Riparian
Circus hudsonius†	northern harrier	SSC	Focus—Grasslands

Scientific Name	Common Name	Status	CalPIF Focus Species?
Elanus leucurus†	white-tailed kite	CDFW FP	-
Haliaeetus leucocephalus†	bald eagle	SE, BCC, CDFW FP	-
ORDER STRIGIFORMES (Owls)			
Family Tytonidae (Barn-Owls)			
Tyto alba	barn owl	-	Focus—Sierra Nevada
Family Strigidae (Owls)			
Athene cunicularia†	burrowing owl	BCC, SSC	Focus—Desert
Bubo virginianus	great horned owl	-	Focus—Sierra Nevada
Megascops kennicottii	western screech-owl	-	Focus—Sierra Nevada
ORDER CORACIIFORMES (Kingfishers)			
Family Alcedinidae (Kingfishers)			
Megaceryle alcyon	belted kingfisher	-	Focus—Sierra Nevada
ORDER PICIFORMES (Woodpeckers)			
Family Picidae (Woodpeckers)			
Colaptes auratus	northern flicker	-	Focus—Sierra Nevada
Sphyrapicus ruber	red-breasted sapsucker	-	Focus—Sierra Nevada
Melanerpes formicivorus	acorn woodpecker	-	Focus—Oak Woodlands, Sierra Nevada
Dryobates pubescens	Nuttall's woodpecker	-	Focus—Oak Woodlands, Sierra Nevada
Dryobates pubescens	downy woodpecker	-	Focus—Sierra Nevada
Dryobates villosus	hairy woodpecker	-	Focus—Sierra Nevada
ORDER FALCONIFORMES (Falcons & Caracaras)			
Family Falconidae (Falcons & Caracaras)			
Falco mexicanus	prairie falcon	BCC, CDFW WL	-
Falco peregrinus	peregrine falcon	-	-
Falco sparvicus	American kestrel	-	-
ORDER PASSERIFORMES (Perching Birds)			
Family Tyrannidae (Tyrant Flycatchers)			
Contopus sordidulus	western wood-pewee	-	Focus—Sierra Nevada
Empidonax difficilis	Pacific slope flycatcher	-	-
Myiarchus cinerascens	ash-throated flycatcher	-	Focus—Desert, Sierra Nevada
Sayornis nigricans	black phoebe	-	Focus—Sierra Nevada
Sayornis saya	Say's phoebe	-	-
Tyrannus verticalis	western kingbird	-	Focus—Sierra Nevada
Tyrannus vociferans	Cassin's kingbird	-	-
Family Laniidae (Shrikes)			
Lanius ludovicianus†	loggerhead shrike	BCC, SSC	Focus—Sagebrush, Sierra Nevada
Family Vireonidae (Vireos & Allies)			
Vireo belli	least Bell's vireo	FE, SE	-
Vireo gilvus	warbling vireo	-	-
Vireo huttoni	Hutton's vireo	-	-
Vireo cassinii	Cassin's vireo	-	-
Family Corvidae (Crows, Jays, & Magpies)			
Aphelocoma californica	California scrub jay	-	-
Corvus brachyrhynchos	American crow	-	Focus—Sierra Nevada
Corvus corax	common raven	-	Focus—Desert, Sierra Nevada
Cyanocitta stelleri	Stellar's jay	-	Focus—Sierra Nevada
Pica nuttalli	yellow-billed magpie	BCC	Focus—Oak Woodlands
Family Alaudidae (Larks)			
Eremophila alpestris	horned lark	-	-

Scientific Name	Common Name	Status	CalPIF Focus Species?
Family Hirundinidae (Swallows)			
Petrochelidon pyrrhonota	cliff swallow	-	-
Hirundo rustica	barn swallow	-	Focus—Sierra Nevada
Progne subis†	purple martin	SSC	Focus—Sierra Nevada
Stelgidopteryx serripennis	northern rough-winged swallow	-	Focus—Sierra Nevada
Tachycineta bicolor	tree swallow	-	Focus—Riparian, Sierra Nevada
Tachycineta thalassina	violet-green swallow	-	Focus—Sierra Nevada
Family Paridae (Tits, Chickadees & Titmice)			
Baeolophus inornata	oak titmouse	-	Focus—Oak Woodlands, Sierra Nevada
Baeolophus ridegwayi	juniper titmouse	-	Focus—Sagebrush, Sierra Nevada
Poecile rufescens	chestnut-backed chickadee	-	-
Family Aegithalidae (Long-Tailed Tits)			
Psaltriparus minimus	bushtit	-	Focus—Sierra Nevada
Family Polioptilidae (Gnatcatchers)			
Polioptila caerulea	blue-gray gnatcatcher	-	Focus—Oak Woodlands, Sierra Nevada
Family Regulidae (Kinglets)			
Regulus celandula	ruby-crowned kinglet	-	Focus—Sierra Nevada
Family Paradoxornithidae (Parrotbills, Wrentit & Allies)			
Chamaea fasciata	wrentit	-	Focus—Coastal Scrub and Chaparral, Sierra Nevada
Family Turdidae (Thrushes)			
Catharus guttatus	hermit thrush	-	Focus—Sierra Nevada
Catharus usulatus	Swainson's thrush	-	Focus—Riparian, Sierra Nevada
Sialia mexicana	western bluebird	-	Focus—Oak Woodlands, Sierra Nevada
Turdus migratorius	American robin	-	Focus—Sierra Nevada
Mimidae (Mockingbirds & Thrashers)			
Mimus polyglottos	northern mockingbird	-	-
Toxcostoma redividum	California thrasher	-	Focus—Sierra Nevada
Family Fringillidae (Finches, Euphonias, & Allies)			
Spinus lawrenci	Lawrence's goldfinch	-	Focus—Sierra Nevada
Spinus psaltria	lesser goldfinch	-	Focus—Sierra Nevada
Spinus tristis	American goldfinch	-	Focus—Sierra Nevada
Haemorhous mexicanus	house finch	-	Focus—Sierra Nevada
Haemorhous purpueus	purple finch	-	Focus—Sierra Nevada
Family Passerellidae (New World Sparrows)			
Junco heyemalis	dark-eyed junco	-	Focus—Coniferous Forests, Sierra Nevada
Melospiza melodia	song sparrow	-	Focus—Riparian, Sierra Nevada
Passercules sandwichensis	savannah sparrow	-	Focus—Sierra Nevada
Ammodramus savannarum†	grasshopper sparrow	SSC	Focus—Grasslands, Sierra Nevada
Chondestes grammacus	lark sparrow	-	Focus—Sagebrush, Sierra Nevada
Artemospiza belli	sage sparrow (Bell's sparrow)	-	Focus—Sagebrush, Coastal Scrub and Chaparral, Sierra Nevada
Spizella passerine	chipping sparrow	-	Focus—Sierra Nevada
Aimophila ruficeps†	rufous-crowned sparrow	-	-
Zonotrichia atricapilla	golden-crowned sparrow	-	-
Zonotrichia leucophrys	white-crowned sparrow	-	-
Melozone crissalis	California towhee	-	Focus—Sierra Nevada
Piplio maculatus	spotted towhee	-	Focus—Sierra Nevada

Scientific Name	Common Name	Status	CalPIF Focus Species?
Family Icteridae (Troupials & Allies)			
Agelaius tricolor†	tricolored blackbird	ST, BCC, SSC	Focus—Riparian
Agelaius phoeniceus	red-winged blackbird	-	-
Euphagus cyanocephalus	Brewer's blackbird	-	Focus—Sierra Nevada
Molothrus ater	brown-headed cowbird	-	Focus—Sierra Nevada
Icterus bullockii	Bullock's oriole	-	-
Sturnella neglecta	western meadowlark	-	Focus—Grasslands, Sagebrush, Sierra Nevada
Family Parulidae (New World Warblers)			
Setophaga nigrescens	black-throated gray warbler	-	-
Setophaga occidentalis	hermit warbler	-	Focus—Sierra Nevada
Setophaga petechia†	yellow warbler	BCC, SSC	Focus—Riparian
Setophaga coronata	yellow-rumped warbler	-	-
Setophaga townsendi	Townsend's warbler	-	-
Cardellina pusilla	Wilson's warbler	-	Focus—Riparian, Sierra Nevada
Oreothlypis ruficapilla	Nashville warbler	-	Focus—Sierra Nevada
Oreothlypis celata	orange-crowned warbler	-	-
Geothlypis trichas	common yellowthroat	-	Focus—Riparian, Sierra Nevada
Family Cardinalidae (Cardinals & Allies)			
Piranga ludoviciana	western tanager	-	Focus—Coniferous Forests, Sierra Nevada
Pheucticus melanocephalus	black-headed grosbeak	-	-
Passerina caerulea	blue grosbeak	-	Focus—Riparian, Sierra Nevada
Passerina amoena	lazuli bunting	-	Focus—Sierra Nevada

Sources: Bern 1999; CAJS-ENV database; Cornell Lab of Ornithology.

Notes:
† Denotes a SWAP Focal Species.

Status: BCC = USFWS Bird of Conservation Concern; CDFW FP = CDFW Fully Protected; CDFW WL = CDFW Watch List; FE = Federally Endangered; SE = State Endangered; ST = State Threatened

D.7 Mammals Species Recorded at Camp San Luis Obispo

Scientific Name	Common Name	Status
Family Canidae (Dogs)		
Canis latrans	coyote	-
Family Cervidae (Deer)		
Urocyon cinereoargenteus	gray fox	-
Odocoileus hemionus columbianus	black-tailed deer	-
Family Cricetidae (Rodents)		
Microtus californicus	California vole	-
Mus musculus	house mouse	-
Neotoma fuscipes	dusky-footed woodrat	-
Neotoma fuscipes luciana	Monterey dusky-footed woodrat	SSC
Neotoma lepida	desert woodrat	-
Peromyscus boylii	brush mouse	-
Peromyscus californicus	California mouse	-
Peromyscus maniculatus	deer mouse	-
Peromyscus truei	pinyon mouse	-

Scientific Name	Common Name	Status
Reithrodontomys megalotis	western harvest mouse	-
Family Didelphidae (Opossums)		
Didelphis virginiana	Virginia opossum	-
Family Felidae (Cats)		
Felis concolor	mountain lion	-
Felis domesticus	house cat	-
Felis rufus	bobcat	-
Family Geomyidae (Pocket Gophers)		
Thomomys bottae	Botta's pocket gopher	-
Family Heteromyidae (Pocket Mice & Kangaroo Rats)		
Chaetodipus californicus	California pocket mouse	-
Dipodomys heermanni	Heermann's kangaroo rat	-
Family Leporidae (Hares & Rabbits)		
Lepus californicus	black-tailed jackrabbit	-
Sylvilagus bachmani	brush rabbit	-
Family Mustelidae (Weasels & Allies)		
Mustela frenata	long-tailed weasel	-
Taxidea taxus†	American badger	SSC
Family Procyonidae (Raccoons & Allies)		
Procyon lotor	raccoon	-
Family Sciuridae (Squirrels)		
Sciurus griseus	western gray squirrel	-
Spermophilus beecheyi	California ground squirrel	-
Family Molossidae (Free-Tailed Bats)		
Antrozous pallidus pacificus	pallid bat	SSC, WBWG-H
Family Vespertilionidae (Evening or Common Bats)		
Corynorhinus townsendii	Townsend's big-eared bat	SSC, WBWG-H
Eptesicus fuscus	big brown bat	-
Lasionycteris noctivagans	silver-haired bat	WBWG-M
Lasiurus blossevillii†	western red bat	SSC, WBWG-H
Myotis californicus	California myotis	-
Myotis yumanensis	Yuma myotis	WBWG-LM
Tadarida brasiliensis	Brazilian free-tailed bat	-

Sources: CAJS-ENV database.

