

Navy Region Southwest Leverages Key Partnerships

Collaborations Center on Endangered Species & Advancing Scientific Research

A NUMBER OF partnerships between the Navy and various academic and nonprofit entities is making southern and central California a hotspot for environmental stewardship and advanced technology development.

On San Nicolas Island, part of Naval Base Ventura County (NBVC), the Navy hosts a range of research programs and data stations operated by multiple academic collaborators.

“The U.S. Navy is committed to meeting its mission of protecting our nation as the world’s premier sea force, but we are also committed to being good stewards of the environment. We make every effort to protect the resources in our care,” said Capt. Larry Vasquez, NBVC’s commanding officer. “By partnering and sharing information with other federal agencies and learning institutions, we can expand our knowledge and improve both our operational performance and our environmental understanding.”

The Scripps Institution of Oceanography at the University of California, San Diego, has partnered with the Navy and the Marine Corps on numerous projects over the years. In many cases, the scientists benefit

from access to secure deployment areas, and their military hosts are the recipients of information that aids at-sea rescues and vessel navigation; enables compliance with clean air standards, and even lends itself to battlespace advantage.

The Coastal Data Information Program (CDIP) based at Scripps has partnered with the Navy since the 1990s at what is now NBVC Point Mugu to operate a series of wave buoys around San Nicolas Island. These buoys support both develop-

mental and operational test and evaluation of Navy systems. The westward buoys also provide the outer boundary conditions for nowcast (present time) and forecast wave models. Data is accessible to anyone, and is posted in real-time at <http://cdip.ucsd.edu>.

There are two Scripps surface current mapping systems at Marine Corps Base Camp Pendleton, and individual systems at Naval Base Point Loma, San Clemente Island, NBVC Point Mugu, and San Nicolas Island. These

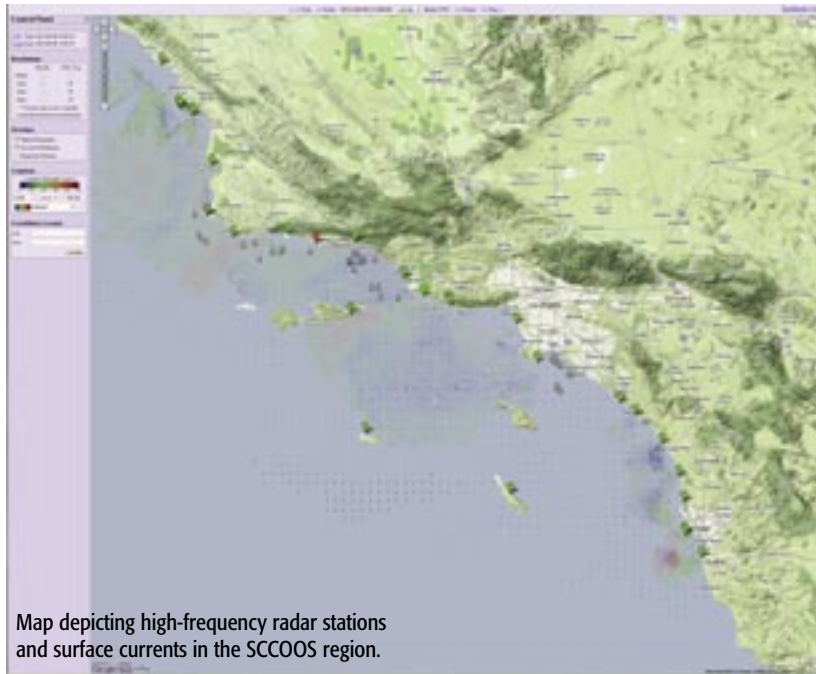


stations contribute to an overall network of approximately 50 high frequency (HF) radar systems along the California coast. The offshore deployments fill important gaps and are required for resolving surface current measurements along the Southern California coast, according to Lisa Hazard, operations manager, Coastal Observing Research and Development Center. “Collaborations with the U.S. Navy, Coast Guard, and Marine Corps allow us to maintain surface current mapping systems in areas we otherwise wouldn’t have access to,” said Hazard.

