# U. S. AIR FORCE

# INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

# Pillar Point Air Force Station

## DRAFT

## 2022


*(See INRMP signature pages for plan approval date)*

## ABOUT THIS PLAN

This installation-specific Environmental Management Plan (EMP) is based on the United States Air Force's (USAF) standardized Integrated Natural Resources Management Plan (INRMP) template. This INRMP has been developed in cooperation with applicable stakeholders, which includes Sikes Act cooperating agencies and/or local equivalents, to document how natural resources will be managed. Where applicable, external resources, including Air Force Instructions (AFIs); Department of Defense Instructions (DoDIs); USAF Playbooks; federal, state, and local requirements; Biological Opinions; and permits are referenced.

Certain sections of this INRMP begin with standardized, USAF-wide "common text" language that address USAF and Department of Defense (DoD) policy and federal requirements. This common text language is restricted from editing to ensure that it remains standard throughout all plans. Immediately following the USAF-wide common text sections are installation sections. The installation sections contain installation-specific content to address local and/or installation-specific requirements. Installation sections are unrestricted and are maintained and updated by the approved plan owner.

*NOTE: The terms "Natural Resources Manager," "NRM," "Point of Contact", "POC", and "NRM/POC" are used throughout this document to refer to the installation person responsible for the natural resources program, regardless of whether this person meets the qualifications within the definition of a natural resources management professional in DoDI 4715.03,* Natural Resources Conservation Program.

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## DOCUMENT CONTROL

### *Standardized INRMP Template*

In accordance with (IAW) the Air Force Civil Engineer Center (AFCEC) Environmental Directorate (CZ) Business Rule 08, *EMP Review, Update, and Maintenance*, the standard content in this INRMP template is reviewed periodically, updated as appropriate, and approved by the Natural Resources Subject Matter Expert.

This version of the template is current as of 06/26/2020 and supersedes the 2018 version.

*NOTE:* Installations are not required to update their INRMPs every time this template is updated. When it is time for installations to update their INRMPs, they should refer to the eDASH EMP Repository to ensure they have the most current version.

### *Installation INRMP*

**Record of Review**—The INRMP is updated no less than annually, or as changes to natural resource management and conservation practices occur, including those driven by changes in applicable regulations. IAW the Sikes Act and AFMAN 32-7003, *Environmental Conservation*, the INRMP is required to be reviewed for operation and effect no less than every five years. An INRMP is considered compliant with the Sikes Act if it has been approved in writing by the appropriate representative from each cooperating agency within the past five years. Approval of a new or revised INRMP is documented by signature on a signature page signed by the Installation Commander (or designee), and a designated representative of the United States Fish and Wildlife Service (USFWS), state fish and wildlife agency, and National Oceanic and Atmospheric Administration (NOAA) Fisheries when applicable (AFMAN 32-7003).

Annual reviews and updates are accomplished by the installation Natural Resources Manager (NRM), and/or a Section Natural Resources Media Manager. The installation shall establish and maintain regular communications with the appropriate federal and state agencies. At a minimum, the installation NRM (with assistance as appropriate from the Section Natural Resources Media Manager) conducts an annual review of the INRMP in coordination with internal stakeholders and local representatives of USFWS, state fish and wildlife agency, and NOAA Fisheries, where applicable, and accomplishes pertinent updates. Installations will document the findings of the annual review in an Annual INRMP Review Summary. By signing the Annual INRMP Review Summary, the collaborating agency representative asserts concurrence with the findings. Any agreed updates are then made to the document, at a minimum updating the work plans.

## INRMP APPROVAL/SIGNATURE PAGES

**Integrated Natural Resources Management Plan**

**Pillar Point Air Force Station, California**

This INRMP has been prepared in accordance with regulations, standards and procedures of the Department of Defense and the United States Air Force in cooperation with the USFWS, NMFS, and California Department of Fish and Wildlife.

_____ _____

Col. Robert A. Long Date
Commander
Space Launch Delta 30

_____ _____

Field Supervisor Date
Sacramento Fish and Wildlife Office
United States Fish and Wildlife Service, Region 8

_____ _____

Regional Manager Date
Bay Delta Region
California Department of Fish and Wildlife

_____ _____

Assisting Regional Administrator Protected Resources Division Date
West Coast Regional Office
National Marine Fisheries Service

## EXECUTIVE SUMMARY

The Integrated Natural Resources Management Plan (INRMP) for Pillar Point Air Force Station (Pillar Point AFS or Station) has been prepared to address the requirements of Air Force Manual (AFMAN) 32-7003, 20 April 2020, *Environmental Conservation*, and the Sikes Act Improvement Amendments of 1997 (16 United States Code [U.S.C.] 670 (a)(1)(A).

Under the Sikes Act Improvement Amendments of 1997 (670 *et seq.*), the Secretary of Defense is directed to "carry out a program to provide for the conservation and rehabilitation of natural resources on military installations." AFMAN 32-7003 directs U.S. Air Force (USAF) installations to apply the principles of ecosystem management to maintain and restore native ecosystem types, natural disturbance regimes, and ecological processes; and apply regional approaches to implement ecosystem management with other installations, federal, state and local partners, and adjacent landowners, when each is practicable and compatible with the military mission.

INRMPs will be prepared to assist the installation commander with the conservation and rehabilitation of natural resources consistent with the use of the installation to ensure the readiness of the Armed Forces. The INRMP will define natural resources management goals and objectives that are consistent with the military mission and ensure no net loss in the capability of installation lands to support the military mission.

The purpose of this INRMP is to provide integrated, comprehensive, ecosystem-based resources management strategies and recommend goals for natural resources at Pillar Point AFS. As a living document, the intent of the INRMP is to integrate all aspects of natural resources management with the Station's mission, with no net loss to mission capability and readiness. To accommodate changes in the programs at Pillar Point AFS, in addition to the dynamic nature of the ecosystems on the Station, the INRMP recommends an adaptive management approach.

Adaptive management strategies provide an alternative to traditional environmental planning by stressing inventiveness and flexibility in approaching environmental problems. Through interim monitoring, adaptive management provides the information required to assess the effect of management goals on habitat improvement, ecological restoration, and species preservation. Such an approach provides the proactive management strategy needed to successfully protect ecosystems in the face of change. Adaptive management further allows practitioners to adjust management approaches when desired land conditions are not successfully achieved.

In the past, natural resources management relied on implementation of separate plans addressing different aspects of natural resources management, such as Land Management, Urban Forestry, Fish and Wildlife Management, and Outdoor Recreation. Each plan addressed various resources independently, and management strategies were not integrated. This approach is no longer recommended. Current natural resources management takes an integrated approach that considers effects on resources from all management activities in their entirety. This change in approach to natural resources management—from a series of independently conceived and executed management plans to a single, integrated document—is reflected in this INRMP.

Ecosystem-based management strategies, when combined, provide optimum opportunity for Pillar Point AFS ecosystems to flourish. The overall goal—and benefit—of ecosystem management is to minimize intervention in natural, self-regulating habitats in an effort to return Pillar Point AFS to a self-sustaining environment.

This INRMP includes specific actions to be implemented over the next 5 to 10 years. Some actions may require Environmental Impact Analysis Process review for compliance with the National Environmental Policy Act. These and other actions described in the INRMP may require Endangered Species Act Section 7 consultation; Clean Water Act Section 404 consultations; or coastal resource impact consultations under the Coastal Zone Management Act, Magnuson Stevens Fishery Conservation and Management Act, and

Marine Mammal Protection Act. Implementation of actions identified in this INRMP and/or required by other regulatory authority, are programmed for funding as directed by the USAF. Implementation of these actions therefore depends on the availability of adequate funding. This INRMP describes these recurring and projected future actions, and identifies internal processes and policies that support natural resource management objectives and ensure regulatory compliance.

Some information provided on the resources at Pillar Point AFS is based on the original Pillar Point supplement to the Vandenberg Space Force Base (Vandenberg SFB, formerly Vandenberg Air Force Base) INRMP, prepared in November 2000 by the Santa Barbara Museum of Natural History (Santa Barbara Museum of Natural History [SBMNH] 2000). SBMNH performed surveys at Pillar Point AFS in May 1999 for that supplement. Subsequent surveys conducted by various organizations are presented to provide an overview of natural resources present at the Station and to reflect the living-document nature of the INRMP.

Priority natural resource categories present on/adjacent to Pillar Point AFS include federal and state listed species, wetlands, invasive species, and significant coastal erosion concerns. The California red-legged frog is the only known federally listed species to be documented on the Station; however, the last confirmed sighting was in 1999. Other federal or state listed species have been identified adjacent to the Station, or have the potential to occupy the Station; these species include the San Francisco garter snake, southern sea otter, and bank swallow.

Aarcher Inc.'s (2015) surveys of wetlands on the Station concluded that 0.07 acres met the U.S. Army Corps of Engineers (USACE) definition of jurisdictional waters of the United States; however, an official jurisdictional determination of these wetlands by the USACE has not been completed. Several Waters of the United States are adjacent to the Station, including Princeton Marsh and the territorial waters of the Pacific Ocean, and the operation and maintenance of the Station have the potential to affect these resources. Therefore, management approaches to conserve wetlands are detailed in this INRMP. Coastal erosion is presenting a greater risk to the infrastructure on the Station and is discussed in this INRMP.

Invasive vegetation species at Pillar Point AFS threaten habitat, wetlands, and operations at the Station. Priority invasive species include pampas grass, Cape ivy, Bermuda buttercup, Monterey cypress, Monterey pine, and iceplant. The problems caused by these non-native species are discussed and management approaches are presented.

*2022 INRMP update and five-year review*

For the five-year review, the goals, objectives, and projects—which form the heart of the INRMP—were updated to reflect the management directions of the INRMP for the next five years. Goals express a vision for a desired condition for the installation's natural resources and are the primary focal points for INRMP implementation. Objectives indicate a management initiative or strategy for specific long or medium range outcomes and are supported by projects. Projects are specific actions with defined time scales that can be accomplished within a single year or across several years. Additionally, the INRMP was transferred into the 2020 USAF standardized INRMP template and additional sections were completed, detailing the training requirements of natural resource staff, natural resource recordkeeping requirements, INRMP implementation, the integration of cultural resource management with INRMP, and the climate vulnerabilities of the Station. Finally, separate management component plans were integrated into the main INRMP, reducing the need to maintain several separate plans and facilitate holistic management of all resource categories.

# 1.0 OVERVIEW AND SCOPE

This Integrated Natural Resources Management Plan (INRMP) was developed to provide for effective management and protection of natural resources. It summarizes the natural resources present on the installation and outlines strategies to adequately manage those resources. Natural resources are valuable assets of the U.S. Air Force (USAF). They provide the natural infrastructure needed for testing weapons and technology, as well as for training military personnel for deployment. Sound management of natural resources increases the effectiveness of USAF adaptability in all environments. The USAF has stewardship responsibility for the physical lands on which installations are located to ensure all natural resources are properly conserved, protected, and used in sustainable ways. The primary objective of the USAF natural resources program is to sustain, restore, and modernize natural infrastructure to ensure operational capability and no net loss in the capability of USAF lands to support the military mission of the installation. The plan outlines and assigns responsibilities for the management of natural resources, discusses related concerns, and provides program management elements that will help to maintain or improve the natural resources within the context of the installation's mission. The INRMP is intended for use by all installation personnel. The Sikes Act is the legal driver for the INRMP.

## *1.1 Purpose and Scope*

The purpose of this INRMP is to provide strategic direction for ecosystem and natural resources management on Pillar Point Air Force Station (Pillar Point AFS or Station) in accordance with (IAW) Air Force Manual (AFMAN) 32-7003, Environmental Conservation. The long-term goal of the INRMP is to integrate all management activities in a manner that sustains, promotes, and restores the health and integrity of Pillar Point AFS ecosystems using an adaptive management approach consistent with the military mission and ensuring no net loss in the capability of installation lands to support the military mission (AFMAN 32-7003). Such an approach recognizes the underlying complexities of functioning ecosystems and complies with the intent of AFMAN 32-7003 to ensure ecologically sound stewardship of the nation's natural resources found on Air Force lands.

The INRMP is designed to:

- Summarize existing management plans and natural resources literature pertaining to Pillar Point AFS;
- Identify and analyze management goals in existing plans;
- Integrate the management goals and objectives of the individual plans;
- Support Station compliance with applicable regulatory requirements;
- Support the integration of natural resources stewardship with the Air Force mission; and
- Provide direction for monitoring strategies.

## *1.2 Management Philosophy*

Department of Defense Instruction (DoDI) 32-7064, *Environmental Conservation Program*, states that each military installation in the United States under the jurisdiction of the Secretary of Defense must prepare and implement an INRMP, unless a determination is made that the absence of significant natural resources makes preparation of such a plan inappropriate. The development of the plans involves active participation of installation and higher command personnel and coordination with relevant outside authorities. Natural resources management is to be integrated and should follow the principles and practices of ecosystem management and biodiversity conservation. AFMAN 32-7003 and DoDI 4715.3, paragraph E6.2, outlines ecosystem management principles and guidelines that form the cornerstone of Department of Defense (DoD) ecosystem management policy:

- Maintain and improve the sustainability and native biological diversity of the ecosystem;
- Administer with consideration of ecological units and timeframes;
- Support sustainable human activities;
- Develop a vision of ecosystem health;
- Develop priorities and reconcile conflicts;
- Develop coordinated approaches to work toward ecosystem health;
- Use the best science available;
- Use benchmarks to monitor and evaluate outcomes;
- Use adaptive management; and
- Implement through installation plans and programs.

Given the dynamic nature of ecosystems, natural resources management programs must be flexible and able to incorporate new information. As such, AFMAN 32-7003 requires that installations use an adaptive management approach, which combines monitoring, evaluation, and research so the effects of managerial strategies can be detected, assessed, and improved over time (Holling 1978, Lee and Lawrence 1986). Adaptive management relies on the use of the best available scientific knowledge and treats each management goal as a set of experiments, using performance criteria to assess goal effectiveness. Interim assessment of management actions produces knowledge that enhances learning and allows the program to improve results over time. Such an approach provides the proactive management strategy needed to protect ecosystems in the face of change.

The adaptive management of natural resources as ecological units can also provide financial benefits. For instance, the cost of generating oak seedlings in overgrazed areas is higher than implementing proper management techniques from the start (e.g., rotation of grazing areas and fencing of sensitive oak woodland seedlings). Ideally, a balanced, natural environment requires minimum manipulation by humans and is the most cost-effective method of managing natural systems. Therefore, Pillar Point AFS's overall natural resources policy is one of minimizing intervention in a natural, self-regulating system.

### *1.2.1 INRMP Integration with the Station Mission*

Management goals of this INRMP are shaped by the military mission, DoD guidelines, laws and regulations, public needs, and ecological theory. This INRMP has three overarching goals of natural resource management:

1. Maintain a well-trained, informed, and funded natural resources staff and an adaptive Pillar Point AFS natural resources program that supports the military mission while complying with natural resource regulations.
2. Maintain regulatory compliance and ensure availability of up-to-date management data by conducting regular flora and fauna surveys.
3. Monitor and protect natural resources and infrastructure from the effects of erosion and unauthorized pedestrian access.

The integration of the military mission with natural resources protection is a long-standing, overarching goal for Pillar Point AFS. Military missions often require setting aside undeveloped open spaces as safety buffers, which allows these land reserves to act as sanctuaries where habitat and wildlife remain

undisturbed. Many of these areas are ecologically significant, biologically diverse, and have aesthetic value. However, routine and ongoing surveys of each resource category are required to understand what specifically is present on an installation and how they are changing in response to management decisions. Management of the natural resources in these areas ensures their continued availability to support the military mission. This INRMP ensures that there is no net loss in the capability of Station lands to support the military mission of Pillar Point AFS. The full list of goals, objectives, and projects for INRMP implementation are provided in section 8.

## *1.3 Authority*

The authority for the INRMP comes from The Sikes Act, as amended (16 U.S.C. 670 *et seq*.), DoDI 4715.3, 3 May 1996, Air Force Policy Directive (AFPD) 32-70, 20 July 1994, *Environmental Quality*; and AFMAN 32-7003, *Environmental Conservation*.

The Sikes Act, as amended in November 1997, requires that INRMPs meet diverse requirements, including but not limited to:

- Fish and wildlife management, land management, and wildlife-oriented recreation;
- Fish and wildlife habitat enhancement or modifications;
- Wetland protection, enhancement, and restoration where necessary to support fish, wildlife, or plants;
- Integration of, and consistency among, the various activities conducted under the INRMP;
- Public access will be considered, if compatible with the military mission and resource use and sustainability;
- Enforcement of applicable natural resource laws; and
- No net loss in the capability of military installation lands to support the military mission of the installation.

### *1.3.1 Responsibilities*

*Installation Commander*

The Space Launch Delta 30 installation commander (SLD 30/CC) is responsible for the daily operation and mission accomplishment of Pillar Point AFS. SLD 30/CC has authority to approve the INRMP, ensure funding and staffing for INRMP, and control access to and use of installation and facility natural resources. The Secretary of a military department may enter into cooperative agreements with states, local governments, non-governmental organizations, and individuals to provide for the maintenance and improvement of natural resources on, or to benefit natural and historic research on, DoD installations. The SLD 30 Vice Commander (SLD 30/CV) chairs the Environmental, Safety, and Occupational Health Council (ESOHC).

*Environmental, Safety, and Occupational Health Council*

As the foundation and authority of the Environmental, Safety, and Occupational Health (ESOH) program at Pillar Point AFS, the ESOHC provides senior leadership involvement and direction at all levels of command. The ESOHC is responsible for:

- Providing guidance and oversight for implementing, maintaining, and improving the Pillar Point AFS Environmental Management System (EMS);

- Reviewing and approving policy, resource requirements, and EMS performance and making recommendations on changes required;
- Developing, approving, and monitoring EMS risk-based performance goals, measures, objectives, and targets; and
- Providing additional ESOH guidance to subordinate organizations as required.

*Space Launch Delta 30*

SLD 30 has oversight for both the 30th Civil Engineer Squadron (30 CES) and the 30th Security Forces Squadron (30 SFS), in addition to the Mission Support Services, Contracting, and Logistics Readiness squadrons. SLD 30 has authority to approve specific recreational activities on Pillar Point AFS. Pillar Point AFS does not have enforcement personnel on Station. The Station uses the Federal Bureau of Investigations and the local sheriff's office to enforce regulations inside and outside the fence line, respectively, as necessary (H. Erhart, Former Site Manager Pillar Point AFS, pers. comm.)

*Base Civil Engineer*

The Base Civil Engineer Squadron Commander (30 CES/CC) oversees the Installation Management Flight.

*Installation Management Flight*

The Installation Management Flight (30 CES/CEI) manages environmental planning, conservation, compliance, and pollution prevention functions. Natural resources management at Pillar Point AFS is the responsibility of the Natural Resources section (30 CES/CEIEA), located at Vandenberg Space Force Base (SFB). 30 CES/CEIEA is within the Conservation pillar of 30 CES/CEI. The Conservation pillar also includes cultural resource management and National Environmental Policy Act (NEPA) functions.

The 30 CES/CEIEA is responsible for conservation and management of threatened and endangered species, fish and wildlife, grazing and cropland, research, pest and land management, and certain outdoor recreation activities. In addition, 30 CES/CEIEA coordinates project planning and implementation with other organizations and reviews project plans and Environmental Impact Analysis Process (EIAP) documentation to ensure compliance with applicable natural resources regulations. 30 CES/CEIEA staff are the Air Force's technical experts who consult with the U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS); and coordinate with the California Department of Fish and Wildlife (CDFW) and other regulatory agencies as required. 30 CES/CEIEA staff is responsible for training and educating Pillar Point AFS personnel involved in mission requirements affecting natural resources on the Station. They also provide technical support to the Public Affairs office at Vandenberg SFB in providing education for on- and off-base personnel on natural resource issues of interest to the community.

The table below lists the State laws and regulations applicable to Pillar Point AFS; federal laws and regulations are provided in Appendix A. Annotated Summary of Key Legislation Related to Design and Implementation of the INRMPAppendix A. Annotated Summary of Key Legislation Related to Design and Implementation of the INRMP..

| Installation-Specific Policies (including State and/or Local Laws and Regulations) | |
|---|---|
| California Coastal Act (CCA) of 1976 | This Act provides long-term protection of California's 1,100-mile coastline for the benefit of current and future generations. Coastal Act policies constitute the standards used by the Coastal Commission in its coastal development permit decisions and for the review of local coastal programs prepared by local governments and submitted to the Commission for approval. These policies are also used by the Commission to review federal activities that affect the coastal zone. |

| | |
|---|---|
| California Endangered Species Act of 1970 | Provides protection at state level for species designated as rare, threatened, or endangered. |
| [California] Clean Air Act of 1988 | This Act develops and implements a program to attain the California Ambient Air Quality Standards for ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, particulate matter less than or equal to 10 microns in diameter, lead, sulfates, hydrogen sulfide, and vinyl chloride. 40 Code of Federal Regulations Part 51 gives state and local agencies the authority to establish air quality rules and regulations. Rules adopted by the local air pollution control districts and accepted by the Air Resources Board are included in the State Implementation Plan. When approved by the U.S. Environmental Protection Agency, these rules become federally enforceable. |
| Porter-Cologne Water Quality Control Act | Protects all waters of the state for the use and enjoyment of the people of California and declares that the protection of water resources be administered by the regional water quality control boards. |
| California Integrated Waste Management Act of 1989, California Assembly Bill AB 939 | Provides for the proper management and disposal of solid wastes, to include the diversion requirements for construction and demolition debris. |
| Marine Life Protection Act of 1999 | Reorganized and designated marine protected areas to protect and conserve marine life and habitat along the California coast. |
| California Fish & Game Code §§ 3511 (birds), 4700 (mammals), and 5515 (fish) | Provides (additional) protection at state level for species designated as Fully protected animals or parts thereof may not be taken or possessed at any time. |

### *1.4 Integration with Other Plans*

Vandenberg SFB Base Comprehensive Planning in the Civil Engineer Squadron is responsible for the completion of mapping systems used in documents such as the Vandenberg SFB Installation Development Plan (IDP), its INRMP, and the Pillar Point INRMP. Completion of mapping systems will be accomplished via Air Force Instruction (AFI) 32-1015, *Air Force Integrated Installation Planning*, which directs the Air Force to consolidate plans and guidelines, regardless of program, that are related to the management and development of Air Force lands, facilities, and resources, into a document to guide future growth and development.

The Vandenberg SFB IDP was last updated in 2020 and includes information about Vandenberg SFB satellite facilities such as Pillar Point AFS. As with the INRMP, the IDP is a living document and updating the IDP is a cooperative effort that includes all land areas under Space Force control and regions of influence. The IDP establishes a systematic framework for decision making with regard to development of Space Force installations. It also incorporates operational, environmental, urban planning, and other Space Force programs using the INRMP as a starting point for analysis. While mission impacts are also discussed in the INRMP, the transition of baseline data and management goals into a more specific, mission-by-mission format is accomplished by the IDP. The INRMP lays the foundation for the IDP and provides baseline natural resources data and management goals for the base comprehensive planning process.

As the IDP partially relies upon geographic information system (GIS) maps contained in the INRMP, it is recommended that Base Comprehensive Planning develop complete GIS overlays of the natural resources present at Pillar Point AFS. Land uses and natural resources constraints should be identified for future planning projects and used to determine potential impact of current and future Station missions on natural resources.

## 2.0 INSTALLATION PROFILE

| | |
|---|---|
| **Office of Primary Responsibility (OPR)** | Space Launch Delta 30 has overall responsibility for implementing the natural resources management program and is the lead organization for monitoring compliance with applicable federal, state, and local regulations. |
| **Natural Resources Manager/Point of Contact (POC)** | Name: Rhys Evans<br>Email: rhys.evans@spaceforce.mil |
| **State and/or local regulatory POCs** (Include agency name for Sikes Act cooperating agencies) | Field Supervisor<br>Region 8, United States Fish and Wildlife Service<br>2800 Cottage Way<br>Sacramento, CA 95825<br>United States<br><br>Assistant Regional Administrator<br>West Coast Region, National Marine Fisheries Service<br>1201 Northeast Lloyd Boulevard, Suite 1100<br>Portland, OR 97232<br><br>Regional Manager<br>Bay Delta Region, California Department of Fish and Wildlife<br>2825 Cordelia Road, Suite 100<br>Fairfield, CA 94534 |
| **Total acreage managed by installation** | 55 acres |
| **Total acreage of wetlands** | 0.07 acres |
| **Total acreage of forested land** | N/A |
| **Does installation have any Biological Opinions?** (If yes, list title and date, and identify where they are maintained) | N/A |
| **Natural Resources Program Applicability**<br>(Place a checkmark next to each program that must be implemented at the installation. Document applicability and current management practices in Section 7.0) | ☒ Fish and Wildlife Management<br>☐ Outdoor Recreation and Access to Natural Resources<br>☐ Conservation Law Enforcement<br>☒ Management of Threatened, Endangered, and Host Nation-Protected Species<br>☒ Water Resource Protection<br>☒ Wetland Protection<br>☒ Grounds Maintenance<br>☐ Forest Management<br>☐ Wildland Fire Management<br>☐ Agricultural Outleasing<br>☒ Integrated Pest Management Program<br>☐ Bird/Wildlife Aircraft Strike Hazard (BASH)<br>☒ Coastal Zone and Marine Resources Management<br>☒ Cultural Resources Protection<br>☒ Public Outreach<br>☒ Geographic Information Systems (GIS) |

## *2.1 Installation Overview*

### *2.1.1 Location and Area*

Pillar Point AFS is located on the Pacific Ocean side of the San Francisco Peninsula in northern California, approximately 20 miles south of San Francisco and 42 miles north of Santa Cruz (Figure 2-1). This 55-acre parcel is situated on a peninsula at the north end of Half Moon Bay, due west of the town of Princeton-by-the-Sea and Pillar Point Harbor. The Station contains 64 facilities that include 14 buildings.


Figure 2-1. Pillar Point AFS location overview.

### *2.1.2 Installation History*

Pillar Point was originally part of the Rancho Corral de Tierra, granted by Mexico to Francisco Guerrero y Palomares in 1839 (SAIC 1994). Until World War II, this land was used for farming and grazing (SAIC 1994). The site has been owned and operated by various branches of the DoD since 1940. The United States Army bought 12.68 acres at Pillar Point on 28 October 1940. The Army used the site as an artillery observation post during World War II, and it was deactivated after the war. In 1959, the site was reactivated and transferred from the Army to the U.S. Navy, which used the site as a command and control facility for the Regulus missile, an air-breathing, surface-to-surface missile that could be launched from submarines or cruisers. In 1962, the Navy used the site to support the Minuteman I missile program. In 1964, the control and property title for the Pillar Point site was transferred from the Navy to the U.S. Air Force and construction began on tracking operations facilities. The Pillar Point site was administered by the Air Force from 1965 to 2021, when Vandenberg Air Force Base was transferred to the U.S. Space Force following a renaming ceremony on 14 May 2021. Vandenberg Space Force Base is responsible for the operations at Pillar Point AFS, which remains an Air Force Station as of May 2022. During the transition from Air Force to Space Force operations, the former Air Force 30th Space Wing was re-designated as SLD 30 within Space Force. This INRMP has been updated to refer to SLD 30 and Vandenberg SFB throughout; however, references that predate the Space Force transition in 2021 will retain "30th Space Wing" and "Vandenberg Air Force Base."

Most of the current infrastructure on the Station was built between 1967 and 1972, when the facility was upgraded to support the Minuteman III missile program (SAIC 1994). The Station's exterior layout has changed little since 1972. However, interior hardware for all systems at the Station has been constantly upgraded to support evolving space and ballistic missile testing programs at Vandenberg SFB and aeronautical tests conducted at Edwards Air Force Base and the Naval Air Warfare Center at Point Mugu, California (SAIC 1994). In 1979, the Air Force acquired 42.15 acres of privately owned leased lands on the Pillar Point peninsula by condemnation and the land was added to Pillar Point AFS. Currently, Pillar Point AFS houses radar, command control, meteorological, and telemetry systems to support ballistic missile and space launch activities at Vandenberg SFB.

### *2.1.3 Military Missions*

Pillar Point AFS is a tracking station, which supports polar-orbiting space satellite and operational intercontinental ballistic missile launches from Vandenberg SFB. Operations at Pillar Point AFS include radar tracking, telemetry reception, command control, and communication services in support of polar launch operations. The Station provides critical side-look capability for launches from the Western Range, guaranteeing collection of data during plume attenuation at Vandenberg SFB sensors. The Station is administered under the SLD 30, headquartered at Vandenberg SFB, which conducts West Coast space and missile launch operations, and manages the Western Range. The technical services contractor, RG Next, Inc., currently performs management, maintenance, and operation services at this facility.

### *2.1.4 Natural Resources Needed to Support the Military Mission*

The mission at Pillar Point AFS requires a location where it can obtain the critical side-look capability for launches from the Western Range. The mission also requires that security needs be met, which is mainly accomplished by restricting the public from the southern half of the Station. The primary structures on Pillar Point AFS, including buildings and radar, must be located on lands that are accessible, easy to maintain, and aren't at risk from coastal erosion.

### *2.1.5 Surrounding Communities*

Pillar Point AFS is located on a peninsula in northwestern San Mateo County, California. This peninsula shelters Half Moon Bay and the Pillar Point Harbor to the east from the Pacific Ocean to the west. Princeton-by-the-Sea is the nearest town to the Station. Economic activity in this small, unincorporated community

centers on fishing, boat maintenance, and tourism. The town is located about 0.3 miles east of Pillar Point AFS, on the east side of Princeton Marsh (Figure 2-1). Pillar Point Harbor, a popular sailing area and commercial fishing port, is located on the east side of Pillar Point, enclosed by two rock jetties. The El Granada Mobile Home Park and the Half Moon Bay Airport are due north of the Station. Other nearby communities include Montara, Moss Beach, and Seal Cove (north of the airport), El Granada (east of Princeton-by-the-Sea), and Miramar and Half Moon Bay (southeast of Pillar Point Harbor).

### *2.1.6 Local and Regional Natural Areas*

At a number of sites in the immediate vicinity of Pillar Point AFS, the public can access coastal areas for recreation. A public parking area on the west side of Princeton Marsh is accessible through West Point Avenue, the entrance road to the Station. The West Shoreline Access-Pillar Point Harbor trail (Figure 2-1), is administered by the San Mateo County Harbor District, and borders the base of the cliffs along the east side of Pillar Point AFS. It provides public access to the Pillar Point Harbor jetty, the beach and rocky intertidal zone south of Pillar Point, and the popular Mavericks surf area off the end of the peninsula. Bicycle riders, hikers, and joggers use West Point Avenue, along with numerous unpaved trails on the northern third of Pillar Point AFS, for recreational riding and exercise. The public also uses several unpaved trails that cross the northern portion of the Station to reach the west-facing bluff and beaches of the Pillar Point peninsula. In addition to the West Shoreline Access-Pillar Point Harbor trail, the James V. Fitzgerald Marine Reserve, and Princeton Marsh, discussed below, a number of state and local parks north and south of Pillar Point provide public access to local beaches, including Montara State Beach, Miramar Beach, Naples Beach, Dunes Beach, Venice Beach, Elmar Beach, Francis Beach, and Poplar Beach Park.

The coastal area from the southernmost tip of Pillar Point north to Point Montara (a distance of three miles) is designated as the James V. Fitzgerald Marine Reserve. This 402-acre reserve is administered as a marine life refuge by San Mateo County Department of Parks and is designated by the State of California as an Area of Special Biological Significance.

Princeton Marsh, a 41-acre freshwater marsh and brackish tidal estuary, is located on the northeast side of Pillar Point AFS and along West Point Avenue. The marsh is administered as a Wetlands Salt Marsh by San Mateo County Department of Parks. This estuary forms a natural buffer between the Station and the unincorporated town of Princeton-by-the-Sea, the nearest populated area. Princeton Marsh is used by many species of resident and migratory birds (San Francisco Bay Bird Observatory 1993) and is home to several special status wildlife species. It is a favorite spot for birding along the San Mateo County coastline. The predominant habitat at Princeton Marsh is salt marsh, which grades into freshwater marsh and riparian woodland upstream of the crossing with West Point Avenue. Riparian woodland is found along the road shoulders and in upstream areas north and east of the marsh. Except for the immediate road and road shoulders of West Point Avenue, the rest of Princeton Marsh and its associated wetlands are not contained within lands administered by Pillar Point AFS.

## ***2.2 Physical Environment***

Climate, soil type, current and past land use, water, and topography all interact to influence the habitat types at this coastal site. Vegetation is heavily influenced by proximity to the Pacific Ocean, with fog, ocean winds, and cloudiness strongly influencing the types of plant communities. Except for a small ephemeral wetland in the cantonment area and several smaller swales supporting wetland habitat on the northern portion of the Station, there are no permanent impoundments or perennial drainages on this site. Freshwater marsh and willow scrub border West Point Avenue at the entrance to Pillar Point AFS.

### *2.2.1 Climate*

This section summarizes climatological information for the area. Half Moon Bay and Point Montara are the nearest weather recording stations to Pillar Point AFS for which weather data are available. Since both of

these stations are close to Pillar Point AFS, they provide representative data for weather conditions at the Station.

The Pacific Ocean is the principal influence on local climate conditions at Pillar Point AFS. The climate is characterized as Mediterranean, with dry, mild summers and moist, cool winters. Temperatures are generally mild with most precipitation falling during the six-month winter period, November to April, when frontal systems pass through the region. Very little rainfall occurs from May to October (Table 2-1). Average annual precipitation at Half Moon Bay is 26.76 inches, with most of this falling between the months of November and April (Table 2-1). As a result of ocean upwelling and northwest winds, Pillar Point AFS experiences frequent foggy conditions that help moderate temperatures. Temperature data from the Half Moon Bay recording station indicates a variation of less than 10 degrees in average daily temperature between winter and summer (Table 2-2). Maximum daily temperatures in June through August at Half Moon Bay are between 63 to 65 degrees Fahrenheit (°F). Daily maximum temperatures during the winter months are in the high 50s. Average minimum temperatures are about 43 degrees °F in winter and 50 to 52 degrees °F in the summer (Table 2-2).

Table 2-1. Average monthly and annual precipitation (in inches) at Half Moon Bay for the period from 1948-1998.

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Annual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Maximum | 12.13 | 15.70 | 13.05 | 7.43 | 4.10 | 1.44 | 1.01 | 1.56 | 3.66 | 10.97 | 9.86 | 13.81 | 55.01 |
| Mean | 5.49 | 4.20 | 3.95 | 1.84 | 0.73 | 0.27 | 0.11 | 0.21 | 0.41 | 1.60 | 3.31 | 4.64 | 26.76 |
| Minimum | 0.26 | 0.25 | 0.12 | 0.13 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.32 | 0.03 | 13.13 |

Table 2-2. Average monthly and annual temperature (in Fahrenheit) at Half Moon Bay for the period from 1948-1998.