Notes:
† Denotes a SWAP Focal Species.

Status: SSC = Species of Special Concern; WBWG = Western Bat Working Group (H = High Priority; M = Medium Priority; LM = Low-Medium Priority)

Appendix E. Invasive Plants List

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Scientific Name (Common Name)	Cal-IPC/CDFA Rating	Common Habitat Type	CDFW Sensitive Natural Communities Effected (S1-S3)	CA SWAP Target Conservation Vegetative Communities Effected	TES Habitat Affected
	Management Priority*	Management Recommendations (Small-Scale)	Other Considerations (Landscape-Level Management)	Reproduction & Dispersal Mechanism(s)	
Ailanthus altissima (Tree of Heaven)	Cal-IPC Moderate, CDFA "C"	Disturbed areas, riparian areas, grasslands, woodlands	California Sycamore Woodland S3 Valley Needle Grass Grassland S3	Warm Southwestern Riparian Forest California Forest & Woodland California Annual & Perennial Grassland	SCCC Steelhead: FT; Swainson's Hawk: ST; Least Bell's Vireo: FE; W Yellow-Billed Cuckoo: FT; Bald Eagle: SE
	Medium priority, can form dense stands outcompeting natives in riparian habitat.	Mechanically eradicate from riparian areas and treat stumps with herbicide outside of riparian habitat.	Heavily shaded areas suppress Ailanthus growth	One tree can produce more than 325,000 seeds annually. Fast growing tree. Also reproduces through rhizomes. Seeds do not last more than a year in seed banks.	
Arundo donax (Giant Reed, Arundo)	Cal-IPC High, CDFA "B"	Disturbed areas, riparian areas, wetlands	California Sycamore Woodland S3	Warm Southwestern Riparian Forest Western North American Freshwater Marsh Western North America Wet Meadow and Low Shrub Carr	Least Bell's Vireo: FE; SCCC Steelhead: FT; W Yellow-Billed Cuckoo: FT; Chorro Creek Bog Thistle: FE; Bald Eagle: SE; Tricolored Blackbird: ST
	High—monitor, eradicate. High priority, Chokes out riparian and wetland areas. Lowers water table due to high transpiration.	Mechanically eradicate all Arundo from the base and treat stumps with herbicide outside of wetland and riparian habitats.	Goats have shown success in riparian areas. Burning or cutting can be used followed by herbicide treatment. Could benefit from a watershed partnership approach beneficial.	Arundo quickly establishes sites after disturbance. Species availability made possible through dispersal of rhizomes forming dense stands which interfere with native growth. Plant fragments disperse downstream and form new colonies.	
Asphodelus fistulosus (Onionweed)	Cal-IPC Moderate, CDFA "B", Federal Noxious Weed	Disturbed areas, Grasslands	Valley Needle Grass Grassland S3	California Annual & Perennial Grassland	Swainson's Hawk: ST
	Medium- monitor, control. Low priority. Primarily contained within disturbed areas.	Hand pull onion weed in sensitive habitat.	Burning and grazing is not feasible.	Reproduces by seed and spreads primarily through water, animals, and human activities. Seeds last for many years in the soil seedbank.	
Avena barbata (Slender Wild Oat)	Cal-IPC Moderate	Grasslands, woodlands, disturbed areas, non-wetlands	Valley Needle Grass Grassland S3	California Forest & Woodland California Annual & Perennial Grassland	Swainson's Hawk: ST
	Low - Cannot contain, management a low priority.	Mechanically eradicate via hand pulling in any sensitive habitat.	Burning can reduce seed viability. Competitive stand of perennial vegetation discourages growth.	Plants only reproduce by seed. Seeds are viable for 10 years in the soil.	

Scientific Name (Common Name)	Cal-IPC/CDFA Rating	Common Habitat Type	CDFW Sensitive Natural Communities Effected (S1-S3)	CA SWAP Target Conservation Vegetative Communities Effected	TES Habitat Affected
	Management Priority*	Management Recommendations (Small-Scale)	Other Considerations (Landscape-Level Management)	Reproduction & Dispersal Mechanism(s)	
Avena fatua (Wild Oats)	Cal-IPC Moderate	Disturbed areas, understory of woodlands, grasslands, non-wetlands	Valley Needle Grass Grassland S3	California Forest & Woodland California Annual & Perennial Grassland	Swainson's Hawk: ST
	Low - Cannot contain, management a low priority.	Mechanically eradicate via hand pulling in any sensitive habitat.	Same as slender wild oats.	Same as slender wild oats.	
Bellardia trixago (Bellardia)	Cal-IPC Limited	Disturbed areas, grasslands, serpentine grasslands	Valley Needle Grass Grassland S3	California Annual & Perennial Grassland	Swainson's Hawk: ST
	Low – monitor. Medium priority. Hemi-parasitic plant that can crowd out rare native plants that are endemic to serpentine soils.	Chemically treat with selective contact herbicide in sensitive habitats and serpentine chaparral.	Extra consideration necessary since the plant is hemi-parasitic.	Spreads by seed.	
Brachypodium distachyon† (False Brome)	Cal-IPC Moderate, CDFA "A"	Grasslands, understory of woodlands with rocky soils.	Valley Needle Grass Grassland S3	California Forest & Woodland 4 California Annual & Perennial Grassland	Swainson's Hawk: ST;
	Low priority. Primarily within grasslands with rocky soils.	None – monitor populations.	Prescribed burn, mowing, tilling and cultivation all provide good control. Poor forage quality for grazing.	Plants reproduce only by seed. Dispersal is facilitated by animals, and human activities. Germination occurs in fall or early winter. Seeds typically last a couple of years in the soil.	
Brassica nigra (Black Mustard)	Cal-IPC Moderate	Disturbed areas, grasslands non-wetlands	Valley Needle Grass Grassland S3	California Annual & Perennial Grassland	Swainson's Hawk: ST
	Low -- Monitor. Medium priority - grows profusely and produces allelopathic chemicals that prevent germination of native plants.	Mechanically eradicate dense populations yearly via mowing before seed sets.	Mowing and tilling are very effective at mustard control. Grazing control is fair	Reproduces only by seed. Seeds typically fall near parent plants and persist for up to 50 years.	
Bromus diandrus (Ripgut Brome)	Cal-IPC Moderate	Disturbed areas, woodlands, grasslands, non-wetlands	Valley Needle Grass Grassland S3	California Forest & Woodland California Annual & Perennial Grassland	Swainson's Hawk: ST;
	Low—monitor. Cannot contain, management a low priority.	Mechanically eradicate via hand pulling in any sensitive habitat.	Burn before seeds mature in the late spring. Tilling & cultivation can be effective	Seeds spread short distances by wind and greater distances by animals and people. Reproduces by seed only. Seeds can last up to 5 years in the seedbank. Thatch accumulation promotes germination.	

Scientific Name (Common Name)	Cal-IPC/CDFA Rating	Common Habitat Type	CDFW Sensitive Natural Communities Effected (S1-S3)	CA SWAP Target Conservation Vegetative Communities Effected	TES Habitat Affected
	Management Priority*	Management Recommendations (Small-Scale)	Other Considerations (Landscape-Level Management)	Reproduction & Dispersal Mechanism(s)	
Bromus hordeaceus (Soft Chess)	Cal-IPC Limited	Disturbed areas, grasslands, woodlands, serpentine grasslands, wetlands	Valley Needle Grass Grassland S3	California Forest & Woodland California Annual & Perennial Grassland Western North American Freshwater Marsh Western North America Wet Meadow and Low Shrub Carr	Swainson's Hawk: ST; Chorro Creek Bog Thistle: FE; Tricolored Blackbird: ST
	Low-- monitor. Medium priority grows on serpentine soils home to rare plants.	Mechanically pull in wetlands and any other sensitive habitat.	Burning and grazing has been shown to temporarily reduce populations. Promoting native plant establishment out competes brome.	Reproduction is only by seed. Dispersal is mainly focused primarily around the parent plant with longer dispersal being accomplished through animals and people. Seeds can last between 2 to 5 years.	
Bromus madritensis ssp. *rubens* (Red Brome)	Cal-IPC High	Disturbed areas, woodlands, grasslands	Valley Needle Grass Grassland S3	California Forest & Woodland California Annual & Perennial Grassland	Swainson's Hawk: ST;
	Low-- monitor. Cannot contain, management a low priority.	Mechanically pull small patches in sensitive habitats. Chemically treat larger patches.	Burning is not very effective. Moderate grazing mixed with herbicide has shown success. Tilling and cultivation can be effective.	Seeds spread short distances by wind and greater distances by animals and people. Reproduces by seed only. Seeds can last up to 5 years in the seedbank. Thatch accumulation promotes germination.	
Bromus tectorum (Cheatgrass)	Cal-IPC High	Grasslands, woodlands, disturbed areas, non-wetlands	Valley Needle Grass Grassland S3	California Forest & Woodland California Annual & Perennial Grassland	Swainson's Hawk: ST;
	Low priority—invasiveness typically only a problem in more arid climates.	Mechanically pull small patches in sensitive habitats. Chemically treat larger patches.	Burning is not very effective. Moderate grazing mixed with herbicide has shown success. Tilling and cultivation can be effective.	Seeds spread short distances by wind and greater distances by animals and people. Reproduces by seed only. Seeds can last up to 5 years in the seedbank. Thatch accumulation promotes germination.	
Carduus pycnocephalus (Italian Thistle)	Cal-IPC Moderate, CDFA "C"	Grasslands, disturbed areas, non-wetlands	Valley Needle Grass Grassland S3	California Annual & Perennial Grassland	Swainson's Hawk: ST;
	Medium—monitor, control. Low priority, mainly contained in disturbed areas.	Mechanically remove entire plant in sensitive habitats. Big populations can be mowed and treated with herbicide.	Thistles compete poorly with healthy established grasses and other vegetation. Grazing and fire has varied results.	Can form dense colonies around parent plant and disperse farther by wind. Seeds do not last more than a few years in the soil bank.	
Carpobrotus chilensis (Sea Fig)	Cal-IPC Moderate	Coastal scrub, grasslands, chaparral, dunes and beaches	Valley Needle Grass Grassland S3	California Annual & Perennial Grassland California Chaparral	Swainson's Hawk: ST, California Condor: FE
	Low priority in all communities other than dune communities.	Monitor populations. In sensitive habitat, treat sea fig with herbicide then let it dry. Once dried the plant colony can be rolled up and removed offsite.	Grazing and fire are not effective means of control.	Propagates by seed and vegetatively. Even small stem fragments can regenerate into a new plant, making control difficult. Seeds are primarily dispersed by animals after consumption. Seeds typically remain viable for up to three years.	