The surface current mapping stations have provided critical data on the direction and speed of ocean surface

currents during responses to oil spills and blooms of potentially hazardous algae. They guide the navigation of vessels in and out of California’s busiest ports and are made available to the public through the Southern California Coastal Ocean Observing System (SCCOOS). To access SCCOOS data, go to www.sccoos.org/data/observations.

Lee Eddington, a meteorologist in the Geophysics Branch at the Naval Air Warfare Center Weapons Division (NAWCWD) at NBVC, approached SCCOOS scientists with a proposal to site HF radar stations on Navy property at San Nicolas Island four years ago. He saw how the Navy could use the HF radar-derived surface current maps to improve calculations of the drift of floating objects. “All the areas of offshore waters that we test in are covered,” said Eddington. “There are not many places you can place this offshore, so it was an ideal location.”



Map depicting high-frequency radar stations and surface currents in the SCCOOS region.

Atmospheric Rivers

San Nicolas Island is also home to the model for an observatory network designed to track a climate phenomenon scientists have only identified in the past decade. Atmospheric rivers are tight flows of water vapor in the atmosphere that are periodically channeled over central and northern California. These flows can carry an amount of water more than 10 times greater than the flow of the Mississippi River, and have

the capacity to bring unrelenting rainstorms that cause catastrophic flooding in western states.

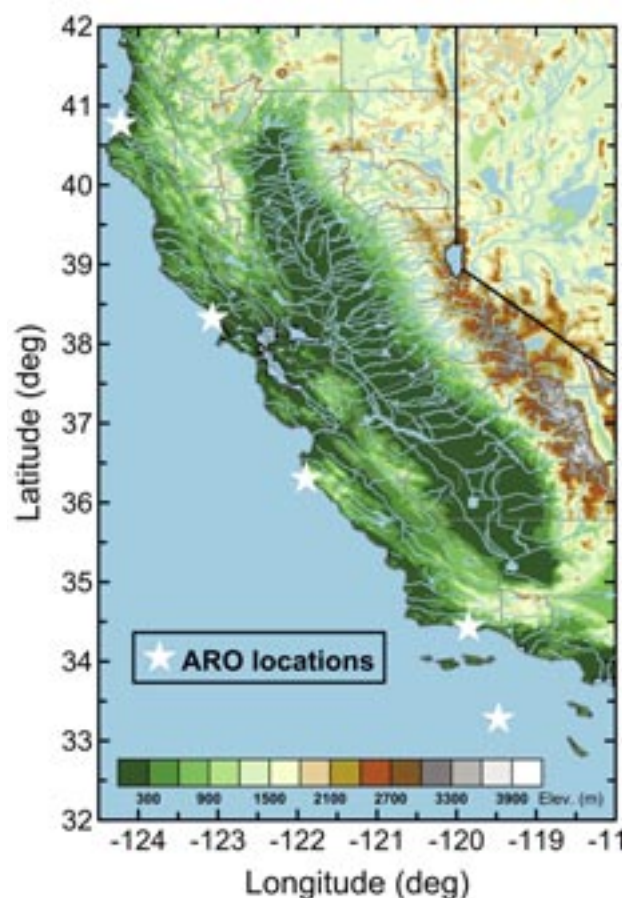
Researchers say there is reason to believe that climate change will produce more atmospheric river patterns. In 2010, the California Department of Water Resources signed an agreement with National Oceanic and Atmospheric Administration (NOAA) to install four Atmospheric River Observatories along the mainland California coast, including one at the Point Sur Naval Facility. The coastal observatories will give weather forecasters, emergency managers, and water resource experts detailed information about incoming storms such as winds and water content.



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The four coastal observatories will include:

- A Doppler wind profiling radar, which reveals the speed and direction of winds at several altitudes aloft
- A technique for extracting critical information from wind profiler data—the level in the atmosphere where falling snow turns to rain
- Global positioning system water vapor instruments, which measure the total amount of water vapor above the site
- Standard meteorological instruments (relative humidity, temperature, pressure, rain gauge)



Locations of the four Atmospheric River Observatories.
Allen White

Environmental Collaborations

Navy environmentalists also rely on volunteer and nonprofit groups to help manage their ever-growing conservation and restoration programs. At NBVC San Nicolas Island, a pair of efforts are combating invasive plant species and non-native feral cats.