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Annual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Highest Temp. | 74.0 | 78.0 | 79.0 | 87.0 | 90.0 | 90.0 | 81.0 | 94.0 | 94.0 | 94.0 | 87.0 | 79.0 | 94.0 |
| Average Max. | 58.1 | 59.3 | 59.6 | 60.5 | 61.4 | 63.0 | 63.8 | 65.1 | 66.9 | 65.9 | 62.8 | 58.7 | 62.1 |
| Mean Temp. | 50.5 | 51.6 | 51.9 | 52.6 | 54.4 | 56.4 | 57.7 | 58.9 | 59.3 | 57.3 | 54.2 | 51.1 | 54.6 |
| Average Min. | 43.0 | 43.8 | 44.1 | 44.7 | 47.4 | 49.9 | 51.6 | 52.7 | 51.6 | 48.6 | 45.9 | 43.4 | 47.2 |
| Lowest Temp. | 27.0 | 28.0 | 30.0 | 32.0 | 35.0 | 37.0 | 40.0 | 41.0 | 38.0 | 35.0 | 30.0 | 18.0 | 18.0 |

Meteorological data (Table 2-3) from Point Montara, approximately four miles north of Pillar Point, were used to develop a wind rose diagram illustrating the prevailing and ancillary wind directions and average wind speeds for a coastal site in the vicinity of Pillar Point (Figure 2-2). The predominant wind direction is from the northwest. Average wind speed from this direction is about 10 miles per hour. The strongest winds tend to come from the south and are usually associated with winter storms. Highest average wind speed during the winter is about 18 miles per hour.

Table 2-3. Annual surface wind summary at Point Montara, four miles north of Pillar Point AFS.

| Direction | Percent of Time | Mean Speed (miles per hour) |
|---|---|---|
| N | 1.6 | 9.9 |
| NNE | 0.2 | 10.6 |
| NE | 1.2 | 8.9 |
| ENE | 0.4 | 10.4 |
| E | 2.9 | 7.8 |
| ESE | 0.9 | 7.2 |
| SE | 7.3 | 10.1 |
| SSE | 3.2 | 12.2 |
| S | 9.2 | 10.4 |
| SSW | 3.2 | 12.2 |
| SW | 4.4 | 7.7 |
| WSW | 0.9 | 8.6 |
| NW | 32.3 | 10.8 |
| NNW | 2.7 | 11.1 |
| Calm | 21.6 | |
| All | | 8.8 |

Source: California Air Resources Board (1989); Period of Record: February 1938 – November 1941; Number of Observations: 10,829

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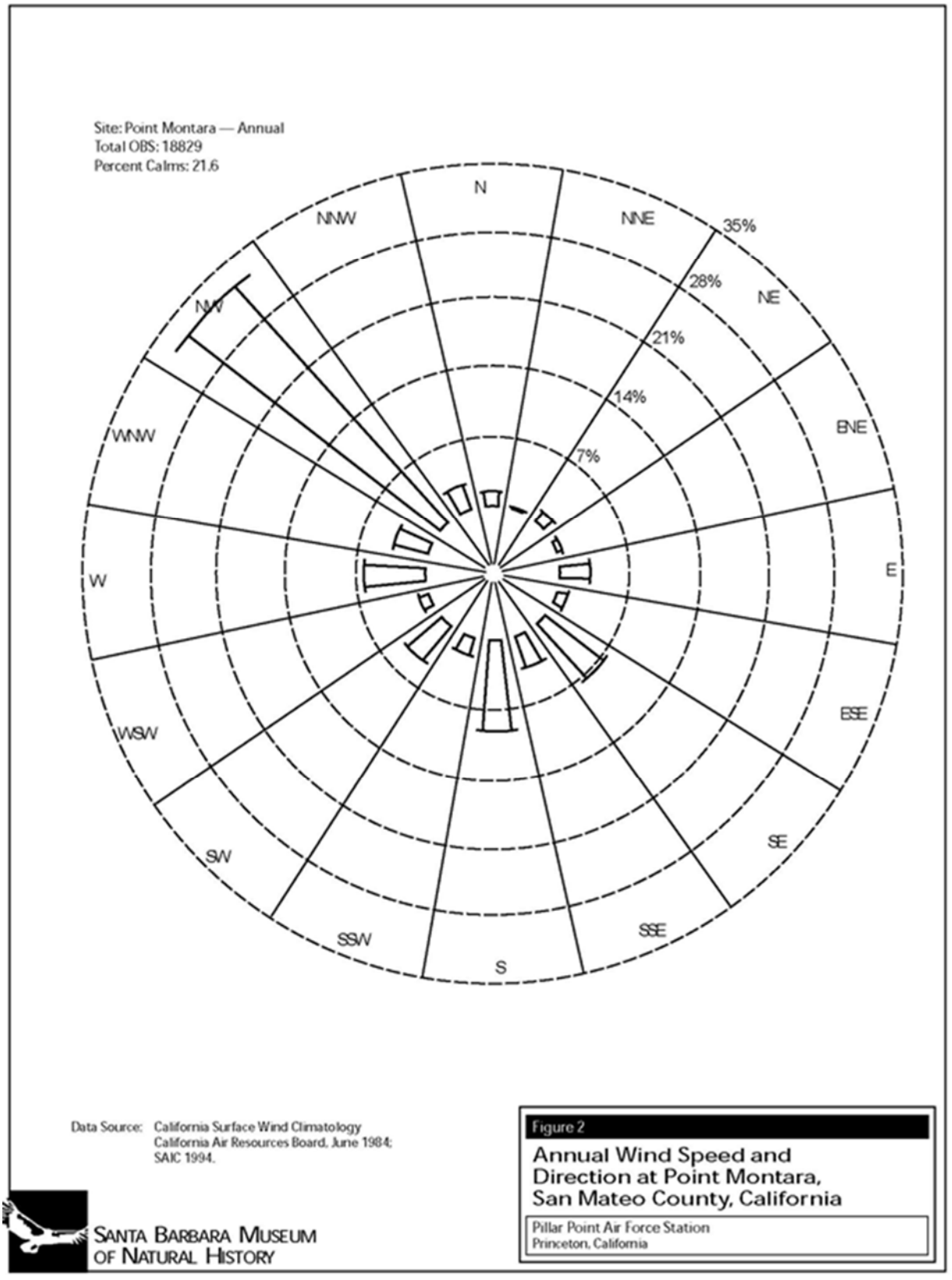


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615 Figure 2-2. Annual wind speed and direction at Point Montara, San Mateo County, California.

#### 2.2.1.1 Climate Change Projections

Colorado State University (CSU) Center for Environmental Management of Military Lands (CEMML) generated site-specific climate projections for Pillar Point AFS under two future carbon-emissions scenarios: Representative Concentration Pathway (RCP) 4.5 (moderate emission levels) and RCP 8.5 (high emission levels). CEMML then used these projections to assess potential impacts of future climate on natural resources at the base (CEMML 2019). Historical daily climate data recorded from 1980 through 2009 were used to represent average historical (hereafter, baseline) conditions and generate the climate projections. These data represent the 30-year historical reference period used by the Intergovernmental Panel on Climate Change (IPCC) to define climate change scenarios. Future climate conditions for Pillar Point AFS, assessed under both emissions scenarios, were projected to produce two decadal time series of daily climate values for 2026–2035 and 2046–2055, represented hereafter as 2030 and 2050 (see Methods Appendix in CEMML 2019).

Historical data gathered for Pillar Point AFS included average daily temperature, maximum and minimum daily temperatures, and daily precipitation. For each of these variables, a daily anomaly was computed (the difference between a future climate and the historical climate) under each emissions scenario for 2030 and 2050. Then, daily data were averaged within both 10-year periods for each variable and emissions scenario to produce an average annual temperature (TAVE), average annual maximum (TMAX) and minimum (TMIN) temperatures, and average annual precipitation (PRECIP) values.

The CEMML assessment was based primarily on publicly available data and data provided by Air Force Civil Engineer Center (CEMML 2019). The projections were based on recent global climate model simulations developed for the IPCC Fifth Assessment Report (IPCC AR5), the Coupled Model Intercomparison Project Phase 5, and the U.S. National Center for Atmospheric Research (NCAR) Community Climate System Model (CCSM) (Hibbard et al. 2007; Moss et al. 2008, 2010; Gent and Danabasoglu 2011; Hurrell et al. 2013). For additional information on methodologies, see CEMML 2019.

Climate projections for Pillar Point AFS (Table 2-4) indicate that TMIN and TMAX temperatures will increase under both emissions scenarios and timeframes. For 2030, both scenarios project a similar increase in TAVE of 1.5 °F to 1.1 °F over the historical average. The two emissions scenarios show higher warming by 2050, with RCP 4.5 showing an increase of 2.1 °F, and 2.7 °F under scenario RCP 8.5 (see Table 1 in CEMML 2019).

For 2030, models project a PRECIP increase of 18 percent under the RCP 4.5 scenario, and an increase of 2 percent under RCP 8.5. For 2050, models project an 11 percent increase in PRECIP under RCP 4.5 and a larger increase of 22 percent under RCP 8.5 (CEMML 2019).

Table 2-4. Summary climate data for Pillar Point AFS.

| Variable | Historical | RCP 4.5 | | RCP 8.5 | |
|---|---|---|---|---|---|
| | | 2030 | 2050 | 2030 | 2050 |
| PRECIP (inches) | 28.1 | 33.2 | 31.1 | 28.7 | 34.2 |
| TMIN (°F) | 47.9 | 49.3 | 49.9 | 49.0 | 50.7 |
| TMAX (°F) | 64.1 | 65.7 | 66.3 | 65.3 | 66.8 |
| TAVE (°F) | 56.0 | 57.5 | 58.1 | 57.1 | 58.7 |
| GDD (°F) | 2780.0 | 3197.0 | 3339.0 | 3079.0 | 3498.0 |
| HOTDAYS | 0.7 | 0.4 | 0.7 | 0.3 | 0.7 |

Table 2-4. Summary climate data for Pillar Point AFS.

| Variable | Historical | RCP 4.5 | | RCP 8.5 | |
|---|---|---|---|---|---|
| | | 2030 | 2050 | 2030 | 2050 |
| WETDAYS | 1 | 0.5 | 0.7 | 0.8 | 0.9 |

**Notes:** TAVE ºF = annual average temperature; TMAX ºF = annual average maximum temperature; TMIN °F = annual average minimum temperatures; PRECIP (inches) = average annual precipitation; GDD ºF = Average annual accumulated growing degree days with a base temperature of 50 ºF; HOTDAYS (average # of days per year) = average number of hot days exceeding 90 °F; WETDAYS (average # of days per year) = annual number of days with precipitation exceeding 2 inches in a day.

Understanding changes in daily intensity and total precipitation for multi-day precipitation events is helpful to evaluate precipitation patterns in addition to assessment of annual averages. CSU CEMML generated three-day storm events (design storms) from projected precipitation data based on RCP 4.5 and 8.5 emissions scenarios for the 2030 and 2050 timeframes (Table 2-5). Historical precipitation data were used to calculate a baseline storm event for the year 2000 for comparison. Design storms were used to model stream channel overflow in the hydrology assessment. Projected changes in design storm precipitation follow no clear pattern. For each timeframe, projected rainfall increased for one emissions scenario and decreased for the other.

Table 2-5. Design storm precipitation for Pillar Point AFS.

| Design Storm | | Baseline | RCP 4.5 | | RCP 8.5 | |
|---|---|---|---|---|---|---|
| | | 2000 | 2030 | 2050 | 2030 | 2050 |
| Precipitation (inches) | Day 1 | 1.16 | 0.95 | 1.04 | 1.05 | 1.14 |
| | Day 2 | 2.25 | 2.13 | 1.94 | 1.81 | 1.79 |
| | Day 3 | 0.60 | 1.09 | 0.93 | 1.07 | 1.21 |
| | Total | 4.01 | 4.17 | 3.91 | 3.93 | 4.14 |
| Percent change from baseline | | | 4 | -2 | -2 | 3 |

### *2.2.2 Landforms*

Topography of the Pillar Point area consists of a series of flat and rolling wave-cut terraces, bounded on the east by Princeton Marsh, below the Santa Cruz Mountains, and on the west by the Pacific Ocean (Figure 2-1). Pillar Point AFS is on a relatively isolated peninsula, approximately 0.30 miles wide and 0.25 miles long. It is surrounded on all sides by 80- to 140-foot-high sea cliffs, ranging from steep to near vertical, that extend down to the ocean shoreline. The surface topography of the Station is fairly uniform, with relatively flat terrain on top of the peninsula, sloping from two to 17 degrees on the natural terraces above the sea cliffs (Fugro West 1998). Elevations at the Station range from about 80–180 feet above mean sea level. Slopes around the peninsula are steepest along the west and south sides adjacent to the Pacific Ocean, and are less so along the northeast and east sides adjacent to Princeton Marsh and Pillar Point Harbor. Sandy

beaches border the base of these cliffs along the south and northwest sides, while rocky beaches and rock outcrops are present along the southwest and west sides.

### *2.2.3 Geology and Soils*

This section describes existing soil conditions and geology at Pillar Point AFS. Information presented is based on geological investigations found in several previous environmental reports for projects at Pillar Point AFS, including Fugro West 1998, SAIC 1994, Tetra Tech 1999a and 1999b, and the Draft Fitzgerald Marine Reserve Master Plan (Brady/LSA 2002). Detailed geological data are available only for the southern half of the Station (Fugro West 1998), and as a result, the geology map (Figure 2-3) contains geological data only for that area.

The Station is located in the Coast Ranges geomorphic/geologic province of central and northern California. The Coast Ranges extend from the Transverse Ranges geomorphic province, located 300 miles to the south, to the Klamath Mountains located approximately 250 miles to the north of the Station (Fugro West 1998). The Coast Ranges province is bordered by the Pacific Ocean to the west and the Great Valley province to the east. The Coast Ranges generally consist of northwest-trending mountain ranges and north-northwest trending faults and folds (Fugro West 1998). The province consists of sedimentary, metamorphic, volcanic, and igneous rocks, which range in age from Jurassic/Cretaceous to Holocene.

The coastal region of northern San Mateo County is a series of flat and rolling wave-cut terraces that extend east toward the foothills of Montara Mountain in the northern Santa Cruz Mountains. The igneous and sedimentary rocks in this area range in age from Jurassic-Cretaceous to Holocene (Fugro West 1998). This area is part of the Jurassic/Cretaceous Salinian Block, which is characterized by crystalline basement rocks (Fugro West 1998). The San Andreas fault, located about seven miles east of the Station, delineates the eastern boundary of the Salinian Block and is also considered the tectonic demarcation between the Pacific and North American plate that has been translated northward (Fugro West 1998).

The San Gregorio fault (SGF), locally known as the Seal Cove fault, and a number of related small-scale faults traverse the area (Fugro West 1998). West of the onshore trace of this fault, Cretaceous clastic sediments and Cenozoic-age sedimentary and volcanic rocks are exposed (Fugro West 1998). The SGF is part of a coastal system of parallel strike-slip faults extending from Point Conception in the south to the Marin Peninsula in the north. This fault is the principal tectonic structure west of the San Andreas Fault in the coastal region of central California between Monterey Bay and Bolinas Lagoon. The frequency and magnitude of potential earthquakes along the SGF is poorly understood because the fault zone is complex and primarily lies offshore. Exploratory excavations have found that the SGF is an active, right-lateral strike-slip fault that has moved repeatedly during the past 5,000 years (Brady/LSA 2002). The two most recent earthquakes on the SGF occurred between A.D. 1270 and A.D. 1775, and between A.D. 620 and A.D. 1400. The first of these is estimated to have had a magnitude on the order of 7.0 (Wells and Coppersmith 1994).


Figure 2-3. Geology of Pillar Point AFS.

#### 2.2.3.1 Site Setting

Surface deposits at Pillar Point are composed of Pleistocene-age, marine Half Moon Bay terrace deposit (Simpson et al. 1997) and artificial fill (Tetra Tech 1999a). Soils in these deposits are of the Tierra type, which are clay loam to sandy loam and are highly erosive and prone to cliff retreat and landslides.

*Bedrock*

Rock material from the Purisima Formation (Tp) underlies Pleistocene-aged terrace deposits, landslides, and artificial fill at Pillar Point (Fugro West 1998). The Purisima Formation is an early to middle Pliocene-age highly fractured, well-indurated (hardened) marine conglomerate, with fine-grained soft to medium-hard fossiliferous sandstone, mudstone, siltstone, and shale in distinct, thin beds (Pampeyan 1994, Fugro West 1998). The Purisima Formation is subdivided into two subunits based on the relative degree of hardness and resistance to erosion. "TP-1 is a soft, pervasively sheared, thin-bedded mudstone which is susceptible to erosion and large-scale slope failure. TP-2 is a moderately- to well-indurated, thin-bedded, silicified mudstone that is relatively resistant to erosion and slope failure" (Brady/LSA 2002). TP-1 is associated with deep-seated slope failures along the sea cliff and TP-2 forms the steep sea cliffs that characterize the south and west-facing sides of Pillar Point. Localized outcrops of Purisima Formation shale and conglomerate (Tpr) are exposed in cliff faces along the west, northwest, and southeast sea cliffs of Pillar Point (Figure 2-3).

*Surface Materials*

Surface materials that overlie most of the terrace at Pillar Point are composed of Holocene Terrace deposits (Qt), active and inactive landslide deposits (Qlsa and Qlso, respectively), and artificial fill (af). Most of the top of Pillar Point is covered by Holocene Terrace deposits of the Pleistocene-aged, marine, Half Moon Bay Terrace (Figure 2-3). This deposit is composed of locally cross-bedded silty sand, which ranges in thickness up to 20 feet (Fugro West 1998). Holocene- to Pleistocene-aged landslide deposits occur in several locations around the perimeter of Pillar Point AFS (Figure 2-3). Artificial fill is generally composed of derivatives of the terrace deposits and Purisima Formation material and is found at several locations throughout the Station (Fugro West 1998) (Figure 2-3).

*Cliff Retreat*

Sea cliffs at Pillar Point AFS range in height from 90 to 120 feet. Cliffs are fronted either by a narrow beach or by no beach. As a result, the cliffs are subject to wave impact during high tides or periods of high surf. The lower part of the cliff face consists of Purisima Formation bedrock, and the upper part of marine terrace deposits. These materials are weakly to moderately consolidated, and are susceptible to slope failure and/or erosion. As a result, cliff retreat is occurring via landslides primarily due to undercutting of the cliff base by waves with subsequent failure of the slope above (Tetra Tech 1999a). Cliff retreat has helped to create the steep cliff faces found along the southwest, west, and northwest sides of Pillar Point. Sea cliff retreat tends to be episodic, with large sections of sea cliff failing when there has been sufficient scouring at the toe of the cliff. The slope never reaches a state of equilibrium or stability because waves remove fallen material at the cliff base, renewing the cycle of retreat. Sea cliff failure is expected to continue at Pillar Point due to scouring by wave action, although strong ground motion along the SGF or one of the other regional faults may also cause failure. Nine to 12 feet of sea cliff adjacent to Building 17 on the west side of the Station was lost during the 1997–1998 winter season, with continued encroachment expected for other developed facilities (Figure 2-1).

*Landslides*

Numerous landslides have occurred on Pillar Point. The failure scars left on the cliff sides and sediments deposited at the cliff bases surrounding the Station are geological features of both interest and concern (Figure 2-3). Evidence of more recent landslides is found along the north side of Northern Loop Road, and

along the north-facing slope located north of West Point Avenue, adjacent to the main entry gate (Figure 2-3). Additional landslide scars and deposits occur on east-facing slopes south of the main guard house (Figure 2-1), west of the main entrance road, and on west-facing slopes along the shoreline of the James V. Fitzgerald Marine Reserve (Figure 2-3).

*Beaches/Rocky Headlands/Points*

Sandy beach deposits occur west of the Pillar Point Harbor breakwater on the south side of Pillar Point and at the base of west-facing bluffs on the northern half of Pillar Point AFS. Rocky shoreline and off-lying rock outcrops are located at the base of steep cliffs along the southwest and west sides of Pillar Point. These are composed of material from the Purisima Formation.

### *2.2.4 Hydrology*

No permanent impoundments or perennial drainages occur on Pillar Point AFS, except for a small ephemeral wetland in the developed cantonment, several small freshwater seeps, a small drainage swale, and one unmapped potential seep located near the top of the cliffs on the west side of the peninsula. Surface water runoff at Pillar Point AFS either dissipates into site soils or flows over the cliff edge and onto the beach, where it infiltrates into the permeable sand or discharges directly into the Pacific Ocean (Tetra Tech 1999a). Several v-ditches and storm drains channel surface water runoff away from developed roads and facilities at Pillar Point AFS; the small drainage swale on the northern half of the Station channels surface water runoff southeast into Princeton Marsh. The marsh is a small coastal estuary, and is the only significant wetland in the immediate vicinity of the Station. West Point Avenue, the entrance road into Pillar Point AFS, crosses the northern end of Princeton Marsh. Water levels in the marsh are affected by groundwater recharge from the adjacent Denniston Creek mouth and groundwater and surface water flow that does not reach the ocean. The creek discharges into Pillar Point Harbor (Half Moon Bay) approximately 0.75 miles northeast of Pillar Point AFS. Flows from Princeton Marsh also enter the bay, and then become part of the greater Pacific Ocean. As such, the discharges from the creek and marsh are considered Waters of the United States (WOTUS). No formal jurisdictional determinations have been made for WOTUS on Pillar Point AFS.

#### **2.2.4.1 Coastal Zone Modeling**

Exposure to inundation from sea level rise (SLR) and storm surges (SS) was assessed using a DoD database specific to Pillar Point AFS. Details on the development and use of this database are described in Hall et al. (2016). Extreme water-level scenarios were based on regional frequency analysis estimates of 20-year and 100-year storm surges. Coastal flooding projections were modeled under both RCP 4.5 and RCP 8.5 emissions scenarios for 2035 and 2065 (instead of 2030 and 2050), in accordance with the DoD scenario database (see Methods Appendix in CEMML 2019). Estimates of SLR project the new permanent coastline for each scenario and timeframe, and SS estimates project short-term flooding associated with an extreme water-level event that is expected to recede after the storm.

Because the coastline at Pillar Point AFS is elevated above sea level, projected inundation associated with SLR and SS within the Pillar Point AFS boundary is less than 0.25 acres for both timeframes and scenarios (CEMML 2019). Formal erosion risk modeling was not conducted for the Station; however, under a changing climate, increasing risks to cliff stability are likely. With input and guidance from experts, stakeholders, agencies, and community members, San Mateo County (2018) completed a detailed SLR vulnerability assessment. Their report highlights greater erosion from changes in wave impacts and storm intensities, and reductions in the nourishment of protective beaches from changes in sediment supply and distribution (San Mateo County 2018).

## *2.3 Ecosystems and the Biotic Environment*

Lists of the plants and wildlife known or expected to occur at Pillar Point AFS or in its immediate vicinity are included in Table 14-1, Table 14-2, Table 14-3, and Table 14-4 (within Appendix B).

The biological significance of Pillar Point AFS lies in the fact that it is one of the few open, relatively undeveloped patches of oceanfront land remaining along this part of the San Francisco Peninsula. Northern coastal scrub and coastal terrace plant communities that occupy parts of the peninsula are relatively rare in this area of coastal California. Pillar Point is important to migrating landbirds because it juts westward into the Pacific Ocean, where it can act as a migrant trap for birds that have strayed out over water. This headland is the nearest landfall along this stretch of coast for birds migrating over water and as such, tends to attract a variety of common and rare migrants (San Francisco Bay Bird Observatory 1993). Pillar Point AFS also provides important habitat for both resident and migratory birds.

### *2.3.1 Ecosystem Classification*

Pillar Point AFS is located within the Humid Temperate Domain, Mediterranean Division, California Coastal Chaparral Forest and Shrub Province (Bailey 2014). Ecosystems in this domain are subject to seasonal fluctuations in precipitation and temperature. Other climate variables typical of this domain include high levels of humidity, mild winters, and ample rainfall between November and April (Bailey 2014).

Plant community or vegetation descriptions that follow are based on observations made during surveys conducted by Santa Barbara Museum of Natural History (SBMNH) (2000), Correlli (1993), and Aarcher Inc. (2015). Communities are classified according to broad categories used by Holland (1986), Holland and Keil (1995), and Aarcher Inc. (2015).

### *2.3.2 Vegetation*

This section describes historic and current vegetative cover at Pillar Point AFS.

#### 2.3.2.1 Historic Vegetation Cover

The predominant vegetation on the Pillar Point peninsula at the time of European colonization was likely a mixture of coastal scrub and coastal terrace prairie. These plant communities are uncommon south of the Bay area, where they persist in disjunctive patches along the coast in areas with cool, moist climates (Holland and Keil 1995). Although the climate and shale-derived soils are suitable for closed-cone pines on protected slopes (Axelrod 1983), trees had apparently disappeared prior to historic times. Fires set by Indigenous peoples along the coast to facilitate hunting may have been a factor in the disappearance of pine and cypress stands. Periodic fires would have maintained open areas dominated by perennial grasses, such as coastal terrace prairie (Holland and Keil 1995).

Prior to World War II, the Pillar Point area was used for farming and grazing (SAIC 1994). While many native species survive grazing, plowing eliminates perennial grasses and bulbiferous herbs. Seedlings of perennial grasses are slower to establish than the introduced annual species that accompanied the spread of agriculture (Crampton 1974). Recolonization of abandoned agricultural areas by native perennial vegetation is unlikely with continued disturbance. A 1962 aerial photograph (Naval Missile Facility Point Arguello 1962), taken about the time that the Minuteman missile program was activated, shows extensive areas of bare soil or sparse vegetation and numerous roads on both headland and peninsula (SAIC 1994).

General descriptions of the plant communities of the Santa Cruz Mountains are included in Thomas (1961). Pillar Point is mentioned among examples of coastal strand vegetation. In a discussion of the biogeographic relationships of the flora of the Santa Cruz Mountains, the author includes lists of taxa that reach their southern or northern distributional limits in the region (Thomas 1961). Most of these are wide-ranging taxa, and are not considered special status species. Many are associated with coastal plant communities, which,

like coastal terrace prairie, are approaching their southern limits. From Montara to Pescadero along the coast and up the coastal side of the mountains, 10 species reach their southern limits. Only two species reach their northern limit in the Half Moon Bay/Pescadero area. Species on Pillar Point AFS that appear on Thomas's (1961) lists of plants reaching their distributional limits in the Santa Cruz Mountains include leather fern (*Polypodium scouleri)*, crinkle-awn fescue (*Festuca subuliflora)*, a rye grass, California nettle, and coast angelica (*Angelica hendersonii*).

#### 2.3.2.2 Current Vegetation Cover

California's coastal prairies are the most biologically diverse grasslands in North America. Most of these unique plants are annual and perennial forbs (non-woody broadleaf plants, including wildflowers). In fact, native wildflower species far outnumber grass species in coastal prairie grasslands (Immel et al. 2020).

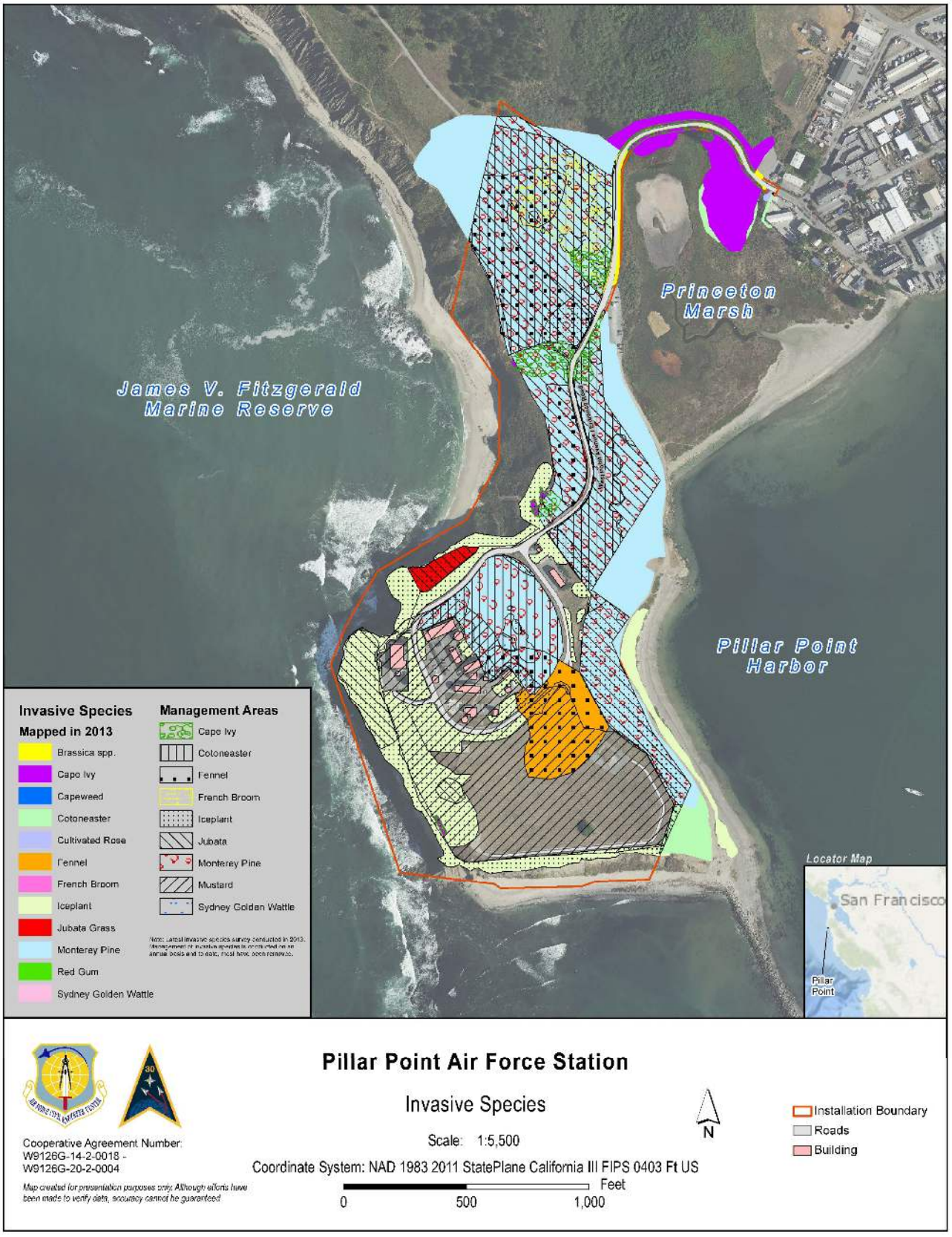
Correlli (1993) first described and mapped the vegetation outside the Pillar Point AFS cantonment perimeter based on three plant communities (coastal terrace prairie, coastal scrub, and coastal swale) described in Schuford and Timossi (1989). A plant species list was compiled for each of the communities during site visits from April to August. No rare, federally threatened, or endangered plant species were found. Non-native invasive plant species were documented primarily within the coastal terrace prairie.

Several maintenance and repair projects at Pillar Point AFS in the 1990s required vegetation surveys of small areas on the Station (SAIC 1994, Tetra Tech 1999b). In May 1999, surveys were also completed in association with the preparation of the 2000 INRMP for Pillar Point AFS (SBMNH 2000). Aarcher Inc. (2015) conducted updated vegetation surveys in 2015 and used the U.S. National Vegetation Classification System (USNVC) to group plant communities found. The associated communities from Correlli (1993) and SBMNH (2000) are listed within the updated USNVC communities described below, and the latter are shown in Figure 2-5.

Perennial shrubs and grasses dominate the slopes of the peninsula, particularly on the seaward side. Native species dominate the terrace east of the entrance gate and outside the fence line along the upper section of the coastal bluffs. Within the cantonment area, native perennial vegetation is restricted to the northerly slopes.

Non-native species are more common along unauthorized erosional trails and roads where disturbance is more frequent, although both annual and perennial non-native plants are scattered in coastal scrub and coastal terrace prairie. Non-native annual species dominate the grassland on the south slope of the coastal terrace from the cantonment fence line along the bluffs to Loop Road.

Invasive species, primarily pampas grass (*Cortaderia selloana*) and iceplant (*Carpobrotus edulis)*, occur both within and outside the cantonment area. Pampas grass clumps are scattered on the peninsula (Figure 2-4). Iceplant has expanded from the landscaped areas within the cantonment area, where it was presumably introduced for erosion control.




871

872 Figure 2-4. Known locations of invasive species at Pillar Point AFS.

Bare soil is generally confined to the steep, middle, and low elevation areas on the cliffs above the ocean, and to recent landslides.

Relatively few studies provide data on the biological resources of Pillar Point AFS, and a survey is needed to fully inventory all biological resources. The Nature Conservancy (1993) conducted the first Station-wide surveys of biological resources in the early 1990s. Their report consisted of a series of individually authored chapters providing inventories of vegetation and rare plants (Correlli 1993) and animals (Serpa 1993, Larsen and McGinnis 1993, San Francisco Bay Bird Observatory 1993, Burton 1993; discussed in section 2.3.3). Additional information on plants and animals seen on Pillar Point AFS is found in project-specific EIAP documentation (SAIC 1994; Tetra Tech 1999a, 1999b). Although no surveys have specifically focused on special status species and their habitats on the Station, the above listed reports include information about these species. Table 14-1 (within Appendix B) provides a list of plant species known or expected to occur on Pillar Point AFS or in its immediate vicinity.

Approximately 160 species of plants belonging to 44 families have been documented at Pillar Point, with approximately 55 percent being native to the area. The following descriptions of the flora and fauna on Pillar Point AFS are taken from Correlli 1993, The Nature Conservancy 1993, SAIC 1994, SBMNH 2000, and Tetra Tech 1999a and 1999b. A map of plant community distribution on the Station is provided in Figure 2-5.

*California Ruderal Forest Group*

This group is dominated by tree species that are non-native to San Mateo County, including Monterey cypress (*Hesperocyparis macrocarpa*), Monterey pine (*Pinus radiata*), and blue gum (*Eucalyptus globulus*). These species were originally planted as windbreaks and landscaping and have since become naturalized on uplands. Understories are depauperate due to the release of allelopathic chemicals by these species, reducing the establishment of other plants (Aarcher Inc. 2015). Previously defined vegetation communities do not correspond to this group.

*California North Coastal and Mesic Scrub Group*

This shrub-dominated vegetation grouping is informally known as “coastal scrub”, which was previously used by Correlli (1993) and SBMNH (2000).Coastal scrub is best developed along the northern California coastline, and extends into Oregon (Heady et al. 1997). In California, particularly toward the southern end of its range on the central coast, it occurs discontinuously in the coolest and most mesic climates along the immediate coast, often near areas of cold-water upwelling. The CDFW considers this plant community rare (California Department of Fish and Game [CDFG] 2003).

Soft-leaved evergreen shrubs, forming dense cover from three to six feet tall, dominate coastal scrub. Herbaceous and woody subshrubs are generally present in the understory (Holland and Keil 1995). This community is best developed in undisturbed areas on the coastal bluffs that surround Pillar Point AFS, where it appears to stabilize the steep west-facing slopes of the peninsula, and occurs in patches elsewhere on the Station (Figure 2-5). Typical dominant species at the Station include coyote brush (*Baccharis pilularis* ssp. *consanguinea*), poison-oak (*Toxicodendron diversilobum*), lizard tail (*Eriophyllum staechadifolium*), California sagebrush (*Artemisia californica*), coffeeberry (*Frangula californica* ssp. *californica*), and sticky monkey flower (*Mimulus aurantiacus*). Herbaceous species include coast angelica, California figwort (*Scrophularia californica*), California cudweed (*Pseudognaphalium californicum*), Pacific blackberry (*Rubus ursinus*), and the non-native scarlet pimpernel (*Anagallis arvensis*) (Aarcher et al. 2015).