Scientific Name (Common Name)	Cal-IPC/CDFA Rating	Common Habitat Type	CDFW Sensitive Natural Communities Effected (S1-S3)	CA SWAP Target Conservation Vegetative Communities Effected	TES Habitat Affected
	Management Priority*	Management Recommendations (Small-Scale)	Other Considerations (Landscape-Level Management)	Reproduction & Dispersal Mechanism(s)	
Carthamus lanatus (Woolly Distaff Thistle)	Cal-IPC High, CDFA "B"	Disturbed areas, non-wetlands, grasslands	Valley Needle Grass Grassland S3	California Annual & Perennial Grassland	Swainson's Hawk: ST
	High—monitor, eradicate. Can form dense populations outcompeting desirable rangeland species and injury grazing animals.	Manually remove small populations in sensitive habitat before flowering. Mowing can help reduce large populations.	Thistles compete poorly with healthy established grasses and other vegetation.	Can form dense colonies around parent plant and disperse farther by wind or human/animal activity. Seeds can remain viable for up to 8 years in the soil bank.	
Centaurea calcitrapa (Purple Starthistle)	Cal-IPC Moderate, CDFA "B"	Disturbed areas, grasslands, woodlands, riparian areas	California Sycamore Woodland S3 Valley Needle Grass Grassland S3	Warm Southwestern Riparian Forest California Forest & Woodland California Annual & Perennial Grassland	SCCC Steelhead: FT; Swainson's Hawk: ST; Least Bell's Vireo: FE; W Yellow-Billed Cuckoo: FT; Bald Eagle: SE
	Medium—monitor, control. Medium priority may produce allelopathic chemicals that outcompete native vegetation.	Mechanically remove entire plant in sensitive habitats. Chemically treat large isolated patches.	Grazing and fire promote purple starthistle growth. Fertility management is best utilized along with competitive native plant establishment.	Plants only reproduce by seed which disperses with the seed head as a unit. Most fall just below the parent plant but can disperse farther with human/animal activity. Seeds last about 3 years in the seedbank.	
Centaurea melitensis (Tocalote, Malta Starthistle)	Cal-IPC Moderate, CDFA "C"	Disturbed areas, grasslands, open woodlands, non-wetlands	Valley Needle Grass Grassland S3	California Forest & Woodland California Annual & Perennial Grassland	Swainson's Hawk: ST
	Low—monitor, prevent spread. Medium priority, may produce allelopathic chemicals that outcompete native vegetation.	Mechanically remove entire plant in sensitive habitats. Chemically treat large isolated patches.	Grazing and fire are not effective tools. Mowing for 2-4 years can eliminate seedbank.	Spreads quickly by producing great quantities of seed. Reproduces only by seed and forms dense colonies around parent plant. Seeds typically last about 4 years in soil.	
Centaurea solstitialis (Yellow Starthistle)	Cal-IPC High, CDFA "C"	Disturbed areas, open woodlands, grasslands, non-wetlands	Valley Needle Grass Grassland S3	California Forest & Woodland California Annual & Perennial Grassland	Swainson's Hawk: ST
	High—monitor, control. High priority, highly competitive and can produce allelopathic chemicals that outcompete native vegetation.	Mechanically remove entire plant in sensitive habitats. Chemically treat large isolated patches.	Goats have shown success in grazing small infestations. Properly timed burns can provide control. Mowing or tilling for 2-4 years can eliminate seedbank & populations.	Propagates rapidly by seed with large plants producing nearly as much as 75,000 seeds per plant most germinating and forming dense colonies around the parent plant. Seeds typically last about 4 years in soil.	

Scientific Name (Common Name)	Cal-IPC/CDFA Rating	Common Habitat Type	CDFW Sensitive Natural Communities Effected (S1-S3)	CA SWAP Target Conservation Vegetative Communities Effected	TES Habitat Affected
	Management Priority*	Management Recommendations (Small-Scale)	Other Considerations (Landscape-Level Management)	Reproduction & Dispersal Mechanism(s)	
Chondrilla juncea (Skeleton weed)	Cal-IPC Moderate, CDFA "A"	Grows primarily in disturbed areas.			
	Low—monitor, prevent spread. Low priority, primarily contained within disturbed areas but can interfere with harvest machinery.	Herbicide is the most effective means of control. Spot spray individual plants in sensitive habitat.	Grazing and fire are generally not effective means of control. Increased nutrient levels in soil spears to discourage survival due to increased competition from other vegetation.	Can reproduce by means of adventitious buds near the top of the taproot and on major lateral roots. Also reproduces from seed which can be dispersed long distances by wind. Seeds appear to survive less than five years.	
Cirsium vulgare (Bull Thistle)	CAL-IPC Moderate, CDFA "C"	Disturbed areas, grasslands, open woodlands, wetlands, riparian areas	California Sycamore Woodland S3 Valley Needle Grass Grassland S3	California Forest & Woodland Warm Southwestern Riparian Forest Western North American Freshwater Marsh California Annual & Perennial Grassland Western North America Wet Meadow and Low Shrub Carr	SCCC Steelhead: FT; Swainson's Hawk: ST; Least Bell's Vireo: FE; W Yellow-Billed Cuckoo: FT; Chorro Creek Bog Thistle: FE; Bald Eagle: SE; Tricolored Blackbird: ST
	Medium priority, primarily contained within disturbed areas but has potentially to occur in sensitive habitat.	Mechanically remove all above ground portions of plant in sensitive habitats and wetlands. Larger isolated patches can be treated with herbicide outside of wetland areas.	Goats have shown success in controlling bull thistle populations. Fires control is unpredictable. Mowing & other mechanical control effective at the start of flowering.	Reproduces only by seed with most seeds only falling a few feet from the parent. Plants can produce as much as 75,000 seeds per plant. Potential to form dense colonies in freshly disturbed areas. Seeds survive for about 3 years in soil.	
Conium maculatum (Poison Hemlock)	Cal-IPC Moderate	Disturbed areas, woodlands, riparian areas, meadows	California Sycamore Woodland S3	California Forest & Woodland Warm Southwestern Riparian Forest Western North America Wet Meadow and Low Shrub Carr	SCCC Steelhead: FT; Least Bell's Vireo: FE; W Yellow-Billed Cuckoo: FT; Chorro Creek Bog Thistle: FE; Bald Eagle: SE
	Low—monitor, prevent spread. Medium priority, highly competitive and shades out natives.	Mechanically remove all above ground portions of plant in sensitive habitats. Larger isolated patches away from wetlands can be treated with herbicide.	Burning or grazing not feasible due to toxic nature of plant. Cultivation can prevent population establishment.	Reproduces only by seed with most seeds falling near the parent plant which can form dense colonies. Seed dispersal occurs from late summer through winter. Seeds survive up to three years in the soil.	

Scientific Name (Common Name)	Cal-IPC/CDFA Rating	Common Habitat Type	CDFW Sensitive Natural Communities Effected (S1-S3)	CA SWAP Target Conservation Vegetative Communities Effected	TES Habitat Affected
	Management Priority*	Management Recommendations (Small-Scale)	Other Considerations (Landscape-Level Management)	Reproduction & Dispersal Mechanism(s)	
Convolvulus arvensis (Bindweed)	CDFA "C"	Grows primarily in disturbed areas; pastures, rangeland, croplands			
	Low priority, typically contained within disturbed areas. Can be a pest in croplands.	Hard to control – monitor populations. Use Herbicides to suppress when necessary.	Prevention is the best method of control. Grazing and fire are not viable means of control.	Very difficult weed to control in landscapes. Spreads vegetatively through a very extensive rhizome system and by seed. Seeds are viable for up to 60 years.	
Cortaderia selloana (Uruguayan pampas grass)	Cal-IPC High	Disturbed areas, grasslands, coastal shrublands, woodlands, riparian areas, wetlands	California Sycamore Woodland S3 Valley Needle Grass Grassland S3	Warm Southwestern Riparian Forest California Forest & Woodland Western North American Freshwater Marsh California Annual & Perennial Grassland Western North America Wet Meadow and Low Shrub Carr	SCCC Steelhead: FT; Swainson's Hawk: ST; Least Bell's Vireo: FE; W Yellow-Billed Cuckoo: FT; Chorro Creek Bog Thistle: FE; Bald Eagle: SE; Tricolored Blackbird: ST
	High – monitor, eradicate. Colonizes bare ground very quickly and other areas not needing fertilizers.	Hand remove plants with shovels in wetland areas and spray stumps with herbicide outside of wetland areas.	Heavily mulching or planting bare or freshly disturbed sites can prevent establishment.	Plants reproducing only by seed with each plume producing up to 100,000 seeds a year all of which are widely dispersed by wind (up to 20 miles) and develop without fertilization. Seeds usually do not persist for long in the seedbank	
Cotoneaster franchetii (Orange Cotoneaster)	Cal-IPC Moderate	Disturbed areas (often residential), mixed evergreen forests, grasslands, coastal scrub.	Valley Needle Grass Grassland S3 Sargent Cypress Woodland S3.2	California Forest & Woodland California Annual & Perennial Grassland	Swainson's Hawk: ST, California Condor: FE
	Low—monitor. Low Priority, typically found in disturbed residential areas.	Mechanically remove above ground vegetation and treat stumps with herbicide in sensitive habitat.	Fruit provides a good food source for some birds. Grazing/ burning not feasible.	Each plant can produce thousands of fruits every year which can be widespread through animals/humans and water. Plant will re-sprout from roots if cut.	
Cotoneaster pannosus (Cotoneaster)	Cal-IPC Moderate	Disturbed areas (often residential), mixed evergreen forests, grasslands, coastal scrub.	Valley Needle Grass Grassland S3 Sargent Cypress Woodland S3.2	California Forest & Woodland California Annual & Perennial Grassland	Swainson's Hawk: ST, California Condor: FE
	Low Priority, typically found in disturbed residential areas.	Mechanically remove above ground vegetation and treat stumps with herbicide in sensitive habitat.	Fruit provides a good food source for some birds. Grazing/ burning not feasible.	Each plant can produce thousands of fruits every year which can be widespread through animals/humans and water. Plant will re-sprout from roots if cut.	

