



2022 Secretary of Defense

Environmental Awards

Cultural Resources Management, Large Installation
Vandenberg Space Force Base

Introduction

Encompassing over 99,000 acres along the central California coast, Vandenberg Space Force Base (VSFB) employs 2,892 military personnel, 1,143 Department of Defense (DoD) civilians, and 2,822 contractors. Space Launch Delta (SLD) 30, the host unit at VSFB, also manages four geographically separated units including Pillar Point Air Force Station. Primary missions include developing and testing Intercontinental Ballistic Missile (ICBM) systems, launching and tracking satellites, and supporting spaceflight operations in the Western Range, which begins at VSFB's coastline and extends to the western Pacific Ocean. SLD 30 supports West Coast launch activities for the U.S. Space Force (USSF), DoD, Missile Defense Agency, National Aeronautics and Space Administration (NASA), National Reconnaissance Organization, foreign nations, and numerous privately-owned launch companies.



A SpaceX Falcon 9 rocket carrying NASA's first planetary defense test mission, the Double Asteroid Redirection Test (DART), launches from Space Launch Complex-4 at VSFB on November 23, 2021.

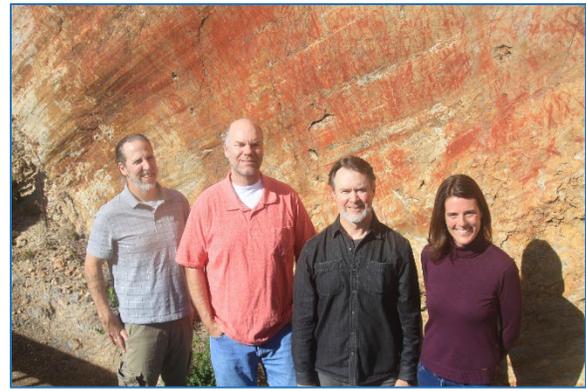
The installation provides stewardship for one of the most diverse and well-preserved groups of cultural resources in the DoD, including 1,674 archaeological sites, five named Chumash villages, 14 rock art sites, 228 Cold War-era and other historical buildings and structures, 18 historic districts, a National Register of Historic Places (NRHP) listed lighthouse, a National Historic Trail, and a National Historic Landmark.

Background

Archeological sites recorded within installation boundaries represent over 11,000 years of prehistory and history. Cultural Resources Management (CRM) activities follow the VSFB Integrated Cultural Resources Management Plan (ICRMP), ensuring effective management and protection of cultural resources. While goals outlined in the ICRMP remain constant, an annual review of objectives addresses progress in achieving those goals, revision of priorities, and other changing conditions.

The three-person expert CRM staff includes an Architectural Historian specializing in Cold War era resource documentation and evaluation. Their expertise includes the ability to create reports accepted by the State Historic Preservation Officer (SHPO), ensuring timely support for highly-technical mission-essential projects and ICRMP goals.

VSFB has a long history of proactive management of historic properties in consultation with the Santa Ynez Band of Chumash Indians (SYBCI). The Installation Tribal Relations Plan sustains the strong relationship built on mutual trust while supporting military readiness. The Plan addresses issues important to the Tribe, including access to and ceremonial use of sacred sites, and opportunities to collaborate in management of significant resources important to Chumash history.



Cultural Resources Management Team

Accomplishments

Overall Cultural Resources Management

VSFB integrates CRM considerations into daily operations, including infrastructure repair/replacement and space/missile launch programs. The CRM team participates in the project approval process, by specifically assessing proposed actions for their potential to affect cultural resources under Section 106 of the National Historic Preservation Act (NHPA) and the National Environmental Policy Act (NEPA). The Department of the Air Force (DAF) Environmental Impact Analysis Process (EIAP) and Section 110 of the NHPA guides the management of cultural resources. Enforcement of the Archaeological Resources Protection Act and compliance with terms of the Native American Graves Protection and Repatriation Act (NAGPRA) constitute additional responsibilities of CRM staff.

The CRM program employs Environmental Management System (EMS)-based processes to ensure effective management of associated risks and instill a culture of continuous improvement throughout all VSFB organizations. Leadership involvement assures a conforming EMS. Recurring Cross-Functional Team meetings chaired by the Vice Commander/Mission Support address

key compliance issues. A biannual briefing by the Environmental, Safety and Occupational Health Council informs the SLD 30 Commander and leadership of internal compliance audit results, ongoing NHPA undertakings, NEPA actions, and other environmental compliance issues. Leadership then approves the EMS plan for addressing compliance risk areas. This process ensures compliance with environmental requirements demonstrated by zero enforcement actions during the accomplishment period.

