

NAVAL BASE VENTURA COUNTY



2019 Secretary of Defense Environmental Award: Installation Restoration

INTRODUCTION

Naval Base Ventura County (NBVC) is comprised of three major operating facilities: Point Mugu (4,500 acres), Port Hueneme (1,600 acres), and San Nicolas Island (13,370 acres). NBVC also maintains operations at remote sites including: San Miguel Island (9,370 acres), Santa Cruz Island, Fort Hunter Liggett and Laguna Peak. Point Mugu and Port Hueneme are both located along the Pacific coastline in southwestern Ventura County, California, adjacent to the cities of Oxnard and Camarillo. Several of the islands and outlying sites are remote from NBVC. San Nicolas Island (SNI) and San Miguel Island (SMI) lay in the Santa Barbara Channel, 75 miles southwest and 100 miles west of Los Angeles respectively. Fort Hunter Liggett (FHL) is 200 miles to the northwest. Although slightly less than 30,000 acres in total size, NBVC includes some of the highest quality habitat in California

including the largest remaining coastal salt marsh estuary in Southern California. SMI and SNI are the first and second most densely populated seal and sea lion rookeries in North America, hosting more than 250,000 between them during breeding season. The Regulatory Community and the general public have recognized NBVC as leaders in conservation, managing and sustaining more than 2,200 acres of wetlands, 57.5 miles of coastline, 3,400 acres of dunes, 1100+ prehistoric archeological sites, and 12 federally endangered species.





Marine Mammal Rookery at San Nicolas Island

NBVC provides airfield, seaport and base support services to fleet operating forces and shore activities. The over 80 tenant commands and departments located at NBVC employ more than 20,060 military and civilian personnel, supporting the diverse missions of the Department of Defense. These tenant commands support both Fleet and Fighter, including three warfare centers: Naval Air Warfare Center Weapons Division; Naval Surface Warfare Center Port Hueneme Division; and Naval Facilities Engineering and Expeditionary Warfare Center [EXWC]. NBVC is also home to the Pacific Seabees and the West Coast E-2C Hawkeyes. Combat and weapon systems testing takes place on the 36,000 square mile Point Mugu Sea Test Range. MQ-8B/C (Fire Scout) and MQ-4C (Triton) unmanned platform operations occur at Point Mugu, Littoral Combat Ship missions are supported at Port Hueneme, and Naval Construction Group One (NCG1) battalion level exercises are performed at FHL.

BACKGROUND

Naval Base Ventura County was formed in 2000 with the merging of Naval Air Weapons Station Point Mugu and Construction Battalion Center Port Hueneme. The Naval Base Ventura County Restoration Program has performed restoration activities at 355 Sites since its inception in the

mid-1980s. Sites include Installation Restoration Program (IRP) sites, Munition Response Program (MRP) sites, Resource Recovery and Compensation Act (RCRA) sites, and RCRA Subtitle I Underground Storage Tank (UST) sites. The majority of Environmental Restoration at NBVC has been performed under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Sites include former landfills, waste disposal areas, leaking storage tanks, industrial areas, aircraft crash locations, utility systems, training areas, small arms ranges, bombing ranges, drainage areas, and burial pits. Contaminants in soil and water include petroleum, oils, lubricants, solvents, polychlorinated biphenyls, metals, pesticides, firefighting compounds, radioactive material, metals, and unexploded ordnance (UXO). UXO items include projectiles, artillery shells, rockets, small arms ammunition, mortar shells, aerial bombs, mines, missiles, grenades, and pyrotechnics. NBVC is not included on the United States Environmental Protection Agency's National Priorities List. Consequently, the primary regulatory stakeholders for the NBVC Restoration Program have been delegated to the State of California including the Department of Toxic Substance Control, the Regional Water Quality Control Board, and the Department of Fish & Wildlife.