NBVC environmentalists have partnered with Channel Islands Restoration (CIR) to combat invasive plant species and to help control erosion, which is also a major concern on San Nicolas Island. CIR is a nonprofit organization dedicated to restoring the natural state and beauty of the Channel Islands, of which San Nicolas Island is one.

Volunteers from CIR have spent years visiting the island; working closely with the Navy to identify and remove invasive plants by hand.

In 2012, the partnership established a greenhouse on San Nicolas Island, which the Navy now uses to grow and nurture native plant species for replanting; combating the effect of erosion and the lasting effects of sheep grazing, which occurred nearly 70 years ago.

“Our goal is to have native plant stock ready to go at any time,” said Valarie Vartanian, NBVC natural resource specialist. “Some plants grow very slowly, so this whole process is going to take some time.” By partnering with CIR, the Navy increases its ability to cover wide swathes of land and quickly replant them with native species. This is critical at San Nicolas Island, which encompasses over 14,000 acres over 60 miles from the mainland.

San Nicolas Island is also home to several endangered species whose lives are in even greater peril because of a large population of feral cats, which were initially brought to the island as pets in the 1950s.

By 2004, it was clear that the feral cats were harming the ecology of San Nicolas Island. As predators, they were eating whatever they found in the nests of cormorants, gulls and other seabirds, and they were targeting native mice, federally threatened Western Snowy Plovers, and federally endangered Island Night Lizards, which are found

on three of the Channel Islands and nowhere else in the world.

The cats were also competing with the island fox for often-scarce food resources. The island fox, an emblematic species not only for San Nicolas Island but also for the rest of the Channel Islands, has experienced significant population fluctuations in the past. Declines in fox populations on the island have coincided with peaks in the cat population.

But rounding up the cats isn't an easy proposition, as Dan Shide, head of the environmental division for NBVC, and Navy biologist Grace Smith explained. No one knew how many there were or exactly where each one lived, and no one had tried a poisonless eradication on an island this large—eight miles long by three miles wide, and 14,562 acres in total.

The planning stage alone took four years and involved an unprecedented partnership between the Navy, Island Conservation, the Institute for Wildlife Studies, the Humane Society, and the Montrose Settlements Trustee Council; which paid for the \$3 million project through fines collected from companies that in the past had illegally used dichlorodiphenyltrichloroethane (DDT), polychlorinated biphenyls (PCB), and other seabird-harming chemicals.

Over the next six months, 66 cats were trapped, with 59 of them going to a Humane Society facility near San Diego. Three of the cats were pregnant, so in the end, 10 kittens were also removed from the island and adopted.

What was believed to be the last cat was removed in June of 2010. Monitoring continued for another six months, but no more were found. Successful removal was declared in December of 2011.

“The cooperation of everyone involved was fantastic, and the successful results will influence future projects all over the world,” said Chad Hanson, project manager for Island Conservation.



Volunteers from Channel Islands Restoration remove invasive plant species at San Nicolas Island, part of an ongoing partnership with Navy environmentalists from NBVC.

Channel Islands Restoration

San Clemente Loggerhead Shrike

In 1990, a Navy biologist contacted the San Diego Zoo for assistance in protecting a federally endangered bird. The bird was the San Clemente Loggerhead Shrike (*Lanius ludovicianus mearnsi*), a subspecies on the edge of extinction, found only on the Navy's San Clemente Island (SCI). The shrike had been listed as critically endangered in 1977; its numbers had dwindled due to massive habitat destruction caused by the grazing of sheep and goats introduced by ranchers in the early 1900s. “The Navy went through the process of formal consultation with the U.S. Fish and Wildlife Service (USFWS) and as a result developed a very rigorous and robust program to recover this bird,” said Melissa Booker, the Navy's Wildlife Biologist for SCI.