In the cantonment vicinity, iceplant is a common invader. On the top of the coastal terrace and peninsula, periodic mowing appears to repress this vegetation in favor of coastal terrace prairie or introduced species. Areas along roads and trails contain a significant component of introduced annuals from the non-native grassland and ruderal communities. Clumps of pampas grass and potentially invasive shrubs are scattered

in this vegetation but invasive plant control efforts have successfully reduced pampas grass and continue to address French broom (*Genista monspessulana)*, fennel (*Foeniculum vulgare)*, and cotoneaster (*Cotoneaster* spp.). However, Cape ivy (*Delairea odorata)* and Bermuda buttercup (*Oxalis pes-caprae)* infestations may be expanding and treatment protocols for these species need to be developed.

*Southern Vancouverian Shrub and Herbaceous Bald, Bluff and Prairie Group*

This vegetation grouping is often known as "coastal prairie" or "coastal terrace prairies", as used in Correlli (1993) and SBMNH (2000). This group occurs on gentle to moderately sloping terrain at the upper elevations of the Pillar Point peninsula. Dominant species include native perennial grasses, such as California oatgrass (*Danthonia californica*), California hairgrass (*Deschampsia caespitosa* ssp. *holciformis*), purple needlegrass (*Stipa pulchra*), beach strawberry (*Fragaria chiloensis*), as well as the mat-forming shrub prostrate coyote brush (*Baccharis pilularis* ssp. *pilularis*) (Aarcher Inc. 2015). The low-statured vegetation generally forms a mosaic with northern coastal scrub and has a similar distribution (Holland and Keil 1995). It is considered a rare community by the CDFW (2003).

On Pillar Point AFS, coastal terrace prairie is best developed on north-facing slopes behind the main facilities and on the peninsula south and east of West Point Avenue (Correlli 1993, Aarcher Inc. 2015) (Figure 2-5). It is patchily distributed along the top and east-facing slopes of the peninsula.

*Pacific Coastal Cliff and Bluff Vegetation Macrogroup (not recognized by USNVC)*

This vegetation group occurs on eroding bluffs; vegetation is sparse on large, steeper sections and denser near the bluff base where sediments have accumulated and provided for soil development. Species richness is low and usually consists of non-native species, such as ripgut brome (*Bromus diandrus*), soft chess (*Bromus hordeaceus*), scarlet pimpernel, summer mustard (*Hirschfeldia incana*), Indian melilot (*Melilotus indicus*), red brome (*Bromus madritensis* ssp. *rubens*), and prickly sow thistle (*Sonchus asper*). Native species generally have cover less than five percent and include Seaside wooly sunflower (*Eriophyllum staechadifolium*), *Grindelia stricta* ssp. *platyphylla* (no common name), maritime brome, coastal buckwheat (*Eriogonum latifolium*), and cotton-batting plant (*Pseudognaphalium stramineum*) (Aarcher Inc. 2015).

*California Coastal beach and Dune Scrub Group*

This vegetation group occurs on low sand dunes above the high tide of the Pacific Ocean and at Pillar Point Harbor. This group is sparse to moderately dense perennial herbaceous species which tend to be short-lived. Dominant species include beach bur (*Ambrosia chamissonis*), yellow sand verbena (*Abronia latifolia*), and iceplant (*Carpobrotus* spp.) (Aarcher Inc. 2015).

*North Pacific Maritime Coastal Ruderal Shrub and Grass Dune Group*

This vegetation group occurs on low sand dunes and upper beaches above the high tide mark of the Pacific Ocean and at Pillar Point Harbor. Vegetation is sparse to very dense herbaceous species, dominated by non-native species, including iceplant, annual grasses and European sea rocket (*Cakile maritima*) (Aarcher Inc. 2015).

*Vancouverian Freshwater Coastal Marsh and Meadow Group*

This vegetation group was known as "coastal swale" in SBMNH (2000) and occurs in low, moist areas around swales and beds of ephemeral streams. Surface water is brief and this group is dominated by moderately hydrophytic species, including gray rush (*Juncus patens*), soft rush (*Juncus effusus* ssp. *pacificus*), Idaho bittercress (*Cardamine oligosperma*), and the non-native bristly ox-tongue (*Helminthotheca echioides*) and prickly sow thistle.

*North American Warm Desert Riparian Low Bosque and Shrubland Group*

This vegetation group was known as "willow scrub" in SBMNH (2000) and occurs along seasonally active streams and frequently along the upper limits of salt or brackish marshes. The dominant species is arroyo willow (*Salix lasiolepis*) and understory species include poison-oak, Pacific blackberry (*Rubus ursinus*), California figwort (*Scrophularia californica*), and the non-native Cape ivy, and field mustard (*Brassica rapa*) (Aarcher Inc. 2015).

*Temperate Pacific Tidal Salt and Brackish Marsh Group*

This vegetation group was previously called "freshwater marsh" by SBMNH (2000), but occurs in brackish to euryhaline tidal marshes (Princeton Marsh) and small freshwater seepages, subject to ocean salt water spray. Vegetation species vary from site to site depending on the water regime (e.g., permanently vs. seasonally saturated or flooded) and salt concentration. Unlike most other plant communities in the Mediterranean climate zone, freshwater marsh species are most active during the late spring and summer months (Holland and Keil 1995). Dominant plant species include California bulrush (*Schoenoplectus californicus*), broad-leaved cattail (*Typha latifolia*), brassbuttons (*Cotula coronopifolia*), salt grass (*Distichlis spicata*), fat hen (*Atriplex prostrata*), rabbitfoot grass (*Polypogon monspeliensis*), alkali heath (*Frankenia salina*), marsh jaumea (*Jaumea carnosa*), Pacific silverweed (*Potentilla anserina* ssp. *pacifica*), pickleweed (*Salicornia pacifica*), and salt rush (*Juncus lescurii*) (Aarcher Inc. 2015)

An expanse of freshwater marsh vegetation with bulrush and cattail colonies extends upstream of West Point Avenue and in Princeton Marsh, and for a short distance on the downstream side adjacent to the road, although little of this vegetation is actually within the boundary of the Station (Figure 2-5). These areas may become brackish in late summer, or earlier in years with low rainfall.

*California Ruderal Grassland and Forb Meadow Group*

This herbaceous vegetation occurs in areas with recent soil disturbance, particularly roadsides, former construction areas, and the bases of coastal bluffs. This vegetation group is typically non-native, annual, biennial, or short-lived perennial species. Dominant species include ripgut brome, soft chess, slender wild oat (*Avena barbata*), brome fescue (*Festuca bromoides*), bristly ox-tongue, field mustard, burclover (*Medicago polymorpha*) and Bermuda buttercup. Native species of this group include yarrow (*Achillea millefolium*) and maritime brome (*Bromus maritimus*) (Aarcher Inc. 2015).

This group occurs within a large section of the cantonment at Pillar Point AFS, primarily south of Southern Loop Road and extending upslope on the east side, non-native grassland has replaced native vegetation (Figure 2-5). Non-native grassland also occurs in the area surrounding the Bore Sight Tower on the peninsula, where it has spread along and around trails. This community is also scattered within the coastal terrace prairie on the peninsula.


Figure 2-5. Plant communities of Pillar Point AFS.

#### 2.3.2.3 Future Vegetation Cover

Climate change impacts to grasslands and pasture bioregions at Pillar Point AFS include increased seasonal, annual, minimum, and maximum temperatures; and changing precipitation patterns. Because these ecosystems are relatively dry with a strong seasonal climate, they are sensitive to climatic changes and vulnerable to shifts in climatic regime. Rising temperatures under various climate change scenarios will likely enhance soil decomposition which may reduce plant productivity over large areas.

Slight changes in temperature and precipitation can substantially alter the composition, distribution, and abundance of species, as well as the products and services they provide. The extent of these changes will also depend on changes in frequency and intensity of precipitation and fire. Increased drought frequency could also cause major changes in vegetation cover. As warmer temperatures increase evaporation and water use by plants, soils are likely to continue to become drier. Losses of vegetative cover coupled with increases in precipitation intensity and climate-induced reductions in soil aggregate stability will dramatically increase potential erosion rates.

California's coastal prairies are vulnerable to changes to hydrologic and temperature regimes. Higher diversity prairies, such as the ones found on the Station, are thought to be linked to moister and wetter conditions directly influenced by coastal and marine influence (Barbour and Keeler-Wolf 2007). These changes could alter the structure of the coastal grasslands and prairies at Pillar Point AFS, potentially reducing the diversity of flora, and fauna, species. Declines in coastal fog (Johnstone and Dawson 2010) may alter hydrologic input to these communities and change vegetative composition. A projected warmer and wetter climate may facilitate the establishment and spread of invasive species and non-desirable native species in these prairies.

Coastal shrublands, such as those present on the Station, have been found to have low sensitivity to climate-driven changes in disturbance regimes and non-climate stressors. This is primarily due to the positive influence of projected increases in fire within this habitat type, which has a stronger influence on the habitat than weaker negative climatic stressors (EcoAdapt 2021). However, increased precipitation, severity of coastal storms, and rising seas levels will cause more pronounced erosional effects on the coast, and may calve sections of shrublands or coastal prairie into the ocean (Cayan et al. 2008, Environmental Protection Agency 2021).

Average rainfall is likely to increase at Pillar Point AFS during winter, spring, and summer. Slight changes in temperature and precipitation, including the total amount, intensity, and frequency of rainfall, can have substantial effects on the composition, distribution, and abundance of plant species, as well as the products and services that they provide. The extent of overall change in vegetation communities also depends on changes in the frequency and intensity of drought and fire. Reduced vegetative cover, coupled with increasing rainfall intensity and the associated decline in soil stability, would result in dramatically greater rates of erosion.

#### 2.3.2.4 Turf and Landscaped Areas

Landscaped areas consist of nursery stock trees and shrubs, and ground cover with low flammability. A few trees (Monterey pine and Monterey cypress) and shrubs are present among the buildings and pads. Iceplant and sea fig (*Carpobrotus chilensis)* historically formed the herbaceous layer in landscaping among the building pads and along the roads. These non-native species were removed as part of restoration efforts to convert landscaping areas to native species in 2017 (ManTech SRS Technologies, Inc. 2017). These native landscape areas have successfully established and maintenance is no longer required, except for periodic invasive species control. A large portion of the cantonment is maintained by mowing and is dominated by grasses and forbs. Monterey pines and Monterey cypresses are scattered in the cantonment and on the peninsula. Four planted groves of Monterey cypress occur within the Station: one on the steeper

north slope within the cantonment area, one on the coastal bluffs above Princeton Marsh, and two adjacent to Princeton Marsh along West Point Avenue.

### *2.3.3 Fish and Wildlife*

The Nature Conservancy (1993) biological resource survey report includes captures on the following fish and wildlife taxons: invertebrates (Serpa 1993), reptiles and amphibians (Larsen and McGinnis 1993), birds (San Francisco Bay Bird Observatory 1993), and land mammals (Burton 1993). Table 14-2 (within Appendix B) provides a list of wildlife known or expected to occur in the same area, including five species of amphibians, 14 species of reptiles, 94 species of birds, and 33 species of mammals. More thorough surveys need to be completed at Pillar Point AFS to confirm the plant and wildlife species presently occurring at the Station.

*Coastal Scrub*

Many native wildlife species occur within coastal scrub. Although not documented on Pillar Point AFS, two special status wildlife species that may occur in this habitat include the San Francisco garter snake (*Thamnophis sirtalis tetrataenia)* and the San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens)*.

*Coastal Terrace Prairie*

This plant community supports a subset of wildlife species that inhabit coastal scrub. The open nature of the community makes it ideal foraging habitat for a variety of medium- and large-sized mammals, several species of avian predators, and a number of avian insectivores. No special status wildlife species are expected in this habitat at Pillar Point AFS.

*Coastal Swale*

Several wildlife species frequent this habitat due in part to its more mesic character. Special status wildlife species that may use this habitat include the San Francisco garter snake, the San Francisco dusky-footed woodrat, and the San Francisco common yellowthroat (*Geothlypis trichas sinuosa)*. Common yellowthroats, believed to be the special status San Francisco common yellowthroat, were observed in coastal swale during field surveys conducted in 1999 (SBMNH 2000).

*Willow Scrub*

Willow scrub at Pillar Point AFS is an important wildlife habitat, supporting a high diversity of wildlife. The federally threatened California red-legged frog (*Rana draytonii*) (CRLF) is expected to occur in this plant community at Pillar Point AFS. Other special status wildlife species that may occur in this plant community include San Francisco garter snake, San Francisco dusky-footed woodrat, and San Francisco common yellowthroat. During the 1999 field surveys (SBMNH 2000), common yellowthroats believed to be the special status San Francisco common yellowthroat, were observed in willow scrub at Pillar Point AFS.

*Freshwater Marsh*

Several wildlife species use freshwater marsh habitat for breeding, feeding, and cover. CRLF, San Francisco garter snake and San Francisco common yellowthroat are the only special status wildlife species that may frequent this habitat in or near Pillar Point AFS. During the 1999 field surveys (SBMNH 2000) CRLF and common yellowthroats, believed to be the special status San Francisco common yellowthroat, were observed in or near freshwater marsh adjacent to Pillar Point AFS, where small breeding populations of both species occur. It is unknown to what extent these two species use adjacent upland habitats at Pillar Point AFS. The small patch of freshwater marsh vegetation adjacent to the access road to the Bore Sight Tower is not suitable to support a breeding population of CRLF.

*Non-native Grassland*

Several reptiles, birds, and mammals occur in non-native grasslands at the Station. No special status wildlife species occur or are expected in this plant community at Pillar Point AFS.

*Sandy Beaches, Coastal Bluffs, Rocky Intertidal, Rocky Headlands, and Nearshore Waters*

Sandy beaches, coastal bluffs, rocky headlands, rocky intertidal areas, and nearshore waters that surround Pillar Point AFS provide foraging and roosting habitat for birds and marine mammals. A variety of shorebirds, gulls, and terns have been observed roosting and/or feeding on the sandy beaches, exposed rocky shorelines, and nearshore waters.

Seabird nesting and roosting sites and marine mammal haul-outs are the most sensitive wildlife resources found in these marine and nearshore habitats surrounding Pillar Point AFS. Off the Station, a small harbor seal (*Phoca vitulina)* haul-out is located on the flat rocky shelf immediately southwest of the Station. Cormorants, gulls, and occasionally California sea lions (*Zalophus californianus)* also use Sail Rock located to the south as a roost site and a protected haul-out respectively. Double-crested (*Phalacrocorax auritus)* and pelagic cormorants (*Phalacrocorax pelagicus)*, along with several species of gulls and Caspian terns (*Sterna caspia)*, were observed roosting on this rock during the 1999 field surveys (SBMNH 2000). A small number of harbor seals were also seen hauled out on the flat rocky shelf adjacent to Sail Rock.

In 1979, a small number of pelagic cormorants and pigeon guillemots (*Cepphus columba)* reportedly nested on the west-facing cliff of Pillar Point (Sowls et al. 1980). Breeding-season surveys between 1989 and 1991 located five pelagic cormorants and two pigeon guillemots nesting at Pillar Point (Carter et al. 1992). Bluff retreat that occurred during the winter of 1997–1998 destroyed these cliff-face nesting sites. Neither species was found to be nesting or roosting on any of the coastal bluffs or cliffs on the Station during the 1999 field surveys (SBMNH 2000). Other special status wildlife known or expected to frequent marine and nearshore habitats in the vicinity of Pillar Point AFS include osprey (*Pandion haliaetus)*, elegant tern (*Sterna elegans)*, southern sea otter (*Enhydra lutris nereis)*, and Steller sea lion (*Eumetopias jubatus)*.

The ocean water surrounding the Pillar Point AFS is an area identified as essential fish habitat (EFH) for various life stages of fish species managed with Fishery Management Plans under the Magnuson Stevens Fishery Conservation and Management Act (MSA). See section 7.13 for additional discussion.

#### 2.3.3.1 Climate Impacts on Fish and Wildlife

Fish and wildlife species that inhabit freshwater marshes and riparian habitat at Pillar Point AFS are potentially at risk from changing temperatures and precipitation. These wetlands exist only when streams are flowing, and they become increasingly brackish towards the end of summer when freshwater input diminishes. Increase temperatures and relatively constant projected precipitation during the summer may portend a future with less freshwater in the marshes and earlier onset of brackish conditions. As sea level rises, saltwater invades the water table and the distribution of freshwater will be limited to higher elevations. Birds and mammals may be somewhat affected by this, while amphibians and some fish species may be completely displaced. Amphibians and fish currently inhabiting coastal marshes and other wetlands will not be able to tolerate saltwater encroachment, effectively resulting in habitat loss for these species.

Increasing temperatures are not likely to have direct effects on generalist fish and wildlife species at Pillar Point AFS; however, they could have direct effects on more sensitive species that require specific temperature ranges for reproduction or other stages in their lifecycles. Indirect effects of warmer (earlier) spring temperatures also could include earlier insect emergence, which in turn could decouple spring arrivals of migratory birds from crucial food resources needed to complete migration or breeding cycles at Pillar Point AFS (Both et al. 2010).

Increases in temperature and precipitation also have the potential to alter vegetation at Pillar Point AFS, negatively impacting specialist species of wildlife that depend on specific native plant species (Dukes and Mooney 1999). The loss of native animals could, in turn, create new niches easily filled by invasive wildlife species, as newly arriving invasive species are often able to outcompete native species experiencing reduced fitness due to shifting environmental conditions (Hellmann et al. 2008).

### *2.3.4 Threatened and Endangered Species and Species of Concern*

Federal and state threatened and endangered wildlife species known or expected to occur on Pillar Point AFS or in its immediate vicinity are listed in Table 14-3 (within Appendix B). Although the federal Endangered Species Act (ESA) does not protect species listed as threatened or endangered at the state level, AFMAN 32-7003 directs Air Force installations to provide similar protections to state-listed species where practicable, and where such protection is not in direct conflict with the military mission.

Until the 1999 field surveys (SBMNH 2000), no federally threatened or endangered species had been documented on Pillar Point AFS. Rather, several species were listed as expected to occur or as having been observed in habitats found adjacent to Pillar Point AFS, such as Princeton Marsh or the nearshore waters or rocky headlands adjacent to the Station. The California Natural Diversity Database ([CNDDB] 2022) contains records of listed and special status plant and animal species from the Montara Mountain and Half Moon Bay U.S. Geological Survey (USGS) 7.5-minute quadrangles, encompassing the coastline five miles north and south of Pillar Point. However, none of the records in the CNDDB database are from within the borders of Pillar Point AFS.

*Plants*

No federal- or state-listed plant species were found during previous surveys of Pillar Point (Correlli 1993, SAIC 1994, SBMNH 2000, Tetra Tech 1999b, Aarcher Inc. 2015). There are no occurrences for listed plants recorded by the CNDDB (1994), nor in the regional flora (Thomas 1961). One CA Rare Plant Rank species—Rose leptosiphon (*Leptosiphon rosaceus)*, CA Rare Plant Rank 1B.1—was confirmed during plant surveys in 2015 (Aarcher Inc. 2015; see Figure 2-6). Aarcher Inc. (2015) estimated the population of rose leptosiphon at Pillar Point AFS at over 4,500 individual plants, among the largest known populations of this species globally. Threats to this species include competition with invasive species (particularly iceplant and Cape ivy), and trampling through unauthorized pedestrian access.

*Wildlife*

Federally and state threatened and endangered wildlife species known or expected to occur on Pillar Point AFS or in its immediate vicinity are listed in Table 14-3 (within Appendix B) and described below. Observations of all federal and state listed species shall be documented and incorporated into planning decisions. Observations by qualified individuals shall be reported to the CNDDB.

**California red-legged frog (*Rana draytonii*)**

The CRLF is the only federally threatened fauna species known to occur on Pillar Point AFS. The CRLF was listed as federally threatened under the ESA on 23 May 1996 (61 FR 25813). Critical habitat for this species was revised on 17 Mar 2010 (75 FR 12816) and no critical habitat units are present on Pillar Point AFS. A Recovery Plan for CRLF was published in May 2002.

The CRLF is the largest native frog in the western United States. It once ranged across much of California, including portions of the Sierra Nevada Mountain Range. The present distribution ranges from Sonoma and Butte Counties in the north to Riverside County in the south, where they are found in still or slow-moving waters of streams, ponds, lakes, and reservoirs. The CRLF require aquatic habitat for breeding but also use a variety of other habitat types, including riparian and upland areas. Adults often use dense, shrubby, or emergent vegetation closely associated with deep-water pools with fringes of cattails and dense stands of

overhanging vegetation such as willows. The decline of the CRLF is attributed to the spread of exotic predators such as bullfrogs, and widespread changes that have fragmented habitat, isolated populations, and degraded streams.

CRLF were observed in the vicinity of Pillar Point AFS in scour pools downstream of culverts under West Point Avenue at Princeton Marsh during May 1999 field surveys (SBMNH 2000). This was the last known sighting of CRLF at Pillar Point AFS (USFWS 2020). Potential breeding habitat for this species does not occur within Station boundaries. Water depth in the drainage swale parallel to the Bore Sight Tower access road is insufficient to support breeding of this species, even during a year with high rainfall. The potential exists for CRLF to occur on West Point Avenue during the wet season and become exposed to vehicular traffic.

Key threats to CRLF on Pillar Point AFS include:

1. Habitat degradation: Wetland degradation from herbicide spraying of road shoulders along the segment of West Point Avenue that traverses wetlands associated with Princeton Marsh.
2. Human disturbance: Potential injury and mortality from vehicle traffic on West Point Avenue.

Suitable habitat for CRLF on Pillar Point AFS is protected from disturbances associated with human activities through measures implemented as part of natural resources management. Surveys should be completed periodically using USFWS-approved protocols (USFWS 2005) to provide continuous evaluation of its status on the Station.

**San Francisco garter snake (*Thamnophis sirtalis tetrataenia*)**

The San Francisco garter snake was listed as federally endangered under the ESA on 11 March 1967 (32 FR 4001) and as state endangered by the California Fish and Game Commission on 27 June 1971 (California Code of Regulations, Title 14, Section 670.5). Critical habitat for this species has not been designated. A Recovery Plan for San Francisco garter snake was published in September 1985.

These snakes are associated with permanent or temporary ponds, lakes, marshes, and sloughs and are often found at pond or stream edges, where they feed upon juvenile CRLF, Pacific treefrogs, juvenile California newts, juvenile western toads, threespine stickleback, and mosquito fish (Fox 1951, 1952; USFWS 1985; Larsen et al. 1991). Occasionally they may be found away from water in grassland habitats (USFWS 1985).

The San Francisco garter snake is known only from San Mateo County, California, and was not detected during the 1999 field surveys (SBMNH 2000). There is one pre-1976 confirmed sighting of this snake at Princeton Marsh (LSA 1986). Observations of this and other sensitive species by qualified individuals shall be reported to the CNDDB.

The USGS conducted targeted San Francisco garter snake surveys on Pillar Point AFS using drift fences and funnel traps in 2019, with no detections (Ersan et al. 2019). The nearest known extant populations of San Francisco garter snakes are at Mori Point (eight miles to the north) and Crystal Springs reservoir (seven miles to the east); both are separated from Pillar Point AFS by mountainous terrain, urban development, and major roads, reducing the chance of successful dispersal (Ersan et al. 2019).

**Southern sea otter (*Enhydra lutris nereis*)**

The southern sea otter was listed as federally threatened under the ESA on 14 January 1977 (42 FR 2965). Critical habitat for this species has not been designated. A Recovery Plan was published in February 2003.

Southern sea otters occur in nearshore marine environments of California from San Mateo County to Santa Barbara County. Optimal habitats include rocky substrates with ample interstices. Kelp beds provide cover from high surf and predators. Sea otters are opportunistic foragers known to eat mostly abalones, sea urchins, crabs, and clams. Other food items include snails, mussels, scallops, chitons, barnacles, squid,

octopuses, and starfish. They are often seen sleeping and diving for food in or near kelp beds, and play a key ecological role in kelp bed communities, particularly by controlling sea urchins that graze on kelp.

The southern sea otter was not observed during the 1999 field surveys (SBMNH 2000), but suitable habitat is present near the Station.

*State Listed Species*

One bird species, listed as threatened by the state of California and protected by the Migratory Bird Treaty Act (MBTA), is of interest to natural resource managers (NRM) at Pillar Point AFS and Vandenberg SFB. AFMAN 32-7003 directs Air Force installations to provide similar protections to species listed under the California Endangered Species Act of 1970 where practicable and where such protection is not in direct conflict with the military mission.

**Bank swallow (*Riparia riparia*)**

The bank swallow was listed as state threatened on June 11, 1989 (California Code of Regulations, Title 14, Section 670.5). Critical habitat for this species has not been designated. A Recovery Plan for bank swallows was published in 1992.

The bank swallow nests in colonies and builds nests in near-vertical earthen banks along streams, coastal bluffs, and sand and gravel pits (CDFG 2005). This species once bred throughout much of California in the lowlands (Grinnell and Miller 1944) and along the coast from Santa Barbara County to San Diego County. However, it has since completely disappeared as a breeding bird from southern California (J. Dunn, pers. comm. in Remsen 1978). Numbers elsewhere in the state have also been reduced. This migratory species is known to have nested historically on coastal bluffs in San Mateo County (Laymon et al. 1988). It is a rare summer resident along the San Mateo County coast, and an uncommon spring and fall migrant to the Pillar Point region.

The San Francisco Bay Bird Observatory (1993) observed this species at Pillar Point AFS on 8 May 1993, and suggested that the species was nesting on west-facing cliffs of Pillar Point. Nesting at the Station was never confirmed. A careful inspection of west-facing cliffs at Pillar Point during the 1999 field surveys (SBMNH 2000) found no evidence of nesting. Bank swallows are expected to occur as a migrant at Pillar Point from April through May and July through August.

*Other Species of Management Concern*

Several other species occur on Pillar Point AFS that are not listed as either threatened or endangered, but are otherwise protected by federal laws and regulations (e.g., MBTA and Executive Order (EO) 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*). Conservation measures implemented by the Air Force to protect bird species under the MBTA include surveys for active bird nests in buildings prior to construction or demolition, in trees prior to trimming or removal, and in locations where they may be at risk of destruction (e.g., parking areas) and where temporary exclosures can be erected. In addition, some wildlife species found on Pillar Point AFS are of state concern or species likely to become candidates for listing by USFWS in the near future. Consideration to protect viable populations can help preclude the need for listing under the ESA. For most species of concern, protection of habitat is the most important measure to ensure continued viability of the species. Reviews of Pillar Point AFS projects by Vandenberg SFB natural resources staff, and NEPA analysis where required, identify potential impacts to species of concern and their habitats, and identify measures where practicable that minimize or avoid impacts. Brief descriptions for these species are included below.

**Steller sea lion (*Eumetopias jubatus*)**

The Steller sea lion—previously referred to as 'northern sea lion'—was listed as federally threatened under the ESA on 4 December 1990 (55 FR 50005). Critical habitat for this species was designated on 27 August

1993 (58 FR 45269). A Recovery Plan was published in December 1992 and revised February 2008. The eastern population (whose range includes California) has stabilized and was delisted in 2013. They remain protected under the Marine Mammal Protection Act (MMPA).

Steller sea lions are found throughout the North Pacific Rim from Japan to central California, and their breeding range includes Año Nuevo Island in central California (Marine Mammal Center 2001). The current population of these sea lions is about 40,000, but it has declined by 80 percent in the last 30 years. About 500 of them live in California (Marine Mammal Center 2001). Steller sea lions eat a variety of fish, invertebrates, and occasionally other pinnipeds. They tend to remain offshore or haul out in unpopulated areas (Marine Mammal Center 2001).

The Steller sea lion was not observed during the 1999 field surveys (SBMNH 2000), but suitable habitat is present in the vicinity of the Station.

**San Francisco common yellowthroat (*Geothlypis trichas sinuosa*)**

The San Francisco common yellowthroat is a federal Bird of Conservation Concern (USFWS 2021) and a California Bird Species of Special Concern. It is a locally uncommon resident breeder of coastal salt marshes in the San Francisco Bay area, and along the Pacific coast from Tomales Bay, Marin County south through San Mateo County (Grinnell and Miller 1944). It frequents fresh and saltwater marshes, where it is commonly found in low tangles of plant growth near the marsh margins (Grinnell and Miller 1944). A critical aspect of habitat for this species is adequate cover for concealment while foraging along the edge of water or mud, such as thickets of young willows, cattails, tules, and sedges; and areas overgrown with blackberry vines, nettles, and dock.

The San Francisco Bay Bird Observatory (1993) reported that common yellowthroats were breeding at Pillar Point AFS in the riparian area adjacent to the Bore Sight Tower access road. In 1993, they recorded four birds, two of which were singing males. Field surveys by the SBMNH in 1999 also found common yellowthroats in weedy upland habitat between Princeton Marsh and the parking area for the coastal access trail, and in weedy vegetation adjacent to the riparian area where the species was reported to occur in 1993. Grinnell and Miller (1944) include the Pillar Point area within the geographic range of the salt marsh subspecies (*G. t. sinuosa*). Common yellowthroats that nest at Princeton Marsh and on Pillar Point AFS may be of this special status subspecies.

**Elegant tern (*Sterna elegans*)**

The elegant tern is a federal Bird of Conservation Concern (USFWS 2021) and a California Bird Species of Special Concern. Thousands of elegant terns from Mexico spend the summer and fall along the California coast, but there is only one breeding colony in the United States, which makes the species highly vulnerable to extirpation (CDFG 1978).

The elegant tern frequents nearshore waters, estuaries, bays, and harbors for foraging. In the Pillar Point AFS vicinity, it frequents breakwaters, exposed off-lying rocks, and sandy beaches for roosting. Twelve elegant terns were observed at Pillar Point AFS on 3 October 1993 (San Francisco Bay Bird Observatory 1993). They are expected to be an uncommon to rare visitor to Pillar Point AFS in the late summer and early fall, to forage in nearshore waters, and to roost on the beaches adjacent to Pillar Point AFS.

**Osprey (*Pandion haliaetus*)**

The osprey was previously a California Bird Species of Special Concern, however after population increases, they are now on the CDFW watch list. The osprey is a fish-eating specialist bird of prey that breeds in a variety of habitats with shallow water and large fish, including boreal forest ponds, desert salt-flat lagoons, temperate lakes, and tropical coasts. It winters along large bodies of water containing fish. Ospreys are expected to forage over open water habitats such as Princeton Marsh, Pillar Point Harbor, and

the nearshore waters that surround Pillar Point AFS. They are not expected to nest at or in the immediate vicinity of Pillar Point AFS but rather occur as an occasional fall or winter visitor. Ospreys were observed during the 1998 surveys conducted by Tetra Tech (1999).

**Cooper's Hawk (*Accipiter cooperii*)**

The Cooper's hawk was previously a California Bird Species of Special Concern, however after population increases, they are now on the CDFW watch list. Its summer range includes southern Canada southward to southern U.S. and into central Mexico, while it winters throughout the U.S. and Mexico (Cornell Lab of Ornithology 2007). This hawk breeds in deciduous, mixed, and coniferous forests, and is becoming more common in suburban and urban areas (Cornell Lab of Ornithology 2007). While once considered a common nester throughout California (Grinnell and Miller 1944), it has declined throughout California as a breeding bird (Remsen 1978). Cooper's hawks are expected as a winter visitor and were observed during the 1999 surveys (SBMNH 2000).

**San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*)**

The San Francisco dusky-footed woodrat, a California Mammal Species of Special Concern, is one of 11 subspecies that live in California and the arid West. Woodrats are medium-sized rodents that live in a variety of brushy and forested habitats, where they build mounded stick lodges from three to eight feet across at the base and as much as six feet tall (Santa Cruz Mountains Bioregional Council 2007). They tend to live in colonies of three to 15 or more lodges. A single adult occupies each house, and adult females share the nest with their litters for a few months until the young disperse to nearby nests. Woodrats are relatively common, but their complex social structure makes them particularly vulnerable to disturbance (Santa Cruz Mountains Bioregional Council 2007). Nest structures of this species were found in willow woodlands along the north side of Princeton Marsh adjacent to West Point Avenue, and woodrats may inhabit small patches of willow scrub found on the northern half of Pillar Point AFS (SBMNH 2000).

**Pollinators**

Pollinators are a conservation concern on all installations based on the Presidential Memorandum, "Creating a Federal Strategy to Promote the Health of Honeybees and Other Pollinators" (The White House 2014). This Memorandum calls on the DoD to, "consistent with law and the availability of appropriations, support habitat restoration projects for pollinators" and to, "direct military service installations to use, when possible, pollinator-friendly native landscaping and minimize use of pesticides harmful to pollinators through integrated vegetation and pest management practices." Among the many pollinators likely to occur on the installation, Pillar Point within the range of the Western bumble bee (*Bombus occidentalis*), which has been petitioned for listing under the ESA; the Monarch butterfly (*Danaus plexippus plexippus*), which is a candidate species under the ESA; and several pollinating Birds of Conservation Concern (USFWS 2017).


Figure 2-6. Threatened and Endangered Species locations at Pillar Point AFS*.

*Note: Based on current information in GeoBase; not all threatened and endangered species locations have been uploaded to GeoBase.

### *2.3.5 Wetlands and Floodplains*

Wetlands are ecologically important in that they provide food, spawning and nursery grounds, and habitat for many species. Economically, wetlands not only help absorb floodwater runoff, but also act as natural water treatment centers, filtering out nutrients and waterborne pollutants and protecting water quality (Miller 1994).

The USFWS, in cooperation with other agencies, developed a wetland definition for a national wetland inventory: Wetlands are transitional lands between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. They must have one or more of the following three attributes: (1) at least periodically, the land supports predominantly hydrophytes, (2) the substrate is predominantly undrained hydric soil, and (3) the substrate is nonsoil and is saturated with water or covered by shallow water at some time during the growing season of each year (Cowardin, et al. 1979).

Wetlands, as defined by the USACE and U.S. Environmental Protection Agency (EPA), include only areas that are vegetated under normal circumstances, whereas the USFWS definition encompasses both vegetated and non-vegetated areas (Federal Interagency Committee for Wetland Delineation 1989).

*Wetlands Mapping on the Station*

Aarcher Inc. (2015) conducted a detailed delineation of potential wetlands and surface waters at Pillar Point AFS and concluded that 0.07 acres of wetlands meet the USACE criteria of WOTUS of hydric soils, hydrophytic vegetation, and wetland hydrology (see Figure 2-7). Official jurisdictional determination by the USACE is recommended; however, prior to official determination, these wetlands should be treated as WOTUS when considering future project Clean Water Act (CWA) compliance requirements.