Cultural Resources Compliance

Existing surveys and SHPO consensus determinations enabled cost-effective project effects assessments and EIAP reviews. The CRM staff reviewed over 2,000 projects and obtained concurrence or developed memoranda of agreement or programmatic agreements (PA) with the SHPO and other consulting parties during the achievement period. These efforts kept critical schedules on track for mission requirements, including \$100M in facility sustainment, repair, and modernization projects. Successful NHPA compliance also supported execution of over \$72M in electrical infrastructure improvements. In addition to sustaining routine and planned actions, the unique qualifications of CRM staff accelerated Section 106 compliance for emergency events, including repair of a public railroad that runs through the base resulting from the railroad's culvert failure in 2020. VSFB's rapid response helped protect public safety, cultural resources, and had this critical transportation route functional in 72 hours.

CRM activities receive program funding to meet ICRMP objectives, installation requirements, emergent needs, and DAF-wide initiatives. During the accomplishment period VSFB successfully executed \$3M in CRM requirements for many projects, including \$850K for cultural resource excavations at eight new launch complex sites for the USSF Range of the Future.

In 2021, VSFB orchestrated on-time Section 106 compliance for the DAF Nuclear Weapons Center's \$62B Ground Based Strategic Deterrent (GBSD) Test Program, ensuring nuclear arsenal modernization. With 72 cultural resources in the Area of Potential Effects (APE), consultation with the SHPO, SYBCI, and Advisory Council on Historic Preservation (ACHP) was multi-faceted and extremely complex. It included the development of a four-phase PA, a NAGPRA Plan of Action, consideration of sacred sites and an ethnographic landscape, and cumulative effects analysis. This DoD priority wouldn't have been possible without the technical proficiency of documents presented for concurrence combined with relationships established with the SHPO and ACHP. Support for GBSD was streamlined using VSFB's robust, Geographic Information System (GIS)-enabled CRM database. With only a few dozen keystrokes, all site records, reports, prior eligibility determinations, and GIS data needed were available. Expert guidance throughout fieldwork and reporting enabled the implementation of a strategy whereby 19 pre-historic sites were avoided, eliminating \$700K in otherwise required mitigation/monitoring costs. PA execution paved the way for re-using two NRHP-eligible Minuteman ICBM test launch facilities (LFs) while minimizing impacts to two Chumash villages containing sacred areas.

Historic Buildings and Structures

VSFB completed a multi-year endeavor to document all historic-age buildings, structures, and built-environment districts. The effort included evaluating these resources and submitting the results to the SHPO to obtain Section 110 consensus determinations. During the achievement period, the CRM team documented and evaluated over 100 buildings and structures, 16 districts, and 13 NHPA Section 110 consensus determinations were obtained.

The CRM team accurately coded historic assets in real property inventory databases, and documented evaluations in the CRM database. This monumental effort results in future, shortened project completion timelines when already evaluated built-environment resources are within the APE, eliminating the 30-day eligibility determination review period by the SHPO. Additionally, this accomplishment enables VSFb to focus on appropriate Section 110 resource management and subsequently direct funding to preserve these national treasures.

Archaeological Resources

Of the 1,674 archaeological sites recorded, 186 have SHPO eligibility consensus, of which 167 were determined eligible for listing. The CRM staff and contractors surveyed over 3,000 acres for archaeological resources, contributing to the understanding of how early Native Americans lived on the VSFb landscape for thousands of years. The survey work facilitated the regulatory process for utilization of this acreage for critical national defense.



Data Recovery at CA-SBA-698

Archaeological data recovery excavations at CA-SBA-698, a National Register-eligible resource, to recover a portion of the extensive midden deposit before it is lost to coastal erosion and sea cliff retreat.