Since that first year, biologists from the San Diego Zoo and the Navy have worked together to recover this small songbird through a captive breeding program. It wasn't an easy task, because it meant developing methods to artificially incubate the shrike's eggs, and even more difficult, hand-rear the tiny featherless chicks from hatch. Three clutches of eggs were removed from wild shrike nests on SCI in 1991, and 10 young shrikes were successfully reared. These birds became the nucleus of a captive shrike flock.

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—Chad Hanson



THIS PAGE, CLOCKWISE FROM TOP RIGHT: One of five wild chicks brought in for hand-rearing after losing their parents to predation. The chicks were hand-fed for 24 hours and then fostered. (*Meghan McFarland*); Five rescued wild chicks. Each head is colored to identify them individually. (*Jaelean Carrero*); The same five chicks after placement in the nest of their captive foster parents. (*Jaelean Carrero*); Once the hand-reared chick's eyes open, it is fed using a shrike puppet. (*Susan Hammerly*); An adult shrike perched by his cached lizard. (*Daniel Clark*)



THIS PAGE, CLOCKWISE FROM TOP RIGHT: These two- to three-day-old chicks were hatched and reared in the on-island captive breeding aviaries. Since 2001, most chicks have been reared by parent birds. (*Kathy De Falco*); Two chicks caught up for color banding, wait together in a transport bag. (*Susan Hammerly*); Three parent-reared chicks near fledging in a nest in one of the flight cages. (*Jaelean Carrero*); Two hand-reared nestlings are eager for their food. (*Susan Hammerly*); A hand-reared shrike fledgling that is nearing independence. (*Susan Hammerly*); A wild fledgling, offspring of the most successful released shrikes. (*Susan Farabaugh*)



Jeffrey Grabon launches a global drifter buoy into the Pacific Ocean from the amphibious dock landing ship USS Pearl Harbor (LSD 52) while underway for Pacific Partnership 2013. The buoy, belonging to the Scripps Institution of Oceanography, is used to measure ocean currents up to 15 meters in depth, sea surface temperatures, and atmospheric pressure. Pacific Partnership is the largest disaster response-preparation mission in the Indo-Asia-Pacific region.

MC1 Lowell Whitman

“The captive population was moved to the island in 1993, so the captive birds would be acclimated to SCI’s weather and habitat,” said Dr. Susan Farabaugh, Conservation Program Manager at the San Diego Zoo’s Institute for Conservation Research, who has worked on the project

diversity of the captive population and later the wild as well, in a studbook of all the birds on the island.

Despite these early efforts, in the mid-nineties, the San Clemente Loggerhead Shrike had the distinction of being named North America’s rarest bird. The American



Aerial view of Mugu lagoon at NBVC Point Mugu. The protected wetlands at NBVC Point Mugu are home to a diverse ecosystem that includes many endangered and threatened species.

John Burke

since 1999. “We had to find the best way to house them, to pair them, to feed them, and to prepare them for release to the wild,” Farabaugh said. “In general, our guide was to mimic in captivity the way the bird lived in the wild.” For example, they mimicked the seasonal movements of the wild birds when pairing the captives. They provided a diet to most closely resemble the wild shrike’s diet of insects, and small vertebrates (i.e., lizards and live mice). They also kept careful records of everything (what worked and what didn’t work), and established a behavioral monitoring program to assess the birds’ mate choice, to monitor their breeding activities, and to assess their flight and foraging skills. They kept track of the genetic

Bird Conservancy met with Navy officials and voiced their concerns about the shrike’s impending extinction.

Under the Endangered Species Act, the Navy is required, as a federal agency, to assess any action that could affect any endangered species. Due to concerns over the shrike’s status and possible effects of fire, some fairly significant restrictions were placed on the ship-to-shore live firing range. These included constraints placed on the types of incendiary rounds allowed on the bombing



The strongly hooked bill of the shrike allows this small bird to kill and dismember its vertebrate prey.

Kathy De Falco

range at SCI, and limited training days to allow for shrike monitoring on non-live fire days.