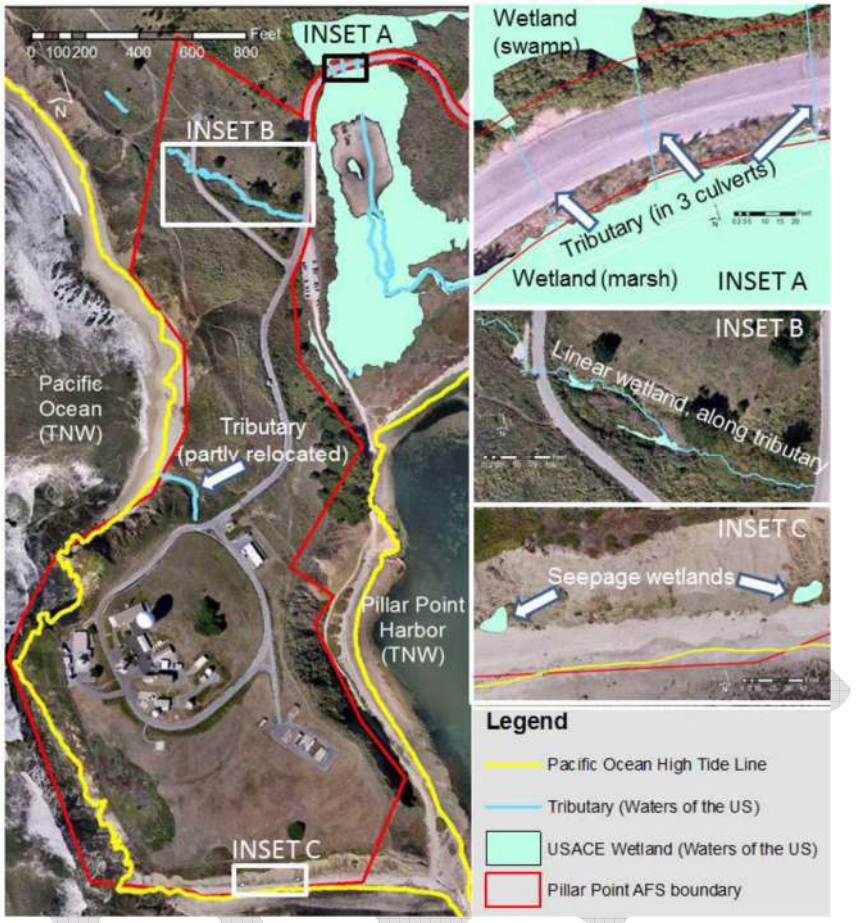



Figure 2-7. Wetlands that meet Waters of the United States criteria (Aarcher Inc 2015)*.

**Note: USACE has not provided a formal jurisdictional determination.*

Previous surveys (Correlli 1993, Aarcher Inc. 2015, SBNMH 2000) identified two broad categories of wetland types on Pillar Point AFS: willow scrub dominated by woody, deciduous vegetation and herbaceous associates, and coastal swale wetlands dominated by herbaceous vegetation. EFH designations apply to the nearby WOTUS of Denniston Creek, flows from Princeton March, Pillar Point Harbor (Half Moon Bay) and the Pacific Ocean, as detailed in section 7.13.

Princeton Marsh, a small coastal estuary adjacent to the Station, is the most significant wetland in the immediate vicinity. Other potential wetlands and surface waters have been identified through efforts to target areas that may need regulatory protection, some of which are associated with drainage infrastructure (Aarcher Inc. 2015). With the exception of an unnamed drainage swale at the north end of the Station that flows into Princeton Marsh, there are no well-developed streams or water impoundments present at Pillar Point AFS. No floodplains occur on Pillar Point AFS.

#### 2.3.5.1 Climate Impacts on Wetlands

Wetlands and marshes are generally resilient to natural hazards such as floods, drought, fire, and erosion. In the context of climate change, they can help to sustain habitat connectivity and provide links between aquatic and terrestrial ecosystems, and they can provide thermal refugia for wildlife. However, wetlands themselves are sensitive to changes in the hydrological regime, including changes in water levels. Climate projections for Pillar Point AFS indicate that minimum and maximum temperatures will increase over time, which could result in higher rates of evaporation and diminished input and quality of freshwater to

ephemeral swales, drainages, and nearby marshland (Erwin 2009). Rising sea levels, in addition to reduced freshwater in wetlands during the summer, will cause saltwater intrusion into the water table. These changes may stress drought-intolerant species and displace them if it becomes dry enough. These conditions may impact the size and resiliency of the wetlands.

### *2.3.6 Other Natural Resource Information*

Other natural resources on the installation include coastal resources, which are not included in the installation profile. Coastal resources and their management are discussed in section 7.13

## ***2.4 Mission and Natural Resources***

### *2.4.1 Natural Resource Constraints to Mission and Mission Planning*

Environmental constraints to future planning and missions at Pillar Point AFS result from a combination of legal factors (e.g., federal and state environmental laws and regulations) and physical factors (e.g., steep topography). These constraints influence the priority of management goals and objectives, as well as the need for other military departments to consult with 30 CES/CEI when planning projects in these areas. Environmental constraints are separated into major and minor constraints. Major constraints are likely to have significant impacts on planning as they include steep slopes, areas prone to landslides, and wetland locations. Minor constraints have a lower chance of significantly impacting planning, as regulated resources have the potential to occur, but may not actually be present in the area. Minor constraints include invasive species and potential protected species habitat.

The environmental constraints map (Figure 2-8) delineates areas on Pillar Point AFS where such constraints may factor into planning. Incorporation of natural resources concerns in these areas early in the planning process is important to avoid conflicts that could impact mission accomplishment. This map should be updated to incorporate results of new surveys for special status species and their habitats on the Station.

### *2.4.2 Land Use*

Land on Pillar Point AFS can be subdivided into three categories: improved, semi-improved, and unimproved. Improved lands include areas altered by development (buildings, roads, concrete drainage ditches, parking areas). Semi-improved lands include areas where natural vegetation has been altered around buildings and parking areas, or where artificial fill has been placed outside of developed areas. Unimproved lands include areas of native and non-native vegetation undisturbed by development.

Nearly all of the improved lands are within a fence line on the southern half of the Station. The only facilities or improvements on the northern half of the Station are West Point Avenue, a paved access road that leads to the Bore Sight Tower (Figure 2-1) and a small equipment building adjacent to the tower. Improved lands at the Station cover approximately 8.3 acres of land, while semi-improved lands cover approximately 1.3 acres, and unimproved lands cover the remaining 45 acres (SBMNH 2000). Total acreage for the Station is 55 acres.

### *2.4.3 Current Major Mission Impacts on Natural Resources*

Pillar Point AFS is a tracking station that supports polar-orbiting space satellite and operational intercontinental ballistic missile launches from Vandenberg SFB. The operations at Pillar Point AFS include radar tracking, telemetry reception, command control, and communication services in support of these polar launch operations. The current mission at Pillar Point AFS is relatively passive and is inherently compatible with natural resources protection.

Because the current operations do not result in adverse effects to species listed under the ESA or protected under the MMPA, and critical habitat for listed species is not designated on the Station, regulatory consultations with the USFWS and NMFS and associated Biological Opinions have not been necessary.

No current major impacts on the Station's natural resources are known; however, site-specific surveys will be conducted as part of future project planning prior to activities that include ground disturbance or other potential impacts to natural resources.

### *2.4.4 Potential Future Mission Impacts on Natural Resources*

As technology changes, updates to the facilities and infrastructure at Pillar Point AFS could be necessary. Antennas are updated as new technologies and requirements emerge, and as current equipment becomes obsolete. Also, if the mission of the Station is expanded, additional construction could be necessary.

*Construction*

The potential effects of new construction at Pillar Point AFS are assessed prior to facility construction in environmental documentation required under the EIAP for compliance with NEPA. Vandenberg SFB EIAP procedures ensure natural resources managers and environmental planners review projects and approve appropriate mitigation measures prior to facility construction.

*Infrastructure Maintenance and Improvements*

Infrastructure maintenance and improvement projects such as installation and maintenance of culverts, utilities, and water lines, can impact threatened and endangered species and disturb habitat, including EFH. Impacts to natural resources can be avoided in most of these instances through AF Form 813, Request for Environmental Analysis, AF Form 332, Base Civil Engineer Work Request, and the EIAP. To lessen impacts, utilities and water lines should be placed within existing disturbed areas (e.g., road shoulders) as much as possible. Close coordination between 30 CES and biologists will help ensure that culvert and drainage construction and maintenance do not adversely impact threatened and endangered species.


Figure 2-8. Environmental constraints at Pillar Point AFS.

#### 2.4.4.1 Climate Impacts on Mission and Mission Planning

Pillar Point AFS's primary mission is to support and track space and land-based operations. Mission operations are reliant on mission critical infrastructure. Climate change may directly or indirectly affect the mission via mission-critical infrastructure and natural resources. See Section 7.16 for a more detailed discussion of climate change vulnerabilities to the mission and operations.

# 3.0 ENVIRONMENTAL MANAGEMENT SYSTEM

The USAF environmental program adheres to the Environmental Management System (EMS) framework and its Plan, Do, Check, Act cycle for ensuring mission success. EO 13834, *Efficient Federal Operations*; DoDI 4715.17, *Environmental Management Systems*; AFI 32-7001, *Environmental Management*; and International Organization for Standardization (ISO) 14001 standard, *Environmental Management Systems—Requirements with guidance for use*, provide guidance on how environmental programs should be established, implemented, and maintained under the EMS framework.

The natural resources program employs EMS-based processes to achieve compliance with all legal obligations and current policy drivers, effectively manage associated risks, and instill a culture of continual improvement. The INRMP serves as an administrative operational control that defines compliance-related activities and processes.

# 4.0 GENERAL ROLES AND RESPONSIBILITIES

General roles and responsibilities necessary to implement and support the natural resources program are listed in the table below. Specific natural resources management-related roles and responsibilities are described in appropriate sections of this plan.

| Office/Organization/Job Title (Listing is not in order of hierarchical responsibility) | Installation Role/Responsibility Description |
|---|---|
| Space Launch Delta 30 Installation Commander (SLD 30/CC) | Responsible for the daily operation and mission accomplishment of Pillar Point AFS. SLD 30/CC has authority to approve the INRMP, ensure funding and staffing for INRMP, and control access to and use of installation and facility natural resources |
| Environmental, Safety, and Occupational Health Council (ESOHC) | Responsible for implementing and maintaining the Pillar Point AFS Environmental Management System (EMS). Reviews policy, resource requirements, EMS performance, and general environmental compliance on the Station. Biannually informs senior leadership on the successes and challenges of the above programs. |
| 30th Civil Engineer Squadron/Installation Management Flight/Environmental Assets (30 CES/CEIEA) | Responsible for conservation and management of threatened and endangered species, fish and wildlife, research, pest and land management, and certain outdoor recreation activities. In addition, 30 CES/CEIEA coordinates project planning and implementation with other organizations and reviews project plans and Environmental Impact Analysis Process documentation to ensure compliance with applicable natural resources regulations |

# 5.0 TRAINING

USAF installation NRMs/POCs and other natural resources support personnel require specific education, training, and work experience to adequately perform their jobs. Section 107 of the Sikes Act requires that professionally trained personnel perform the tasks necessary to update and carry out certain actions required within this INRMP. Specific training and certification may be necessary to maintain a level of competence in relevant areas as installation needs change, or to fulfill a permitting requirement.

*Installation Supplement – Training*

Natural resources management training is provided to ensure that installation personnel, contractors, and visitors are aware of their role in the program and the importance of their participation to its success. Training records are maintained IAW the Recordkeeping and Reporting section of this plan. Below are key natural resources management-related training requirements and programs:

- NRMs at Category I installations must take the course DoD Natural Resources Compliance, endorsed by the DoD Interservice Environmental Education Review Board and offered for all DoD Components by the Naval Civil Engineer Corps Officers School (CECOS). See https://denix.osd.mil/cecos/ for CECOS course schedules and registration information. Other applicable environmental management courses are offered by the Air Force Institute of Technology (http://www.afit.edu), the National Conservation Training Center managed by the USFWS (https://www.fws.gov/training), and the Bureau of Land Management Training Center (https://www.blm.gov/learn/national-training-center).

- Natural resource management personnel shall be encouraged to attain professional registration, certification, or licensing for their related fields, and may be allowed to attend appropriate national, regional, and state conferences and training courses. State and local training courses that cover northern California/San Mateo County-specific issues, particularly sea-level rise, coastal erosion, and recreation, will be prioritized.

- All individuals who will be enforcing fish, wildlife, and natural resources laws on USAF lands must receive specialized, professional training on the enforcement of such laws in compliance with the Sikes Act. This training may be obtained by successfully completing the Land Management Police Training course at the Federal Law Enforcement Training Center (http://www.fletc.gov/). Conservation Law Enforcement activities are not conducted by Pillar Point AFS staff; instead, they are contracted out to federal and state conservation law enforcement entities who have completed this training.

- Individuals participating in the capture and handling of sick, injured, or nuisance wildlife should receive appropriate training, including training that is mandatory to attain any required permits.

- The DoD-supported publication Conserving Biodiversity on Military Lands: A Handbook for Natural Resources Managers (http://dodbiodiversity.org) provides guidance, case studies, and other information regarding the management of natural resources on DoD installations.

# 6.0 RECORDKEEPING AND REPORTING

## *6.1 Recordkeeping*

The installation maintains required records IAW Air Force Manual 33-363, *Management of Records*, and disposes of records IAW the Air Force Records Management System records disposition schedule. Numerous types of records must be maintained to support implementation of the natural resources program. Specific records are identified in applicable sections of this plan, in the Natural Resources Playbook, and in referenced documents.

*Installation Supplement—Recordkeeping*

Survey reports and internal natural resource compliance documentation are maintained digitally on 30 CES servers located at Vandenberg SFB. Additionally, external compliance documents—such as five-year INRMP reviews, annual INRMP reviews, informal and formal consultations with USFWS, NMFS, and CDFW are also maintained on these servers. Hard copies of older records are maintained at Vandenberg SFB and efforts are underway to digitize these and add them to the current digital folder system. Certain records are available on eDASH and are being migrated over to the Tool for Environmental Management Plans (T-EMP) to assist internal military department access. Both eDASH and T-EMP are only accessible from a military computer network. Spatial data are stored within the GeoBase GIS maintained at Vandenberg SFB; additional information about GeoBase is in section 7.17.

## *6.2 Reporting*

The installation NRM is responsible for responding to natural resources-related data calls and reporting requirements. The NRM and supporting AFCEC Natural Resources Media Manager and SMS should refer to the Environmental Reporting Playbook for guidance on execution of data gathering, quality control/quality assurance, and report development.

*Installation Supplement—Reporting*

The NRM provides an annual report detailing INRMP implementation to 30 CES and the cooperating agencies. Other natural resources reporting happens on an as-needed basis for project-specific consultations with internal and external partners. There are no biological opinions for Pillar Point AFS that require annual reporting.

# 7.0 NATURAL RESOURCES PROGRAM MANAGEMENT

This section describes the current status of the installation's natural resources management program and program areas of interest. Current management practices, including common day-to-day management practices and ongoing special initiatives, are described for each applicable program area used to manage existing resources. Program elements in this outline that do not exist on the installation are identified as not applicable and include a justification, as necessary.

*Installation Supplement—Natural Resources Program Management*

Natural resources on Pillar Point AFS are managed by 30 CES/CEI at Vandenberg SFB. Fish and wildlife management on Vandenberg SFB began in 1957. In 1963, Vandenberg SFB entered into its first cooperative agreement with USFWS and CDFG (now CDFW). The Directorate of Environmental Management was formed in 1985, in part to manage a comprehensive natural resources program at Vandenberg SFB and its support facilities.

Prior to the delegation of responsibility for natural resources to 30 CES/CEI in approximately 2001, Pillar Point AFS did not have a natural resource management program. The first comprehensive inventory of the Station's plant and animal resources was conducted in 1992–1993, with assistance from The Nature Conservancy (Nature Conservancy 1993). The original supplement to the Vandenberg SFB INRMP (SBMNH 2000) was the first product from 30 CES/CEI pertaining to Pillar Point AFS, and was designed to develop an integrated program to manage natural resources.

Problem areas relative to the natural resources on the Station include: encroachment of non-native invasive plant species (e.g., pampas grass, iceplant, Cape ivy, and Bermuda buttercup, among others); lack of adequate natural resource data for special status plant and animal species that occur on Station; landscape management practices, including mowing and herbicide spraying, that degrade native plant communities; and unregulated public access on the northern half of the Station. These problems have led to some degradation of native plant communities and wildlife habitat, and to accelerated erosion from unmaintained dirt trails. The problems result from the absence of qualified personnel to inventory and monitor the Station's natural resources, the lack of any cooperative agreements with agencies managing lands that surround the Station, that no resource management personnel are stationed at Pillar Point AFS, and the distance from Vandenberg SFB where personnel are located to address the above-listed problems. Implementation of strategies to meet the goals and objectives developed in this INRMP would lead to a more ecologically sound approach to managing the natural resources of Pillar Point AFS.

*Cooperative Agreements*

Cooperative agreements with outside agencies and organizations assist in maintaining regulatory compliance, and provide for agency input in the stewardship of natural resources. While Vandenberg SFB proper has several cooperative agreements with federal, state and county government, as well as many non-government agreements, universities and non-profit organizations, there are no cooperative agreements specific to natural resources management established for Pillar Point AFS.

Pillar Point AFS is immediately adjacent to the James V. Fitzgerald Marine Reserve, administered by the CDFW and the San Mateo County Department of Parks. It also abuts Princeton Marsh, which is administered by the San Mateo County Department of Parks. The West Shoreline Access Trail, immediately east of the Station, is maintained by the San Mateo County Harbor District. The CDFW regulates fishing in ocean waters surrounding Pillar Point. A master plan has been prepared by the San Mateo County Department of Parks for the Fitzgerald Marine Reserve and the Princeton Marsh (Brady/LSA 2002).

## *7.1 Fish and Wildlife Management*

*Applicability Statement*

This section applies to all USAF installations that maintain an INRMP. The installation is required to implement this element.

*Program Overview/Current Management Practices*

The abundance and diversity of wildlife resources at Pillar Point AFS and in its immediate vicinity provide aesthetic, recreational, and ecological value to the Station, its personnel, and the general public. Five species of amphibians, 14 species of reptiles, 94 species of birds, and 33 species of mammals are known or expected to occur on Pillar Point AFS or its immediate vicinity. Table 14-2 (within Appendix B) provides a list of wildlife known or expected to occur on Pillar Point AFS or in its immediate vicinity. Additionally, several state and federally threatened and endangered wildlife species are known or expected to occur on the Station or in its immediate vicinity (Table 14-3; within Appendix B). Section 7.4 provides management policies and objectives for these sensitive species with the overall goal of preserving, protecting, and enhancing populations and their habitats. Wildlife management responsibilities at Pillar Point AFS include addressing issues such as resource demand, public access, wildlife pest problems, and human-wildlife interaction concerns.

*Migratory Bird Treaty Act Actions*

The MBTA (16 United States Code [U.S.C.] 703–712) dictates that North American migratory birds (including eggs and active nests) shall not be pursued, hunted, taken, captured, killed, or possessed without a permit from the USFWS. Per the MBTA and EO 13186, Responsibilities of Federal Agencies to Protect Migratory Birds, January 10, 2001, within budgetary limits, and in harmony with the Air Force's missions (see EO 13186, Sec. 3(e)), Vandenberg SFB avoids or minimizes the negative impact of Air Force actions on migratory birds, and takes active steps to protect birds and restore or enhance their habitat whenever practicable (see EO 13186, Sec. 3(e)(4)). This includes preventing or abating pollution or detrimental alteration of the environment, as practicable, and incorporating migratory bird conservation into agency planning processes whenever practicable (see EO 13186, Sec. 3(e)(4)). Vandenberg SFB notifies the USFWS if unintentional take of migratory birds, reasonably attributable to Air Force actions, has, or is likely to have, a measurable negative effect on migratory bird populations, and implements conservation measures as specified in EO 13186, Section 3(e)(9).

The DoD participates in the federal Partners in Flight Program for the conservation of neotropical migratory birds. To the extent permitted by law, and subject to budgetary limits and mission constraints, the USAF may make lands and resources accessible for furtherance of the federal Partners-in-Flight program, and provide technical expertise for planning and implementing the program.

Many past and current actions benefiting migratory birds have taken place at Pillar Point AFS and Vandenberg SFB.

- Migratory birds and their nests are assessed as part of Vandenberg SFB's comprehensive EIAP.
- Vandenberg SFB distributes guidance annually that details allowed and prohibited actions in response to nesting birds in buildings. This guidance was adapted from documents produced by the USFWS.
- 30 CES/CEI regularly coordinates with the Region 8 Migratory Bird Treaty Office (MBTO) in Sacramento.
- 30 CES/CEI closely monitors legal developments that relate migratory bird management, including but not limited to the "Military Readiness" exemption to the MBTA.
- Vandenberg SFB distributes guidance, including regulations and recommendations on the proper timing of tree-trimming within developed areas at Pillar Point AFS.

- 30 CES/CEI staff regularly cooperates with organizations such as Partners in Flight, The Wildlife Society, the American Bird Conservancy's "Cats Indoors" campaign, and others. Staff members have attended training in Environmental Law, including specific MBTA training provided by the USFWS National Conservation Training Center.

- 30 CES/CEI staff frequently participates in public outreach events such as Earth Day, National Public Lands Day, and America Recycles Day. Among other actions, we have distributed hundreds of copies of the Partners in Flight "Bird Conservation on Department of Defense Lands" poster. National Public Lands Day in 2008 was successfully hosted by Pillar Point AFS.

- As needed, 30 CES/CEI applies for depredation permits from the Region 8 MBTO in Sacramento.

- Vandenberg SFB has started a comprehensive program to assess and modify power poles on Vandenberg SFB for their risk to migratory birds (primarily raptors); this program has been completed at Pillar Point AFS. Vandenberg SFB and Pillar Point AFS follow Avian Power Line Interaction Committee guidelines and ensure that any new utility poles or poles replaced for other reasons comply with those guidelines. 30 CES/CEI staff and contractors have attended basic Avian Power Line Interaction Committee training.

- 30 CES/CEI has sent representatives to meetings wherein extensive discussions of migratory bird biology and management are discussed. These meetings include (but are not limited to):

    - The Wildlife Society
    - The National Military Fish and Wildlife Association
    - California Burrowing Owl Consortium
    - Southwestern Willow Flycatcher annual training
    - California Partners in Flight
    - 30 CES/CEI and contractor support includes personnel who are widely recognized as experts in the biology, behavior, and management of certain migratory bird species.

*Raptor Management*

Primary management concerns for raptors include degradation of foraging and nesting habitat, protection of nest and roost sites, disturbances caused by noise and human activity, vehicle strike hazards, and power line hazards. Additionally, raptors are top predators and therefore prone to bioaccumulation of toxins from their prey.

Management for raptor conservation should be based primarily on monitoring of species occurrence and breeding activity, protection of habitat, reduction of disturbance, and reduction of human-caused hazards. Implementation of seasonal monitoring for sensitive species should occur during breeding season (February through August) and during primary migratory activity periods (fall through spring) to assess occurrence, critical habitat parameters, and potential impacts of Station activities. All verified active nest sites are protected under the MBTA and/or the Bald and Golden Eagle Protection Act. Any Station activity near nest sites during breeding season that may cause disturbances is reviewed by 30 CES/CEI.

All pest-control poisons that can potentially enter the environment and contribute to toxic accumulation in raptors and other wildlife should receive review and prior approval by 30 CES/CEI before use. The toxic effects of environmental contaminants (e.g., PCBs, perchlorate, lead) on the Station should be assessed. Some raptors that scavenge carrion are particularly susceptible to poison and lead contamination.

*Seabird Nest Sites*

Seabird nesting colonies are protected under the local coastal plan and MBTA. Breeding at seabird nesting colonies in the vicinity of Pillar Point AFS occurs from early April through August. Disturbance of seabird nesting colonies during nesting can lead to nest abandonment and reduction in reproductive success.

Historically, a small number of pigeon guillemots and pelagic cormorants nested at Pillar Point (Sowls et al. 1980). However, cliff retreat during the winter of 1997–1998 eliminated the rocky ledges used by pelagic cormorants for roosting and nesting. SBMNH surveys conducted in 1999 found no evidence that marine birds were roosting and/or nesting on any of the cliff faces bordering Pillar Point AFS (SBMNH 2000).

*Marine Mammal Protection*

The MMPA of 1972 (16 U.S.C. 1361) protects marine mammals, their critical habitat, and migratory routes. Marine mammal haul-out areas are also protected under the local coastal plan. Although there are no marine mammal haul-outs on Pillar Point AFS, the property line of which ends at the mean high tide line, five species of pinnipeds, including harbor seals and California sea lions, as well as the southern sea otter, have been known to or are expected to frequent marine mammal habitat in the immediate vicinity of Pillar Point AFS. Haul-outs in the immediate vicinity of Pillar Point AFS are used throughout the year by harbor seals, with peak breeding activity from April–May and pupping occurring from 1 February–31 May. Sail Rock, south of Pillar Point AFS, and several other sites within the adjacent James V. Fitzgerald Marine Reserve are also regularly used as haul-out sites by harbor seals. Sandy beaches, coastal bluffs, rocky headlands, rocky intertidal areas, and nearshore waters surrounding Pillar Point AFS provide foraging habitat for marine mammals.

Marine mammals are sensitive to human presence in shoreline habitats that border their haul-outs. Disturbance from humans or domestic dogs can result in abandonment of a site, or injury or abandonment of pups. Activities that may impact marine mammals in the vicinity of Pillar Point AFS must be coordinated with NMFS for review and authorization.

Section 101(a)(5)(A) of the MMPA directs the Secretary of Commerce to allow upon request the incidental, but not intentional, taking of marine mammals by U.S. citizens who are engaged in a specific activity (other than commercial fishing) in a specified geographical region if certain findings are made and regulations are issued. Because current activities at the Station do not pose a threat to any of the marine mammals known or expected to occur in waters and nearshore habitats that border the Station, there has been no need for Pillar Point AFS to obtain an incidental take permit. If the future military mission at the Station were to change in a manner such that activities would result in a taking of marine mammals, the Air Force would apply for a Letter of Authorization from NMFS for incidental take of marine mammals.

*Wildlife Damage Control*

Human-wildlife interaction concerns refer to situations wherein the presence or activities of wildlife has the potential to be hazardous or inconvenient to human activities. Feral cats (*Felis catus*), red fox (*Vulpes vulpes*), and European starlings (*Sturnus vulgaris*) are the only non-native pest animal species that have been observed on Pillar Point AFS. There is no formal program in place on Pillar Point AFS to manage these pest species.

The CDFW must be contacted prior to harassing, killing, or trapping nuisance wildlife. Wildlife control activities may require a state and/or federal depredation permit. Activities that affect migratory birds may require a federal permit. Any action that may affect a species listed for protection under the ESA will require consultation with the USFWS.

Emergency wildlife control measures may be warranted if unanticipated wildlife problems endanger Pillar Point AFS operations or threaten public health. Major Commands must authorize emergency control

measures for situations that are not addressed in appropriate plans. Refer to 30 Space Wing Instruction (30 SWI) 32-701, *Conservation, Management and Enforcement*, for further details on procedures for emergency control of wildlife (30 Space Wing has been transferred to SLD 30; however, the Space Wing Instruction has not been updated under SLD 30).

The federal MBTA and the State of California Fish and Game Code protect native wild bird species, their eggs, and nests from "take," including harassment resulting in abandonment of nests and/or death of eggs or young. Any proposal to intentionally kill, wound, capture, or collect a migratory bird requires a migratory bird depredation permit issued by the USFWS under Title 50, Code of Federal Regulations (CFR), Section 21.41. Depredation of migratory birds is also subject to NEPA (42 U.S.C. 4321 et seq.) and the Air Force's EIAP (32 CFR Part 989). Once a permit is issued, Vandenberg SFB will maintain records as mandated under the terms of the permit. Appropriate documentation per the depredation permit or the EIAP will be maintained.

Before facilities at Pillar Point AFS are demolished or modified, they are evaluated for nesting birds. There are many non-lethal solutions to nuisances associated with seasonal bird nesting. 30 CES/CEIEA personnel at Vandenberg SFB can provide assistance and should be consulted in possible nuisance situations.

In accordance with the 2003 National Defense Authorization Act (Public Law [P.L.] 107–314), MBTA requirements shall not apply to the incidental taking of a migratory bird by a member of the Armed Forces during a military readiness activity. Incidental takes during military readiness activities must conform to the rules and limitations set forth in the Final Rule for Take of Migratory Birds by the Armed Forces published by the USFWS on February 28, 2007 (72 FR 8931).

### *7.1.1 Climate Impacts on Fish and Wildlife Management*

Management actions taken to protect wildlife species will be influenced by the rate of climate changes, the nature of those changes, and the ability of each species to adapt. Our understanding of species' response to changing climate is not yet sufficient for predicting how individual species will respond. Moreover, sub-populations of a given species may exhibit unique behavioral, phenotypic, and genetic responses to environmental conditions. Genetic variation within a species has been associated with exposure to environmental conditions; however, populations may not be able to undergo selection for preferred traits if environmental conditions change rapidly (Hoffmann and Sgrò 2011). Behavioral changes, such as switching host plants or food sources, and phenotypic responses, such as changes in body size associated with longer growing seasons, already have been observed (Iwamura et al. 2013, Ozgul et al. 2010).

At Pillar Point AFS, management actions that sustain natural communities and ecosystem function will be critical for effective wildlife management. Monitoring of communities and ecosystem function may become necessary to document changes to wildlife habitat and ecosystem function, and the results will help to inform changes needed to current management. Wildlife surveys are also important to monitor any changes in resident wildlife populations, and management programs should be flexible enough to evolve and accommodate an array of changing issues (Hellmann et al. 2008).

Specific issues threatening wildlife onsite include invasive species, wetlands, and sea-level rise and coastal erosion. Invasive species control will continue to be an important wildlife management tool in the future, especially with the potential for climate change to create open niches for invasive species that could displace native species. A formal program may be needed to control predation on native wildlife by non-native species, such as feral cats and red fox. Management of seabird nesting sites in the vicinity of Pillar Point AFS may become more important in the context of climate change. Rising sea levels and extreme storms have been documented to significantly erode and eliminate shoreline nesting habitats. Lastly, maintenance of wetland extent and connectivity will be critical to maintain wetland resiliency to climate changes. Wetland resiliency will allow persistence of wildlife and amphibian habitats.

## *7.2 Outdoor Recreation and Public Access to Natural Resources*

*Applicability Statement*

This section applies to all USAF installations that maintain an INRMP. The installation is required to implement this element.

*Program Overview/Current Management Practices*

There are no outdoor recreation activities available on Pillar Point AFS for either military personnel or the public. The small size of the installation, mission priorities, safety, and security requirements prohibit public access or the opportunity to establish future outdoor recreation activities. The surrounding area contains many public access points that provide a variety of outdoor recreation opportunities, including hiking, biking, picnicking, wildlife viewing, and beachcombing; these external opportunities further prevents the need to establish such programs on Air Force property. A small parking area off West Point Avenue on the east side of the peninsula is available to the public (Figure 2-1). From this parking area, there is access to beaches and the popular Mavericks surf area off the south end of the peninsula via the West Shoreline Access Trail. Beach walks, bird watching, recreational fishing, scuba diving, and surfing are available at this public area.

Off-road vehicle (ORV) recreation is not authorized at Pillar Point AFS. The Air Force has installed and maintains steel cable barriers along West Point Avenue and there have been no reports of ORV activity on the Station during a site visit in March 2022.

### *7.2.1 Climate Impacts on Outdoor Recreation*

Because no formally recognized recreation occurs at Pillar Point AFS, projected climate changes will not affect its outdoor recreation and public access to natural resources. However, many of the outdoor recreation activities that occur within close proximity, such as those on nearby beaches, could be affected by the rise in sea level and increasing storm surges. Beach-nourishment programs will become increasingly important to support activities on or near the beaches, including picnicking, hiking, and beachcombing. Trails travelling west from the public parking area through the installation and down the bluff may require restoration and stabilization due to rising sea levels and increased erosion. Monitoring of these trails will be important as erosional processes increase, and natural communities become more sensitive. Establishment of "social trails" may also impact sensitive natural communities and bluffs with increased erosion and trampling.

## *7.3 Conservation Law Enforcement*

*Applicability Statement*

This section applies to all USAF installations that maintain an INRMP. The installation is required to implement this element.

*Program Overview/Current Management Practices*

Pillar Point AFS places an emphasis on educating base personnel and contractors about existing natural resources standards rather than maintaining an installation-specific conservation law enforcement program. Access to most of the Station is limited by a security fence, there is no established hunting or fishing program on the Station, and limited occurrence of game species, therefore poaching is not a priority issue at Pillar Point AFS. Pillar Point AFS also encourages additional cooperation with San Mateo County, CDFW, NMFS, and USFWS for conservation law enforcement activities to ensure the protection of natural resources outside of the Station's property lines.

## *7.4 Management of Threatened and Endangered Species, Species of Concern, and Habitats*

*Applicability Statement*

This section applies to USAF installations that have threatened and endangered species on USAF property. This section **IS** applicable to this installation.

*Program Overview/Current Management Practices*

A major overarching goal for managing sensitive species on Pillar Point AFS is to preserve, protect, and enhance populations and their habitats. To achieve this goal, NRMs at Vandenberg SFB work to avoid adverse direct and indirect impacts and disturbances to species and their habitats. Where impacts are unavoidable, they are minimized as much as possible and mitigated where warranted. All projects with potential to affect threatened and endangered species and their habitats on Pillar Point AFS are subject to formal Section 7 consultation under the ESA. Protective measures and monitoring of all threatened and endangered species may occur during implementation of projects within their habitats.

For most protected species, protection of habitat is the most important measure to ensure continued viability of the species. Reviews of projects by Vandenberg SFB natural resources staff, and NEPA analysis where required, identify potential impacts to protected species and their habitats, and identify measures where practicable that minimize or avoid impacts.

In addition to habitat protection, the measures listed below should be implemented in the design and implementation of projects and programs on Pillar Point AFS to minimize impacts to protected species.

1. Surveys of Threatened and Endangered (T&E) species should be prioritized to determine current presence or absence and population trends over time. When practical, surveys for other non-T&E protected species should be conducted to determine their status and changes over time.
2. Surveys will be conducted in proposed project areas for protected species if habitat that could support them occurs within the region of influence of the proposed project. Incorporate measures to minimize impacts into project design and planning where practicable, including avoidance of breeding periods and minimizing or avoiding permanent habitat loss.
3. Review projects involving renovation or demolition of buildings for potential impacts to nesting native birds. Avoid disturbance or removal of bird nest during the period when eggs or young are present (15 February–15 August). Where necessary, install exclusion devices outside the nesting season to prevent nesting.
4. Incorporate measures to minimize entrapment hazards for projects involving trenching or other major excavation.
5. Complete nest surveys prior to tree trimming and removal projects, and defer work if necessary to avoid mortality to nesting raptors and other birds protected by the MBTA.

### *7.4.1 Climate Impacts on Management of Threatened and Endangered Species, Species of Concern, and Habitats.*

Many current management activities are appropriate for enhancing species' resilience to or facilitating their adaptation to climate change. An ecosystem approach to management that prioritizes functional diversity and conserving habitat, including habitat variability and connectivity, can help to sustain the genetic diversity that may be crucial for species adapting to climate change or shifting their distributions to more favorable climates or habitats. The uncertainty inherent with managing species under changing environmental conditions, however, requires additional analysis and planning.

Research on actionable science (science that helps to support decision-makers and planners) for supporting biodiversity conservation under changing conditions has led to the development of some key principles

(Beier et al. 2016). First, historical patterns used as the basis for management decisions are likely to be inadequate for addressing future management challenges (Bierbaum et al. 2013). Second, proactive management approaches that anticipate changes could help to extend the timeline species may need for adapting to a changing climate and to avoid catastrophic species declines associated with stochastic events already stressing ecosystems.

Below is a species-specific climate impact analysis for the CRLF.

**Climate Impacts on CRLF**

Using a framework developed by Thomas et al. (2011), the vulnerability of the CRLF was assessed by analyzing observed and projected changes in the species' range (CEMML 2019). CRLF populations have declined rapidly throughout their range. Exact causes of this decline have not been determined, but may be the result of a complex interaction of habitat loss, pesticide use, and climate change (Belden et al. 2002). Wetland habitat has been lost to human use as well as to long-term drought. Reductions in water levels can expose embryos to increased levels of UV-B radiation, resulting in higher rates of mortality and susceptibility to disease (Kiesecker et al. 2001). Although these changes cannot be attributed entirely to climate change, they do demonstrate some sensitivity to the types of changes that may be observed under projected climate scenarios. Risk of climate-related declines is augmented further by expansions of potentially competing species, such as the bullfrog (*Lithobates catesbeianus*).