Access to current and comprehensive data supports mission readiness. The CRM library includes over 800 hardcopy reports and 2,500 hardcopy project files. Storing this data required developing an unprecedented data management system that supplements and interacts with GIS, facilitating efficient and accurate information retrieval. The data management system remains the most

sophisticated within the DoD. In 2021, VSFb completed efforts to scan the entire inventory of 800 reports and processed and entered over 700 SHPO consultation letters and 2,000 project folders linking resources to consultations and projects. Database establishment resulted in a 95% reduction of time spent over prior years performing background research, decreasing timelines for project impact analysis, and eliminating travel requirements to perform records searches at the Central Coast Information Center. In addition, reports in the data management system are copied into the Digital Archaeological Record (tDAR), an international digital repository. The CRM team archived over 120 documents into tDAR, ensuring the long-term preservation of irreplaceable archaeological data and expanding accessibility.

Every year, the CRM team inspects 20% of sites for natural and human impacts under Section 110 of the NHPA, and all rock art sites and a group of 35 sites categorized as sensitive and threatened are inspected annually. The Condition Assessment tool is a GIS-enabled data dictionary mapping the magnitude of impacts and rates at which impacts are occurring. A recent update to the Condition Assessment Tool includes whether the site meets the definition of “sacred” under Executive Order 13007, Indian Sacred Sites. Site-specific mitigation recommendations developed as part of condition assessments provide key tools for prioritizing resource mitigation and stabilization efforts to halt degradation at highly significant sites.

The frequency of wildland fire is increasing in California, and the Central Coast is also prone to earthquakes. The Canyon Fire scorched more than 12,000 acres on VSFb in 2016, including the Honda Ridge Rock Art site. In the face of these threats, 3D models of all 14 rock art sites were created in 2020, employing state-of-the-art techniques. The models serve as Section 110 condition assessment tools used for comparison,

especially after disastrous events. Additionally, these files are used for educational and outreach presentations, enabling everyone to view and learn about the rock art site panels without traveling, reducing the potential for adverse effects resulting from visitation.

Native American Program

The SYBCI actively participated in the stewardship of Chumash cultural resources on the installation for over 50 years. During the accomplishment period VSFB consulted with the SYBCI regarding 56 project activities affecting Chumash historic properties and attended annual Tribal Elders' Council meetings to discuss matters of importance to the Tribe.



VSFB, Tribal, and County Consultation at Swordfish Cave

Representatives from VSFB, the SYBCI, and the County of Santa Barbara consult regarding view-shed impacts at Swordfish Cave from proposed wind turbines in areas immediately adjacent to the installation boundary.

Tribal members play an active role in historic preservation initiatives under Section 110 of the NHPA regarding management of rock art

and other sacred sites, recovery of eroding archaeological deposits, restoring sites following wildfires, and stemming further natural and human-caused impacts identified during annual condition assessments. Tribal members were key to restoring the Honda Ridge Rock Art site following the Canyon Fire, tirelessly rebuilding and improving the pathway, and beautifully restoring the viewing platform and benches.

Formal consultation is simplified by the outstanding relationship between the Installation Tribal Liaison Officer and the Tribe's consultation liaison. A considerable amount of collaboration and cooperation occurs, including monitoring and management of sacred sites and traditional cultural properties; facilitating access for fishing, hunting, and gathering; supporting the use of Native American monitors during activities impacting culturally sensitive sites; providing escort to traditional religious and ceremonial sites; developing interpretive signage; and sharing information to develop content for a new museum located on the SYBCI Reservation.

VSFB and the SYBCI have a Memorandum of Understanding (MOU) regarding procedures for inadvertent discovery of NAGPRA items and monitoring protocols by Tribal members during projects having the potential to impact sensitive resources. An Installation Tribal Relations Plan ensures federal responsibilities to the Tribe are met and outlines obligations for managing resources associated with Chumash traditions, rights, and activities.

Curation

VSFB developed partnerships and agreements with curation facilities at world-class institutions, ensuring continued research and educational opportunities and preserving the heritage values of these collections for future generations. Archaeological collections are curated by the Repository for Archaeological and

Ethnographic Collections at University of California, Santa Barbara, under an MOU, meeting standards established in 36 CFR 79, Curation of Federally-Owned and Administered Archeological Collections, to ensure long-term management and care of more than 800 cubic feet of archeological collections and associated records. In 2021, a massive rehabilitation effort was completed on approximately 160 boxes of legacy materials, resulting in a stand-alone document summarizing human remains and NAGPRA items that will support full compliance with NAGPRA.