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Cotula coronopifolia (Brass Buttons)	Cal-IPC Limited	Disturbed areas, freshwater marshes, wetlands		Western North American Freshwater Marsh Western North America Wet Meadow and Low Shrub Carr	Chorro Creek Bog Thistle: FE; Tricolored Blackbird: ST
	Medium priority, spreads slowly in wetlands but can occur in CCBT and other sensitive habitats.	Mechanically remove in wetland habitats and treat with herbicides outside of wetland areas.	Tilling can work in areas compatible with the method. Grazing/ burning not feasible.	Plants reproduce by seed and via vegetation. Birds and water can widely disperse seeds. Vegetative growth is slow.	
Crataegus monogyna (Hawthorn)	Cal-IPC Limited	Riparian areas, woodlands, grasslands	California Sycamore Woodland S3 Valley Needle Grass Grassland S3	Warm Southwestern Riparian Forest 5* California Forest & Woodland 4 California Annual & Perennial Grassland	SCCC Steelhead: FT; Swainson's Hawk: ST; Least Bell's Vireo: FE; W Yellow-Billed Cuckoo: FT; Bald Eagle: SE
	Medium priority, spreads slowly in riparian areas and woodlands.	Mechanically remove in riparian areas. Treat stump with herbicide outside of wetland areas.	Grazing and burning are not feasible. Fruit provides good forage for small animals.	Produces fruit which are eaten and dispersed by small animals or human activity and water. Plant will re-sprout from roots or stump if cut.	
Cynodon dactylon (Bermuda Grass)	Cal-IPC Moderate, CDFA "C"	Disturbed areas, riparian areas, wetlands	California Sycamore Woodland S3	Western North American Freshwater Marsh Warm Southwestern Riparian Forest Western North America Wet Meadow and Low Shrub Carr	SCCC Steelhead: FT; Least Bell's Vireo: FE; W Yellow-Billed Cuckoo: FT; Chorro Creek Bog Thistle: FE; Bald Eagle: SE; Tricolored Blackbird: ST
	Medium—monitor, control. Moderate, out competes native riparian species.	Hand weed in wetland habitat and CCBT habitat and other wetland areas.	Shading by other plants, mulches, or cloth can suppress growth. Tilling is effective.	Reproduces and spreads vegetatively from its rhizomes & stolons or by seeds. Rhizome and stolon fragments spread with soil movement and seeds spread with water or human activity. Seeds can last up to 4 years in the soil.	

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Cynosurus echinatus (Annual Dogtail)	Cal-IPC Moderate	Disturbed areas, grasslands, chaparral, oak woodlands, riparian areas.	Valley Needle Grass Grassland S3 California Sycamore Woodland S3	California Annual & Perennial Grassland Warm Southwestern Riparian Forest California Forest & Woodland California Chaparral	SCCC Steelhead: FT; Swainson's Hawk: ST; Least Bell's Vireo: FE; W Yellow-Billed Cuckoo: FT; California Condor: FE; Bald Eagle: SE
	Low priority. Heavy infestations can reduce desirable forage species and increase fire hazard.	Hand pulling and line trimming are effective before seed set in small infestations.	Grazing and burning are not viable options. Mowing and line trimming are effective before the seed sets.	Plants reproduce only by seed. Fertile forests fall near the parent plant and can disperse greater distances due to water, human, and animal activity. Persistent seedbanks do not appear to develop.	
Delairea ordorata (Cape Ivy)	Cal- IPC High, CDFA "B"	Riparian areas, oak woodlands	California Sycamore Woodland S3	Warm Southwestern Riparian Forest California Forest & Woodland	SCCC Steelhead: FT; Least Bell's Vireo: FE; W Yellow-Billed Cuckoo: FT; Bald Eagle: SE
	High priority – monitor, control. Forms dense mats of vegetation outcompeting native vegetation and is toxic to animals. Fish can be killed when vast amounts of plant material is soaking in waterways.	Manually remove plant.	Grazing and burning are not feasible. Watershed partnership approach beneficial.	Plants primarily reproduce vegetatively through fragments of stem, rhizome, and stolon. Most seeds are not viable but when they are, they can spread long distances by wind.	
Dipsacus sativus (Fuller's teasel)	Cal-IPC Moderate	Disturbed areas, grasslands, wetlands, meadows, seeps, riparian areas	Valley Needle Grass Grassland S3 California Sycamore Woodland S3	California Annual & Perennial Grassland Western North American Freshwater Marsh Western North America Wet Meadow and Low Shrub Carr Warm Southwestern Riparian Forest	SCCC Steelhead: FT; Swainson's Hawk: ST; Least Bell's Vireo: FE; W Yellow-Billed Cuckoo: FT; Chorro Creek Bog Thistle: FE; Bald Eagle: SE; Tricolored Blackbird: ST
	Medium priority – has potential to invade Chorro Creek Bog Thistle habitat and other riparian areas.	Manually remove plant before flowering in sensitive habitat.	In open fields or other disturbed areas livestock can be used to graze rosettes. Fire not effective.	Reproduction is only by seed; however a plant can produce more than 2,000 seeds annually with a germination success rate of up to 80%. Seeds dispersal is primarily near the parent plant with seeds remaining viable for up to 2 years.	

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Erodium cicutarium (Redstem Filaree)	Cal-IPC Limited	Disturbed areas, grasslands, occasionally wetlands	Valley Needle Grass Grassland S3	California Annual & Perennial Grassland Western North American Freshwater Marsh Western North America Wet Meadow and Low Shrub Carr	Swainson's Hawk: ST; Chorro Creek Bog Thistle: FE; Tricolored Blackbird: ST
	Low priority -- Cannot contain.	Hard to contain, remove only by either hand in sensitive habitats.	Provides good forage before it matures. Burning not feasible. Cultivation can help control.	Plants reproduce only by seed which are found typically a short distance from the parent plant. Or can disperse further through animal/ human activity. Seeds can form extensive seed banks.	
Eucalyptus camaldulensis (Red Gum)	Cal-IPC Limited	Riparian areas, wetlands, disturbed areas	California Sycamore Woodland S3	Warm Southwestern Riparian Forest Western North American Freshwater Marsh Western North America Wet Meadow and Low Shrub Carr	SCCC Steelhead: FT; Least Bell's Vireo: FE; W Yellow-Billed Cuckoo: FT; Chorro Creek Bog Thistle: FE; Bald Eagle: SE; Tricolored Blackbird: ST
	Low priority, spreads slowly and typically contained.	None – monitor stands and remove only when critical. Prevent spread in riparian areas.	Seedlings do not tolerate shade. Re-sprouting will occur when cut.	Prolific seed producer. Seeds do not spread far from parent plant besides when done through water. Seeds can remain dormant for several years.	
Eucalyptus globulus (Tasmanian Blue Gum, Blue Gum Eucalyptus)	Cal-IPC Limited	Disturbed areas, riparian areas	California Sycamore Woodland S3	Warm Southwestern Riparian Forest	SCCC Steelhead: FT; Least Bell's Vireo: FE; W Yellow-Billed Cuckoo: FT; Bald Eagle: SE
	Medium—monitor, control. Low priority, spreads slowly and typically contained.	None – monitor stands and remove only when critical	Grazing and burning not effective. Resprouting occurs when cut. Dense groves accumulate highly combustible litter.	Reproduces by seed with most falling within 300' from the parent plant. Some are dispersed farther through animal & human activity. Seeds can remain dormant for several years.	
Festuca myuros (Rattail Fescue)	Cal-IPC Moderate	Disturbed areas, grasslands, wetlands	Valley Needle Grass Grassland S3	California Annual & Perennial Grassland Western North American Freshwater Marsh Western North America Wet Meadow and Low Shrub Carr	Swainson's Hawk: ST; Chorro Creek Bog Thistle: FE; Tricolored Blackbird: ST
	Medium—monitor, control. Medium priority, control in wetlands and other sensitive habitats.	Hand remove small clusters in wetlands and CCBT habitat. Treat with herbicide dense clusters outside of wetland areas.	Grazing and burning have produced varying results. Typically, not feasible to control on a landscape level.	Reproduces by seed only with most falling near the parent plant. Some have potential to spread further through animal and human activity.	

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Festuca perennis (Italian Ryegrass)	Cal-IPC Moderate	Disturbed areas, grasslands, wetlands	Valley Needle Grass Grassland S3	Western North American Freshwater Marsh California Annual & Perennial Grassland Western North America Wet Meadow and Low Shrub Carr	Swainson's Hawk: ST; Chorro Creek Bog Thistle: FE; Tricolored Blackbird: ST
	Medium, control in wetlands, CCBT habitat	Hand remove small clusters in wetlands and CCBT habitat. Treat dense clusters with herbicide outside of wetland areas.	Grazing and burning have produced varying results. Typically, not feasible to control on a landscape level.	Reproduces by seed only with most falling near the parent plant. Some have potential to spread further through animal and human activity. Seeds typically do not persist for long in seedbanks.	
Foeniculum vulgare (Wild Fennel)	Cal-IPC Moderate	Disturbed areas, grasslands, riparian areas, wetlands	California Sycamore Woodland S3 Valley Needle Grass Grassland S3	Western North American Freshwater Marsh Western North America Wet Meadow and Low Shrub Carr Warm Southwestern Riparian Forest California Annual & Perennial Grassland	Swainson's Hawk: ST; SCCC Steelhead: FT; Least Bell's Vireo: FE; W Yellow-Billed Cuckoo: FT; Chorro Creek Bog Thistle: FE; Bald Eagle: SE; Tricolored Blackbird: ST
	Medium—monitor, control. High priority, drastically alters the composition and structure of many plant communities, including grasslands, coastal scrub, riparian, and wetland communities.	Hand slash all clusters in sensitive areas. Revisit later if necessary. Treat dense clusters with herbicide outside of wetland areas.	Grazing is not effective and spreads the population. Fall burns followed by herbicide treatment can be effective.	Plants reproduce by seed and sometimes vegetatively through root or crown fragments. Seeds typically do not fall far from the parent but can travel further through animal & human activity. Forms dense colonies. Seeds persist for several years in soil.	
Geranium dissectum (Geranium)	Cal-IPC Limited	Disturbed areas, grasslands, shrublands, open woodlands	Valley Needle Grass Grassland S3	California Chaparral California Forest & Woodland California Annual & Perennial Grassland	California Condor: FE; Swainson's Hawk: ST;
	Low priority, primarily contained in disturbed areas.	Hand pull only the plants in sensitive habitat.	Grazing and burning are not effective means of control. Exclusion most likely the best control. Cultivation is effective.	Reproduces only by seed with most falling close to the parent plant but some spreading further through animal and human activity. Seeds form a seed bank viable for up to 10 years.	