Projected seasonal precipitation patterns at Pillar Point AFS indicate a similar pattern of change under the different climate scenarios. Alone, this suggests that no further habitat loss or increase in UV-B exposure is expected to occur during the breeding season; however, when coupled with projected increases in temperature, the CRLF may be subjected to a loss of wetland habitat through increasing rates of evaporation and storm surges. Alternatively, additional precipitation could facilitate the expansion of species that may outcompete it.

Fragmentation of the CRLF habitat and the species' limited dispersal capabilities likely limit its potential for population increases outside of its current range. This is supported by environmental DNA (eDNA) research that finds little evidence of CRLF presence at the edges of its current range (Halstead et al. 2018).

Causes of historical declines in CRLF populations vary across the species' range. These declines cannot be attributed to a single cause, and links to climate change are not definitive. Some research suggests that pesticide use and disturbance associated with invasive species are stronger drivers of population declines (Davidson et al. 2002) and climate change is not an identified threat in the species' recovery plan.

### *7.5 Water Resource Protection*

*Applicability Statement*

This section applies to USAF installations that have water resources. This section **IS** applicable to this installation.

*Program Overview/Current Management Practices*

Given the landscape and location of the Station, surface water resources are few on Pillar Point AFS. Specialized management practices are therefore not required. However, the Station is located in a region of important local and national water resources. Prevention of erosion, maintenance of stormwater infrastructure, and restoration of areas that contribute pollution to downstream sites are actions needed to protect these resources.

### *7.6 Wetland Protection*

*Applicability Statement*

This section applies to USAF installations that have existing wetlands on USAF property. This section **IS** applicable to this installation.

*Program Overview/Current Management Practices*

Wetlands of significance are few at Pillar Point AFS; however, those at the Station and in the immediate vicinity play a valuable role in providing habitat for many species, including feeding, spawning, and nursing grounds. These habitats may support the federally threatened CRLF and the federally endangered San Francisco garter snake.

The protection and preservation of wetlands is important to the functioning of natural communities on Pillar Point AFS. Disturbance and contamination due to urbanization and other activities are important factors influencing the health and functionality of these wetland habitats. Minimization of these influencing factors is important in proper stewardship of these "keystone" ecosystems.

*Regulatory Wetland Protections*

Two federal legislative acts drive wetlands regulation at the national level. The most important of these is the CWA of 1977, which entails wetland protection provisions at the federal level. The Rivers and Harbors Act of 1899 (33 U.S.C. 403), entails federal provisions for projects such as dredging.

The CWA has several sections that pertain to wetlands. Section 404 regulates development or activities that would impact WOTUS and wetlands. The USACE and the EPA have been given jurisdiction to implement Section 404, and all projects that would impact waters or wetlands require a permit from the USACE. In the absence of wetlands, the upstream limit of Section 404 jurisdiction is the point at which the ordinary high watermark is no longer perceptible. Where wetlands are present, either adjacent to jurisdictional waters or not, the jurisdictional limit is the boundary of the wetland as defined by the USACE 1987 Wetlands Delineation Manual. Jurisdictional wetlands are those wetlands that fulfill the three criteria (vegetation, soils, and hydrology) as described in the Wetland Delineation Manual (USACE 1987).

The proponent of any activity that may affect known or suspected WOTUS or wetlands is required to conduct a jurisdictional wetland delineation. Delineations are valid for a limited period of time, as established by the USACE District Regulatory Office, or whenever a change in definition or delineation methodology alters the demarcation.

Proposed actions that could impact wetlands, even if the affected area is not within a jurisdictional wetland boundary, require environmental impact analysis in accordance with NEPA and the USAF EIAP. A Finding of No Practicable Alternative (FONPA) must be signed along with a Finding of No Significant Impact (FONSI) or Record of Decision (ROD) document. The proposed action must include all practicable measures to minimize harm to wetlands. The EIAP must document CWA and Rivers and Harbors Act compliance, permit actions, and any mitigation actions required as a condition of a permit. Installation Restoration Program projects on wetland sites that are conducted under the regulatory authority of Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended (Title 42, U.S.C. 9601–9675) do not require a FONPA.

Furthermore, if a proponent is given final authorization to work in or around a water or wetland, best management practices (BMPs) must be followed. These are practices that should be implemented by the proponent and are designed and documented to prevent and minimize potential harm to wetland resources. BMPs include compliance with applicable state and federal regulations, in addition to those practices formulated and agreed upon during consultation with state and federal agencies such as the USACE and USFWS.

Implementation of the below-listed BMPs should be considered when working in and around wetlands on Pillar Point AFS:

- Minimizing soil disturbance: disturb as little area as possible by minimizing the project footprint. Identify and delineate control points, such as those within the project area that should be accessed, those that should be avoided, and those for which special considerations are necessary.
- Avoiding soil compaction: minimize activities, such as vehicle use and foot traffic, that would result in soil compaction in and around wetlands. Restrict traffic to predefined access routes.
- Keeping debris out of wetlands: if debris is generated from work conducted by the proponent, take measures to ensure this does not enter the wetland and that it is disposed of appropriately. Debris includes construction waste, excavated material, removed vegetation, etc.
- Maintaining natural contour of the drainage: the natural contour of the wetland should be maintained to ensure that activities do not result in the immediate or gradual conversion of a wetland to a non-wetland.
- Ensuring that wetland hydrology remains intact: activities should not restrict the inflow or outflow of surface water or groundwater. Activities should not alter the residence time of waters, introduce toxic substances, or change the temperature regime.
- Exercising water management: manage water to prevent offsite impacts to water quality.
- Preventing chemicals from entering the wetland: when using chemicals in or in proximity to wetlands, follow all label instructions, ensure that applications are conducted by skilled licensed applicators, and establish buffer areas between the water and the application site.
- Preventing pollution and siltation: outflows from roads, access ways, or cleared areas constructed during project-related activities should be discharged before they enter the wetland. The width and extent of access ways and clearings should be minimized.
- Minimizing traffic through wetlands: keep the frequency and duration of activities taking place in a wetland to a minimum. To the maximum extent feasible, avoid the use of heavy equipment within wetlands during wet conditions. Use a geotextile fabric when operating in wetlands and in soils with low weight-bearing strength.
- Protecting the environment: many wetlands provide habitat for special status plants and animals. Proponents should be aware of special status species occurring or with potential to occur within the project area and follow BMPs to prevent and minimize adverse impacts to these species.
- Creating buffers: if the project does not require entering a wetland, a buffer of 50 feet or the maximum width feasible should be created around the wetland to minimize potential adverse effects.

*Wetland Mitigation Banking*

A wetland mitigation bank is a wetland area that is restored, enhanced, or created, and set aside to compensate for future actions that may negatively impact other wetlands within the same watershed and provide in-kind wetland functions.

AFMAN 32-7003 encourages the development of wetland mitigation banks when practicable as a cost-effective method to reduce the uncertainty and delays that may be associated with mitigation requirements for future installation development. A wetland bank is established by means of a formal agreement with the USACE or other appropriate regulatory agencies enacted prior to nomination of a wetland to the program. The value of a bank is determined through cooperation with the regulating agency to quantify the wetland values restored, enhanced, or created in terms of credits.

*Wetland Restoration and Enhancement*

AFMAN 32-7003 requires that INRMPs for Air Force installations with jurisdictional wetlands include plans for long-term monitoring of wetland trends and habitat values as well as plans for wetland restoration and enhancement. Updated surveys of the wetlands of Pillar Point should be conducted, and the USACE should be consulted for a jurisdictional determination of these wetlands. Based on the results of this jurisdictional determination, Pillar Point AFS will prepare any required plans for the long-term protection of these sensitive habitats.

*Invasive Plant Impacts on Wetlands*

Non-native invasive plant species such as Cape ivy and eucalyptus (*Eucalyptus globulus*) pose a threat to some wetland areas on Pillar Point AFS. These plants outcompete native plants and contribute to the degradation of wetland habitats. Some patches of Cape ivy were noted in the coastal swale, among the willows on the east-facing side of the peninsula. This weed is very difficult to eradicate once it has become established. Eucalyptus, which was intentionally planted on the Station in the past, is also seen as a threat to native species in willow scrub habitat.

Given that invasive plant species spread rapidly and can cause irreparable harm to wetland habitats, control should be given high priority. Additional discussion on the control of non-native invasive plants that negatively affect wetland habitats can be found in Tab A—Invasive Plant Species Management Plan.

*Baseline and Long-term Wetland Habitat Monitoring*

Either directly or indirectly, most sensitive species on the Station rely heavily on the health of wetland ecosystems. For this reason, the implementation of a long-term habitat monitoring program should be a priority. Previous wetland surveys on Pillar Point AFS (Aarcher Inc. 2015) serve as a baseline wetland assessment. The main objectives of such a program should be to assess the current health of wetland systems on the Station, to identify and prioritize specific management goals for each system, and to monitor the effectiveness of actions taken to meet these goals over time.

Central to wetland habitat monitoring is vegetation community structure and composition. Plant community structure and composition is indicative of hydrological conditions, succession and disturbance, and potential wildlife habitat. There are many methods for wetland vegetation monitoring. The peculiarities of each wetland system on the Station may warrant an independent selection of the appropriate monitoring method for each. However, methods used throughout the Station should be standardized to some degree to facilitate comparisons.

To ensure the usefulness of baseline data for future management decisions, two or more methods should be used simultaneously to monitor wetland vegetation. Robust methods that focus on habitat structure should be combined with more precise methods to characterize the vegetation on a variety of scales. Precise methods would include sampling randomly placed quadrates or transects for species cover, line-intercept, stem counts, and others. Such methods are well established and are reviewed in *Ecology and Field Biology* (Smith 1990).

*General Wetland Management Considerations*

To better manage the wetland resources of Pillar Point AFS, natural resources managers should consider:

- Adding GIS data from the Aarcher Inc. 2015 survey into the Station's GeoBase. GIS and remote sensing technologies can provide data on current wetland coverage for Pillar Point AFS for use in project planning and review.

- Avoidance of disturbances to wetland habitats to the maximum extent practicable. 30 CES/CEI biologists should be consulted as part of the planning process for all development projects that may potentially affect wetlands on Pillar Point AFS.

- Establishment of a 100-foot buffer zone as a setback from wetlands for the construction of any permanent facilities. Specific setback distances will be determined on a case-by-case basis, and made after considering: (a) soil type, slope, and stability; (b) surface water runoff and infiltration; and (c) potential upland use by the CRLF, and other special status species.

- Any construction within or near wetlands should be done during the dry season, and should minimize impacts from increased runoff, sedimentation, and water quality degradation.

- Diking and filling activities in or adjacent to wetlands should be minimized. Where such activity is unavoidable, it should be conducted in a manner that ensures the continued viability of the wetland habitat. These activities should be prohibited in breeding and nursery areas for aquatic and wetland species during their breeding seasons. Design for excavation projects will include protective measures to limit the entry of refuse, accidental spills, and silt materials into wetlands. Spoils should be stored only temporarily on existing dikes or designated spoil storage areas. Spoils should not be stored in areas subject to tidal influence.

- Contingency plans should be developed to protect wetlands from disturbances, degradation, or loss due to accidents such as oil spills or fires.

Solutions to the problems affecting wetlands require cooperation between Pillar Point AFS and the surrounding communities, landowners, interest groups, and local regulatory agencies. 30 CES/CEA Natural Resources staff should work with these groups to develop larger-scale ecosystem management goals and procedures to address issues such as undesired removal of native vegetation and control of non-native vegetation.

Restoration and revegetation plans should be developed to mitigate both short-term, project-specific impacts and long-term impacts to wetland habitats.

*Princeton Marsh*

Although Princeton Marsh and its associated wetlands are not contained within the Station boundary, their close proximity makes this sensitive area susceptible to possible adverse effects from operations and maintenance activities at Pillar Point AFS. In addition, several sensitive wildlife resources occur in one or more of the plant communities of Princeton Marsh and should therefore be considered in operations, maintenance, and planning for Pillar Point AFS.

Several ditches and storm drains channel surface water runoff away from developed roads and facilities at Pillar Point AFS. A small drainage swale on the Station's northern half channels surface water runoff southeast into Princeton Marsh. Conversely, the proximity to Princeton Marsh leaves Pillar Point AFS susceptible to spread of invasive species from the marsh, highlighting the need for cooperation with surrounding landowners for wetland and invasive species management.

*Herbicide Use Impacts on Wetlands*

Accidental herbicide drift from spraying road shoulders to control invasive vegetation may adversely impact and degrade adjacent wetlands if proper application methods are not followed. When spraying herbicides along the road sides for invasive plant control, all personnel and contractors are required to implement BMPs to prevent drift and adverse impacts to adjacent wetlands.

## *7.7 Grounds Maintenance*

*Applicability Statement*

This section applies to USAF installations that perform ground maintenance activities that could impact natural resources. This section **IS** applicable to this installation.

*Program Overview/Current Management Practices*

The primary goal of grounds maintenance at Pillar Point AFS is to minimize and avoid adverse effects to natural resources while maintaining landscaping that is compatible with operational needs and aesthetic considerations. In addition, all grounds maintenance activities must comply with all applicable environmental regulations, including but not limited to those in Table 14-5 (within Appendix B).

### *7.7.1 Grounds*

Pillar Point AFS grounds are divided into three categories: unimproved, semi-improved and improved, based on the amount of maintenance received and level of development.

Per AFMAN 32-7003, unimproved grounds include croplands, grazing lands, lakes, ponds, wetlands, and other undeveloped areas where natural vegetation grows unimpeded by maintenance activities. Unimproved grounds often support native vegetation and can provide important habitat for native plants and wildlife.

However, unimproved areas also include previously disturbed, unmaintained areas that may contain a preponderance of non-native and invasive species.

Semi-improved grounds are lands were periodic maintenance is conducted usually for operational reasons. These areas are minimally maintained to control weeds, prevent brush from creating a fire hazard, and limit the spread of wildfires. Semi-improved grounds include areas adjacent to runways, taxiways, and aprons; runway clear zones; lateral safety zones; rifle and pistol ranges; weapons firing and bombing ranges; picnic areas; ammunition storage areas; antenna facilities; and golf course roughs (AFMAN 32-7003).

The term “improved grounds” includes lands occupied by buildings and other permanent structures, as well as lawns and landscape plantings with intensive maintenance. Improved grounds include cantonment areas, parade grounds, drill fields, athletic areas, golf courses (except roughs), and housing areas (AFMAN 32-7003). Ground cover typically consists of landscape plantings and turf areas. Standard grounds maintenance usually includes lawn mowing, weed and brush removal, watering, and fertilizing.

### *7.7.2 Maintenance*

Grounds maintenance on Pillar Point AFS includes mowing of non-native grassland and coastal terrace prairie habitats within the fenced enclosure in the main cantonment; occasional trimming and removal of downed wood from non-native trees on the Station; mowing vegetation along road shoulder, fence lines, drainage ditches, and parking areas in the main cantonment and along West Point Avenue; and herbicide application of parking areas, fence-lines, and around buildings when not in proximity of wetlands. No maintenance plans, landscaping guidelines, or lists of approved plant materials have been developed for Pillar Point AFS.

Effective grounds maintenance is important in natural resource management because it helps to promote the health and development of native plant and animal species. The use of regionally native plants offers the advantages of natural adaptation to the climatic and geologic environments. In addition, the use of native plants can promote regional identity, and enhance wildlife habitat and biodiversity. Invasive non-native plant species can cause stress to an ecosystem by out-competing and replacing native plant species and subsequently destroying habitat for the native wildlife; therefore these species are not used in grounds maintenance.

A principal goal of the ground maintenance program at Pillar Point AFS should be to promote native plant communities. Native plants have few pests and do not typically require fertilization (USAF 2006). Due to their low water requirements and adaptation to local conditions, regional natives are well suited to sustainable landscapes. This limits the need for regular application of fertilizers and pesticides, which contribute to non-point source pollution problems. Promoting native plants over introduced plants would enhance wildlife habitat and overall biodiversity on the Station.

### *7.7.3 Management Considerations*

It is recommended that a Grounds Maintenance Plan be developed for Pillar Point AFS after a vegetation survey of the Station is completed. The plan should address issues such as revegetation and erosion control methods; sustainable landscaping; implementation of established BMPs for herbicide application to reduce non-point pollution sources; and habitat evaluation to determine areas where enhancement would be of high value. At a minimum, the following issues should be addressed in the plan.

*Erosion Control*

Erosion control methods will use new and emerging technologies, such as biodegradable erosion control blankets and wattles, sediment filtration systems, and other solutions, in conjunction with barriers to prevent ORV use as detailed in section 7.2

*Sustainable Landscaping*

An overarching goal of ground maintenance at Pillar Point AFS should be to promote the health and development of native plant communities. The appropriateness of annual mowing of coastal terrace prairie habitat within the developed portions of Pillar Point AFS should be reevaluated. This practice contributes to the spread of invasive non-native plants like iceplant and pampas grass. Suppression of shrub growth and flowering may remove habitat needed for insect life cycles (Pickering 1997). Spread of non-native invasive species ultimately leads to the need for more frequent and labor-intensive grounds maintenance. Coastal terrace prairie habitat is uniquely adapted to grow on Pillar Point without human intervention, and species from this community are likely to be superior choices for erosion control.

Turf areas at Pillar Point AFS should be minimized to the greatest extent possible and replaced with more conservative landscapes that require less maintenance. Turf grasses are among the highest maintenance plants, requiring high water input, frequent mowing, fertilization, and herbicide application. This can contribute to non-point source pollution problems (USAF 2006).

*Non-point Source Pollution*

Herbicide use is restricted when in proximity to wetlands, except for invasive species control. When applying herbicides for invasive species control, and for general grounds maintenance activities away from wetlands, BMPs are implemented to prevent non-point source pollution.

*Solid Waste*

Grounds maintenance activities at Pillar Point AFS produce only small quantities of green wastes in the form of tree and shrub branches, and plant debris cleared from along roads and around parking areas and buildings. Grass and vegetation clippings generated when non-native grassland and coastal terrace prairie habitats are mowed are left in place. Green waste is disposed of in on-site trash bins that are emptied weekly by a commercial trash removal service that transports waste to the local landfill. There is no program to recycle or compost green wastes generated at Pillar Point AFS.

*Migratory Birds and Special Status Species*

The MBTA prohibits the take of native birds, their nests, and their young. Native birds use a variety of trees and bushes for nesting in addition to structures. The nesting season for passerines extends from February

to August; major pruning and vegetation clearing should be avoided during this period. Trees should also be checked for the presence of active raptor nests before pruning or cutting. If activities of this nature are necessary, efforts should be coordinated with 30 CES/CEIEA.

*Mapping and Database Maintenance*

Pillar Point AFS maintains a grounds maintenance GIS layer that delineates all improved, semi-improved, and unimproved grounds. This GIS layer is updated as needed if grounds maintenance needs change to benefit natural resources, or as mission requirements dictate.

## *7.8 Forest Management*

*Applicability Statement*

This section applies to USAF installations that maintain forested land on USAF property. This section **IS NOT** applicable to this installation.

*Program Overview/Current Management Practices*

Pillar Point AFS does not contain large forested areas and therefore has no forest management program.

## *7.9 Wildland Fire Management*

*Applicability Statement*

This section applies to USAF installations with unimproved lands that present a wildfire hazard and/or installations that utilize prescribed burns as a land management tool. This section **IS NOT** applicable to this installation.

*Program Overview/Current Management Practices*

The probability of fire ignition at Pillar Point AFS is low because the Station is adjacent to the ocean, where ambient humidity levels are high and expected to remain high, despite increases in maximum temperatures. Moreover, mission-related activities at Pillar Point AFS do not result in substantial potential for ignitions. Due to the low risk of wildland fires and small size of Pillar Point AFS, an installation-specific firefighting division is not present. Should a small fire occur at the Station, the local fire department will be contacted for assistance.

### *7.9.1 Climate Impacts on Wildland Fire Management*

Ignition probability at Pillar Point AFS will likely remain low in response to changes in climate. Directly adjacent to the ocean, ambient humidity is expected to remain high, despite increases in temperature maximums, and the mission does not produce substantial numbers of ignition sources. Low projected summer rainfall will continue at levels similar to historical amounts, and provide opportunities for ignitions, but no more so than currently. Large portions of the vegetation on the installation are managed, and no change in the fire behavior in these areas, which is quite low, is expected. In unmanaged vegetation, fuel load is expected to increase somewhat due to more growing degree days combined with increases in annual precipitation of 3.0 to 6.1 inches in most model scenarios. This, in combination with increased temperatures during the fire season, will create higher intensity of fires. Despite increased intensity of fires, the ability of fires to spread will remain limited due to substantial tracts of heavily managed vegetation such as low-cut grasses.

## *7.10 Agricultural Outleasing*

*Applicability Statement*

This section applies to USAF installations that lease eligible USAF land for agricultural purposes. This section **IS NOT** applicable to this installation.

*Program Overview/Current Management Practices*

Pillar Point AFS does not maintain any agricultural outleases and lacks sufficient grazing and cropland to establish such a program.

## *7.11 Integrated Pest Management Program*

*Applicability Statement*

This section applies to USAF installations that perform pest management activities in support of natural resources management (e.g., invasive species, forest pests, etc.). This section **IS** applicable to this installation.

*Program Overview/Current Management Practices*

### *7.11.1 Invasive Plant Species Management*

Invasive non-native plant species are major threats to native flora and fauna. The most problematic and widespread species on Pillar Point AFS is Cape ivy; eucalyptus, iceplant, and pampas grass are also species of concern, however management efforts to control iceplant and pampas grass have successfully reduced the extent of these species. Coastal scrub, coastal terrace prairie, and coastal swale are the habitats most affected by these species on the Station. Additional information regarding the management of invasive non-native plant species is in Tab A—Invasive Plant Species Management Plan.

## *7.12 Bird/Wildlife Aircraft Strike Hazard (BASH)*

*Applicability Statement*

This section applies to USAF installations that maintain a BASH program to prevent and reduce wildlife-related hazards to aircraft operations. This section **IS NOT** applicable to this installation.

*Program Overview/Current Management Practices*

Pillar Point AFS has no flying mission, nor is there an airfield within the installation boundary. Therefore, there is no need to establish a BASH program.

## *7.13 Coastal Zone and Marine Resources Management*

*Applicability Statement*

This section applies to USAF installations that are located along coasts and/or within coastal management zones. This section **IS** applicable to this installation.

*Program Overview/Current Management Practices*

Pillar Point AFS is located on a peninsula and the entire Station is within the California Coastal Zone. The peninsula is surrounded by a variety of coastal habitats, including beaches, coastal bluffs, rocky shorelines, and a coastal salt marsh. These habitats are used for foraging, roosting, and haul-out sites by several special status wildlife species. Disturbances to some of these coastal habitats occurred in the past due to military developments at Pillar Point AFS, and from erosion caused by channeled runoff onto adjacent beaches, rocky shorelines, and Princeton Marsh. Given the occurrence of special status wildlife resources in adjacent marine and estuarine habitats, potential effects of activities on the Station should be evaluated. Management of these coastal areas is important to maintain the health of the habitats and the species they support.

*Coastal Zone Management Act (CZMA) Compliance*

The CZMA; EO 11296, *Marine Protected Areas*; and the Coral Reef Conservation Act mandate that the National Oceanic and Atmospheric Administration (NOAA), through the Office of Ocean and Coastal Resource Management (OCRM), provide national leadership, strategic direction, and guidance to state and territory coastal programs, and estuarine research reserves. The OCRM collaborates with state coastal resources managers under their jurisdiction to develop scientifically-based, comprehensive national system of marine protected areas, and supports effective management and sound science to protect, sustain, and restore coral reef ecosystems to the first major ridgeline or five miles from the mean high tide line.

NOAA (2004) defines the California coastal zone as the area extending 3,000 feet inland from the mean high tide line and extending seaward for three nautical miles. In significant estuarine habitat and recreational areas, the coastal zone can extend inland. The entire Pillar Point AFS is encompassed within the coastal zone. The California Coastal Program, approved by NOAA in 1978, is authorized by the California Coastal Act (CCA), McAteer-Petris Act (applicable to San Francisco Bay only), and Suisun Marsh Preservation Act (applicable to Suisun Marsh only). This program consists of the California Coastal Commission (CCC), which manages development along the California coast (except for San Francisco Bay); the San Francisco Bay Conservation and Development Commission; and the California Coastal Conservancy, which purchases, protects, restores, and enhances coastal resources, and provides access to the shore.

Consistency with the CCA must be in accordance with the CZMA. The CCC implements the CZMA as it applies to federal activities, development projects, permits and licenses, and support to state and local governments. The process established to implement this requirement is called a consistency determination for federal activities and development projects, and a consistency certification for federal permits and licenses and federal support to state and local agencies.

*Essential Fish Habitat*

The ocean surrounding Pillar Point AFS is identified as EFH for various life stages of fish species managed under the MSA. Under the MSA, the Department of Defense must consult with NMFS with respect to any action authorized, funded, or undertaken, or proposed to be, by such agency that may adversely affect any EFH. EFH is defined in the MSA as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" 16 U.S.C. §1802(10). Under the EFH implementing regulations [50 C.F.R. 600.810(a)], the term "adverse effect" is defined as any impact that reduces quality and/or quantity of EFH. It may include direct or indirect physical, chemical, or biological alterations of the waters or substrate; and loss of, or injury to, benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce quantity and/or quality of EFH.

Although no direct actions described in the INRMP would cause negative impacts to EFH, infrastructure maintenance and improvements at Pillar Point AFS have the potential to adversely affect EFH. Potential impacts include (1) increased water turbidity due to construction activities; and (2) decreased water quality due to runoff, drainage, and water outfalls.

*California Coastal National Monument*

The California Coastal National Monument (CCNM) was established in January 2000 under the authority of the Antiquities Act of 1906, as part of the National Landscape Conservation System. The monument stretches the length of the 1,100-mile California coastline and is meant to protect important biological and geological values. It includes roughly 8,000 acres of onshore lands and 1,000 acres of off-shore rocks, pinnacles, exposed reefs, and small islands. The Bureau of Land Management (BLM) manages the monument in cooperation with other federal, state, local government, universities, and private interests.

The CCNM Resources Management Plan (RMP) provides guidance, objectives, policies, and management actions for the public lands of the CCNM administered by the BLM. The RMP attempts to resolve a wide range of natural resource and land use issues within the CCNM area comprehensively. The document addresses and integrates, where possible, the numerous related management issues of the various current and potential future coastal partners who are included in the planning effort. One of the planning criteria used to develop the CCNM RMP states: "Nothing in the RMP expressly or implicitly precludes, restricts, or requires modification of current or future uses of lands, waters, or airspace adjacent to the CCNM by the Department of Defense, or their agents, allies, military range and test facility users, or range service providers" (BLM 2005).

## *7.14 Cultural Resources Protection*

*Applicability Statement*

This section applies to USAF installations that have cultural resources that may be impacted by natural resource management activities. This section **IS** applicable to this installation.

*Program Overview/Current Management Practices*

The Pillar Point AFS Cultural Resources Management Plan guides the management of cultural resources on the Station. Two prehistoric archaeological sites exist on the Station: one is not eligible for listing in the National Register of Historic Places (NRHP) and one is listed in the NRHP. Under the Archaeological Resources Protection Act, the location of each site is confidential. 30 CES/CEI would consult with Vandenberg SFB cultural resources management (CRM) personnel during the course of the project development process for natural resources management projects to ensure compliance with Section 106 of the National Historic Preservation Act (NHPA), as needed.

Additionally, all 39 buildings and structures on Pillar Point AFS have been inventoried and evaluated for their eligibility for listing in the NRHP; four buildings are eligible for listing (Building 14, 18, 22, and 40) (Gerber et al. 2009). Natural resource management has limited involvement with the structures located on the Station. However, if natural resource management projects occur near the historic structures, 30 CES/CEI would consult with Vandenberg SFB CRM personnel to ensure compliance with section 106 of the NHPA, as needed.

Native American human remains exist at Pillar Point AFS (Gerber et al. 2009). Ground disturbing activities—such as wetland delineations, invasive vegetation management, small mammal surveys, and erosion mitigation work—have the potential to encounter human remains. In the event human remains are encountered, all work would stop immediately and Vandenberg SFB CRM personnel would be consulted to determine whether to treat the remains IAW the Native American Graves Protection and Repatriation Act or to contact the County Coroner.

Finally, 30 CES/CEI would coordinate with Vandenberg SFB CRM personnel to support consultation with the Muwekma Ohlone Tribe of the San Francisco Bay Area whenever the INRMP is updated. In support of this relationship, a senior-level representative from Vandenberg SFB would provide the Muwekma Ohlone Tribe with a copy of the completed INRMP.

## *7.15 Public Outreach*

*Applicability Statement*

This section applies to all USAF installations that maintain an INRMP. The installation is required to implement this element.

*Program Overview/Current Management Practices*

The size and mission of Pillar Point AFS does not necessitate much public outreach. Erosion impacts from unauthorized erosional trails are addressed through signage around the installation perimeter.

### *7.16 Climate Change Vulnerabilities*

*Applicability Statement*

This section applies to USAF installations that have identified climate change risks, vulnerabilities, and adaptation strategies using authoritative region-specific climate science, climate projections, and existing tools. This section **IS** applicable to this installation.

*Program Overview/Current Management Practices*

Vulnerability to climate change generally refers to the extent to which a species, habitat, ecosystem, place, or project is susceptible to harm from climate change impacts (Stein et al. 2014). By this definition, species and systems that are more vulnerable will experience greater harm, while less vulnerable species and systems will be less affected or even benefit from climate change. Based on installation-specific climate change projections (CEMML 2019), Pillar Point AFS may be vulnerable to the following changes:

- Significant increases in average annual temperature, ranging from 1.1–2.7 °F above the historical baseline.
- Significant increases in average annual precipitation, ranging from 0.6–6.1 inches depending on scenario.
- Increased intensity of wildfire may damage infrastructure and natural resources.
- Sea level rise, storm surges, and precipitation eroding coastline and intruding into freshwater groundwater supplies.
- Shifts in ecological systems and associated vegetation driven by increases in temperature, increases in precipitation, and seasonal shifts. Indirect threats to wildlife, such as shifts in the temporal availability of food resources for migratory birds, loss of habitat due to changes in vegetation, and increases in non-native invasive species.
- Changing conditions may cause additional species to be listed at the federal or state level, increasing regulatory burden.
- Increased water temperature and decreased dissolved oxygen will impair habitat quality for aquatic wildlife.
- Greater likelihood of increases of disease vectors such as ticks and mosquitos, and outbreaks of infectious diseases such as rabies and mosquito-borne West Nile virus.

Pillar Point AFS is vulnerable to increased coastal erosion caused by SLR, increased precipitation rates, and larger storm surges predicated under both emissions scenarios. Although Pillar Point is elevated enough to be unaffected by direct SLR and SS inundation (CEMML 2019), changes in both will influence the existing problem of coastal erosion from wave action on the seaward cliffs (Griggs et al. 2019). Both processes will continually erode seaward cliffs, moving towards the installation. Increased projected precipitation will further exacerbate erosion problems as higher volumes of water will run off during the winter wet season (CEMML 2019). SLR is likely to cause saltwater intrusion into fresh groundwater below the installation, leading to a receding salt front that may stress freshwater wetland vegetation (EPA 2021). This may also affect drinking water supply, if the installation uses groundwater.

Adaptation strategies to combat coastal erosion have trade-offs and associated regulations (Griggs and Patsch 2019). Possible strategies include living shorelines, managed retreat, and coastal armoring. Living

shorelines include the use of coastal vegetation (such as salt marshes) to dissipate the energy of wave action; however, living shorelines are effective only in specific circumstances and are not applicable for protecting sea cliffs (Griggs and Patsch 2019). Managed retreat consists of purposefully relocating structures and development away from areas subject to coastal erosion, but has limited potential within the property boundaries of Pillar Point AFS due to the installation's small size. Coastal armoring requires seawalls, revetments, and other hard structures that take the brunt of wave action energy. Coastal armoring has several negative side effects such as loss of beach space and likelihood of failure from SLR (Griggs and Patsch 2019). Additionally, recreational access to beaches and marine areas cannot be obstructed by new construction of coastal armoring features (California Coastal Act of 1976). Further investigation is required to identify whether coastal armoring would be appropriate to reduce coastal erosion.

At a minimum, the installation may consider prioritizing existing structures located farther from the sea cliffs for use, maintenance, and renovation over those at greater risk from coastal erosion.

Finally, Pillar Point AFS is vulnerable to changing environmental conditions that potentially increase the presence of invasive species and/or protected species on and adjacent to the installation. These distribution changes can lead to an increased regulatory environment that require additional management.

### *7.17 Geographic Information Systems*

*Applicability Statement*

This section applies to all USAF installations that maintain an INRMP, since all geospatial information must be maintained within the USAF GeoBase system. The installation is required to implement this element.

*Program Overview/Current Management Practices*

30th Civil Engineer Squadron Comprehensive Planning (30 CES/CENPD) is the supporting section for all land use planning activities on Vandenberg SFB and Pillar Point AFS. 30 CES/CENPD has a partial GIS overlay for infrastructure features at Pillar Point AFS including buildings, roads/walks, pads, fences, boundary lines, antennas, etc. They have topography for the southern half of the Station. There are no GIS overlays for geology (rock and soil types, slopes), vegetation types, wetlands, special status wildlife, or any other natural resources.

As part of the Air Force-wide implementation of the GeoBase GIS system, Vandenberg SFB has started building an installation-specific GeoBase, which will include spatial data for Pillar Point AFS. GeoBase use is expected to continue despite the transition to Space Force. GeoBase uses the Spatial Standards for Facilities, Infrastructure, and Environment to ensure uniform data standards for all installation spatial data. Standardized data layers are used for each resource category in GeoBase and installation-specific surveys can be added using relational database structures to connect non-standardized layers.

Data specific to Pillar Point AFS is incomplete for several resource categories, and acquiring these data is a priority. Once all data are available, GeoBase can facilitate the management of natural resources, as well as provide an optimized view of natural resource considerations for project-specific EIAP coordination with other internal stakeholders. GeoBase is not specific to natural resources, but includes cultural resource considerations, installation infrastructure, and military training spatial data when applicable. This integration supports the military mission while conserving natural resources and other environmental considerations.

# 8.0 MANAGEMENT GOALS AND OBJECTIVES

The installation establishes long-term, expansive goals and supporting objectives to manage and protect natural resources while supporting the military mission. Goals express a vision for a desired condition for the installation's natural resources and are the primary focal points for INRMP implementation. Objectives indicate a management initiative or strategy for specific long- or medium-range outcomes and are supported by projects. Projects are specific actions with defined time scales that can be accomplished within a single year or across several years. Also, in cases where off-installation land uses may jeopardize USAF missions, this section may list specific goals and objectives aimed at eliminating, reducing, or mitigating the effects of encroachment on military missions. These natural resources management goals for the future have been formulated by the preparers of the INRMP from an assessment of the natural resources, current condition of those resources, mission requirements, and management issues previously identified. Below are the integrated goals for the entire natural resources program.

The installation goals and objectives are in the "Installation Supplement" section below in a format that facilitates an integrated approach to natural resource management. By using this approach, measurable objectives can be used to assess the attainment of goals. Individual work tasks support INRMP objectives. The projects are key elements of the annual work plans and are programmed into the conservation budget, as applicable.