The key to the continued successes of the NBVC Restoration Program is the team of three civilian personnel who oversee it. This team administers all aspects of the Program to ensure that all actions enhance mission readiness and are protective of the environment. This monumental task is achieved by working closely with Command leadership, tenant activities, community stakeholders through the Restoration Advisory Board, and the regulatory community



aspiring to achieve consensus from all parties. The program's methodology for continued success is to identify efficiencies in all elements of the program including contractual, administrative, logistical, field investigation, and remedial actions. Using cost effective, streamlined, and innovative techniques is critical to the ongoing success of the program due to the widespread geography of NBVC (a site visit across the Restoration Program at NBVC requires six hours of driving, one airplane flight, and three helicopter flights). The Restoration Program has been successful for many years with site closure achieved for over 82% of all sites. The momentum continued during the current cycle with an additional nine sites achieving site closure. Year by year incremental successes are the key to achieving the final goal of 100% sites achieving closure.

SUMMARY OF ACCOMPLISHMENTS

Accelerated Environmental Cleanup: The NBVC Restoration Program prioritizes speed of execution, cost, and protection of human health and environment in all environmental restoration contracts. The speed of execution is especially important when Navy mission activities have been impacted by environmental restoration issues. The NBVC Restoration Program executed two fast track environmental restoration projects during the award period to restore mission capability that had been adversely affected by chemical munitions training items. The former Gas Mask Training Area (GMTA) site located at NBVC Point Mugu has legacy impacts due to chemical agent identification sets (CAIS) that prevented continued use of the site for military family housing. CAIS kits, used during World War II to familiarize the troops

with the types of chemical munitions in use at the time, contained glass vials with four types of chemical agents: phosgene, chloropicrin, mustard gas, and lewisite. Unused CAIS were typically buried at the training site upon completion of training. The NBVC Restoration Program determined that the remedial action for the site, removal of all structures, selected utilities, and screening for CAIS would be less risky, if it was performed as two contract actions accomplished back to back rather than as a single acquisition. There was considerable concern about subsurface conditions regarding the quantities of CAIS kits and utilities in the area leading to costly delays from unforeseen conditions. This approach allowed for lessons learned from phase 1 to be applied to phase 2. All unforeseen conditions from phase 1 were included in the scope of work for phase 2. This superior approach allowed for both phases to be completed on time and within the original contract budgets. Overall, the two contract actions returned 30 acres of land for future mission use at NBVC and \$9.9M of cost avoidance compared to the original project estimate.



Mission impacts avoided by performance of work outside of regular business hours

The NBVC Restoration Program uses adaptive management techniques to continually monitor and evaluate ongoing cleanup actions, looking



for opportunities to increase efficiencies, reduce costs, and ultimately reduce cleanup times. A 4,500-foot-long methyl tertiary butyl ether (MTBE) groundwater plume from a leaking Gas Station at NBVC Port Hueneme discovered in the late 1990s generated congressional interest of the wrong kind. The chosen remedial alternative installed in 2000 was a biologically reactive groundwater flow-through barrier (Biobarrier). The initial estimated time required to completed cleanup was 40 to 50 years. NBVC's use of adaptive management allowed for the script to be rewritten. Two additional biobarriers were installed to break the plume into shorter treatment zones, air injection was replaced by pure oxygen to increase dissolved oxygen saturation levels, and in-situ oxygen monitoring allowed for oxygen injection rates to be individually adjusted in the close to 1000 total injection points. This extra effort successfully paid off in 2018 when monitoring confirmed that 100% of the MTBE contaminated plume had been reduced to safe drinking water levels 22 years ahead of the most optimistic schedule. The subsequent reduction of future monitoring will save over \$5.5M.

Innovative Technology Demonstration, Validation and Implementation: The NBVC Environmental Restoration Program implements innovative solutions whenever doing so provides added value in terms of efficiency, effectiveness, and or economy when performing removal or remedial actions. An excellent example of this were the two remedial projects at the former GMATA site located in the middle of the military family housing area at Point Mugu. The chance of CAIS kit discovery during excavation work would normally require an exclusion zone 1000 feet in diameter for the duration of the projects. Evacuation of hundreds of military family

residents for 18 months looked unavoidable. The innovative solution was a purpose built mobile chemical agent containment hood, which reduced the exclusion zone diameter to zero feet, allowing military families to safely stay in their homes for the duration of the projects. The hood is trailer mounted for mobility with vacuum blowers and filters, allowing it to be deployed over excavations to create a negative pressure containment shroud over a buried CAIS kit. An additional benefit is that site personnel do not require any supplemental respiratory or skin personnel protective equipment when working around the hood. The hood's filter agent can be modified to work at any installation restoration site that presents a respiratory hazard during subsurface work.