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Hedypnois cretica (Mediterranean Crete-weed)		Disturbed areas, riparian areas	California Sycamore Woodland S3	Warm Southwestern Riparian Forest	SCCC Steelhead: FT; Least Bell's Vireo: FE; W Yellow-Billed Cuckoo: FT; Bald Eagle: SE
	Low—monitor. Has potential to negatively impact rangelands by outcompeting desirable species.	Hand pull only the plants in sensitive habitat.	Some control can be offered through grazing. Fire not a viable option.	Reproduces by seed with most falling close to the parent plant and others being wind dispersed up to long distances. Seeds not viable for more than two years seed banks.	
Helminthotheca echioides (Bristly Ox-Tongue)	Cal- IPC Limited	Disturbed areas, grasslands, wetlands, riparian areas, meadows and seeps	California Sycamore Woodland S3 Valley Needle Grass Grassland S3	Warm Southwestern Riparian Forest Western North American Freshwater Marsh Western North America Wet Meadow and Low Shrub Carr California Annual & Perennial Grassland	Swainson's Hawk: ST; SCCC Steelhead: FT; Least Bell's Vireo: FE; W Yellow-Billed Cuckoo: FT; Chorro Creek Bog Thistle: FE; Bald Eagle: SE; Tricolored Blackbird: ST
	Low priority within most habitats. High priority within CCBT habitat – monitor and eradicate here.	Hand pull all plants in CCBT habitat and sensitive habitats.	Grazing and mowing have shown to facilitate bristly ox tongue growth.	Reproduces exclusively by seed with most falling close to the parent plant forming dense colonies in disturbed areas. Some spread further through animal and human activity.	
Hirschfeldia incana (Mediterranean or Short-Pod Mustard)	Cal-IPC Moderate	Disturbed areas, grasslands	Valley Needle Grass Grassland S3	California Annual & Perennial Grassland	Swainson's Hawk: ST;
	Low—monitor. Medium priority, fairly abundant in grasslands and coastal scrub.	Hand pull plants in sensitive habitat. Treat with herbicide dense clusters.	Grazing and fire are not effective. Will reproduce vegetatively through the base if damaged.	Reproduce primarily by seed with most falling close to the parent plant. Seed production is high with seeds likely to survive in the soil for several years.	
Hordeum marinum ssp. *gussoneanum* (Mediterranean Barley)	Cal-IPC Moderate	Disturbed areas, grasslands, wetlands	Valley Needle Grass Grassland S3	Western North American Freshwater Marsh Western North America Wet Meadow and Low Shrub Carr California Annual & Perennial Grassland	Swainson's Hawk: ST; Chorro Creek Bog Thistle: FE; Tricolored Blackbird: ST
	Moderate, outcompetes plants in wetlands – fairly abundant.	Hand pull plants in sensitive habitat. Treat dense clusters with herbicide outside of wetland areas.	Burning is an effective control for Hordeum species. Thick mulches can reduce germination.	Reproduction is only by seed with most falling close to the parent pant to form dense colonies. Some have potential to move further with animal/ human activity. Seed bank is short-lived.	
Hordeum murinum (Wall Barley)	Cal-IPC Moderate	Disturbed areas, grasslands	Valley Needle Grass Grassland S3	California Annual & Perennial Grassland	Swainson's Hawk: ST;
	Medium – monitor, prevent spread.	Hand pull plants in sensitive habitat. Treat dense clusters with herbicide.	Burning is an effective control for *Hordeum* species. Thick mulches can reduce germination.	Reproduction is only by seed with most falling close to the parent pant to form dense colonies. Some have potential to move further with animal/ human activity. Seed bank is short-lived.	

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Hordeum murinum subsp. Leporinum (Hare Barley)		Disturbed areas, grasslands, riparian areas, wetlands	California Sycamore Woodland S3 Valley Needle Grass Grassland S3	California Annual & Perennial Grassland Western North American Freshwater Marsh Western North America Wet Meadow and Low Shrub Carr Warm Southwestern Riparian Forest	Swainson's Hawk: ST; SCCC Steelhead: FT; Least Bell's Vireo: FE; W Yellow-Billed Cuckoo: FT; Chorro Creek Bog Thistle: FE; Bald Eagle: SE; Tricolored Blackbird: ST
	Low—monitor, control.	Hand pull plants in sensitive habitat.	Useful livestock forage early in the season before flower spikes develop.	Reproduction is only by seed with most falling close to the parent pant to form dense colonies. Some have potential to move further with animal/ human activity. Seed bank is short-lived.	
Hypochaeris glabra (Smooth Cat's Ear)	Cal-IPC Limited	Disturbed areas, grasslands, woodlands, chaparral	Valley Needle Grass Grassland S3	California Forest & Woodland California Annual & Perennial Grassland California Chaparral	Swainson's Hawk: ST; California Condor: FE
	Low priority, primarily contained within disturbed areas.	Hand pull only plants in sensitive areas.	Cultivation can be used to control smooth cat's ear but grazing and burning are not feasible.	Seeds are dispersed primarily by wind but also through animal and human activity. Seeds generally do not persist in the seedbank. Can also reproduce vegetatively through offsets from the crown.	
Lepidium latifolium (Perennial Pepperweed)	Cal-IPC High, CDFA "B"	Disturbed areas, wetlands, riparian areas	California Sycamore Woodland S3	Western North American Freshwater Marsh Warm Southwestern Riparian Forest Western North America Wet Meadow and Low Shrub Carr	SCCC Steelhead: FT; Least Bell's Vireo: FE; W Yellow-Billed Cuckoo: FT; Chorro Creel Bog Thistle: FE; Bald Eagle: SE; Tricolored Blackbird: ST
	High—monitor, control. High priority, grows very aggressively, forming dense colonies that exclude native species in riparian areas and wetlands.	Mow or cut dense stands in all wetland habitat and treat cut stems with herbicide outside of wetland areas.	Grazing can suppress populations, but will re-sprout once stopped. Best control is through the establishment of desirable competitive vegetation.	Forms dense colonies that exclude native species. It reproduces by seed and vegetatively through root fragments. Dispersal is accomplished through animal and human activity. Produces large amounts of seed which do not remain viable in the soil for long – appears to reproduce primarily vegetatively through root and root fragments.	

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Marrubium vulgare (White Horehound)	Cal-IPC Limited	Disturbed areas, grasslands, chaparral, riparian areas, wetlands	California Sycamore Woodland S3 Valley Needle Grass Grassland S3	Western North American Freshwater Marsh Warm Southwestern Riparian Forest California Chaparral California Annual & Perennial Grassland Western North America Wet Meadow and Low Shrub Carr	SCCC Steelhead: FT; Least Bell's Vireo: FE; Swainson's Hawk: ST; California Condor: FE; W Yellow-Billed Cuckoo: FT; Chorro Creek Bog Thistle: FE; Bald Eagle: SE; Tricolored Blackbird: ST
	Low priority, primarily occurs in disturbed areas and has low impact on natives.	Hand pull in wetland habitat. Treat with herbicide outside of wetland habitat.	Grazing and burning alone are not effective controls. Deep cultivation can control the species.	Reproduces primarily by seed with most falling directly under the parent plant and some being moved long distances through animal and human activity. Has potential to form dense stands and the seed bank is viable for up to 10 years.	
Medicago polymorpha (California Burclover)	Cal-IPC Limited	Disturbed areas, grasslands, disturbed wetlands	Valley Needle Grass Grassland S3	Western North American Freshwater Marsh California Annual & Perennial Grassland Western North America Wet Meadow and Low Shrub Carr	Swainson's Hawk: ST; Chorro Creek Bog Thistle: FE; Tricolored Blackbird: ST
	Low priority, primarily contained within disturbed areas.	Monitor population. Hand pull plants in sensitive habitat if needed.	Tilling provides good control of burclover. Grazing and burning provide varied results.	Reproduces only by seed which can be spread long distances through animal and human activity.	
Nicotiana glauca (Tree Tobacco)	Cal-IPC Moderate	Disturbed areas, riparian areas, grasslands, woodlands	California Sycamore Woodland S3 Valley Needle Grass Grassland S3	Warm Southwestern Riparian Forest California Forest & Woodland California Annual & Perennial Grassland	SCCC Steelhead: FT; Least Bell's Vireo: FE; Swainson's Hawk: ST; W Yellow-Billed Cuckoo: FT; Bald Eagle: SE
	Low—monitor. Low priority, primarily contained within disturbed areas.	Mechanically remove tree in wetlands and treat stump with herbicide outside of wetland areas.	Burning and grazing are not effective controls. Plants will re-sprout from the base if cut.	Individual trees can produce 10,000-1,000,000 seeds per year with viability approaching 100%. Water and animals are the primary dispersal agents. Seed banks typically are not long lived.	
Oxalis pes-caprae (Bermuda Buttercup)	Cal-IPC Moderate	Disturbed areas, oak woodlands		California Forest & Woodland	
	Low—monitor. Low priority, primarily contained within disturbed areas.	Monitor populations in native habitats and treat with chemical when necessary.	Burning and grazing are not considered effective control options. Repeated tillage is effective.	Does not produce seeds but reproduces vegetatively by bulbs which spread with cultivation, and other forms of soil movement.	

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Pennisetum setaceum (Fountain Grass)	Cal-IPC Moderate	Disturbed areas, chaparral		California Chaparral	California Condor: FE; Swainson's Hawk: ST
	High—monitor, control. Moderate priority, forms dense stands out competing natives.	Remove plants in sensitive habitat manually or by line trimming.	Plants can increase in density after burns. Grazing also is not an effective control.	Plants reproduce only by seed which is produced in abundance. Seeds are primarily dispersed by wind and animals. Seeds have been shown to live up to 6 years in soil banks.	
Pennisetum villosum (Feathertop)	Cal-IPC Watch	Disturbed areas, grasslands, chaparral	Valley Needle Grass Grassland S3	California Annual & Perennial Grassland California Chaparral 8	Swainson's Hawk: ST; California Condor: FE;
		Remove plants in sensitive habitat manually or by weed eating.	Plants can increase in density after burns. Grazing also is not an effective control.	Plants spread by rhizomes and seed. Seeds typically fall near the parent plant with some spreading further through animal and human activity.	
Phalaris aquatica (Harding Grass)	Cal-IPC Moderate	Disturbed areas, riparian areas, disturbed wetlands	California Sycamore Woodland S3	Warm Southwestern Riparian Forest Western North American Freshwater Marsh Western North America Wet Meadow and Low Shrub Carr	SCCC Steelhead: FT; Least Bell's Vireo: FE; W Yellow-Billed Cuckoo: FT; Chorro Creek Bog Thistle: FE; Bald Eagle: SE; Tricolored Blackbird: ST
	Medium—monitor, control. Moderate priority, outcompetes natives in wetland habitats.	Hand remove small populations in sensitive habitat/ wetlands and treat larger clusters with herbicide outside of wetland areas.	Burning or grazing can successfully suppress the species if followed up with an herbicide.	Most reproduction is by seed which typically falls near the parent plant forming dense stands. Seeds generally last less than two years in the soil bank.	
Plantago lanceolata (English Plantain)	Cal-IPC Limited	Disturbed areas, wetlands, riparian areas, grasslands, open woodlands	California Sycamore Woodland S3 Valley Needle Grass Grassland S3	Warm Southwestern Riparian Forest California Forest & Woodland Western North American Freshwater Marsh California Annual & Perennial Grassland Western North America Wet Meadow and Low Shrub Carr	SCCC Steelhead: FT; Least Bell's Vireo: FE; Swainson's Hawk: ST; W Yellow-Billed Cuckoo: FT; Chorro Creek Bog Thistle: FE; Bald Eagle: SE; Tricolored Blackbird: ST
	Moderate priority, primarily contained within disturbed areas, but is found on clay and serpentine soils. Potential to occur in CCBT habitat.	Hand pull small populations in sensitive habitat/ wetlands and treat larger clusters with herbicide outside of wetland areas.	Grazing, burning and cutting are all ineffective. Tilling populations produces good results.	Most reproduction is by seed which typically fall near the parent plant forming dense stands.	