*Installation Supplement—Management Goals and Objectives*

**GOAL 1 MAINTAIN A WELL-TRAINED, INFORMED, AND FUNDED NATURAL RESOURCES STAFF AND AN ADAPTIVE PILLAR POINT AFS NATURAL RESOURCES PROGRAM THAT SUPPORTS THE MILITARY MISSION WHILE COMPLYING WITH NATURAL RESOURCE REGULATIONS.**

OBJECTIVE 1.1 Review the INRMP and all component plans every five years at a minimum and update as needed to reflect management successes, new challenges, and changing regulatory compliance needs.

PROJECT 1.1.1 Conduct INRMP annual reviews and 5-year revisions with cooperating agencies on schedule and update the document throughout the year as new data are obtained.

PROJECT 1.1.2 Review the Invasive Species Management Plan every five years and update as new information is obtained, regulatory changes are made, or new protocols are developed.

PROJECT 1.1.3 Coordinate all activities listed in the INRMP with the Vandenberg SFB Integrated Cultural Resources Management Plan (ICRMP), including working with the Vandenberg SFB cultural resources department to provide the Muwekma Ohlone Tribe of the San Francisco Bay Area with the updated INRMP.

OBJECTIVE 1.2 Review the Station's GIS data on GeoBase every five years and update or add layers as needed to maintain up-to-date information for management.

PROJECT 1.2.1 By 2026, develop GIS layers for soil types, slopes, protected species, invasive species, vegetation communities, wetlands, erosion and habitat restoration sites, and other natural resources requiring management. Incorporate these layers into GeoBase when complete.

PROJECT 1.2.2 Once Project 1.2.1 is completed, annually update and maintain spatial data on GeoBase for protected species, invasive species, and restoration sites. Update spatial data for all other resource categories as needed.

PROJECT 1.2.3 By 2026, incorporate updated data from the BLM and CDFW on the boundaries of the CCNM, new State Marine Protected Area boundaries, and other protected jurisdictions for natural resources into GeoBase.

OBJECTIVE 1.3 Maintain an adequate level of qualified staff within 30 CES/CEI Natural Resources.

PROJECT 1.3.1 Ensure that enough professionally-trained natural resources management personnel and natural resources law enforcement personnel are available and assigned responsibility to perform tasks necessary to fulfill Sikes Act requirements.

PROJECT 1.3.2 Encourage natural resources personnel to continue professional development, especially as it relates to northern California/San Mateo County-specific issues such as sea-level rise, coastal erosion, and recreation. Send personnel to local natural resources training and conferences at least once every five years.

OBJECTIVE 1.4 Coordinate with Station Grounds Maintenance to maintain the functional and aesthetic value of the improved and semi-improved lands and effectively manage natural resources.

PROJECT 1.4.1 Develop a Grounds Maintenance Plan that meets landscaping/safety/aesthetic needs, recommends erosion control measures in improved sites, recommends the use of readily available and hardy native landscaping plants, and applies the USAF Pollinator Strategy and Reference Guide to reduce harm to pollinators and other sensitive species.

PROJECT 1.4.2 Develop a recommended planting list of nectar-producing plant species to support early-season breeding populations of western monarch and develop a plan to seed, outplant, and maintain pollinator support species.

OBJECTIVE 1.5 Establish cooperative agreements and coordinate with local agencies and neighboring landowners to benefit natural resources on Pillar Point AFS and in the immediate vicinity.

PROJECT 1.5.1 Develop educational materials in coordination with San Mateo County Department of Parks to distribute to the public about natural resources on Pillar Point AFS and in the vicinity and ways to reduce disturbance from unauthorized pedestrian access to the Station.

PROJECT 1.5.2 Establish a cooperative agreement with agencies willing to control invasive species near Pillar Point AFS with the goal of reducing the source populations of pampas grass, Cape ivy, French broom, and sweet fennel.

PROJECT 1.5.3 Explore the potential for using regional partnerships (e.g., Hummingbird Monitoring Network) to improve pollinator monitoring and conservation efforts.

**GOAL 2 MAINTAIN REGULATORY COMPLIANCE AND ENSURE AVAILABILITY OF UP-TO-DATE MANAGEMENT DATA BY CONDUCTING REGULAR FLORA AND FAUNA SURVEYS.**

OBJECTIVE 2.1 To ensure adequate protected species management and mission success, conduct surveys to assess the presence of protected species on the installation and, when appropriate, design management plans.

PROJECT 2.1.1 Plan for and conduct an annual species-specific survey, alternating yearly between a floral survey and a faunal survey. Prioritize surveys for protected species with unknown presence on the installation.

PROJECT 2.1.2 Survey for pollinators of conservation concern that may occur on the installation, including western bumble bee, monarch butterfly, calliope hummingbird, and rufous hummingbird.

PROJECT 2.1.3 Every five years, conduct targeted surveys for the CRLF in areas of the installation adjacent to Princeton marsh.

PROJECT 2.1.4 Annually review the USFWS, NMFS, CDFW, and California Native Plant Society lists of threatened and endangered species, as well as candidate species for listing and rare plant watch list species. Schedule survey needs and update documentation for newly added species that may be present on the installation or for those that may become candidates for protected status in the future.

PROJECT 2.1.5 If a protected species is confirmed present on the installation, create and implement management plans utilizing survey information and best-management practices that protect the operational functionality of Pillar Point AFS mission while protecting and enhancing species populations on the installation under a changing climate, especially increasing temperatures.

OBJECTIVE 2.2 To ensure data availability for effective natural resources management, conduct general flora and fauna inventories to determine the presence of existing species and detect newly arriving species that would require future management actions.

PROJECT 2.2.1 By 2024, conduct inventories of plants, mammals, birds, invertebrates, and herpetofauna on Pillar Point AFS, with emphasis on protected, invasive, and pollinator species. Compare the results of these surveys to the initial 1993 baseline inventory and update the INRMP as needed to highlight any species that are newly detected on the installation. Repeat these surveys on a five-year schedule to identify newly arriving species as distributions change in response to climate change.

OBJECTIVE 2.3 Monitor and control invasive plant species to maintain and enhance the Station's ecological integrity, prevent erosion, and sustain the aesthetic value of the Station's unimproved lands under increasing temperatures.

PROJECT 2.3.1 Every five years, update the invasive species management plan with annual control data to facilitate adaptive management and progression of work towards specific goals. During the first update, develop (1) measurable species-specific target goals for reduction levels and/or

timeframe for removal of all reproductive plants from the Station, and (2) monitoring protocols capable of determining progress toward goals.

PROJECT 2.3.2 Plan and budget for a minimum of three invasive plant control visits each year to treat high-priority species identified in Project 2.3.4 at the most effective growth stage. Leverage the existing grid-based treatment recording system to accurately track invasive species control and progress.

PROJECT 2.3.3 Collect vegetation monitoring data annually consistent with established monitoring protocols, and use the data to evaluate invasive species control effectiveness and adapt management as needed.

PROJECT 2.3.4 Every five years, review invasive plant monitoring data and prioritize documented species for control based on degree of potential ecological harm, potential to harm protected species, extent of infestation, and availability of effective control measures.

PROJECT 2.3.5 By 2025, develop effective treatment protocols for Cape ivy including ascertaining the most effective treatment timing intervals, chemical formulation, and follow-up restoration techniques.

PROJECT 2.3.6 By 2026, develop effective treatment and restoration protocols for Bermuda buttercup including ascertaining the most effective timing, chemical formulation, and follow-up restoration techniques.

PROJECT 2.3.7 Maintain or further reduce the current low level of pampas grass infestation and treat 100 percent of seedlings in the first year to prevent any on-site reproduction.

PROJECT 2.3.8 Maintain the current extent of the Monterey cypress and Monterey pine by removing all seedlings within two years of establishment.

PROJECT 2.3.9 Explore additional invasive plant control techniques such as using local community volunteers, expanding current eradication methods to include the use of mechanical removal, and increased herbicide application capabilities.

PROJECT 2.3.10 Evaluate the current invasive species control efforts for opportunities to support native pollinators by reducing herbicide use or changing chemical formulations, timing, and/or application methods, as described in the USAF Pollinator Conservation Strategy and Reference Guide.

**GOAL 3 MONITOR AND PROTECT NATURAL RESOURCES AND INFRASTRUCTURE FROM THE EFFECTS OF EROSION AND UNAUTHORIZED PEDESTRIAN ACCESS.**

OBJECTIVE 3.1 Monitor areas of active erosion and identify opportunities for protection of Pillar Point AFS resources.

PROJECT 3.1.1 Consolidate existing cliff erosion monitoring data and images into a related table within GeoBase.

PROJECT 3.1.2 Establish an annual monitoring protocol for documentation of ongoing erosion with photographic and remote sensing sources.

PROJECT 3.1.3 Investigate feasibility of a hazards survey for identification of potential impacts to installation resources from erosion due to earthquake damage,

increasing impacts from storm surge, and precipitation intensity under a changing climate.

PROJECT 3.1.4 Collaborate with local groups to identify opportunities for coastal erosion mitigation and develop feasibility studies for possible projects in line with San Mateo County Sea Level Vulnerability Assessment.

OBJECTIVE 3.2 Monitor the condition of social trails and remediate as needed to protect sensitive coastal vegetation communities and the security of the installation.

PROJECT 3.2.1 Continue to collaborate with local groups to remediate erosion and impacts to sensitive resources from trails across the northern portion of the installation.

PROJECT 3.2.2 Perform annual monitoring of trail remediation and restoration work completed on Pillar Point AFS in 2019.

PROJECT 3.2.3 Continuously monitor living shoreline project outcomes and develop new projects to support the positive results and extend if feasible.

OBJECTIVE 3.3 Monitor water and wetland resources to identify resources of concern and potential impacts to those resources

PROJECT 3.3.1 Incorporate results of 2015 wetlands and surface waters survey into GeoBase.

PROJECT 3.3.2 Develop a management and monitoring plan for wetland and riparian areas identified in survey including goals addressing protection, restoration, and adaptive management of the resources under a changing climate.

OBJECTIVE 3.4 Mitigate natural resources impacts and disturbances using educational materials

PROJECT 3.4.1 Maintain all existing erosion signage and improve as needed

PROJECT 3.4.2 Seek opportunities to add additional signage to address erosion concerns or other relevant natural resources topics.

# 9.0 INRMP IMPLEMENTATION, UPDATE, AND REVISION PROCESS

## *9.1 Natural Resources Management Staffing and Implementation*

Natural resources management staff for Pillar Point AFS are stationed at Vandenberg SFB; these staff must have the necessary knowledge, skills, and professional education/training to conduct their duties. In addition to professional experience and education, all natural resources staff undertake additional DoD and USAF-specific natural resource trainings, which are detailed in section 5.0. Staff are encouraged to attend local/state trainings and attend professional conferences when funding is available.

To effectively implement this INRMP, Pillar Point AFS must (1) actively request, receive, and use funds for accomplishing the goals, objectives, and projects, (2) ensure that enough professionally trained natural resources management personnel are available to perform the tasks required by the INRMP, (3) coordinate with external partners to ensure compliance with the Sikes Act, (4) document specific INRMP action accomplishments undertaken each year.

## *9.2 Monitoring INRMP Implementation*

Completion of projects, and work towards goals and objectives, are evaluated to ensure effective INRMP implementation. Pillar Point AFS implements an adaptive management approach to natural resource management, which sets specific resource condition targets within INRMP goals, monitors progress towards those goals, and directs changes in management practices when progress is faltering. As part of the adaptive management approach, funding, staffing, and on-the-ground management efforts are reviewed to identify whether conditions are approaching desired target levels, and management approaches are adjusted if necessary. INRMP implementation is monitored during the annual INRMP review process.

## *9.3 Annual INRMP Review and Update Requirements*

The INRMP is a living document and has been compiled in a modular format to facilitate replacement of outdated data and maps with current data. In addition, the proper maintenance of updated data in the INRMP on an annual or as-needed basis is recommended to ensure the living nature of the document. This will be accomplished through the exchange and input of information into the Vandenberg SFB GeoBase.

The INRMP is to be reviewed annually with the cooperation of the USFWS, NMFS, and CDFW. Annual reviews will ensure the most current information on all conservation issues is available, budgeting and implementation are on schedule, and projects and activities for the upcoming year are identified and included (AFMAN 32-7003 Annual INRMP Review and Coordination: “Establish and maintain regular communications with the appropriate federal, state, and installation organizations to address issues concerning implementation of the INRMP. At a minimum, this shall include an annual review of the INRMP by the installation in coordination with the USFWS and state fish and wildlife agency. The annual review will be certified by the installation or wing commander, or designee.”)

In addition, the INRMP must be reviewed for operation and effect at least once every five years by the appropriate higher command headquarters, USFWS, NMFS, and CDFW. The INRMP may be revised more frequently if warranted by significant changes to the Station’s mission requirements or its natural resources.

# 10.0 ANNUAL WORK PLANS

The INRMP Annual Work Plans are included in this section. These projects are listed by fiscal year, including the current year and four succeeding years. For each project and activity, a specific timeframe for implementation is provided (as applicable), as well as the appropriate funding source and priority for implementation. The work plans provide all the necessary information for building a budget within the USAF framework. Priorities are defined as follows:

- High: The INRMP signatories assert that if the project is not funded, the INRMP is not being implemented and the USAF is non-compliant with the Sikes Act; or that it is specifically tied to an INRMP goal and objective and is part of a "Benefit of the Species" determination necessary for ESA Sec 4(a)(3)(B)(i) critical habitat exemption.
- Medium: Project supports a specific INRMP goal and objective and is deemed by INRMP signatories to be important for preventing non-compliance with a specific requirement within a natural resources law or by EO 13112, *Exotic and Invasive Species*. However, the INRMP signatories would not contend that the INRMP is not being implemented if not accomplished within the programmed year due to other priorities.
- Low: Project supports a specific INRMP goal and objective, enhances conservation resources or the integrity of the installation mission, and/or supports long-term compliance with specific requirements within natural resources law; but is not directly tied to specific compliance within the proposed year of execution.

| Resource Category | Goal | Objective | Occurrence | FY | Project Number | Description |
|---|---|---|---|---|---|---|
| All | 1 | 1.1 | Annually | 2023, 2024, 2025, 2026, 2027 | 1.1.1 | Conduct INRMP annual reviews and 5-year revisions with cooperating agencies on schedule and update the document throughout the year as new data are obtained. |
| All | 1 | 1.1 | Every five years | 2023 | 1.1.2 | Review the Invasive Species Management Plan every five years and update as new information is obtained, regulatory changes are made, or new protocols are developed. |
| All | 1 | 1.1 | As needed | 2023, 2024, 2025, | 1.1.3 | Coordinate all activities listed in the INRMP with the Vandenberg SFB ICRMP, including working with the Vandenberg SFB cultural resources department to provide the |

| Resource Category | Goal | Objective | Occurrence | FY | Project Number | Description |
|---|---|---|---|---|---|---|
| | | | | 2026, 2027 | | Muwekma Ohlone Tribe of the San Francisco Bay Area with the updated INRMP. |
| GIS | 1 | 1.2 | One-off development, updates as needed | 2026 | 1.2.1 | By 2026, develop GIS layers for soil types, slopes, protected species, invasive species, vegetation communities, wetlands, erosion and habitat restoration sites, and other natural resources requiring management. Incorporate these layers into GeoBase when complete. |
| GIS | 1 | 1.2 | Annually | 2023, 2024, 2025, 2026, 2027 | 1.2.2 | Once Project 1.2.1 is completed, annually update and maintain spatial data on GeoBase for protected species, invasive species, and restoration sites. Update spatial data for all other resource categories as needed. |
| GIS | 1 | 1.2 | One-off development, updates as needed | 2026 | 1.2.3 | By 2026, incorporate updated data from the BLM and CDFW on the boundaries of the CCNM, new State Marine Protected Area boundaries, and other protected jurisdictions for natural resources into GeoBase. |
| All | 1 | 1.3 | Annually | 2023, 2024, 2025, 2026, 2027 | 1.3.1 | Ensure that enough professionally-trained natural resources management personnel and natural resources law enforcement personnel are available and assigned responsibility to perform tasks necessary to fulfill Sikes Act requirements. |
| All | 1 | 1.3 | Every five years | 2023, | 1.3.2 | Encourage natural resources personnel to continue professional development, especially as it relates to northern California/San Mateo County-specific issues such as sea-level rise, coastal erosion, and recreation. Send personnel to local |

| Resource Category | Goal | Objective | Occurrence | FY | Project Number | Description |
|---|---|---|---|---|---|---|
| | | | | | | natural resources training and conferences at least once every five years. |
| Grounds maintenance, Vegetation, Pollinators | 1 | 1.4 | One-off development, updates as needed | 2025 | 1.4.1 | Develop a Grounds Maintenance Plan that meets landscaping/safety/aesthetic needs, recommends erosion control measures in improved sites, recommends the use of readily available and hardy native landscaping plants, and applies the USAF Pollinator Strategy and Reference Guide to reduce harm to pollinators and other sensitive species. |
| Vegetation, Pollinators | 1 | 1.4 | One-off development, updates as needed | 2024 | 1.4.2 | Develop a recommended planting list of nectar-producing plant species to support early-season breeding populations of western monarch and develop a plan to seed, outplant, and maintain pollinator support species. |
| Public Outreach | 1 | 1.5 | One-off development, updates as needed | 2023 | 1.5.1 | Develop educational materials in coordination with San Mateo County Department of Parks to distribute to the public about natural resources on Pillar Point AFS and in the vicinity and ways to reduce disturbance from unauthorized pedestrian access to the Station. |
| Invasive Species | 1 | 1.5 | One-off development, updates as needed | 2024 | 1.5.2 | Establish a cooperative agreement with agencies willing to control invasive species near Pillar Point AFS with the goal of reducing the source populations of pampas grass, Cape ivy, French broom, and sweet fennel. |
| Vegetation, Fish and Wildlife | 1 | 1.5 | One-off development, updates as needed | 2024 | 1.5.3 | Explore the potential for using regional partnerships (e.g., Hummingbird Monitoring Network) to improve pollinator monitoring and conservation efforts. |

| Resource Category | Goal | Objective | Occurrence | FY | Project Number | Description |
|---|---|---|---|---|---|---|
| Vegetation, Fish and Wildlife | 2 | 2.1 | Annually | 2023, 2024, 2025, 2026, 2027 | 2.1.1 | Plan for and conduct an annual species-specific survey, alternating between a floral survey and a faunal survey each year. Prioritize surveys for protected species with unknown presence on the installation. |
| Pollinators | 2 | 2.1 | Every five years | 2024 | 2.1.2 | Survey for pollinators of conservation concern that may occur on the installation, including western bumble bee, monarch butterfly, calliope hummingbird, and rufous hummingbird. |
| Threatened and Endangered Species | 2 | 2.1 | Every five years | 2024 | 2.1.3 | Every five years, conduct targeted surveys for the CRLF in areas of the installation adjacent to Princeton marsh. |
| Threatened and Endangered Species | 2 | 2.1 | Annually | 2023, 2024, 2025, 2026, 2027 | 2.1.4 | Annually review the USFWS, NMFS, CDFW and California Native Plant Society lists of threatened and endangered species, as well as candidate species for listing and rare plant watch list species. Schedule survey needs and update documentation for newly added species that may be present on the installation or for those that may become candidates for protected status in the future. |
| Threatened and Endangered Species | 2 | 2.1 | As needed | 2023, 2024, 2025, 2026, 2027 | 2.1.5 | If a protected species is confirmed present on the installation, create and implement management plans utilizing survey information and best-management practices that protect the operational functionality of Pillar Point AFS mission while protecting and enhancing their populations on the installation under a changing climate, especially increasing temperatures. |

| Resource Category | Goal | Objective | Occurrence | FY | Project Number | Description |
|---|---|---|---|---|---|---|
| Fish and Wildlife, Threatened and Endangered Species, Vegetation, Invasive Species, Pollinators | 2 | 2.2 | Every five years | 2024 | 2.2.1 | By 2024, conduct inventories of plants, mammals, birds, invertebrates, and herpetofauna on Pillar Point AFS, with emphasis on protected, invasive, and pollinator species. Compare the results of these surveys to the initial 1993 baseline inventory and update the INRMP as needed to highlight any species that are newly detected on the installation. Repeat these surveys on a five-year schedule to identify newly arriving species as distributions change in response to climate change. |
| Invasive Species | 2 | 2.3 | Every five years | 2023 | 2.3.1 | Every five years, update the invasive species management plan with annual control data to facilitate adaptive management and progression of work towards specific goals. During the first update, develop (1) measurable species-specific target goals for reduction levels and/or timeframe for removal of all reproductive plants from the Station, and (2) monitoring protocols capable of determining progress toward goals. |
| Invasive Species | 2 | 2.3 | Three times per year | 2023, 2024, 2025, 2026, 2027 | 2.3.2 | Plan and budget for a minimum of three invasive plant control visits each year to treat high-priority species identified in Project 2.3.4 at the most effective growth stage. Leverage the existing grid-based treatment recording system to accurately track invasive species control and progress. |
| Vegetation | 2 | 2.3 | Annually | 2023, 2024, 2025, 2026, 2027 | 2.3.3 | Collect vegetation monitoring data annually consistent with established monitoring protocols, and use the data to evaluate invasive species control effectiveness and adapt management as needed. |

| Resource Category | Goal | Objective | Occurrence | FY | Project Number | Description |
|---|---|---|---|---|---|---|
| Invasive Species | 2 | 2.3 | Every five years | 2023 | 2.3.4 | Every five years, review invasive plant monitoring data and prioritize documented species for control based on degree of potential ecological harm, potential to harm protected species, extent of infestation, and availability of effective control measures. |
| Invasive Species | 2 | 2.3 | One-off development, updates as needed | 2025 | 2.3.5 | By 2025, develop effective treatment protocols for Cape ivy including ascertaining the most effective treatment timing intervals, chemical formulation, and follow-up restoration techniques. |
| Invasive Species | 2 | 2.3 | One-off development, updates as needed | 2026 | 2.3.6 | By 2026, develop effective treatment and restoration protocols for Bermuda buttercup including ascertaining the most effective timing, chemical formulation, and follow-up restoration techniques. |
| Invasive Species | 2 | 2.3 | Annually, as needed | 2023, 2024, 2025, 2026, 2027 | 2.3.7 | Maintain or further reduce the current low level of pampas grass infestation and treat 100 percent of seedlings in the first year to prevent any on-site reproduction. |
| Invasive Species | 2 | 2.3 | Annually, as needed | 2023, 2024, 2025, 2026, 2027 | 2.3.8 | Maintain the current extent of the Monterey cypress and Monterey pine by removing all seedlings within two years of establishment. |
| Invasive Species | 2 | 2.3 | Every three years | 2023, 2026 | 2.3.9 | Explore additional invasive plant control techniques such as using local community volunteers, expanding current |

| Resource Category | Goal | Objective | Occurrence | FY | Project Number | Description |
|---|---|---|---|---|---|---|
| | | | | | | eradication methods to include the use of mechanical removal, and increased herbicide application capabilities. |
| Invasive Species, Pollinators | 2 | 2.3 | Every three years | 2023, 2026 | 2.3.10 | Evaluate the current invasive species control efforts for opportunities to support native pollinators by reducing herbicide use or changing chemical formulations, timing, and/or application methods, as described in the USAF Pollinator Conservation Strategy and Reference Guide. |
| GIS, Erosion | 3 | 3.1 | One-off development, updates as needed | 2023 | 3.1.1 | Consolidate existing cliff erosion monitoring data and images into a related table within GeoBase. |
| Erosion | 3 | 3.1 | Annually | 2023, 2024, 2025, 2026, 2027 | 3.1.2 | Establish an annual monitoring protocol for documentation of ongoing erosion with photographic and remote sensing sources. |
| Erosion | 3 | 3.1 | One-off development, updates as needed | 2024 | 3.1.3 | Investigate feasibility of a hazards survey for identification of potential impacts to installation resources from erosion due to earthquake damage, increasing impacts from storm surge and precipitation intensity under a changing climate. |
| Erosion | 3 | 3.1 | One-off development, updates as needed | 2025 | 3.1.4 | Collaborate with local groups to identify opportunities for coastal erosion mitigation and develop feasibility studies for possible projects in line with San Mateo County Sea Level Vulnerability Assessment. |

| Resource Category | Goal | Objective | Occurrence | FY | Project Number | Description |
|---|---|---|---|---|---|---|
| Erosion | 3 | 3.2 | Annually | 2023, 2024, 2025, 2026, 2027 | 3.2.1 | Continue to collaborate with local groups to remediate erosion and impacts to sensitive resources from trails across the northern portion of the installation. |
| Outdoor Recreation, Erosion | 3 | 3.2 | Annually | 2023, 2024, 2025, 2026, 2027 | 3.2.2 | Perform annual monitoring of trail remediation and restoration work completed on Pillar Point AFS in 2019. |
| Erosion | 3 | 3.2 | Every three years | 2023, 2026 | 3.2.3 | Continuously monitor living shoreline project outcomes and develop new projects to support the positive results and extend if feasible. |
| Wetlands, GIS | 3 | 3.3 | One-off development, updates as needed | 2023 | 3.3.1 | Incorporate results of 2015 wetlands and surface waters survey into GeoBase. |
| Wetlands | 3 | 3.3 | One-off development, updates as needed | 2025 | 3.3.2 | Develop a management and monitoring plan for wetland and riparian areas identified in survey including goals addressing protection, restoration, and adaptive management of the resources under a changing climate. |
| Erosion, Public Outreach | 3 | 3.4 | Annually, as needed | 2023, 2024, 2025, 2026, 2027 | 3.4.1 | Maintain all existing erosion signage and improve as needed. |

| Resource Category | Goal | Objective | Occurrence | FY | Project Number | Description |
|---|---|---|---|---|---|---|
| Public Outreach | 3 | 3.4 | Every three years | 2023, 2026 | 3.4.2 | Seek opportunities to add additional signage to address erosion concerns or other relevant natural resources topics. |

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2619 ***Natural Resources Standard Titles by PB28 Code (excluding CZT/CZC titles):**

| INRP | MMA | T&E | MNRA | WTLD |
|---|---|---|---|---|
| P&F, CN | Mgt, Species | Mgt, Habitat | Compliance Public Notification | Mgt, Wetlands / Floodplains |
| Interagency/Intraagency, Government, Sikes Act | Interagency/Intraagency, Government, Sikes Act | Mgt, Species | Plan Update, Other | Monitor Wetlands |
| Interagency/Intraagency, Government, Sikes Act, CLEO | Outsourced Environmental Services, CN | Mgt, Invasive Species | Recordkeeping, Other | Interagency/Intraagency, Government, Sikes Act |
| Outsourced Environmental Services, CN | Supplies, CN | Mgt, Nuisance Wildlife | Outreach | Outsourced Environmental Services, CN |
| Supplies, CN | Supplies, CN, CLEO | Interagency/Intraagency, Government, Sikes Act | | |
| Supplies, CN, CLEO | Vehicle Leasing, CN | Interagency/Intraagency, Government, Sikes Act, CLEO | | |
| Equipment Purchase / Maintain, CN | | Outsourced Environmental Services, CN | | |
| Vehicle Leasing, CN | | Supplies, CN | | |
| Vehicle Fuel & Maintenance, CN | | Supplies, CN, CLEO | | |
| Mgt, Wildland Fire | | Equipment Purchase / Maintain, CN | | |
| Plan Update, INRMP | | Vehicle Leasing, CN | | |
| Plan Update, Other | | Vehicle Fuel & Maintenance, CN | | |
| Mgt, Habitat | | Plan Update, Other | | |

| INRP | MMA | T&E | MNRA | WTLD |
|---|---|---|---|---|
| Mgt, Species | | Environmental Services, CN | | |
| Mgt, Invasive Species | | | | |
| Mgt, Nuisance Wildlife | | | | |
| Recordkeeping, Other | | | | |
| Environmental Services, CN | | | | |

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## *11.1 Standard References (Applicable to all USAF installations)*

- AFMAN 32-7003, *Environmental Conservation*
- Sikes Act
- eDASH Natural Resources Program Page
- Natural Resources Playbook
- DoDI 4715.03, *Natural Resources Conservation Program*
- AFI 32-1015, *Integrated Installation Planning*
- AFI 32-10112, *Installation Geospatial Information and Services (IGI&S)*

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# 12.0 ACRONYMS

## *12.1 Standard Acronyms (Applicable to all USAF installations)*

- eDASH Acronym Library
- Natural Resources Playbook—Acronym Section
- U.S. EPA Terms & Acronyms

## *12.2 Installation Acronyms*

| | |
|---|---|
| 30 CES | 30th Civil Engineer Squadron |
| 30 CES/CC | 30th Civil Engineer Squadron Commander |
| 30 CES/CEI | 30th Civil Engineer Squadron Installation Management Flight |
| 30 CES/CEIE | 30th Civil Engineer Squadron, Installation Management Flight, Environmental Assets |
| 30 CES/CENPD | 30th Civil Engineer Squadron Comprehensive Planning |
| 30 SFS | 30th Security Forces Squadron |
| AF | Air Force |
| AFCEC | Air Force Civil Engineer Center |
| AFI | Air Force Instruction |
| AFPD | Air Force Policy Directive |
| AFS | Air Force Station |
| AR5 | Fifth Assessment Report |
| BASH | Bird/Wildlife Aircraft Strike Hazard |
| BMP | Best Management Practice |
| CCA | California Coastal Act |
| CCC | California Coastal Commission |
| CCNM | California Coastal National Monument |
| CCSM | Community Climate System Model |
| CDFG | California Department of Fish and Game (now CDFW, see below) |
| CDFW | California Department of Fish and Wildlife (formerly CDFG, see above) |
| CEMML | Center for Environmental Management of Military Lands |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act |
| CFR | Code of Federal Regulations |
| CLEO | Conservation Law Enforcement Officer |
| CNDDB | California Natural Diversity Data Base |
| CRLF | California Red-Legged Frog |
| CRM | Cultural Resources Management |
| CSU | Colorado State University |
| CUI | Controlled Unclassified Information |
| CWA | Clean Water Act |
| CZMA | Coastal Zone Management Act |
| DoD | Department of Defense |
| DoDI | Department of Defense Instruction |
| eDNA | Environmental DNA |
| EFH | Essential Fish Habitat |
| EIAP | Environmental Impact Analysis Process |
| EMS | Environmental Management System |
| EO | Executive Order |
| EPA | Environmental Protection Agency |
| ESA | Endangered Species Act |
| ESOH | Environmental, Safety, and Occupational Health |

| | |
|---|---|
| ESOHC | Environmental, Safety, and Occupational Health Council |
| ESOHCAMP | Environmental, Safety and Occupational Health Compliance Assessment and Management Program |
| FONPA | Finding of No Practicable Alternative |
| FONSI | Finding of No Significant Impact |
| GIS | Geographic Information System |
| IAW | In Accordance With |
| ICRMP | Integrated Cultural Resources Management Plan |
| INRMP | Integrated Natural Resources Management Plan |
| IPCC | Intergovernmental Panel on Climate Change |
| MBTA | Migratory Bird Treaty Act |
| MMPA | Marine Mammal Protection Act |
| MSA | Magnuson Stevens Fishery Conservation and Management Act |
| NCAR | National Center for Atmospheric Research |
| NEPA | National Environmental Policy Act |
| NHPA | National Historic Preservation Act |
| NMFS | National Marine Fisheries Service |
| NOAA | National Oceanic and Atmospheric Administration |
| NRHP | National Register of Historic Places |
| NRM | Natural Resource Manager |
| OCRM | Ocean & Coastal Resource Management |
| ORV | Off-road Vehicle |
| OPR | Office of Primary Responsibility |
| P.L. | Public Law |
| POC | Point of Contact |
| PRECIP | Average Annual Precipitation |
| QT | Holocene Terrace deposits |
| RCP | Representative Concentration Pathway |
| RMP | Resource Management Plan |
| ROD | Record of Decision |
| SAIC | Science Applications International Corporation |
| SBMNH | Santa Barbara Museum of Natural History |
| SFB | Space Force Base |
| SGF | San Gregorio Fault |
| SLD 30 | Space Launch Delta 30 |
| SLD 30/CC | Space Launch Delta 30 Installation Commander |
| SLR | Sea Level Rise |
| SS | Storm Surge |
| TAVE | Average Annual Temperature |
| T&E | Threatened and Endangered |
| TMAX | Average Annual Maximum Temperature |
| TMIN | Average Annual Minimum Temperature |
| U.S. | United States |
| U.S.C. | United States Code |
| USACE | United States Army Corps of Engineers |
| USAF | United States Air Force |
| USFWS | United States Fish and Wildlife Service |
| USGS | United States Geological Survey |
| WOTUS | Waters of the United States |