Trailer portable vacuum hood in operation at Point Mugu keeping everyone safe

The NBVC Environmental Restoration Program has a long been a leader in innovation in the field of remediation of chlorinated solvents. Specific remediation technologies used have included anaerobic bioremediation via the addition of and optimization of electron donors, bioaugmentation with engineered microorganisms, and in-situ chemical oxidation (ISCO) as a companion to bioremediation in contaminant source zones. ISCO was successfully implemented at Point Mugu Site UST 24 in 2016 and 2017 where chlorinated



solvent contamination had not responded to bioaugmentation. Contamination levels at UST Site 24 were reduced and have remained below cleanup goals for over two years after the ISCO injection. UST 24 has been referred to the Los Angeles Regional Water Quality Control for closure based on the successful ISCO injection results.

Partnerships Addressing Environmental Restoration Issues Between DoD and Other

Entities: Beneficial partnerships are integral to the success of the NBVC Environmental Restoration Program. These partnerships include federal, state, & local government, industry, and academia. Partnerships are developed whenever necessary to help achieve program goals.

An essential partnership is with the Calleguas Creek Watershed Committee (CCWC). The CCWC stakeholder group includes the California regulatory community, local government, and agricultural interests. The CCWC was formed to address regional surface water contamination from the 343 square mile watershed that flows into the Pacific Ocean within NBVC at Mugu Lagoon. NBVC originally joined the CCWC in 1998 to collaborate with the other regulated stakeholders and the Los Angeles Regional Water Quality Control Board (LARWQCB) in preparing Total Maximum Daily Loading (TMDL) limits for Clean Water Act listed pollutants. This regional contamination has and is still contributing to contamination at Point Mugu IR site 11, the Mugu Lagoon. The final TMDLs include use of natural attenuation, continued monitoring and contaminant source control as the preferred method for contaminant removal throughout the watershed. This collaboration led to development of the CCWC TMDL Watershed Monitoring Memorandum of Agreement (MOA) in 2008. The MOA

implemented a cost share agreement by all stakeholders, including NBVC, to perform TMDL compliance monitoring of the entire watershed. Since then, the MOA monitoring program has been very successful in reducing contaminant loading in the watershed, so much so that the NBVC Environmental Program leveraged the success into further partnering with the State of California regulatory community in 2017, yielding a consensus that implementation of TMDL program by the CCWC stakeholders would be the major component of the preferred remedy for NBVC IR Site 11, the Mugu Lagoon. The MOA was revalidated and updated in 2018 for 10 more years. This will certainly lead to future beneficial improvements in water quality and natural resource habitats within Mugu

Calleguas Creek Watershed Committee Membership

The California Department of Transportation

The Farm Bureau of Ventura County
(representing >1200 Farmers)

The City of Camarillo

The City of Moorpark

The City of Oxnard

The City of Simi Valley

The City of Thousand Oaks

The County of Ventura

The U.S. Department of Navy

Camrosa Water District

The Camarillo Sanitary District

The Ventura County Waterworks District

The Ventura Coast Keeper

Heal the Bay



Lagoon at NBVC Point Mugu. Participation by NBVC in the CCWC has generated estimated future costs savings for implementation of the preferred alternative for NBVC IR Site 11 of \$10.2M net present value over the next 20 years. The NBVC Environmental Restoration Program has maintained an active Restoration Advisory Board (RAB) since 1993, fostering an atmosphere of mutual respect and cooperation between the Navy, regulators, and the local community. The local community regards the RAB as a helpful and positive tool, enhancing a good working relationship between the Navy, regulators, and community members that attend regularly. RAB meetings have created strong trust and bonds between the public and their good neighbors at NBVC. The public has positive opinion and better understanding of the NBVC Environmental Restoration Program and its ultimate benefits to the community, its people and the surrounding environment.