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Polypogon monspeliensis (Rabbitsfoot Grass)	Cal-IPC Limited	Disturbed areas, wetlands, riparian areas	California Sycamore Woodland S3	Warm Southwestern Riparian Forest Western North American Freshwater Marsh Western North America Wet Meadow and Low Shrub Carr	SCCC Steelhead: FT; Least Bell's Vireo: FE; W Yellow-Billed Cuckoo: FT; Chorro Creek Bog Thistle: FE; Bald Eagle: SE; Tricolored Blackbird: ST
	Low priority, primarily contained within disturbed areas.	Hand pull small populations in sensitive wetlands and treat larger clusters with herbicide outside of wetland areas.	Grazing produces varied results while prescribed burns and tilling offers good control if timed correctly.	Mainly reproduces by seed which typically does not fall far from the parent plant. Some get transported farther through animals and human activity. Can form dense colonies. Seeds generally do not last long in soil.	
Pyracantha angustifolia (Pyracantha)	Cal-IPC Limited	Disturbed areas, riparian areas	California Sycamore Woodland S3	Warm Southwestern Riparian Forest	SCCC Steelhead: FT; Least Bell's Vireo: FE; W Yellow-Billed Cuckoo: FT; Bald Eagle: SE
	Low—monitor. Low priority, primarily contained within disturbed areas and spreads slowly.	Mechanically remove trees along riparian areas and treat stumps with herbicide outside of riparian areas.	Will re-sprout if burned or cut. Weed wrench offers good control over young plants.	Reproduces primarily by seeds which are dispersed through water, small mammals and birds. Successful new introductions are rare unless it occurs in a cool moist climate.	
Raphanus sativus (Radish)	Cal-IPC Limited	Disturbed areas, grasslands, open woodlands, riparian areas, wetlands	California Sycamore Woodland S3 Valley Needle Grass Grassland S3	Warm Southwestern Riparian Forest Western North American Freshwater Marsh California Forest & Woodland California Annual & Perennial Grassland Western North America Wet Meadow and Low Shrub Carr	SCCC Steelhead: FT; Least Bell's Vireo: FE; Swainson's Hawk: ST; W Yellow-Billed Cuckoo: FT; Chorro Creek Bog Thistle: FE; Bald Eagle: SE; Tricolored Blackbird: ST
	Low priority, primarily contained within disturbed areas and spreads slowly.	Hand pull small populations in wetland habitat. Treat larger populations with herbicide outside of wetland habitat.	Burning and grazing are typically not practical. Maintaining competitiveness of grasses will exclude the species. Tilling is generally effective.	Reproduce only by seed which typically falls to the base of the parent plant. The seeds have a long dormancy and can stay viable in the soil for years.	

Scientific Name (Common Name)	Cal-IPC/CDFA Rating	Common Habitat Type	CDFW Sensitive Natural Communities Effected (S1-S3)	CA SWAP Target Conservation Vegetative Communities Effected	TES Habitat Affected
	Management Priority*	Management Recommendations (Small-Scale)	Other Considerations (Landscape-Level Management)	Reproduction & Dispersal Mechanism(s)	
Ricinus communis (Castor Bean)	Cal-IPC Limited	Disturbed areas, riparian areas	California Sycamore Woodland S3	Warm Southwestern Riparian Forest	SCCC Steelhead: FT; Least Bell's Vireo: FE; W Yellow-Billed Cuckoo: FT; Bald Eagle: SE
	Medium—monitor, control. Moderate, seeds are toxic and outcompetes some riparian vegetation.	Hand pull small populations in riparian habitat. Treat larger populations with herbicide outside of riparian areas.	Grazing and burning are not effective forms of control. Shallow, repeated cultivation provides control.	Plants reproduce by seed that disperse short distances when capsules snap open at maturity. Can disperse farther when moved by wildlife or human activity. Castor bean does not form persistent seedbanks.	
Rumex acetosella (Sheep Sorrel)	Cal-IPC Moderate	Disturbed areas; grasslands, riparian areas, freshwater marshes and montane meadows. Tolerates serpentine soils.	Valley Needle Grass Grassland S3 California Sycamore Woodland S3	California Annual & Perennial Grassland Western North American Freshwater Marsh Western North America Wet Meadow and Low Shrub Carr Warm Southwestern Riparian Forest	Chorro Creek Bog Thistle: FE, Swainson's Hawk: ST, SCCC Steelhead: FT; Least Bell's Vireo: FE; W Yellow-Billed Cuckoo: FT; Bald Eagle: SE; Tricolored Blackbird: ST
	Medium priority—shares the same habitat type as CCBT, invades other sensitive habitats and tolerates serpentine soils. However, not that aggressive of an invader.	Hand pull the entire plant from sensitive plant habitat.	Mowing, grazing and fire are not effective. Reduced disturbance and native plant competition are the most viable means of landscape level control.	Plants reproduce vegetatively via rhizomes and seed. Root fragments can regenerate into new plants. Seeds are dispersed by animals and human activity. Seeds can persist in the seed bank for up to 25 years.	
Rumex crispus (Curly Dock)	Cal-IPC Limited	Disturbed areas; grasslands, riparian areas, wetlands	California Sycamore Woodland S3 Valley Needle Grass Grassland S3	Warm Southwestern Riparian Forest Western North American Freshwater Marsh California Annual & Perennial Grassland Western North America Wet Meadow and Low Shrub Carr	SCCC Steelhead: FT; Least Bell's Vireo: FE; Swainson's Hawk: ST; W Yellow-Billed Cuckoo: FT; Chorro Creek Bog Thistle: FE; Bald Eagle: SE; Tricolored Blackbird: ST
	Medium priority, primarily contained within disturbed areas but also has potential to occur in CCBT and other sensitive habitats.	Cut below soil with shovel in wetland habitat. Treat dense clusters with herbicide outside of wetland habitat.	Improving drainage can help control the species. Grazing and burning are not feasible. Resprouts when cut. Tilling is effective were viable.	Plants reproduce primarily by seed which falls close to the plant or is dispersed long distances by water. Plants are prolific seed producers which are viable for over 20 years in seed banks.	

Scientific Name (Common Name)	Cal-IPC/CDFA Rating	Common Habitat Type	CDFW Sensitive Natural Communities Effected (S1-S3)	CA SWAP Target Conservation Vegetative Communities Effected	TES Habitat Affected
	Management Priority*	Management Recommendations (Small-Scale)	Other Considerations (Landscape-Level Management)	Reproduction & Dispersal Mechanism(s)	
Salsola tragus (Russian Thistle)	Cal-IPC Limited, CDFA "C"	Disturbed areas			
	Low priority, low density and primarily contained within disturbed areas.	Hand pull entire plant from any sensitive habitat.	Species does poorly in areas dominated by other vegetation.	Plants reproduce primarily by seed which is dispersed as the plant dies then tumbles with the wind. Seeds only viable in the seedbank for about one year.	
Schinus molle (Peruvian Peppertree)	Cal-IPC Limited	Riparian areas	California Sycamore Woodland S3	Warm Southwestern Riparian Forest	SCCC Steelhead: FT; Least Bell's Vireo: FE; W Yellow-Billed Cuckoo: FT; Bald Eagle: SE
	Medium—monitor, control. Low priority, low density and primarily contained within disturbed areas.	Mechanically remove tree in riparian habitat.	Burning kills seeds but promotes tree coppicing.	Plants reproduce by seed and sometimes vegetatively through root sprouts. Most seeds remain viable for less than a year in seedbanks.	
Senecio glomeratus (Cutleaf Burnweed)	Cal-IPC Moderate	Disturbed areas, grasslands	Valley Needle Grass Grassland S3	California Annual & Perennial Grassland	Swainson's Hawk: ST;
	Low—primarily found in disturbed areas or nonnative grasslands.	Monitor population. Manually remove plants in sensitive habitat.	Grazing and fire are typically not viable or effective means of control. Herbicide works well.	Plants reproduce by seed and sometimes vegetatively through root sprouts. It spreads via seeds which travel by wind. Most seeds do not remain viable for long in seedbanks.	
Silybum marianum (Blessed Milk Thistle)	Cal-IPC Limited	Disturbed areas, chaparral, woodlands		California Forest & Woodland California Chaparral	Swainson's Hawk: ST; California Condor: FE
	Medium—monitor, control. Low priority, primarily contained within disturbed areas.	Monitor populations. Hand remove dense populations in sensitive habitat.	Grazing and burning are not feasible methods of control. Tilling can work on younger plants.	Can form dense stands. Plants reproduce only by seed which are dispersed short distances by seed or longer distances by human activities. Seeds can survive for up to 9 years in the seed bank.	
Sinapis arvensis (Charlock Mustard)	Cal-IPC Limited	Disturbed areas, non-wetlands			
	Low priority, primarily contained within disturbed areas.	Monitor populations. Hand remove dense populations in sensitive habitat.	Grazing and burning are not effective. Mowing during the bud stage can help suppression.	Plants reproduce only by seed with most falling near the parent plants causing them to form dense stands. Seeds can survive up to 11 years in seed banks.	
Sonchus oleraceus (Sow Thistle)		Disturbed areas, wetlands, meadows and seeps		Western North American Freshwater Marsh Western North America Wet Meadow and Low Shrub Carr	Chorro Creek Bog Thistle: FE; Tricolored Blackbird: ST
	Low priority in most habitats. Medium priority in CCBT habitat.	Hand pull all plants in CCBT habitat and sensitive habitats. Monitor populations.	Grazing and burning are viable. Competition with successful natives suppresses recruitment.	Reproduces only by seed. Seeds can be spread by wind or water. Seeds do not persist for long in the seedbank.	

Scientific Name (Common Name)	Cal-IPC/CDFA Rating	Common Habitat Type	CDFW Sensitive Natural Communities Effected (S1-S3)	CA SWAP Target Conservation Vegetative Communities Effected	TES Habitat Affected
	Management Priority*	Management Recommendations (Small-Scale)	Other Considerations (Landscape-Level Management)	Reproduction & Dispersal Mechanism(s)	
Stipa miliacea var. *miliacea* (Smilo Grass)	Cal-IPC Limited	Disturbed areas, riparian areas, woodlands, chaparral, grasslands	California Sycamore Woodland S3 Valley Needle Grass Grassland S3	California Forest & Woodland California Chaparral Warm Southwestern Riparian Forest California Annual & Perennial Grassland	SCCC Steelhead: FT; Least Bell's Vireo: FE; Swainson's Hawk: ST; California Condor: FE; W Yellow-Billed Cuckoo: FT; Bald Eagle: SE
	Low—monitor. Low priority, primarily contained within disturbed areas. Eradicate from sensitive habitats.	Hand remove plants in sensitive habitats.	Grazing and burning alone are not effective controls due to resprouting.	Reproduces only by seed with most falling near the parent plant and some dispersing farther due to animal and human activity. Seeds do not remain viable for long in seedbanks.	
Tamarix ramosissima (Tamarisk, Salt Cedar)	Cal-IPC High, CDFA "B"	Disturbed areas, riparian areas, wetlands	California Sycamore Woodland S3	Warm Southwestern Riparian Forest Western North American Freshwater Marsh Western North America Wet Meadow and Low Shrub Carr	SCCC Steelhead: FT; Least Bell's Vireo: FE; W Yellow-Billed Cuckoo: FT; Chorro Creek Bog Thistle: FE; Bald Eagle: SE; Tricolored Blackbird: ST
	High—monitor, eradicate. High priority, causes dramatic changes in geomorphology, groundwater availability, soil chemistry, fire frequency, plant community composition, and native wildlife diversity in riparian and wetland habitats.	Remove all Tamarix trees mechanically and treat cut stumps with herbicide outside of wetland habitat.	Any mechanical, grazing, or burning control must be followed up with herbicide to be successful & prevent resprouting. Watershed partnership approach beneficial.	Reproduce primarily by seed and sometimes vegetatively through root sprouts and stem fragments. One plant can produce about 500,000 seeds per year which are primarily dispersed with wind and water. Seeds germinate within 24 hours of contacting water and only survive for 5 weeks.	
Verbascum bonariensis (Tall Vervain)	Cal-IPC Watch	Disturbed areas, grasslands, dry streambeds in oak woodlands, riparian areas	Valley Needle Grass Grassland S3 California Sycamore Woodland S3	California Annual & Perennial Grassland California Forest & Woodland Warm Southwestern Riparian Forest	SCCC Steelhead: FT; Least Bell's Vireo: FE; Swainson's Hawk: ST; W Yellow-Billed Cuckoo: FT; Bald Eagle: SE
	Low—monitor.	Hand pull plants in sensitive habitat.	Fire and grazing are not effective means of control. Plant is easily outcompeted by natives in healthy undisturbed habitats.	Plants readily self-fertilize with most seeds dispersing via human and animal activity. However, most seeds fall near the parent plant and establish with periodic disturbance. Seeds can survive for over 100 years in the soil.	