## 13.0 DEFINITIONS

### *13.1 Standard Definitions (Applicable to all USAF installations)*

- Natural Resources Playbook—Definitions Section

### *13.2 Installation Definitions*

- N/A

## 14.0 APPENDICES

### *14.1 Standard Appendices*

*14.1.1 Appendix A. Annotated Summary of Key Legislation Related to Design and Implementation of the INRMP.*

| Federal Public Laws and Executive Orders | |
|---|---|
| National Defense Authorization Act of 1989, Public Law (P.L.) 101-189; Volunteer Partnership Cost-Share Program | Amends two Acts and establishes volunteer and partnership programs for natural and cultural resources management on DoD lands. |
| Defense Appropriations Act of 1991, P.L. 101-511; Legacy Resource Management Program | Establishes the "Legacy Resource Management Program" for natural and cultural resources. Program emphasis is on inventory and stewardship responsibilities of biological, geophysical, cultural, and historic resources on DoD lands, including restoration of degraded or altered habitats. |
| EO 11514, *Protection and Enhancement of Environmental Quality* | Federal agencies shall initiate measures needed to direct their policies, plans, and programs to meet national environmental goals. They shall monitor, evaluate, and control agency activities to protect and enhance the quality of the environment. |
| EO 11593, *Protection and Enhancement of the Cultural Environment* | All Federal agencies are required to locate, identify, and record all cultural resources. Cultural resources include sites of archaeological, historical, or architectural significance. |
| EO 11987, *Exotic Organisms* | Agencies shall restrict the introduction of exotic species into the natural ecosystems on lands and waters which they administer. |
| EO 11988, *Floodplain Management* | Provides direction regarding actions of Federal agencies in floodplains, and requires permits from state, territory and Federal review agencies for any construction within a 100-year floodplain and to restore and preserve the natural and beneficial values served by floodplains in carrying out its responsibilities for acquiring, managing and disposing of Federal lands and facilities. |
| EO 11989, *Off-Road vehicles on Public Lands* | Installations permitting off-road vehicles to designate and mark specific areas/trails to minimize damage and conflicts, publish information including maps, and monitor the effects of their use. Installations may close areas if adverse effects on natural, cultural, or historic resources are observed. |

| Federal Public Laws and Executive Orders | |
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| EO 11990, *Protection of Wetlands* | Requires Federal agencies to avoid undertaking or providing assistance for new construction in wetlands unless there is no practicable alternative, and all practicable measures to minimize harm to wetlands have been implemented and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities for (1) acquiring, managing, and disposing of Federal lands and facilities; and (2) providing Federally undertaken, financed, or assisted construction and improvements; and (3) conducting Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities. |
| EO 12088, *Federal Compliance with Pollution Control Standards* | This EO delegates responsibility to the head of each executive agency for ensuring all necessary actions are taken for the prevention, control, and abatement of environmental pollution. This order gives the U.S. Environmental Protection Agency (US EPA) authority to conduct reviews and inspections to monitor federal facility compliance with pollution control standards. |
| EO 12898, *Environmental Justice* | This EO requires certain federal agencies, including the DoD, to the greatest extent practicable permitted by law, to make environmental justice part of their missions by identifying and addressing disproportionately high and adverse health or environmental effects on minority and low-income populations. |
| EO 13112, *Invasive Species* | To prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause. |
| EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds* | The USFWS has the responsibility to administer, oversee, and enforce the conservation provisions of the Migratory Bird Treaty Act, which includes responsibility for population management (e.g., monitoring), habitat protection (e.g., acquisition, enhancement, and modification), international coordination, and regulations development and enforcement. |
| **United States Code** | |
| Animal Damage Control Act (7 U.S.C. § 426-426b, 47 Stat. 1468) | Provides authority to the Secretary of Agriculture for investigation and control of mammalian predators, rodents, and birds. DoD installations may enter into cooperative agreements to conduct animal control projects. |
| Bald and Golden Eagle Protection Act of 1940, as amended; 16 U.S.C. 668-668c | This law provides for the protection of the bald eagle (the national emblem) and the golden eagle by prohibiting, except under certain specified conditions, the taking, possession and commerce of such birds. The 1972 amendments increased penalties for violating provisions of the Act or regulations issued pursuant thereto and strengthened other enforcement measures. Rewards are provided for information leading to arrest and conviction for violation of the Act. |
| Clean Air Act, (42 U.S.C. § 7401– 7671q, July 14, 1955, as amended) | This Act, as amended, is known as the Clean Air Act of 1970. The amendments made in 1970 established the core of the clean air program. The primary objective is to establish Federal standards for air pollutants. It is designed to improve air quality in areas of the country which do not meet federal standards and to prevent significant deterioration in areas where air quality exceeds those standards. |

| Federal Public Laws and Executive Orders | |
|---|---|
| Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 (Superfund) (26 U.S.C. § 4611–4682, P.L. 96-510, 94 Stat. 2797), as amended | Authorizes and administers a program to assess damage, respond to releases of hazardous substances, fund cleanup, establish clean-up standards, assign liability, and other efforts to address environmental contaminants. Installation Restoration Program guides cleanups at DoD installations. |
| Endangered Species Act (ESA) of 1973, as amended; P.L. 93-205, 16 U.S.C. § 1531 et seq. | Protects threatened, endangered, and candidate species of fish, wildlife, and plants and their designated critical habitats. Under this law, no federal action is allowed to jeopardize the continued existence of an endangered or threatened species. The ESA requires consultation with the USFWS and the NOAA Fisheries (National Marine Fisheries Service) and the preparation of a biological evaluation or a biological assessment may be required when such species are present in an area affected by government activities. |
| Federal Aid in Wildlife Restoration Act of 1937 (16 U.S.C. § 669–669i; 50 Stat. 917) (Pittman-Robertson Act) | Provides federal aid to states and territories for management and restoration of wildlife. Fund derives from sports tax on arms and ammunition. Projects include acquisition of wildlife habitat, wildlife research surveys, development of access facilities, and hunter education. |
| Federal Environmental Pesticide Act of 1972 | Requires installations to ensure pesticides are used only in accordance with their label registrations and restricted-use pesticides are applied only by certified applicators. |
| Federal Land Use Policy and Management Act, 43 U.S.C. § 1701–1782 | Requires management of public lands to protect the quality of scientific, scenic, historical, ecological, environmental, and archaeological resources and values; as well as to preserve and protect certain lands in their natural condition for fish and wildlife habitat. This Act also requires consideration of commodity production such as timbering. |
| Federal Noxious Weed Act of 1974, 7 U.S.C. § 2801–2814 | The Act provides for the control and management of non-indigenous weeds that injure or have the potential to injure the interests of agriculture and commerce, wildlife resources, or the public health. |
| Federal Water Pollution Control Act (Clean Water Act [CWA]), 33 U.S.C. §1251–1387 | The CWA is a comprehensive statute aimed at restoring and maintaining the chemical, physical, and biological integrity of the nation's waters. Primary authority for the implementation and enforcement rests with the US EPA. |
| Fish and Wildlife Conservation Act (16 U.S.C. § 2901–2911; 94 Stat. 1322, PL 96-366) | Installations encouraged to use their authority to conserve and promote conservation of nongame fish and wildlife in their habitats. |
| Fish and Wildlife Coordination Act (16 U.S.C. § 661 et seq.) | Directs installations to consult with the USFWS, or state or territorial agencies to ascertain means to protect fish and wildlife resources related to actions resulting in the control or structural modification of any natural stream or body of water. Includes provisions for mitigation and reporting. |

| Federal Public Laws and Executive Orders | |
|---|---|
| Lacey Act of 1900 (16 U.S.C. § 701, 702, 32 Stat. 187, 32 Stat. 285) | Prohibits the importation of wild animals or birds or parts thereof, taken, possessed, or exported in violation of the laws of the country or territory of origin. Provides enforcement and penalties for violation of wildlife related Acts or regulations. |
| Leases: Non-excess Property of Military Departments, 10 U.S.C. § 2667, as amended | Authorizes DoD to lease to commercial enterprises Federal land not currently needed for public use. Covers agricultural outleasing program. |
| Migratory Bird Treaty Act 16 U.S.C. § 703–712 | The Act implements various treaties for the protection of migratory birds. Under the Act, taking, killing, or possessing migratory birds is unlawful without a valid permit. |
| National Environmental Policy Act of 1969 (NEPA), as amended; P.L. 91-190, 42 U.S.C. § 4321 et seq. | Requires federal agencies to utilize a systematic approach when assessing environmental impacts of government activities. Establishes the use of environmental impact statements. NEPA proposes an interdisciplinary approach in a decision-making process designed to identify unacceptable or unnecessary impacts on the environment. The Council of Environmental Quality (CEQ) created Regulations for Implementing the National Environmental Policy Act [40 Code of Federal Regulations (CFR) Parts 1500– 1508], which provide regulations applicable to and binding on all Federal agencies for implementing the procedural provisions of NEPA, as amended. |
| National Historic Preservation Act, 16 U.S.C. § 470 et seq. | Requires federal agencies to take account of the effect of any federally assisted undertaking or licensing on any district, site, building, structure, or object included in or eligible for inclusion in the National Register of Historic Places (NRHP). Provides for the nomination, identification (through listing on the NRHP), and protection of historical and cultural properties of significance. |
| National Trails Systems Act (16 U.S.C. § 1241–1249) | Provides for the establishment of recreation and scenic trails. |
| National Wildlife Refuge Acts | Provides for establishment of National Wildlife Refuges through purchase, land transfer, donation, cooperative agreements, and other means. |
| National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. § 668dd–668ee) | Provides guidelines and instructions for the administration of Wildlife Refuges and other conservation areas. |
| Native American Graves Protection and Repatriation Act of 1990 (25 U.S.C. § 3001–13; 104 Stat. 3042), as amended | Established requirements for the treatment of Native American human remains and sacred or cultural objects found on Federal lands. Includes requirements on inventory, and notification. |
| Rivers and Harbors Act of 1899 (33 U.S.C. § 401 et seq.) | Makes it unlawful for the USAF to conduct any work or activity in navigable waters of the United States without a federal permit. Installations should coordinate with the U.S. Army Corps of Engineers (USACE) to obtain permits for the discharge of refuse affecting navigable waters under National Pollutant Discharge Elimination System (NPDES) and should coordinate with the USFWS to review effects on fish and wildlife of work and activities to be undertaken as permitted by the USACE. |

| Federal Public Laws and Executive Orders | |
|---|---|
| Sale of certain interests in land, 10 U.S.C. § 2665 | Authorizes sale of forest products and reimbursement of the costs of management of forest resources. |
| Soil and Water Conservation Act (16 U.S.C. § 2001, P.L. 95-193) | Installations shall coordinate with the Secretary of Agriculture to appraise, on a continual basis, soil/water-related resources. Installations will develop and update a program for furthering the conservation, protection, and enhancement of these resources consistent with other federal and local programs. |
| Sikes Act (16 U.S.C. § 670a–670l, 74 Stat. 1052), as amended | Provides for the cooperation of DoD, the Departments of the Interior (USFWS), and the State Fish and Game Department in planning, developing, and maintaining fish and wildlife resources on a military installation. Requires development of an INRMP and public access to natural resources and allows collection of nominal hunting and fishing fees.<br>NOTE: AFMAN 32-7003 sec 3.11. INRMP Implementation. As defined in DoDI 4715.03, use professionally trained natural resources management personnel with a degree in the natural sciences to develop and implement the installation INRMP. (T-0). 3.11.1. Outsourcing Natural Resources Management. As stipulated in the Sikes Act, 16 U.S.C. § 670 et. seq., the Office of Management and Budget Circular No. A-76, Performance of Commercial Activities, August 4, 1983 (Revised May 29, 2003) does not apply to the development, implementation and enforcement of INRMPs. Activities that require the exercise of discretion in making decisions regarding the management and disposition of government owned natural resources are inherently governmental. When it is not practicable to utilize DoD personnel to perform inherently governmental natural resources management duties, obtain these services from federal agencies having responsibilities for the conservation and management of natural resources. |
| **DoD Policy, Directives, and Instructions** | |
| DoD Instruction 4150.07 *DoD Pest Management Program* dated 29 May 2008 | Implements policy, assigns responsibilities, and prescribes procedures for the DoD Integrated Pest Management Program. |
| DoD Instruction 4715.1, *Environmental Security* | Establishes policy for protecting, preserving, and (when required) restoring and enhancing the quality of the environment. This instruction also ensures environmental factors are integrated into DoD decision-making processes that could impact the environment, and are given appropriate consideration along with other relevant factors. |
| DoD Instruction (DoDI) 4715.03, *Natural Resources Conservation Program* | Implements policy, assigns responsibility, and prescribes procedures under DoDI 4715.1 for the integrated management of natural and cultural resources on property under DoD control. |

| Federal Public Laws and Executive Orders | |
|---|---|
| OSD Policy Memorandum, 17 May 2005—*Implementation of Sikes Act Improvement Amendments: Supplemental Guidance Concerning Leased Lands* | Provides supplemental guidance for implementing the requirements of the Sikes Act in a consistent manner throughout DoD. The guidance covers lands occupied by tenants or lessees or being used by others pursuant to a permit, license, right of way, or any other form of permission. INRMPs must address the resource management on all lands for which the subject installation has real property accountability, including leased lands. Installation commanders may require tenants to accept responsibility for performing appropriate natural resource management actions as a condition of their occupancy or use, but this does not preclude the requirement to address the natural resource management needs of these lands in the installation INRMP. |
| OSD Policy Memorandum, 1 November 2004—*Implementation of Sikes Act Improvement Act Amendments: Supplemental Guidance Concerning INRMP Reviews* | Emphasizes implementing and improving the overall INRMP coordination process. Provides policy on scope of INRMP review, and public comment on INRMP review. |
| OSD Policy Memorandum, 10 October 2002—*Implementation of Sikes Act Improvement Act: Updated Guidance* | Provides guidance for implementing the requirements of the Sikes Act in a consistent manner throughout DoD and replaces the 21 September 1998 guidance Implementation of the Sikes Act Improvement Amendments. Emphasizes implementing and improving the overall INRMP coordination process and focuses on coordinating with stakeholders, reporting requirements and metrics, budgeting for INRMP projects, using the INRMP as a substitute for critical habitat designation, supporting military training and testing needs, and facilitating the INRMP review process. |
| **USAF Instructions and Directives** | |
| 32 CFR Part 989, as amended, and AFI 32-7061, Environmental Impact Analysis Process (EIAP) | Provides guidance and responsibilities in the EIAP for implementing INRMPs. Implementation of an INRMP constitutes a major federal action and therefore is subject to evaluation through an Environmental Assessment or an Environmental Impact Statement. |
| AFI 32-1015, *Integrated Installation Planning* | This publication establishes a comprehensive and integrated planning framework for development/redevelopment of Air Force installations.. |
| AFMAN 32-7003, *Environmental Conservation* | Implements AFPD 32-70, *Environmental Quality;* DoDI 4715.03, *Natural Resources Conservation Program*; and DoDI 7310.5, *Accounting for Sale of Forest Products*. It explains how to manage natural resources on USAF property in compliance with Federal, state, territorial, and local standards. |
| AFI 32-7065, *Cultural Resources Management* | This Manual implements AFPD 32-70 and DoDI 4710.1, *Archaeological and Historic Resources Management.* It explains how to manage cultural resources on USAF property in compliance with Federal, state, territorial, and local standards. |

| Federal Public Laws and Executive Orders | |
|---|---|
| AFI 32-10112 *Installation Geospatial Information and Services (IGI&S)* | This instruction implements Department of Defense Instruction (DoDI) 8130.01, Installation Geospatial Information and Services (IGI&S) by identifying the requirements to implement and maintain an Air Force Installation Geospatial Information and Services program and Air Force Policy Directive (AFPD) 32-10 Installations and Facilities. |
| AFPD 32-70, *Environmental Quality* | Outlines the USAF mission to achieve and maintain environmental quality on all USAF lands by cleaning up environmental damage resulting from past activities, meeting all environmental standards applicable to present operations, planning its future activities to minimize environmental impacts, managing responsibly the irreplaceable natural and cultural resources it holds in public trust and eliminating pollution from its activities wherever possible. AFPD 32-70 also establishes policies to carry out these objectives. |
| Policy Memo for Implementation of Sikes Act Improvement Amendments, HQ USAF Environmental Office (USAF/ILEV) on January 29, 1999 | Outlines the USAF interpretation and explanation of the Sikes Act and Improvement Act of 1997. |

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### *14.1.2 Appendix B. Additional INRMP Tables*

Table 14-1. Plant species known or expected to occur on Pillar Point AFS or in its immediate vicinity.

| PLANTS | | | | | | |
|---|---|---|---|---|---|---|
| ***Scientific Name*[1]** | **Common Name** | **Community[2]** | **Corelli[3]** | **Tetra Tech[4]** | **SBMNH[5]** | **Aarcher[6]** |
| *Acacia* sp. | Acacia | CTP, Planted | | | x | |
| *Achillea millefolium* | Yarrow | CS, CTP | x | x | x | x |
| *Acmispon wrangellianus* | Chile trefoil | CS, CTP | | | | x |
| *Agave americana* | American century plant | CS | | | | x |
| *Aira caryophyllea* | Silver hair grass | CTP | | | | x |
| *Allium* sp. | Onion | CTP | | | x | |
| *Allium triquetrum* | Three-square onion | R, CTP | | | | x |
| *Aloe arborescens* | Candelabra aloe | CS | | | | x |
| *Ambrosia chamissonis* | Beach bur | R | | | | x |
| *Ammi visnaga* | Bishop's weed | CTP | x | x | x | |
| *Anagallis arvensis (=Lysimachia arvensis)* | Scarlet pimpernel | CS, CTP, R | | x | x | x |
| *Anaphalis margaritacea* | Pearly everlasting | CS, CTP, WS | x | x | x | |
| *Angelica hendersonii* | Coast angelica | CS | x | | ? | x |
| *Apiastrum angustifolium* | Wild celery | CS | | | | x |
| *Arctotis calendula* | Capeweed | CTP | | | x | |
| *Armeria maritima* | Sea pink | CTP | | | x | |
| *Armeria maritima* ssp. *californica* | Sea-pink | CS | | | | x |
| *Artemisia californica* | California sagebrush | CS, CTP | | x | x | x |
| *Artemisia douglasiana* | Mugwort | CS, S | x | x | x | x |
| *Aster chilensis* | Aster | CS, S | x | x | | |
| *Astragalus nuttallii* var. *virgatus* | Nuttall's milkvetch | CS | | | | x |
| *Atriplex californica* | California saltbush | R | | | | x |
| *Atriplex prostrata* | Spearscale | R, S | | | | x |
| *Avena fatua* | Wild oat | G, CTP, R | x | x | x | x |
| *Baccharis pilularis* | Coyote brush | CS, CTP | x | x | x | x |
| *Bellardia trixago* | Bellardia | CTP, G | x | x | x | x |
| *Brachypodium distachyon* | Purple falsebrome | CTP | | | | x |
| *Brassica nigra* | Black mustard | CTP, R | x | x | x | |
| *Brassica rapa* | Field mustard | CTP, R | | | x | x |
| *Briza minor* | Small quaking grass | CTP, G | x | x | x | x |
| *Bromus carinatus* var. *maritimus* | California brome | CTP | x | x | x | |
| *Bromus diandrus* | Ripgut brome | G, CTP, R | | | x | x |
| *Bromus hordeaceus* | Soft chess | G, CTP, R | x | x | x | x |
| *Bromus madritensis* ssp. *rubens* | Red brome | R | | | | x |

Table 14-1. Plant species known or expected to occur on Pillar Point AFS or in its immediate vicinity.

| PLANTS | | | | | | |
|---|---|---|---|---|---|---|
| ***Scientific Name*[1]** | **Common Name** | **Community[2]** | **Corelli[3]** | **Tetra Tech[4]** | **SBMNH[5]** | **Aarcher[6]** |
| *Bromus maritimus* | Maritime brome | CS, CTP, R | | | | x |
| *Cakile maritima* | Sea rocket | Co. Strand | | x | | x |
| *Calandrinia ciliata* | Red maids | R | | | | x |
| *Cardamine californica* | Milk maids | CS | | | | x |
| *Cardamine oligosperma* | Few-seeded bitter cress | CTP, WS | | | | x |
| *Carduus pycnocephalus* ssp. *pycnocephalus* | Italian thistle | CS | | x | x | x |
| *Carex brevicaulis* | Short-stemmed sedge | CS, CTP | | | | x |
| *Carex praegracilis* | Freeway sedge | CS, CTP | | | | x |
| *Carex* spp. | Sedge | FM, CS, CTP | | | x | |
| *Carex subbracteata* | Small-bracted sedge | FM | | | x | x |
| *Carpobrotus chilensis* | Sea fig | CS | | x | x | x |
| *Carpobrotus edulis* | Iceplant | CS, CTP | x | x | x | x |
| *Castilleja affinis* ssp. *affinis* | Indian paint brush | CS | x | | x | |
| *Castilleja subinclusa* ssp. *franciscana* | Franciscan paintbrush | CTP | | | | x |
| *Castilleja wightii* | Wight's paintbrush | CS, CTP | | | | x |
| *Caulanthus lasiophyllus* | California mustard | CS | | | | x |
| *Centaurea melitensis* | Tocalote | CS | | | | x |
| *Centaurium davyi* | Centaury | CTP, WS | x | x | | |
| *Cerastium glomeratum* | Mouse-ear chickweed | G, R | | | x | |
| *Chenopodium californicum* | California goosefoot | CS | | | | x |
| *Chenopodium* sp. | Goosefoot | CS | | x | | |
| *Chlorogalum pomeridianum* | Amole | CTP | | | x | |
| *Chlorogalum pomeridianum* var. *pomeridianum* | Soap plant | CS, R | | | | x |
| *Cirsium occidentale* | Western thistle | CTP, CS | | x | x | |
| *Cirsium vulgare* | Bull thistle | CS, CTP | x | x | x | x |
| *Clinopodium douglasii* | Yerba buena | CTP | | | x | x |
| *Collinsea* sp. | Chinese houses | CTP | | | x | |
| *Conium maculatum* | Hemlock | CS, CTP, G, R WS | x | x | x | x |
| *Convolvulus arvensis* | Morning-glory | S | | | x | x |
| *Cortaderia jubata* | Jubata grass | CS, CTP, G | x | x | x | x |
| *Cota tinctoria* | Golden marguerite | R | | | | x |
| *Cotoneaster lacteus* | Late cotoneaster | CTP | | | | x |
| *Cotoneaster* sp. | Cotoneaster | CTP | x | x | x | |
| *Cotula coronopifolia* | Brass-buttons | S | | | | x |
| *Cynodon dactylon* | Bermuda grass | R | | | x | x |
| *Cynosurus echinatus* | Bristly dogtail grass | CS | | | | x |
| *Cyperus eragrostis* | Tall cyperus | R | | | | x |

Table 14-1. Plant species known or expected to occur on Pillar Point AFS or in its immediate vicinity.

| PLANTS | | | | | | |
|---|---|---|---|---|---|---|
| ***Scientific Name*[1]** | **Common Name** | **Community[2]** | **Corelli[3]** | **Tetra Tech[4]** | **SBMNH[5]** | **Aarcher[6]** |
| *Cyperus* sp. | Nut-sedge | CTP, WS | | x | x | |
| *Dactylis glomerata* | Orchard grass | R | | | | x |
| *Danthonia californica* | Oat grass | CTP | x | x | | x |
| *Daucus carota* | Queen Anne's lace | CTP | | | | x |
| *Daucus pusillus* | Rattlesnake weed | CS, R | | | | x |
| *Deinandra corymbosa* | Coast tarweed | CS | | | | x |
| *Deschampsia caespitosa* ssp. *holciformis* | California hairgrass | CS, R | | | | x |
| *Deschampsia cespitosa* var. *holciformis* | Tufted hairgrass | CTP | x | x | x | |
| *Dimorphotheca ecklonis* | Blue and white daisybush | R | | | | x |
| *Dipsacus sativus* | Fuller's teasel | CS | | | | x |
| *Distichlis spicata* | Salt grass | CTP | | x | | x |
| *Dryopteris arguta* | Coastal woodfern | CS | | | | x |
| *Dudleya farinosa* | Sea lettuce | CBS, CS | x | x | x | x |
| *Eleocharis* sp. | Spike-rush | FM | x | x | x | |
| *Elymus condensatus* | Giant wild rye | R | | | | x |
| *Elymus glaucus* ssp. *glaucus* | Blue wild rye | CTP | x | x | x | x |
| *Epilobium brachycarpum* | Panicled willow-herb | CTP, FM | | | | x |
| *Epilobium ciliatum* | Willow herb | FM | | | x | |
| *Epilobium* sp. | Willow herb | WS | | | x | |
| *Equisetum telmeteia* var. *braunii* | Giant horsetail | CS | | x | | |
| *Erigeron canadensis* | Horseweed | CS, WS | | | | x |
| *Erigeron glaucus* | Seaside daisy | CTP, CS | x | x | x | x |
| *Eriogonum latifolium* | Coast buckwheat | CS | x | x | x | x |
| *Eriogonum parvifolium* | Dune buckwheat | CS | | | | x |
| *Eriogonum* spp. | Buckwheat | CS | | x | | |
| *Eriophyllum stachaedifolium* | Golden yarrow (lizard tail) | CS | x | x | x | x |
| *Erodium cicutarium* | Red-stem filaree | CTP, G, R | x | x | x | x |
| *Eschscholzia californica* | California poppy | CTP | | x | x | x |
| *Eucalyptus globulus* | Blue gum | R | | | | x |
| *Euphorbia crenulata* | Chinese caps | CTP | | | | x |
| *Euphorbia peplus* | Petty spurge | CTP | | | x | |
| *Euthamia occidentalis* | Western goldenrod | S | | | | x |
| *Festuca arundinacea* | Tall fescue | R | | | | x |
| *Festuca bromoides* | Brome fescue | CS, R | | | | x |
| *Festuca myuros* | Rattail sixweeks grass | R | | | | x |
| *Festuca perennis* | Italian ryegrass | CTP | x | x | x | x |
| *Festuca rubra* | Red fescue | R | | | | x |

Table 14-1. Plant species known or expected to occur on Pillar Point AFS or in its immediate vicinity.

| PLANTS | | | | | | |
|---|---|---|---|---|---|---|
| ***Scientific Name*[1]** | **Common Name** | **Community[2]** | **Corelli[3]** | **Tetra Tech[4]** | **SBMNH[5]** | **Aarcher[6]** |
| *Festuca subuliflora* | Crinkle-awn fescue | CTP | x | x | ? | |
| *Foeniculum vulgare* | Fennel | CTP | x | x | x | x |
| *Fragaria chiloensis* | Beach strawberry | CS, CTP | x | x | x | x |
| *Fragaria vesca* | Wood strawberry | CS | | | | x |
| *Frangula californica* ssp. *californica* | California coffeeberry | CS, CTP, R, WS | | | | x |
| *Galium aparine* | Goosegrass | R | | | | x |
| *Galium californicum* | Bedstraw | CTP | | | x | |
| *Gamochaeta ustulata* | Purple cudweed | CS, CTP, R | | | | x |
| *Genista monspessulana* | French broom | CTP | x | x | x | x |
| *Geranium dissectum* | Cut-leaved geranium | CTP, G, WS | x | x | x | x |
| *Gnaphalium purpureum* | Cudweed | CTP, G | x | x | x | |
| *Grindelia stricta* var. *platyphylla* | Gum plant | CBS, CS, CTP | x | x | x | x |
| *Grindelia stricta* var. *stricta* | Gum plant | CBS, CS, CTP | x | x | x | |
| *Helenium puberulum* | Sneezeweed | WS | x | x | | x |
| *Heliotropium curassavicum* var. *oculatum* | Seaside heliotrope | CS | | | | x |
| *Helminthotheca echioides* | Bristly ox-tongue | CS, CTP, R | | | | x |
| *Heracleum lanatum (H. maximum)* | Cow-parsnip | CBS, CS, CTP | x | x | x | |
| *Hesperocyparis macrocarpa* | Monterey cypress | CTP | x | x | x | x |
| *Heteromeles arbutifolia* | Toyon | CS, WS | | | | x |
| *Hirschfeldia incana* | Summer mustard | CS, R | | | | x |
| *Holcus lanatus* | Velvet grass | CTP | x | x | | x |
| *Holodiscus discolor* var. *discolor* | Oceanspray | CS | | | | x |
| *Hordeum brachyantherum* | Meadow barley | FM | | | | x |
| *Hordeum murinum* | Foxtail | G, R | | | x | |
| *Hordeum murinum* ssp. *leporinum* | Farmer's foxtail | R | | | | x |
| *Horkelia californica* var. *californica* | California horkelia | CTP | x | x | x | x |
| *Hypochaeris radicata* | Rough cat's-ear | CTP, R | | | | x |
| *Hypochoeris radicata* | Hairy cat's ear | CTP | x | x | x | x |
| *Iris douglasiana* | Douglas' iris | CS, CTP | | | | x |
| *Iris longipetela* | Coast iris | CS, CTP | x | x | x | |
| *Isolepis cernua* | Low clubrush | FM | | | | x |
| *Juncus balticus* | Baltic rush | CS, CTP, FM, S | | x | x | |
| *Juncus bufonius* var. *congestus* | Clustered toad rush | FM | | | | x |
| *Juncus effusus* | Soft rush | S | | x | x | |
| *Juncus effusus* ssp. *pacificus* | Pacific rush | CTP, FM | | | | x |
| *Juncus falcatus* ssp. *falcatus* | Sickle-leaved rush | CTP | | | | x |

Table 14-1. Plant species known or expected to occur on Pillar Point AFS or in its immediate vicinity.

| PLANTS | | | | | | |
|---|---|---|---|---|---|---|
| ***Scientific Name*[1]** | **Common Name** | **Community[2]** | **Corelli[3]** | **Tetra Tech[4]** | **SBMNH[5]** | **Aarcher[6]** |
| *Juncus lescurii* | Salt rush | FM | | | | x |
| *Juncus occidentalis* | Western rush | CTP | | | | x |
| *Juncus patens* | Spreading rush | CS | | x | x | x |
| *Juncus phaeocephalus* | Brown-headed rush | CS, G, S | | x | x | |
| *Juncus* spp. | Rush | FM, S | | x | x | |
| *Koeleria macrantha* | June grass | CTP | | | x | |
| *Lathyrus* sp. | Wild pea | CS | | | x | |
| *Lathyrus vestitus* var. *vestitus* | Common Pacific pea | CS | | | | x |
| *Lavatera* sp. | Lavatera | CTP | | | x | |
| *Lemna minor* | Smaller duckweed | FM, WS | | | | x |
| *Lepidium strictum* | Wayside peppergrass | R | | | | x |
| *Leptosiphon rosaceus* | Rose leptosiphon | CS | | | | x |
| *Leucanthemum maximum* | Shasta daisy | CS | | | | x |
| *Leymus* sp. | Rue grass | CTP | | | x | |
| *Leymus x vancouverensis* | Rye grass | CTP | x | x | | |
| *Linum bienne* | Flax | CTP | x | x | x | x |
| *Lobularia maritima* | Sweet alyssum | CTP, G | | | x | x |
| *Logfia gallica* | Daggerleaf cottonrose | CTP | | | | x |
| *Lonicera hispidula* | Hairy honeysuckle | CS, CTP | | | | x |
| *Lonicera involucrata* | Twinberry | CS | | x | x | |
| *Lotus corniculatus* | Birdsfoot trefoil | CTP, G, W | x | x | x | x |
| *Lupinus arboreus* | Yellow bush lupine | CS, CTP | x | x | x | x |
| *Lupinus littoralis* | Lupine | CS, CTP | x | x | | |
| *Lupinus* sp. | Lupine | CTP | | | x | |
| *Lupinus variicolor* | Lindley's varied lupine | CS, CTP | x | x | | x |
| *Luzula comosa* var. *comosa* | Common wood rush | CTP | | | | x |
| *Luzula multiflora* | Wood rush | S | | x | x | |
| *Lythrum hyssopifolia* | Grass-poly | FM | | | | x |
| *Madia sativa* | Tarweed (coast madia) | CS | x | x | | x |
| *Malva parviflora* | Cheeseweed | R | | | | x |
| *Marah fabaceus* | California man-root | CS | | | | x |
| *Matricaria discoidea* | Pineapple weed | R | | | | x |
| *Medicago polymorpha* | Burclover | R | | | | x |
| *Melilotus indicus* | Annual yellow sweet-clover | CTP, R | | x | x | x |
| *Melilotus officinalis* | Yellow sweet-clover | CTP | x | x | | |
| *Mimulus aurantiacus* | Bush monkeyflower | CS | | x | x | |
| *Mimulus aurantiacus* var. *aurantiacus* | Sticky monkeyflower | CS | | | | x |

Table 14-1. Plant species known or expected to occur on Pillar Point AFS or in its immediate vicinity.

| PLANTS | | | | | | |
|---|---|---|---|---|---|---|
| ***Scientific Name*[1]** | **Common Name** | **Community[2]** | **Corelli[3]** | **Tetra Tech[4]** | **SBMNH[5]** | **Aarcher[6]** |
| *Myoporum laetum* | Myoporum | CS | | | | x |
| *Nassella lepida* | Foothill needlegrass | CS, CTP | x | x | | |
| *Navarettia squarrosa* | Skunkweed | S | x | x | | x |
| *Oenanthe sarmentosa* | Pacific water parsley | S, WS | | | | x |
| *Oenothera elata* ssp. *hookeri* | Hooker's evening primrose | CTP, FM | | | | x |
| *Oenothera elata* var. *hookeri* | Evening primrose | CS, CTP | x | x | x | |
| *Opuntia* sp. | Cholla cactus | CS | | | | x |
| *Opuntia* spp. | Prickly pear | CTP | | x | x | |
| *Oxalis corniculata* | Creeping woodsorrel | CTP, R | | | | x |
| *Oxalis pes-caprae* | Bermuda buttercup | CTP | x | x | | x |
| *Pentagramma triangularis* ssp. *triangularis* | Goldback fern | CS | | | | x |
| *Persicaria amphibia* | Water knotweed | WS | | | | x |
| *Phalaris californica* | California canary grass | CS | | | | x |
| *Phalaris* sp. | Canary grass | CTP | | x | x | |
| *Phyllospadix scouleri* | Scouler's surfgrass | R | | | | x |
| *Picris echioides* | Prickly ox-tongue | CTP, G, R | x | x | x | |
| *Pinus radiata* | Monterey pine | Planted | x | x | x | x |
| *Plantago coronopus* | Plantain | CS, CTP, G | x | x | x | x |
| *Plantago lanceolata* | English plantain | CTP | x | x | x | x |
| *Plantago maritima* | Seaside plantain | CS | | x | | x |
| *Poa annua* | Annual bluegrass | R | | | x | |
| *Poa secunda* ssp. *secunda* | One-sided bluegrass | CTP | | x | | |
| *Polygonum aviculare* ssp. *depressum* | Common knotweed | R | | | | x |
| *Polygonum paronychia* | Knotweed | CS, CTP | x | x | | |
| *Polypodium californicum* | California polypody | CS | | | | x |
| *Polypodium scouleri* | Leather fern | CS | | x | x | |
| *Polypogon elongatus* | Beard grass | CTP | x | x | | |
| *Polypogon monspeliensis* | Rabbitsfoot grass | CTP | | x | x | x |
| *Polystichum munitum* | Sword fern | CTP | | x | x | x |
| *Potentilla anseriana* ssp. *pacifica (P. egedii)* | Silver cinquefoil | CS | | x | x | |
| *Potentilla anserina* ssp. *pacifica* | Pacific silverweed | CTP, FM | | | | x |
| *Potentilla/Horkelia* | Potentilla/horkelia | CS, CTP | x | x | x | |
| *Prunella vulgaris* var. *lanceolata* | Narrowleaf self-heal | CS | | | | x |
| *Pseudognaphalium californicum* | California cudweed | CS, R | | | | x |
| *Pseudognaphalium luteoalbum* | Weedy cudweed | CS, R | | | | x |
| *Pseudognaphalium ramosissimum* | Pink cudweed | G, R | | | s | x |
| *Pseudognaphalium stramineum* | Cotton-batting plant | CS, R | | | | x |

Table 14-1. Plant species known or expected to occur on Pillar Point AFS or in its immediate vicinity.

| PLANTS | | | | | | |
|---|---|---|---|---|---|---|
| ***Scientific Name*[1]** | **Common Name** | **Community[2]** | **Corelli[3]** | **Tetra Tech[4]** | **SBMNH[5]** | **Aarcher[6]** |
| *Pseudotsuga menziesii* var. *menziesii* | Douglas fir | CS | | | | x |
| *Pteridium aquilinum* var. *pubescens* | Bracken fern | CS | x | x | x | x |
| *Pyracantha angustifolia* | Firethorn | CTP | x | x | x | |
| *Ranunculus californicus* | California buttercup | CS | | | | x |
| *Raphanus sativus* | Wild radish | CTP, R | x | x | x | x |
| *Rhamnus californica* | Coffeeberry | CS | x | x | x | |
| *Ribes sanguineum* var. *glutinosum* | Red-flowering currant | CS | | | | x |
| *Rosa californica* | Wild rose | CS | x | x | | x |
| *Rubus ursinus* | Blackberry | CTP, CS, WS | x | x | x | x |
| *Rumex acetosella* | Sheep sorrel | CS, CTP | x | x | x | x |
| *Rumex crispus* | Curly dock | CS | | x | | x |
| *Rumex salicifolius crassus* | Spreading dock | CS, CTP, WS | x | x | x | |
| *Rumex transitorius* | Willow dock | R | | | | x |
| *Salix lasiolepis* | Arroyo willow | CTP, WS | x | x | | x |
| *Sambucus racemosa* var. *racemosa* | Red elderberry | CS, WS | | | | x |
| *Sanicula crassicaulis* | Pacific sanicle | CS, CTP | x | x | x | x |
| *Sanicula* sp. | Sanicle | CTP | | | x | |
| *Schismus* sp. | Mediterranean grass | R | | | x | |
| *Schoenoplectus californicus* | California bulrush | FM | | | x | x |
| *Scirpus cernuus* | Fiber optic grass | S | | x | | |
| *Scrophularia californica* | California bee plant | CS, CTP, WS | x | x | x | x |
| *Senecio mikanioides (Delairea odorata)* | Cape ivy | CS, WS | | x | x | x |
| *Sequoia sempervirens* | Coast redwood | CS | | | | x |
| *Sherardia arvensis* | Field madder | CS, CTP | | | | x |
| *Sidalcea malvaefolia* | Checker mallow | CS, CTP | x | x | x | |
| *Sidalcea malviflora* ssp. *malviflora* | Checkerbloom | CTP | | | | x |
| *Silene gallica* | Windmill pink | G | | | x | x |
| *Silybum marianum* | Milk thistle | CS | | | | x |
| *Sisyrinchium bellum* | Blue-eyed grass | CS, CTP, G | x | x | x | x |
| *Solanum americanum* | Small-flowered nightshade | CS, FM | | | | x |
| *Sonchus asper* | Prickly sow-thistle | CTP, G, R | | x | | |
| *Sonchus asper* ssp. *asper* | Prickly sow thistle | CS, CTP, R | | | | x |
| *Sonchus oleraceus* | Sow thistle | CTP, G | x | x | x | x |
| *Sparganium eurycarpum* var. *eurycarpum* | Broad-fruited bur-reed | FM, WS | | | | x |
| *Spergularia macrotheca* var. *macrotheca* | Large-flowered sand-spurrey | CS | | | | x |
| *Spergularia rubra* | Purple sand-spurrey | CS | | | | x |

Table 14-1. Plant species known or expected to occur on Pillar Point AFS or in its immediate vicinity.

| PLANTS | | | | | | |
|---|---|---|---|---|---|---|
| ***Scientific Name***[1] | **Common Name** | **Community**[2] | **Corelli**[3] | **Tetra Tech**[4] | **SBMNH**[5] | **Aarcher**[6] |
| *Stachys albens* | White-stem hedge-nettle | CTP | | x | x | |
| *Stachys rigida* var. *quercetorum* | Hedge nettle | CS | x | x | x | x |
| *Stipa pulchra (=Nassella pulchra)* | Purple needlegrass | CTP | | x | x | x |
| *Symphyotrichum chilense* | Common California aster | CS, CTP, R | | | | x |
| *Taraxacum officinale* | Common dandelion | R | | | | x |
| *Taraxia ovata* | Sun cup | CTP | x | x | x | x |
| *Tetragonia tetragonioides* | New Zealand spinach | R | | | | x |
| *Toxicodendron diversilobum* | Poison oak | CBS, CS, CTP | x | x | x | x |
| *Trifolium angustifolium* | Narrow-leaved clover | CTP | | | | x |
| *Trifolium dubium* | Little hop clover | R | | | | x |
| *Trifolium* spp. | Clover | CS, CTP | | x | x | |
| *Typha latifolia* | Broad-leaved cattail | FM | | | | x |
| *Typha* sp. | Cattail | FM | | x | x | |
| *Urtica californica* | Stinging nettle | WS | x | x | x | |
| *Urtica dioica* ssp. *holosericea* | Hoary nettle | R, WS | | | | x |
| *Urtica urens* | Dwarf nettle | CTP | | | x | |
| *Vicia americana americana* | American vetch | CS | x | x | | |
| *Vicia benghalensis* | Purple vetch | CTP | x | x | | x |
| *Vicia sativa nigra* | Narrow-leaved vetch | CS | x | x | | |
| *Vicia sativa* ssp. *sativa* | Spring vetch | CTP | x | x | x | x |
| *Vulpia bromoides* | Six-weeks fescue | CTP | x | x | | |
| *Vulpia myuros* var. *myuros* | Rattail fescue | CT, G, R | | x | x | |
| *Zeltnera muehlenbergii* | Monterey centaury | CS, CTP | | | | x |

x indicates species was reported at or in immediate vicinity of Pillar Point Air Force Station during one of the surveys indicated.