Reducing Risk to Human Health and the Environment: The NBVC Environmental Restoration Program works side by side with the California regulatory community to reduce risk to human health and the environment through partnering and fast track remedial actions. Successful treatability studies are rolled into interim removal actions. Successful interim removal actions are documented with Records of Decisions. Waste streams are minimized to the maximum extent feasible, with onsite treatment preferred to reduce long term liability from shipping waste to an off base location.

A bioaugmentation treatability study to remediate chlorinated groundwater at IRP Site 35 at NBVC Point Mugu has been ongoing since 2016. Monitoring has confirmed that all contaminants of concern show decreasing concentration trends. Preliminary discussions

are underway with the California regulatory community to transition this treatability study into an interim removal action. The NBVC Environmental Restoration Program performed interim removal action (IRAs) at 14 sites at NBVC Port Hueneme in 2016. Upon successful completion of these IRAs, with concurrence from the California regulatory community, these sites were fast tracked for Records of Decision with three being completed in 2017, another three in 2018, with the remaining eight planned for 2019.



Reducing risk using an in-situ chemical oxidation system at NBVC Point Mugu

The NBVC Environmental Restoration Program has installed multiple successful groundwater treatment systems which has reduced offsite disposal from these sites by over 95%. These systems include three in-situ anaerobic bioaugmentation systems for chlorinated solvents, two in-situ chemical oxidation systems for chlorinated solvents and petroleum, and an oxygen injection system for MTBE. By proactively treating these contaminants onsite, transforming them into innocuous by products, risks to human health and the environment are permanently reduced.

Green Remediation: The NBVC Environmental Restoration Program is committed to the concept of green remediation. Considering all environmental effects of remedy implementation and incorporating options to minimize the environmental footprint of cleanup activities is both a good business practice and



ultimately supports the Navy mission. Stewardship of the nationally acclaimed 2,199 acre Mugu Lagoon is part of the Navy mission at NBVC. The cornerstone tenet of that stewardship is no net loss of wetlands. Developable land is scarce at NBVC Point Mugu, often necessitating the take of wetlands acreage to support new mission requirements. For more than two decades, the NBVC Environmental Restoration Program has provided an innovative solution to this problem by creating a wetlands mitigation account and depositing wetlands acreage from restored IRP sites into the account. More than 56 acres of restored wetlands have been deposited into the account since its inception in 1996 with 87% of the deposits coming from the Environmental Restoration Program.



Crews restoring wetlands using heavy equipment on a portable floating platform

The NBVC Environmental Restoration Program expertly established, in consultation with the California regulatory community, techniques to restore degraded land to thriving wetlands. These techniques include use of native plant palettes matched to hydrologic regimes, the development of a soil amendment, composed of biochar and compost, used to transform substandard soil into synthetic wetlands sediment, and use of post restoration monitoring metrics to quantify successful restoration. Using these techniques, one acre of restored wetlands

exceeded the success metrics, subsequently making the acreage available for deposit into the mitigation account during this award period.



Fully restored wetlands at the site of a former landfill at NBVC Point Mugu

SUCSESSES

Success for the NBVC Environmental Restoration Program is measured by the return of acreage to support Navy mission purposes and reaching site closure. 30 acres of land was returned for use for future mission uses in 2018. A total of nine IRP Sites and two MRP Sites reached site closure via Records of Decision during 2017 and 2018. An additional 18 Sites are on track to have Records of Decision completed by 2020. Five year reviews were completed at six Sites that are undergoing long term remedial actions with all remedies determined to be protective of human health and the environment.

The NBVC Restoration Program processes of adaptive management, continuous identification of efficiencies, and creation of beneficial partnerships create the foundation to meet and exceed the Department of the Navy requirements for environmental restoration. The partnerships with the regulatory community, public stakeholders, and consultants are the framework where ideas and trust are put into action for continued success of the Environmental Restoration Program in support of the Naval Base Ventura County for today and into the future.