Scientific Name (Common Name)	Cal-IPC/CDFA Rating	Common Habitat Type	CDFW Sensitive Natural Communities Effected (S1-S3)	CA SWAP Target Conservation Vegetative Communities Effected	TES Habitat Affected
	Management Priority*	Management Recommendations (Small-Scale)	Other Considerations (Landscape-Level Management)	Reproduction & Dispersal Mechanism(s)	
Vinca major (Periwinkle)	Cal-IPC Moderate	Riparian areas, woodlands, disturbed areas	California Sycamore Woodland S3aa	California Forest & Woodland Warm Southwestern Riparian Forest	SCCC Steelhead: FT; Least Bell's Vireo: FE; W Yellow-Billed Cuckoo: FT; Bald Eagle: SE
	Medium—monitor, control. Moderate priority grows as a dense vine choking out natives in riparian and upland communities.	Hand pull small infestations in riparian habitat. Treat with herbicide outside of riparian areas.	Mowing, grazing, and burning are not effective. Watershed partnership approach beneficial.	Reproduces only vegetatively through stem fragments which disperse through human activities and water. Seeds are not viable.	

Appendix F. Agency Consultations

Biological Opinions
USFWS Biological Opinion for Four Projects, San Luis Obispo County, CA. 1-8-97-F-5. 1996 This BO was issued in response to FEMA's request for formal consultation with the USFWS, pursuant to Section 7 of the ESA of 1973, as amended (Act). FEMA proposed to fund four projects in San Luis Obispo County to repair flood damaged sites in the Santa Rosa Creek and the See Canyon Creek. A non-jeopardy BO was issued for this action.
USFWS Biological Opinion for Limited Livestock Grazing at Camp San Luis Obispo, San Luis Obispo County, CA. 1 -8-97-F-48. 1997 This BO addressed the impacts that limited grazing would have on the Chorro Creek bog thistle. A monitoring program was established to monitor the results of the proposed grazing plan, and a non-jeopardy BO was issued for this action.
USFWS Biological Opinion for Vegetation Removal from a Channel at Camp San Luis Obispo, San Luis Obispo County, CA. I-8-98-F-9. 1997 This BO addressed the impacts on California red-legged frog resulting from vegetation removal in a channelized drainage. Conservation measures were built into the project that minimized impacts on California red-legged frogs and a non-jeopardy BO was issued for this action.
USFWS Biological Opinion for Exotic Plant Eradication from Chorro Creek Headwaters, Camp San Luis Obispo National Guard Training Site, San Luis Obispo County, CA. 1-8-99-F-08. 1999 This BO addressed impacts on California red-legged frog from the application of herbicides for removal of arundo and hand removal of pampas grass, castor bean, tree tobacco, and other aggressive, invasive plant species in Chorro Creek. The USFWS determined that incorporating the conservation measures to protect California red-legged frogs would result in minimal impacts, and a non-jeopardy BO was issued.
USFWS Biological Opinion for the Habitat Improvement Project for the California Red-legged Frog at Camp San Luis Obispo, San Luis Obispo County, CA. 1-8-99-F-86. 2000 This BO addressed impacts on California red-legged frog during a red-legged frog habitat restoration and bullfrog removal project. The USFWS determined that incorporating the conservation measures to minimize impacts on California red-legged frogs would result in minimal impacts, and a non-jeopardy BO was issued.
USFWS Biological Opinion for the Kern Avenue Culvert and Drainage Maintenance Project at Camp San Luis Obispo, San Luis Obispo County, CA. I -8-99-F-102. 2000 This BO addressed impacts on California red-legged frog for sediment and vegetation clearing from the same channel addressed in BO Case Number 1-8-98-F-9, which was described above. With the incorporation of conservation measures to reduce impacts on California red-legged frogs, the USFWS issued a non-jeopardy BO that authorized the incidental take of two red-legged frogs.

USFWS Biological Opinion for the Building Demolition and Landfill Improvement Project at Camp Roberts and Camp San Luis Obispo, CA. 1-8-08-F-18. 2008

This BO addressed impacts from the proposed building demolition and landfill improvement project at Camp Roberts and CSLO, California, and its effects on the federally threatened vernal pool fairy shrimp (Branchinecta lynchi). USFWS issued a non-jeopardy BO that the project was not likely to jeopardize the continued existence of the vernal pool fairy shrimp. We have reached this conclusion because: 1. A very small amount of vernal pool fairy shrimp habitat would be adversely affected. 2. The affected vernal pool fairy shrimp habitat occurs in existing roadways and therefore is low quality habitat. 3. The CA ARNG proposed measures to minimize the adverse effects to vernal pool fairy shrimp.

USFWS Biological Opinion for the Removal of Bridge 109 at Camp San Luis Obispo, San Luis Obispo County, CA. 81440-2010-F-0352. 2011

This BO addressed potential effects of the CA ARNG proposed Bridge 109 removal Project at CSLO on the federally threatened California red-legged frog. The USFWS issued a non-jeopardy BO that the project would not jeopardize the continued existence of the California red-legged frog.

USFWS Programmatic Biological Opinion for Multiple Activities at Camp San Luis Obispo, San Luis Obispo County, CA. 8-8-12-F-51. 2013

This BO addressed potential effects of proposed activities at CSLO, and the effects on the federally threatened California red-legged frog, and the federally endangered least Bell's vireo and the Chorro Creek bog thistle. The USFWS issued a non-jeopardy BO that the CA ANG's proposed activities are not likely to jeopardize the continued existence of these federally listed species.

NMFS Biological Opinion for the Department of the Amy's proposed replacement of two bridges at the Camp San Luis Obispo National Guard Training Site, San Luis Obispo County. 151422SWR02PR6155. 2003

This BO addressed the effects of the replacement of two bridges (one over Chorro Creek and one over Dairy Creek) at the Camp on the SCCC steelhead DPS. The BO required avoidance, minimization, and monitoring efforts and NMFS determined that the effects of the activity would not jeopardize the continued existence of the SCCC steelhead DPS.

USFWS Biological Opinion on the Proposed Conservation and Management of the South-central California Coast Steelhead at Camp San Luis Obispo, San Luis Obispo County, California. #08EVEN00-2021-F-0100. 2021

This BO addressed effects of South central California Coast steelhead conservation and management actions on CSLO on the California red-legged frog and the least Bell's vireo. The USFWS determined the actions were not likely to adversely affect the least Bell's vireo and that the project would not jeopardize the continued existence of the California red-legged frog.

Informal Consultations

NMFS Concurrence Letter for Exotic Plant Eradication from Chorro Creek Headwaters (BO # 1-8-99-F-8 10 Nov 1998).

NMFS determined that incorporation of protection measures during the removal of invasive plants would minimize adverse effects to steelhead and concurred with a not likely to adversely affect determination.

USFWS Concurrence Letter for Two Maintenance Projects, Camp San Luis Obispo National Guard Training Site, San Luis Obispo County, California (19 January 1999).

USFWS determined that incorporation of proposed avoidance measures would minimize potential adverse effects to Chorro Creek bog thistle and California red-legged frog.

USFWS Concurrence Letter for *Arundo donax* Hand Removal, Camp San Luis Obispo National Guard Training Site, San Luis Obispo County, California (22 March 1999).

USFWS concurred with a determination that the project was not likely to affect California red-legged frog.

NMFS Concurrence Letter for CA ARNG's bridge demolition and removal project at Camp San Luis Obispo National Guard Training Site in San Luis Obispo, California (03 June 2002).
NMFS recommended modifications to project proposal to increase the likelihood of avoiding adverse effects to steelhead.

USFWS Letter of Concurrence for the Consolidated Dining Facility Project, Camp San Luis Obispo, San Luis Obispo County, California (08 September 2006). USFWS concurred with a no adverse effect determination for listed species during for the construction of a consolidated dining facility within the cantonment of CSLO.

USFWS Letter of Concurrence for the Proposed Construction and Operation of One Modified Record Firing Range and One Automated Combat Pistol/Military Police Qualification Course at Camp San Luis Obispo, San Luis Obispo County, California (18 November 2008).
USFWS concurred with a may affect, but not likely to adversely affect determination for listed species. Incorporation of conservation measures would minimize potential adverse effects to the California condor, least Bell's vireo, Chorro Creek bog thistle, Monterey spineflower, Morro manzanita, and California red-legged frog.

USFWS Letter of Concurrence for the California Ground Squirrel (*Spermophilus beecheyi*) Pest Control Activities Conducted at Camp San Luis Obispo, San Luis Obispo County, California (07 April 2010).
USFWS determined the proposed ground squirrel control activities may affect, but were not likely to adversely affect, any federally listed species due the incorporation of minimization and avoidance measures.

NMFS Concurrence Letter for CA ARNG's Bridge 109 removal project on Chorro Creek at the Camp San Luis Obispo National Guard Training Site in San Luis Obispo, California (23 November 2010).
NMFS determined that the action would not likely adversely affect steelhead or designated CH.

USFWS Concurrence Letter for the Proposed Construction and Operation of a Motor Transport Operators Course at Camp San Luis Obispo National Guard Training Site, San Luis Obispo County, California (18 August 2011).
USFWS concurred the determination that the project may affect, but not likely adversely affect, California red-legged frog.

NMFS Concurrence Letter for Replacing a Pedestrian Bridge on Chorro Creek at Camp San Luis Obispo, California (07 March 2016).
NMFS determined that action would not likely adversely affect threatened SCCC steelhead or designated CH.

USFWS Concurrence Letter for the Pedestrian Bridge Demolition and Installation Project at Camp San Luis Obispo, San Luis Obispo County, California (15 July 2016).
USFWS determined that the action was not likely to adversely affect the California red-legged frog.

Appendix G. Integrated Pest Management Plan

Please refer to the digital copy of the Integrated Pest Management Plan or the link provided below:

https://ngcasp16.ng.army.mil/sites/CAEV/NR/Shared%20Documents/Forms/AllItems.aspx

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Appendix H. Migratory Bird Management

Each INRMP must address the conservation of birds and their habitat to promote and support migratory birds in compliance with the MBTA, EO 13186 "Responsibilities of Federal Agencies to Protect Migratory Birds" (2001), and subsequent rules and agreements. Recognizing the important role military lands play in bird conservation worldwide, it is the DoD policy that, during annual reviews of INRMPs, installations will discuss with the USFWS conservation measures implemented and the effectiveness of these measures in avoiding, minimizing, or mitigating the take of migratory birds.