1. Scientific names follow Hickman, J. C. (Ed.). 1993. The Jepson Manual. Higher Plants of California. Univ. California Press. 1400 pp.

2. Plant Communities

CS = Coastal Scrub
CTP = Coastal Terrace Prairie
FM = Freshwater Marsh
G = Non-native Grassland
R = Ruderal
S = Coastal Swale
WS = Willow Scrub

3. Correlli, T. 1993. Plant and Community Plant Survey of the Pillar Point Air Force Station Half Moon Bay, California. 7 pp. *In* The Nature Conservancy (1993). Natural Resources Surveys of the Pillar Point Air Force Station Half Moon Bay, California. Submitted to Department of the Air Force, Headquarters 30th Space Wing, Vandenberg Air Force Base, California. Prepared by The Nature Conservancy, San Francisco, CA.

4. Tetra Tech. 1999. Appendix B. Natural Resources Survey Report Pillar Point Repair Project. *In* Final Environmental Assessment for the Pillar Point Repair Project Pillar Point Air Force Station, California. 2 September 1999. Submitted to: 30CES/CEUPP, Vandenberg Air Force Base, California.

5. Santa Barbara Museum of Natural History. 2000. Integrated Natural Resources Management Plan, Vandenberg Air Force Base; Supplement, Pillar Point Air Force Station for Plan Period November 2000 – November 2005. 3 November 2000. 75 pp.

6. Aarcher Inc. 2015. Wetlands, Vegetation, and Rare Plant Surveys and Geologic Mapping at Pillar Point Air Force Station, San Mateo County, California: A Technical Report in Support of the U.S. Air Force Integrated Natural Resources Management Plan. Aarcher, Inc., Annapolis, MD.

Table 14-2. Wildlife species known or expected to occur at Pillar Point AFS or in its immediate vicinity.

| WILDLIFE | | | | | |
|---|---|---|---|---|---|
| **Common Name** | ***Scientific Name*** | **Correlli[1]** | **Tetra Tech[2]** | **SBMNH[3]** | **Ersan et al.[4]** |
| ***AMPHIBIANS*** | | | | | |
| Arboreal salamander | *Aneides lugubris* | | | | x |
| California slender salamander | *Batrachoseps attenuatus* | x | x | x | x |
| Coast range newt | *Taricha torosa torosa* | x | x | | |
| Western toad | *Bufo boreas* | x | x | x | |
| Pacific chorus frog | *Pseudacris regilla* | x | x | x | |
| California red-legged frog | *Rana draytonii* | | | x | |
| Sierran treefrog | *Pseudacris sierra* | | | | x |
| Yellow-eyed ensatina | *Ensatina eschscholtzii xanthoptica* | | | | x |
| ***REPTILES*** | | | | | |
| Northwestern fence lizard | *Sceloporus occidentalis occidentalis* | x | x | x | |
| Western skink | *Eumeces skiltonianus* | x | x | x | |
| San Francisco alligator lizard | *Elgaria coerulea coerulea* | x | x | x | x |
| California alligator lizard | *Elgaria multicarinata multicarinata* | x | x | | |
| Coast range fence lizard | *Sceloporus occidentalis bocourtii* | | | | x |
| Pacific ringneck snake | *Diadophis punctatus amabilis* | x | x | x | |
| Sharp-tailed snake | *Contia tenuis* | x | x | | |
| Western yellow-bellied racer | *Coluber constrictor mormon* | x | x | x | |
| Pacific gopher snake | *Pituophis melanoleucus catenifer* | x | x | x | |
| Common kingsnake | *Lampropeltis getulus californiae* | x | x | x | |
| San Francisco garter snake* | *Thamnophis sirtalis tetrataenia* | x | x | x | |
| Coast garter snake | *Thamnophis elegans terrestris* | x | x | x | x |
| Santa Cruz garter snake | *Thamnophis couchii atratus* | x | x | x | x |
| California night snake | *Hypsiglena torquata nuchalata* | x | x | x | |
| Northern Pacific rattlesnake | *Crotalus oreganus oreganus* | x | x | x | |
| ***BIRDS*** | | | | | |
| Pacific loon | *Gavia pacifica* | | x | x | |
| Common loon | *Gavia immer* | | | x | |
| Western grebe | *Aechmophorus occidentalis* | | x | | |
| California brown pelican | *Pelecanus occidentalis californicus* | x | x | x | |
| Double-crested cormorant | *Phalacrocorax auritus* | x | | x | |
| Pelagic cormorant | *Phalacrocorax pelagicus* | x | x | x | |
| Great blue heron | *Ardea herodias* | x | | x | |
| Snowy egret | *Egretta thula* | | | x | |

Table 14-2. Wildlife species known or expected to occur at Pillar Point AFS or in its immediate vicinity.

| WILDLIFE | | | | | |
|---|---|---|---|---|---|
| **Common Name** | ***Scientific Name*** | **Correlli[1]** | **Tetra Tech[2]** | **SBMNH[3]** | **Ersan et al.[4]** |
| Black-crowned night heron | *Nycticorax nycticorax* | x | | x | |
| Brant goose | *Branta bernicla* | | | x | |
| Mallard | *Anas platyrhynchos* | | | x | |
| Cinnamon teal | *Anas cyanoptera* | | | x | |
| Gadwall | *Anas strepera* | | | x | |
| Surf scoter | *Melanitta perspicillatus* | | x | x | |
| White-winged scoter | *Melanitta fusca* | x | | | |
| Hooded merganser | *Lophodytes cucullatus* | | | | |
| Turkey vulture | *Cathartes aura* | | | x | |
| Osprey | *Pandion haliaetus* | | x | | |
| Cooper's hawk | *Accipiter cooperii* | | | x | |
| Red-tailed hawk | *Buteo jamaicensis* | x | | x | |
| American kestrel | *Falco sparverius* | x | | x | |
| Peregrine falcon | *Falco peregrinus* | | | | |
| Sora | *Porzana carolina* | x | | | |
| American coot | *Fulica americana* | | | x | |
| Black-bellied plover | *Pluvialis squatarola* | x | | | |
| Semipalmated plover | *Charadrius semipalmatus* | x | | x | |
| Killdeer | *Charadrius vociferus* | x | | x | |
| American oystercatcher | *Haematopus palliatus* | x | x | | |
| Black oystercatcher | *Haematopus bachmani* | | | x | |
| Greater yellowlegs | *Tringa melanoleuca* | | | x | |
| Willet | *Catoptrophorus semipalmatus* | x | x | x | |
| Wandering tattler | *Heteroscelus incanus* | x | x | x | |
| Whimbrel | *Numenius phaeopus* | x | | x | |
| Marbled godwit | *Limosa fedoa* | x | | x | |
| Ruddy turnstone | *Arenaria interpres* | x | | | |
| Black turnstone | *Arenaria melanocephala* | x | x | | |
| Surfbird | *Aphriza virgata* | x | | | |
| Sanderling | *Calidris alba* | x | x | x | |
| Western sandpiper | *Calidris mauri* | | | x | |
| Dunlin | *Calidris alpina* | | x | | |
| Bonaparte's gull | *Larus philadelphia* | | | x | |

Table 14-2. Wildlife species known or expected to occur at Pillar Point AFS or in its immediate vicinity.

| WILDLIFE | | | | | |
|---|---|---|---|---|---|
| **Common Name** | ***Scientific Name*** | **Correlli[1]** | **Tetra Tech[2]** | **SBMNH[3]** | **Ersan et al.[4]** |
| California gull | *Larus californicus* | x | x | | |
| Herring gull | *Larus argentatus* | x | | x | |
| Western gull | *Larus occidentalis* | x | x | x | |
| Glaucous-winged gull | *Larus glaucescens* | x | | x | |
| Caspian tern | *Sterna caspia* | x | | x | |
| Elegant tern | *Sterna elegans* | x | | | |
| Forster's tern | *Sterna forsteri* | | | x | |
| Pigeon guillemot | *Cepphus columba* | | | | |
| Mourning dove | *Zenaida macroura* | x | | x | |
| White-throated swift | *Aeronautes saxatalis* | x | | x | |
| Anna's hummingbird | *Calypte anna* | x | x | x | |
| Allen's hummingbird | *Selasphorus sasin* | x | | x | |
| Belted kingfisher | *Colaptes alcyon* | x | | x | |
| Northern flicker | *Colaptes auratus* | x | | x | |
| Nuttall's woodpecker | *Picoides nuttallii* | | | | |
| Pacific-slope flycatcher | *Empidonax difficilis* | | | | |
| Black phoebe | *Sayornis nigricans* | x | x | x | |
| Say's phoebe | *Sayornis saya* | x | x | x | |
| Western kingbird | *Tyrannus verticalis* | x | | x | |
| Tree swallow | *Tachycineta bicolor* | | | x | |
| Violet-green swallow | *Tachycineta thalassina* | x | | x | |
| Northern rough-winged swallow | *Stelgidopteryx serripennis* | x | | x | |
| Bank swallow | *Riparia riparia* | x | | | |
| Cliff swallow | *Hirundo pyrrhonota* | x | | x | |
| Barn swallow | *Hirundo rustica* | x | | x | |
| American crow | *Corvus brachyrhynchos* | x | | x | |
| Common raven | *Corvus corax* | x | x | x | |
| Western scrub-jay | *Aphelocoma californica* | x | x | x | |
| Bushtit | *Psaltriparus minimus* | x | | x | |
| Bewick's wren | *Thryomanes bewickii* | x | | x | |
| House wren | *Troglodytes aedon* | x | | x | |
| Blue-gray gnatcatcher | *Polioptila caerulea* | x | x | x | |
| American robin | *Turdus migratorius* | x | | x | |

Table 14-2. Wildlife species known or expected to occur at Pillar Point AFS or in its immediate vicinity.

| WILDLIFE | | | | | |
|---|---|---|---|---|---|
| **Common Name** | ***Scientific Name*** | **Correlli[1]** | **Tetra Tech[2]** | **SBMNH[3]** | **Ersan et al.[4]** |
| Wrentit | *Chamaea fasciata* | x | x | | |
| Northern mockingbird | *Mimus polyglottos* | | x | x | |
| European starling | *Sturnus vulgaris* | x | | x | |
| Orange-crowned warbler | *Vermivora celata* | x | | x | |
| Yellow-rumped warbler | *Dendroica coronata* | x | | x | |
| San Francisco common yellowthroat** | *Geothlypis trichas sinuosa* | x | | x | |
| Wilson's warbler | *Wilsonia pusilla* | x | | x | |
| California towhee | *Pipilo crissalis* | x | x | x | |
| Spotted towhee | *Pipilo maculatus* | | | | |
| Savannah sparrow | *Passerculus sandwichensis* | x | | x | |
| Fox sparrow | *Passerella iliaca* | x | | x | |
| Song sparrow | *Melospiza melodia* | x | | x | |
| Lincoln's sparrow | *Melospiza lincolnii* | x | | x | |
| Golden-crowned sparrow | *Zonotrichia atricapilla* | x | | x | |
| White-crowned sparrow | *Zonotrichia leucophrys* | x | x | x | |
| Dark-eyed junco | *Junco hyemalis* | x | | x | |
| Red-winged blackbird | *Agelaius phoeniceus* | x | | x | |
| Western meadowlark | *Sturnella neglecta* | x | | x | |
| Brewer's blackbird | *Euphagus cyanocephalus* | x | | x | |
| Brown-headed cowbird | *Molothrus ater* | x | | x | |
| Purple finch | *Carpodacus purpureus* | | | x | |
| House finch | *Carpodacus mexicanus* | x | x | x | |
| Lesser goldfinch | *Carduelis psaltria* | | | x | |
| American goldfinch | *Carduelis tristis* | x | x | x | |
| ***MAMMALS*** | | | | | |
| Virginia opossum | *Didelphis virginiana* | | | x | |
| Ornate shrew | *Sorex ornatus* | | | x | |
| Trowbridge's shrew | *Sorex trowbridgii* | | | x | |
| Monterey vagrant shrew | *Sorex vagrans paludivagus* | | | x | |
| Broad-footed mole | *Scapanus latimanus* | | | x | |
| Shrew mole | *Neurotrichus gibbsii* | | | x | |
| Big brown bat | *Eptesicus fuscus* | | | x | |
| Brazilian free-tailed bat | *Tadarida brasiliensis* | | | x | |
| Brush rabbit | *Sylvilagus bachmani* | x | x | x | |

Table 14-2. Wildlife species known or expected to occur at Pillar Point AFS or in its immediate vicinity.

| WILDLIFE | | | | | |
|---|---|---|---|---|---|
| **Common Name** | ***Scientific Name*** | **Correlli[1]** | **Tetra Tech[2]** | **SBMNH[3]** | **Ersan et al.[4]** |
| California ground squirrel | *Spermophilus beecheyi* | | | x | |
| California pocket mouse | *Chaetodipus californicus* | | x | | |
| Botta's pocket gopher | *Thomomys bottae* | x | x | x | |
| Western harvest mouse | *Reithrodontomys megalotis* | | | x | |
| California mouse | *Peromyscus californicus* | | | x | |
| Deer mouse | *Peromyscus maniculatus* | x | x | x | |
| San Francisco dusky-footed woodrat | *Neotoma fuscipes annectens* | | | x | |
| California vole | *Microtus californicus* | | | x | |
| Coyote | *Canis latrans* | x | x | x | |
| Gray fox | *Urocyon cinereoargenteus* | x | x | x | |
| Red fox | *Vulpes vulpes* | | x | x | |
| Raccoon | *Procyon lotor* | x | x | x | |
| Long-tailed weasel | *Mustela frenata* | | x | x | |
| Striped skunk | *Mephitis mephitis* | x | x | x | |
| Southern sea otter | *Enhydra lutris nereis* | | x | x | |
| Bobcat | *Felis rufus* | | x | x | |
| Feral cat | *Felis catus* | x | | x | |
| Harbor seal | *Phoca vitulina* | | x | x | |
| Northern elephant seal | *Mirounga angustirostris* | | x | x | |
| Northern fur seal | *Callorhinus ursinus* | | x | x | |
| California sea lion | *Zalophus californianus* | | x | x | |
| Steller sea lion | *Eumetopias jubatus* | | x | x | |
| Mule deer | *Odocoileus hemionus* | x | x | x | |

Table 14-2. Wildlife species known or expected to occur at Pillar Point AFS or in its immediate vicinity.

| WILDLIFE | | | | | |
|---|---|---|---|---|---|
| **Common Name** | ***Scientific Name*** | **Correlli[1]** | **Tetra Tech[2]** | **SBMNH[3]** | **Ersan et al.[4]** |

x indicates that species was observed or expected to occur at or in the immediate vicinity of Pillar Point Air Force Station by indicated survey.
* Species was expected to occur but not actually documented during these surveys. Only one pre-1976 occurrence has been documented at Princeton Marsh.
** Species documented was common yellowthroat, believed to be the San Francisco common yellowthroat.

[1]Correlli, T. 1993. Plant and Community Plant Survey of the Pillar Point Air Force Station Half Moon Bay, California. 7 pp. *In* The Nature Conservancy (1993). Natural Resources Surveys of the Pillar Point Air Force Station Half Moon Bay, California. Submitted to Department of the Air Force, Headquarters 30th Space Wing, Vandenberg Air Force Base, California. Prepared by The Nature Conservancy, San Francisco, CA.

[2]Tetra Tech. 1999. Appendix B. Natural Resources Survey Report Pillar Point Repair Project. *In* Final Environmental Assessment for the Pillar Point Repair Project Pillar Point Air Force Station, California. 2 September 1999. Submitted to: 30CES/CEUPP, Vandenberg Air Force Base, California.

[3]Santa Barbara Museum of Natural History. 2000. Integrated Natural Resources Management Plan, Vandenberg Air Force Base; Supplement, Pillar Point Air Force Station for Plan Period November 2000 – November 2005. 3 November 2000. 75 pp.

[4]Ersan, J.S.M., J.P. Rose, D. Macias, A. Colton, S. Parnell, and B.J. Halstead. 2019. Summary of surveys for San Francisco garter snakes (*Thamnophis sirtalis tetrataenia*) at Pillar Point Air Force Station and Princeton mash, Half Moon Bay, California 2019. U.S. Geological Survey, Dixon, California. 19 pp. *Note only herpetofauna were identified to species level*

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Table 14-3. Threatened and Endangered, and other special status wildlife species known or expected to occur on Pillar Point AFS or in its immediate vicinity.

| **Species Common Name** ***Scientific name*** | **Status[1]** | **Presence on Pillar Point AFS[2]** | **Seasonal Occurrence** | **Habitat** | **Additional Comments** |
|---|---|---|---|---|---|
| ***AMPHIBIANS*** | | | | | |
| California red-legged frog *Rana draytonii* | FT / CSC | A | Year-round | Perennial ponds and streams, freshwater marsh | Observed in Princeton Marsh during 1999 surveys. Ersan et al (2019) did not observe any during surveys on Pillar Point AFS. |
| ***REPTILES*** | | | | | |
| San Francisco garter snake *Thamnophis sirtalis tetrataenia* | FE / SE | A | | Ponds, lakes, marshes, streams, sloughs, and occasional grasslands | Not seen at Princeton Marsh since before 1976, but suitable habitat present. Ersan et al. (2019) did not observe any during surveys on Pillar Point AFS. |
| ***BIRDS*** | | | | | |
| Bank swallow *Riparia riparia* | ST | P | Expected as spring and fall transient | Riverbanks, coastal bluffs, and sand and gravel pits | Historically nested at Pillar Point AFS. Observed in 1992, but not seen during 1999 and subsequent surveys. |
| San Francisco common yellowthroat *Geothlypis trichas sinuosa* | BCC / CSC | O | Uncommon resident | Fresh and salt water marshes | Species documented was common yellowthroat, believed to be the San Francisco common yellowthroat, observed at Princeton Marsh in 1999. |
| Elegant tern *Sterna elegans* | BCC / CSC | O | Uncommon/rare visitor in late summer/early fall | Nearshore waters, estuaries, bays, harbors, breakwaters, off lying rocks and sandy beaches | Expected to forage/roost in vicinity of Pillar Point AFS. Observed at Pillar Point in 1992. |
| ***MAMMALS*** | | | | | |
| San Francisco dusky-footed woodrat *Neotoma fuscipes annectens* | CSC | E | | Riparian, oak, and conifer woodlands, and oak-old growth chaparral | Nest structures found in willow woodlands along north side of Princeton Marsh in 1999 surveys. |
| Southern sea otter *Enhydra lutris nereis* | FT / CP | E | | Nearshore waters off rocky coastline, kelp beds | Not seen during previous surveys, but suitable habitat present. |
| California sea lion *Zalophus californianus* | FP | O | Year-round | Coastal waters and rocky shorelines | Expected throughout year on rocky intertidal coastline bordering Pillar Point AFS. |
| Steller sea lion *Eumetopias jubatus* | FP | E | | Coastal waters and rocky shorelines | Not seen during previous surveys, but suitable habitat present. |
| Northern elephant seal *Mirounga angustirostris* | FP | E | | Coastal waters and rocky shorelines | Expected throughout year on rocky intertidal coastline bordering Pillar Point AFS. |
| Northern fur seal *Callorhinus ursinus* | FP | E | | Coastal waters and rocky shorelines | Not seen during previous surveys, but suitable habitat present. |
| Pacific harbor seal *Phoca vitulina richardii* | FP | O | Year-round | Coastal waters and rocky shorelines | Haul-out on rocky shelf, surrounding Sail Rock, south of Pillar Point AFS. Seen in 1999 surveys. |

Table 14-3. Threatened and Endangered, and other special status wildlife species known or expected to occur on Pillar Point AFS or in its immediate vicinity.

| Species Common Name<br>*Scientific name* | Status[1] | Presence on Pillar Point AFS[2] | Seasonal Occurrence | Habitat | Additional Comments |
|---|---|---|---|---|---|
| [1] FE = Federally Endangered<br>FT = Federally Threatened<br>BCC = Federal Bird of Conservation Concern<br>FP = Federally protected (Bald and Golden Eagle Protection Act, Marine Mammal Protection Act)<br>SE = California Endangered<br>ST = California Threatened<br>CP = California fully protected<br>CSC = California Species of Special Concern<br>[2] E = expected O = observed adjacent to Pillar Point AFS P = confirmed present on Pillar Point AFS during surveys<br>A = absent from Pillar Point AFS during surveys | | | | | |

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Table 14-4. Special status plant species with potential occurrence at Pillar Point AFS or in its immediate vicinity.

| Species | Status[1] | Life History | Habitat | Potential in Study Area |
|---|---|---|---|---|
| **Listed, Proposed and Candidate Species** | | | | |
| *Chorizanthe robusta*<br>Robust spineflower | FE/ - /lB | Annual herb. | Coastal dunes | Unlikely |
| *Holocarpha macradenia*<br>Santa Cruz tarplant | FPT/CE/IB | Annual herb | Coastal terrace | Potential |
| *Lessingia germanorum*<br>San Francisco lessingia | FE/CE/IB | Annual herb | Coastal scrub | Unlikely. No suitable habitat |
| *Pentachaeta bellidiflora*<br>White-rayed pentachaeta | FE/CE/IB | Annual herb | Valley and foothills | Potential, but unlikely |
| *Potentilla hickmanii*<br>Hickman's cinquefoil | FE/CE/IB | Perennial herb | Coastal bluff | Likely to occur, based on habitat |
| *Limnanthes douglasii*<br>Pt. Reyes meadowfoam | FSC/CE/IB | Annual herb | Wet meadows | Not found |
| *Agrostis blasdalei*<br>B1asdale's bent-grass | FSC/? /lB | Perennial grass | Coastal bluff | Potential |
| **Federal Species of Concern** | | | | |
| *Arctostaphylos montarensis*<br>Montara manzanita | FSC/ - /lB | Shrub | Maritime chaparral | Possible |
| *Chorizanthe cuspidata* var. *cuspidata*<br>San Francisco Bay spineflower | FSC/ - /lB | Annual herb | Coastal scrubs | Not found |

Table 14-4. Special status plant species with potential occurrence at Pillar Point AFS or in its immediate vicinity.

| Species | Status[1] | Life History | Habitat | Potential in Study Area |
|---|---|---|---|---|
| *Fritillaria liliacea*<br>Fragrant fritillary | FSC/ - /lB | Perennial herb | Coastal prairie | Possible, but unlikely |
| *Grindelia hirsutula*<br>San Francisco gumplant | FSC/ - /lB | Sub-shrub | Coastal bluff | Possible, but unlikely |
| *Horkelia marinensis*<br>Pt. Reyes horkelia | FSC/ - /lB | Perennial herb | Coastal dunes | Potential, but unlikely |
| *Lessingia arachnoidea*<br>Crystal Springs lessingia | FSC/ - IB | Annual herb | Coastal scrub | Unlikely, but possible |
| *Lupinus arboreus*<br>San Mateo tree lupine | FSC/ - /lB | Shrub | Chaparral, coastal scrub | Possible, but unlikely |
| *Silene verecunda*<br>San Francisco campion | FSC/ - /lB | Perennial herb | Coastal bluff | Potential, but not found |
| *Stebbinoseris decipiens*<br>Santa Cruz microseris | FSC/ - /lB | Annual herb | Coastal prairie and coastal scrub; sandy areas | Potential, but not found |
| *Tryphysaria floribunda*<br>San Francisco Bay owl's clover | FSC/ - /lB | Annual herb | Coastal terrace | Potential, but not found |
| **CNPS list** | | | | |
| *Equisetum palustre*<br>Marsh horsetail | - / - /3 | Perennial herb | Salt marshes | Potential in Princeton Marsh, but not on Pillar Point AFS. Not seen |
| *Eriogonum luteolum* var. *canium*<br>Tiburon buckwheat | - / - /3 | Annual herb | Occurs on serpentine substrates | Unlikely |
| *Hordeum intercedens*<br>Vernal barley | - / - /3 | Annual herb | Valley and foothill Grasslands, vernal pools | Potential, but not found |
| *Lessingia hololeuca*<br>Woolly-headed lessingia | - / - /3 | Annual herb | Occurs on clay and serpentine substrates. | Unlikely, not found |
| *Plagiobothrys chorisianus* var. *chorisianus*<br>Choris's popcorn flower | - / - /3 | Annual herb | Mesic sites in coastal scrub, coastal prairie, and chaparral. | Potential, particularly on the peninsula, |
| [1]Listing Status | U.S. Fish and Wildlife Service (USFWS):<br>FE = Federal Listed Endangered<br>FT = Federal Listed Threatened<br>FPT = Proposed for Federal Listing as Threatened.<br>FPE = Proposed for Federal Listing as Endangered | | California Department of Fish and Game (CDFG):<br>CE = California Listed Endangered<br>CT = California Listed Threatened<br>CR = California Listed Rare | California Native Plant Society (CNPS):<br>1B = Plants rare, threatened or endangered in California and elsewhere.<br>2 = Plants rare, threatened, or endangered in California but more common elsewhere.<br>3 = Plants about which more information is needed. |

Table 14-4. Special status plant species with potential occurrence at Pillar Point AFS or in its immediate vicinity.

| Species | Status[1] | Life History | Habitat | Potential in Study Area |
|---|---|---|---|---|
| | FSC – Federal Species of Concern | | | |

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Table 14-5. Federal and state laws, and other regulations, guidance, and policies affecting natural resources on Pillar Point AFS.

| Federal Law | Activity or Requirement |
|---|---|
| Bald and Golden Eagle Protection Act (16 United States Code [USC] §§ 668-668d, June 8, 1940, as amended 1959, 1962, 1972, and 1978) | The Act prohibits the taking or possession of and commerce in bald and golden eagles, with limited exceptions. |
| Clean Water Act of 1977 (33 USC 1251) | Protects natural resources by requiring permits for discharge and development in waters of the U.S. |
| Coastal Zone Management Act (CZMA) of 1972 (16 USC 2452-24645). | The CZMA plays a significant role in water quality management. Under the CZMA, a federal action that may affect the coastal zone must be carried out in a manner that is consistent with state coastal zone management programs. |
| Endangered Species Act (ESA) of 1973 (7 USC 136; 16 USC 1531-1544; 50 CFR part 17) | Declares the intention of Congress to conserve threatened and endangered species and the ecosystems on which these species depend. The ESA requires that federal agencies, in consultation with the United States Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (Fisheries Service), use their authorities in furtherance of its purposes by carrying out programs for the conservation of endangered or threatened species. |
| Section 7 of the ESA (16 USC 1536) | Contains provisions that require federal agencies to consult with the Secretary of Interior and to take necessary actions to insure that actions authorized, funded, or carried out by them do not jeopardize the continued existence of endangered species and threatened species. |
| Federal Coastal Zone Management Act of 1972 (NOAA) | Protects coastal species by authorizing NOAA to grant funds to states to develop coastal zone management programs to preserve, protect, develop, and restore or enhance coastal resources. |
| Federal Insecticide, Fungicide, and Rodenticide Act of 1996 | Provides federal control of pesticide distribution, sale, and use. |
| Federal Land Policy and Management Act of 1976 | Governs most uses of the federal public lands, including grazing. |
| Fish and Wildlife Coordination Act of 1934 as amended (16 USC 661) | Protects fish and wildlife species by requiring USACE to consult with USFWS and state agencies on permit applications. |
| Marine Mammal Protection Act of 1972 (NOAA, USFWS) | Prohibits taking of marine mammals, except for incidental take under certain permitted activities. |
| Migratory Bird Treaty Act (MBTA) of 1918 as amended (16 USC 703-712) | The MBTA implements various treaties and conventions between the United States (U.S.) and Canada, Japan, Mexico and the former Soviet Union for the protection of migratory birds. Under the Act, taking, killing or possessing migratory birds is unlawful. |
| National Environmental Policy Act (NEPA) of 1969 as amended (42 USC 4321-4347) | Requires federal agencies to analyze the potential environmental impacts of major federal actions and alternatives and to use these analyses as a decision-making tool on whether and how to proceed. |
| Plant Protection Act of 2000 (7 USC 7701) | Gives the U.S. Department of Agriculture (USDA) the ability to prohibit or restrict the importation, exportation, and the interstate movement of plants, plant products, certain biological control organisms, noxious weeds, and plant pests. |
| Pollution Prevention Act (PPA) of 1990 | This Act establishes that pollution should be prevented or reduced at the source whenever feasible; pollution that cannot be prevented should be recycled in an environmentally safe manner, whenever feasible; pollution that cannot be prevented or recycled should be treated in an environmentally safe manner whenever feasible; and that disposal or other release into the environment should be employed only as a last resort and should be conducted in an environmentally safe manner. |
| Resource Conservation and Recovery Act (RCRA) of 1976 (42 USC 6901 et seq.) | This Act gives the Environmental Protection Agency (EPA) the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous wastes. |
| Rivers and Harbors Act of 1899 (USACE) | Protects natural resources and habitats in the environment by regulating development over navigable waters. |

Table 14-5. Federal and state laws, and other regulations, guidance, and policies affecting natural resources on Pillar Point AFS.

| Federal Law | Activity or Requirement |
|---|---|
| Sikes Act and Improvement Amendments of 1997(Department of Defense [DoD], USFWS, CDFG) | Requires military departments to coordinate with federal and state natural resources conservation agencies in the preparation and approval of Integrated Natural Resources Management Plan (INRMP), and to provide an opportunity for submission of public comments. |
| Soil and Water Resources Conservation Act (16 USC 2001 et seq.) | Provides for a continuing appraisal of U.S. soil, water and related resources, including fish and wildlife habitats, and a soil and water conservation program to assist landowners in furthering soil and water conservation |
| Executive Order 11514, Protection and Enhancement of Environmental Quality | Protects and enhances environmental quality through the direction of policies, plans and programs to meet national environmental goals. |
| Executive Order 11987, Exotic Organisms | Restricts federal agencies from introducing exotic species into natural ecosystems. |
| Executive Order 11990, Protection of Wetlands | Protects fish and wildlife species by requiring agencies to act to minimize destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands. |
| Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds (USFWS) | Protects migratory bird species by requiring federal agencies to develop and implement a Memorandum of Understanding with the USFWS to promote the conservation of migratory bird populations for any action that has or is likely to have measurable negative effects on migratory bird populations. |
| **State Law** | **Activity or Requirement** |
| California Coastal Act (CCA) of 1976 | This Act provides long-term protection of California's 1,100-mile coastline for the benefit of current and future generations. Coastal Act policies constitute the standards used by the Coastal Commission in its coastal development permit decisions and for the review of local coastal programs prepared by local governments and submitted to the Commission for approval. These policies are also used by the Commission to review federal activities that affect the coastal zone. |
| California Endangered Species Act of 1970 | Provides protection at state level for species designated as rare, threatened, or endangered. |
| **Air Force Regulation** | **Activity or Requirement** |
| Air Force Instruction (AFI) 32-7045, Environmental Compliance Assessment and Management Program | Provides guidance for establishing an environmental management program designed to ensure compliance with federal, state, and local environmental laws and regulations, as well as DoD and Air Force policies and instructions, through the use of comprehensive environmental compliance assessments and management action plans. |
| Air Force Instruction (AFI) 32-7060, Interagency Intergovernmental Coordination for Environmental Planning | This instruction provides MAJCOMs and installations with a framework to oversee the Air Force environmental program according to AFD 32-70. MAJCOMs provide additional implementing guidance where pertinent in supplemental publication to the instruction. |
| Air Force Instruction (AFI) 32-7061 Environmental Impact Analysis Process | Regulation providing planning considerations for natural resources affected by any federal action. |
| Air Force Instruction 32-7064 Integrated Natural Resources Management | Requires each installation to develop an Integrated Natural Resources Management Plan to protect, manage, and conserve natural resources. |

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### *14.1.3 Appendix C. Public Notification Documentation*

# 15.0 ASSOCIATED PLANS

## *15.1 Tab A—Invasive Plant Species Management Plan*