Paleontological specimens recovered during ongoing excavations in eroding sea cliffs are curated at Santa Barbara City College (SBCC) and also the Los Angeles County Natural History Museum, which houses the largest natural and cultural history collection in the western U.S. and is visited by over a million people annually. These collections currently include 82 specimens dominated by Pleistocene megafauna and Miocene fish.

Cultural Resources Awareness and Education

VSFB implements a robust outreach program, including interpretive signage, brochures interpreting key highlights, and field tours. CRM staff also prepared presentations and addressed public and professional groups regarding the installation's cultural resources.

New personnel receive a cultural resources overview with associated regulations at Newcomers' Orientation. VSFB also hosts annual Earth Day events, including hands-on artifact displays viewed by hundreds of personnel and visitors. These events provide participants an appreciation of unique cultural resources that are seen only on VSFB. By engendering this enthusiasm, Base personnel help protect resources.

CRM staff promote public awareness in the local community during two International Archaeology Day/California Archaeology

Month events annually, one in partnership with California State Parks at Mission La Purísima and another with the San Luis Obispo County Archaeological Society at Mission San Luis Obispo de Tolosa. CRM staff commit an incredible level of time and effort ensuring the public gains an appreciation of regional cultural heritage.



Team Vandenberg Celebrates Earth Day
Visitors learn about the diverse set of cultural resources located on VSFB during an Earth Day event on April 21, 2021(U.S. Space Force Photo).

Innovative time-lapse photography at three rock art sites focused on rayed disc petroglyphs and pictographs and the interplay of shadow and light during sunset or sunrise on Winter Solstice, testing the hypothesis that sun-symbol elements were created in observance of one of the most important times of the year for the Chumash. Collecting this imagery results in verifiability and enables presentation to others for review, including being able to view these events without having to travel to actual sites. Results were presented during the 2021 Society of California Archaeology Annual Meeting and the local non-profit Dunes Center as part of the Speaker of the Month series. Additionally, VSFB staff co-authored a chapter capturing the results of the study for inclusion in a volume of papers published by the Santa Barbara Museum of Natural History.

Community Relations

During the Coronavirus pandemic, VSFB not only maintained partnerships with local historical societies, universities, and

museums, but adopted new ways of participating in community events to promote the installation's extensive and diverse heritage using video and teleconferencing. CRM staff maintain memberships in the Society for American Archaeology, Society for Historical Archaeology, Society for California Archaeology, and Register of Professional Archaeologists. The installation also maintains affiliation with the Santa Barbara Museum of Natural History, which houses the Central Coast Information Center of the California Historical Resources Information System, storing site records, survey reports, and excavation reports.



Team Vandenberg Hosts National Public Lands Day Events

VSFB CRM and Lieutenants install two new cultural resources interpretive panels during National Public Lands Day at the Boathouse in 2020.

Base personnel participate in cultural resources preservation efforts every year on National Public Lands Day. In 2020, volunteers assisted with maintenance and cleanup of the NRHP-eligible former U.S. Coast Guard Boathouse and installed two new interpretive signs. In 2021, local Boy Scout Troop 394 helped the CRM team with trail and viewing platform upkeep at the

Honda Ridge Rock Art site, mentoring future generations on the value of cultural resource stewardship.

Numerous species of Pleistocene megafauna fossils are present in eroding sea cliffs, and VSFB partners with SBCC in managing paleontological resources. In addition to completing regular surveys of sea cliffs, faculty and students help excavate fossil remains. In 2020, SBCC aided in excavating and identifying bone deposits that include Giant North American Sloth and Mastodon, radiocarbon dated to 16,000 years ago.

Mission Enhancement

Recapitalization of two historic LFs to support GBSD is an example of mission-related re-use of historic properties. The recapitalization effort went above and beyond the traditional suite of Historic American Engineering Record documentation by employing cutting-edge Building Information Modeling technology to produce a “digital twin” to mitigate adverse effects. These LFs are nationally significant, embodying the critical design, development, and testing phases of the ICBM program during the Cold War; a legacy that will continue as they are used to develop the nation's next-generation land-based ICBM.

NRHP compliance was completed for five new commercial space launch programs, ensuring the stand-up of Firefly, ABL Space Systems, Relativity, Blue Origin, and Phantom Space. Meeting the USSF Range of the Future strategic intent, VSFB completed surveys and excavations at eight proposed launch complex sites in 2021, posturing future commercial space launch programs for success.