Two legal drivers pertain to different types of activity affecting birds on military lands:

(1) Military readiness activities fall under a Military Readiness Waiver entitled the "Migratory Bird Rule" under the MBTA.
(2) All other activities affecting migratory birds on military lands fall under a USFWS/DoD MOU (71 Fed. Reg. 51580 [30 August 2006]) on implementing EO 13186.

The DoD has entered into agreements with the USFWS with respect to how the take and the management of migratory birds is documented and reported under these legal drivers during INRMP reviews. The purpose of this Appendix is to facilitate that responsibility under the MBTA and EO 13186 (2001).

Military Readiness Waiver and the Migratory Bird Rule

The Migratory Bird Rule under the MBTA relates to military readiness activities and was established in accordance with Section 315 of the National Defense Authorization Act for FY 2003. The final rule, "Migratory Bird Permits: Take of Migratory Birds by the Armed Forces," was published as 72 Fed. Reg. 8931 (28 February 2007). It authorizes the military to "take" migratory birds under the MBTA without a permit, but if the military determines that the activity will "significantly" affect a population of migratory birds, they must work with the USFWS to implement conservation measures to minimize the effects.

While under the Rule the ARNG is authorized to take migratory birds during readiness activities, it is incumbent upon the ARNG to remain cognizant of the possibility that certain readiness activities may result in a significant adverse effect on a migratory bird species at a population level. In remaining aware of this possibility, it is necessary to understand the terms below.

- Population, as used in Section 21.15: a group of distinct, coexisting (conspecific) individuals of a single species, whose breeding site fidelity, migration routes, and wintering areas are temporally and spatially stable, sufficiently distinct geographically (at some time of the year), and adequately described so that the population can be effectively monitored to discern changes in its status.
- Significant adverse effect on a population, used in Section 21.15, means an effect that could, within a reasonable period of time, diminish the capacity of a population of migratory bird species to sustain itself at a biologically viable level. A population is "biologically viable" when its ability to maintain its genetic diversity, to reproduce, and to function effectively in its native ecosystem are not significantly harmed. This effect may be characterized by increased risk to the population from

actions that cause direct mortality or a reduction in fecundity. Assessment of impacts should account for yearly variations and migratory movements of the impacted species. Due to the significant variability in potential military readiness activities and the species that may be impacted, estimates of significant measurable decline will be determined on a case-by-case basis.

Conservation measures undertaken under the Migratory Bird Rule require monitoring and record-keeping for five years from the date the Armed Forces commence their conservation action. During INRMP reviews, the Armed Forces must report to the USFWS migratory bird conservation measures implemented and the effectiveness of the conservation measures in avoiding, minimizing, or mitigating take of migratory birds.

Executive Order 13186 and DoD-USFWS MOU on Migratory Birds

The USFWS/DoD MOU (71 Fed. Reg. 51580 [30 August 2006]) addresses the conservation of migratory birds on military lands in relation to all activities except readiness. In contrast to the MBTA, it does not authorize any take. The "MOU to Promote the Conservation of Migratory Birds between the USFWS and DoD in accordance with EO 13186 (17 January 2001)" is a guidance document on how the DoD will conserve migratory birds. This MOU covers all activities on CA ARNG property including natural resources management, routine maintenance and construction, industrial activities, and hazardous waste cleanups. It emphasizes interdisciplinary collaboration in framework of NABCI Bird Conservation Regions, collaborative inventory and long-term monitoring.

A Council for the Conservation of Migratory Birds was established to help the various agencies implement the EO. The EO requires that advance notice or annual reports must be made to the USFWS concerning actions that result in the taking of migratory birds. The EO also requires agencies to control the establishment of exotic species that may endanger migratory birds and their habitat. Pursuant to its MOU, each agency shall, to the extent permitted by law and subject to the availability of appropriations and within Administration budgetary limits, and in harmony with agency missions:

- Support the conservation intent of the migratory bird conventions by integrating bird conservation principles, measures, and practices into agency activities and by avoiding or minimizing, to the extent practicable, adverse impacts on migratory bird resources when conducting agency actions;
- Restore and enhance the habitat of migratory birds, as practicable;
- Prevent or abate the pollution or detrimental alteration of the environment for the benefit of migratory birds, as practicable;
- Design migratory bird habitat and population conservation principles, measures, and practices, into agency plans and planning processes (natural resource, land management, and environmental quality planning, including, but not limited to, forest and rangeland planning, coastal management planning, watershed planning, etc.) as practicable, and coordinate with other agencies and nonfederal partners in planning efforts;
- Within established authorities and in conjunction with the adoption, amendment, or revision of agency management plans and guidance, ensure that agency plans and actions promote programs and recommendations of comprehensive migratory bird planning efforts such as PIF, U.S. National Shorebird Plan, NAWMP, North American Colonial Waterbird Plan, and other

planning efforts, as well as guidance from other sources, including the Food and Agricultural Organization's International Plan of Action for Reducing Incidental Catch of Seabirds in Longline Fisheries;

- Ensure that environmental analyses of federal actions required by the NEPA or other established environmental review processes evaluate the effects of actions and agency plans on migratory birds, with emphasis on species of concern;
- Provide notice to USFWS in advance of conducting an action that is intended to take migratory birds, or annually report to USFWS on the number of individuals of each species of migratory birds intentionally taken during the conduct of any agency action, including but not limited to banding or marking, scientific collecting, taxidermy, and depredation control;
- Minimize the intentional take of species of concern by: (i) delineating standards and procedures for such take; and (ii) developing procedures for the review and evaluation of take actions. With respect to intentional take, the MOU shall be consistent with the appropriate sections of 50 C.F.R. Parts 10, 21, and 22;
- Identify where unintentional take reasonably attributable to agency actions is having, or is likely to have, a measurable negative effect on migratory bird populations, focusing first on species of concern, priority habitats, and key risk factors. With respect to those actions so identified, the agency shall develop and use principles, standards, and practices that will lessen the amount of unintentional take, developing any such conservation efforts in cooperation with USFWS. These principles, standards, and practices shall be regularly evaluated and revised to ensure that they are effective in lessening the detrimental effect of agency actions on migratory bird populations. The agency also shall inventory and monitor bird habitat and populations within the agency's capabilities and authorities to the extent feasible to facilitate decisions about the need for, and effectiveness of, conservation efforts;
- Within the scope of its statutorily-designated authorities, control the import, export, and establishment in the wild of live exotic animals and plants that may be harmful to migratory bird resources;
- Promote research and information exchange related to the conservation of migratory bird resources, including coordinated inventorying and monitoring and the collection and assessment of information on environmental contaminants and other physical or biological stressors having potential relevance to migratory bird conservation. Where such information is collected in the course of agency actions or supported through federal financial assistance, reasonable efforts shall be made to share such information with USFWS, the USGS–Biological Resources Division, and other appropriate repositories of such data (e.g., the Cornell Laboratory of Ornithology);
- Provide training and information to appropriate employees on methods and means of avoiding or minimizing the take of migratory birds and conserving and restoring migratory bird habitat;
- Recognize and promote economic and recreational values of birds, as appropriate; and
- Develop partnerships with non-federal entities to further bird conservation.

Landscape and Ecosystem Level Management for Migratory Birds

This INRMP provides landscape-scale recommendations that contribute to bird conservation and promote restoration of the natural health and integrity of the CSLO ecosystem, its ecological connections to watershed

and bioregion, and its resiliency to current and future disturbance such as military training, drought, flood, fire, invasion by nonnative species, and climate change. The following are some of those guidelines:

- Restore resilient and healthy ecosystem processes such as fire patterns, soil health, carbon and nutrient cycles, hydrologic processes, migration, to the extent practicable, to their natural potential and range of variation
- Leverage all opportunities to contribute to ecosystem services, including in developed areas. Promote ecosystem restoration that is climate adaptive (California Water Plan 2018).
- Continue to restore stream functions in compliance with TMDL standards and for recovery of riparian species, as a cooperator in the MBNEP CCMP.
- Promote deep-rooted herbaceous perennials, and an increase in woody elements in grasslands (California Air Resources Board 2019). Protect native perennial grassland where it currently exists and restore it where and whenever practicable. Perennial grasses are more fire resilient and build soil carbon stores better than annual grasses. Take advantage of opportunities with projects that disturb ground, such as utility line installation and maintenance, to restore to native herbaceous perennials such that invasive grasses are excluded. Use prescribed grazing and prescribed fire as restoration tools.
- Ensure recruitment of oak trees where it has been impaired, and a healthy understory that facilitates natural recruitment.
- Take advantage of opportunities to reconnect streams to their historic floodplains as part of new flood management approaches.
- Expand riparian forest acreage along watercourses.
- Promote multidisciplinary approaches to water and flood management.
- Expand woodlands, ensuring recruitment of trees and shrubs, as well as a fire safe understory. Continue the use of prescribed fire for ecosystem benefit.
- Avoid the proliferation of roads.
- Manage vegetative fuel biomass and structure. Reduce fire starts and keep fires small for safety, watershed health, air quality, and recovery of native communities.
- Address long-term, ecosystem-level, primary stressors to wildlife and habitat.
- Control the proliferation of non-native species, especially as they affect fire regime (see *Section 4.4.3: Management Strategy—Wildland Fire*) and vegetation type conversion. Control invasive plant species through early detection, maintenance of healthy soils, diverse native plant communities, intact hydrology, and management towards a resilient fire regime for natural communities. Continue, through partnerships, to control predation by non-native aquatic species with priority on those that may affect SAR.
- Reduce wildlife mortality and habitat degradation due to infrastructure practices, such as roadkill, powerline kill, or agricultural or mowing practice by defining best practices.
- Use the best available scientific information in decision-making and adaptive management, such as climate change (DoDI 4715.03), through data sharing with partner agencies.
- Monitor resources over sufficiently long time periods to allow for adaptive management and assessment of changing ecosystem dynamics (DoDI 4715.03). Monitor biologically or geographically significant or sensitive natural communities, ecosystems or species, for their protection and long-term sustainability.

- Implement a coordinated monitoring program that can be implemented cost-effectively over time and that facilitates reporting on natural resources conditions and annual INRMP program review questions. This would help address the Ecosystem Integrity Metric which asks (DoDI 4715.03): (1) To what extent are the installation's native ecological systems currently intact? (2) In what ways are an installation's various habitats susceptible to change or damage from different stressors? (3) What stressors affect each habitat type?
- As appropriate, take part in public awareness initiatives to manage ecosystems more successfully. Promote the continued rural character and land use of the surrounding region.
- Prevent encroachment on natural resources crucial to sustaining the military mission under the above climate change scenarios.

Appendix I. Integrated Wildland Fire Management Plan

Please refer to the digital copy of the Integrated Wildland Fire Management Plan or the link provided below:

https://ngcasp16.ng.army.mil/sites/CAEV/NR/Shared%20Documents/Forms/AllItems.aspx

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