The Navy and the San Diego Zoo learned rapidly how to improve the captive breeding program. While none of the birds bred and released in the 1990s survived, by 2000 there was progress. The captive breeding project transitioned from hand rearing to allow captive shrike parents to raise their own chicks, and then eventually to fostering abandoned eggs and chicks into existing nests in captivity. Release techniques also changed to include supplemental feeding of birds at their release site and allowing pairs of birds to make a nest in a cage—then their chicks could fledge (leave the nest) and fly directly into the wild. Captive-raised birds were placed in a cage near single wild birds and if it was a “match” they would be released to breed in the wild. The whole captive breeding and release process is all carefully planned to match birds that will provide the best genetic diversity; and currently almost all, if not all birds in the wild can be traced to a captive ancestor.

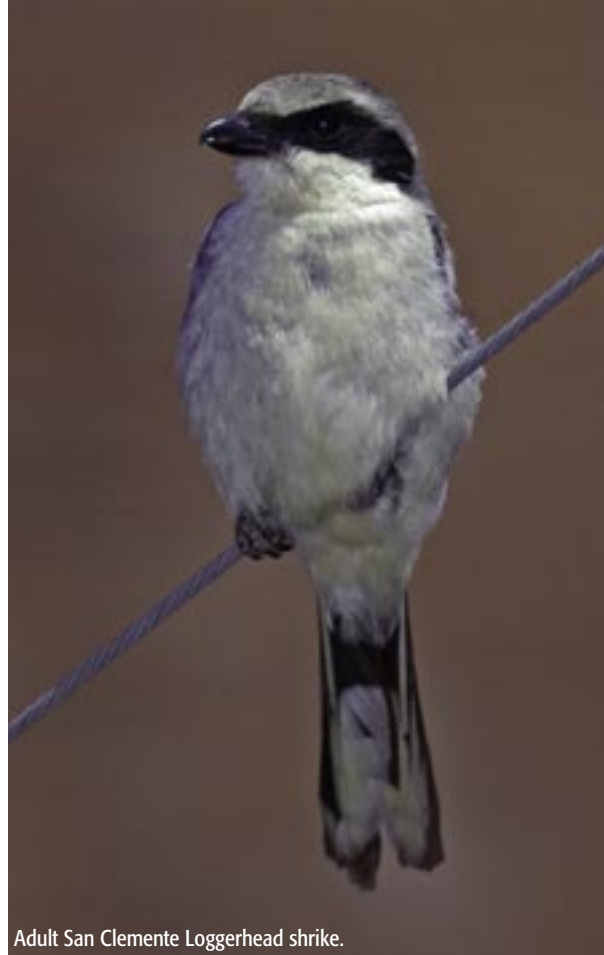
“Chicks reared by parent shrikes, natural parents or fosters, are more

wary than hand-reared,” said Farabaugh, “and this is likely due to their witnessing the vigorous anti-predator behavior that their parents direct at the zoo staff and any island predators that come near the aviaries.”

This program has evolved, but one aspect of the approach has not changed: the zoo and the other shrike contractors work as a collaborative group, guided by the Navy biologists with input from the U.S. Fish and Wildlife Service.

“Everything we did, every protocol change, was discussed with the Navy biologists and the other members of the shrike recovery effort,” said Farabaugh. This collaborative approach has been very successful. “The shrike population that was as few as 14 individuals in 1998 has grown significantly. At present there are 67 wild breeding pairs,” said Booker.

The wild population is doing so well that the end of the captive breeding program is likely in sight, but that won’t end the collaboration of the zoo and the Navy. Other zoo biologists are working with other endangered species that occur on Navy and Marine bases, including the Least Tern, Snowy



Adult San Clemente Loggerhead shrike.

Plover, California pocket mouse, and Desert Tortoise to name a few.

“The U.S. Navy is committed to meeting its mission of protecting our nation as the world’s premier sea force, but we are also committed to being good stewards of the environment,” said Capt. Larry Vasquez, commanding officer, Naval Base Ventura County. “We make every effort to protect the resources in our care. By partnering and sharing information with other federal agencies and learning institutions, we can expand our knowledge and improve both our operational performance and our environmental understanding. Partnerships enhance our capabilities in every way.”

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