Thinking Outside the Shell

Pacific Missile Range Facility's Avian Conservation Programs Enjoy Continued Success

By Tom Savre

A PMRF hatched albatross chick at James Campbell National Wildlife Reservation. *Photo Credit: Tom Savre*

The U.S. Navy's Pacific Missile Range Facility (PMRF) in Hawaii has helped strengthen the populations of two federally protected bird species. Through a multi-year program to relocate a nesting colony of Laysan albatross (*Phoebastria immutabilis*), protected under the Migratory Bird Treaty Act, and implementation of a Dark Sky Initiative to prevent fallout of the nocturnally fledging Newell's shearwater (*Puffinus auricularis newelli*), protected under the Endangered Species Act, PMRF has successfully and creatively solved two conservation challenges with no impact to its mission capabilities.

The Laysan Albatross

PMRF Barking Sands, located on the west coast of Kauai Island is the site of both an active Navy airfield and a seasonal nesting colony of Laysan albatross. When the albatross, with their impressive wingspan of nearly seven feet (two meters), began nesting regularly on the base in the 1980s, it raised concern for both bird and aircraft safety. In 1990, the Navy enlisted the aid of the U.S. Department of Agriculture Animal and Plant Health Inspection Services (USDA APHIS) to capture and relocate albatross adults to protected nesting areas near Kilauea Point on the north shore of Kauai.

While removing albatross adults from PMRF successfully reduced bird strike risk for the airfield, it did not deter the established nesting pairs from returning to the base in following years.

"The birds are programmed to return to the location they fledge from," said John Burger, former PMRF Environmental Coordinator and recipient of the 2009 National Military Fish and Wildlife Association's Natural Resource Conservation Management Award (NMFWA). With a life span of 40 to 50 years, adult albatross that originally fledged from PMRF will

continue to return to the base each year to nest. The only effective solution is to prevent new birds from hatching and imprinting on the base as a future breeding location.

The second phase of PMRF's albatross program evolved in response to a funding shortfall in 2004 that prevented USDA APHIS from capturing albatross at the beginning of the nesting season. By the time new funding came through, a number of eggs were on the verge of hatching. These eggs could not be destroyed, but Navy biologists did not want new albatross to hatch on the base thereby increasing the size of PMRF's albatross nesting population.

Dr. Eric VanderWerf and Eric Robby Kohley of Pacific Rim Conservation feeding a Laysan albatross chick.
Photo courtesy of Pacific Rim Conservation

Staff at Kilauea Point National Wildlife Refuge provided the solution. Albatross nests on the refuge were examined to locate nesting pairs with infertile or damaged eggs that would never hatch. Wildlife technicians and field biologists rushed to locate viable eggs at PMRF and move them to available nests at Kilauea Point, with the hope that the Kilauea Point birds would hatch the eggs and raise the chicks as their own. The experiment worked, and the first generation of albatross chicks was born to surrogate parents at the refuge in the spring of 2005.

This emergency effort was the beginning of what is now PMRF's annual albatross egg swap program. To prevent albatross from hatching at PMRF while supporting conservation of the species elsewhere, all eggs laid at PMRF are collected and moved to suitable nests at distant sites. The egg swap is expected to continue annually until all of PMRF's established nesting pairs no longer return to the base.

Laysan albatross chick fledging from James Campbell National Wildlife Refuge, June 2015.
Photo courtesy of Pacific Rim Conservation

In 2014 an opportunity arose for PMRF to support albatross conservation on another island. The James Campbell National Wildlife Refuge (JCNWR) on the north shore of Oahu acquired a tract of coastal dune habitat to be managed for sea bird nesting. Biologists at Pacific Rim Conservation (PRC) proposed a program to establish a new albatross nesting colony at JCNWR with eggs laid at PMRF.

In December 2014, a selection of albatross eggs were transported from PMRF to Oahu, where they hatched either in an incubator or by temporary

surrogate albatross parents. The chicks were then translocated to JCNWR where they were hand reared by PRC biologists who fed them a daily diet of squid and fish until they reached full size. Recordings of albatross vocalizations were played at the site and albatross decoys were placed near the chicks to attract adult albatross to land at the new "colony" and visit with the chicks. In the end, all 10 chicks raised at the site fledged successfully.

To date, more than 250 Laysan albatross eggs have been translocated from PMRF under either the Kauai egg swap program or the JCNWR hand rearing program, resulting in an increase in the species' overall productivity in Hawaii.

The Laysan albatross project is one aspect of the base's Integrated Natural Resources Plan that earned the top Chief of Naval Operations (CNO) and Secretary of the Navy (SECNAV) honors for Natural Resources Conservation in 2011 and 2013, and one of two projects for which Burger received the NMFWA award.

Both the CNO and SECNAV awards also detail the work that Burger initiated and the base continues to reduce the risk of seabird "fall-out" in the night skies over PMRF.

The Newell's Shearwater

Each fall season, fledglings of the mountain nesting Newell's shearwater fly over PMRF at night and may become disoriented by artificial lighting on the base. Shearwater fledglings are particularly at risk due their lack of experience as they head out to the Pacific Ocean for the first time. These young birds rely on starlight and moonlight to guide them out to sea, and may be confused by artificial lights– especially on cloud-covered nights or during new moon phases. As a result, the birds may become grounded due to collision with structures or exhaustion, sometimes with lethal consequences. Once on the ground, they are unable to fly because their legs are adapted for swimming, so they become easy targets for predators.

In 2010, the base modified its exterior lighting practices to create a dark-sky philosophy. This involved changing conventional lamps to light emitting diodes, or LEDs, and using full-cutoff fixtures to funnel light downward. In addition, PMRF's Environmental Department provided annual training for security and other base personnel to gain their assistance in locating and rescuing grounded birds. Nearly every light fixture on the base was altered, greatly reducing risk to shearwaters while also providing significant energy savings for the Navy.

The number of shearwater groundings at PMRF fell sharply once the new lights were installed: from 12 grounded birds in 2010 to only three birds in 2011 and again in 2012. In 2013, no groundings were recorded.

In 2014, the grounding of eight Newell's shearwaters over a period of two to three nights in October led to further reevaluation of lighting practices at PMRF. It was discovered that, even with use of shielded lights, the base could continue to experience shearwater fallout unless consideration was given to timing of operations with respect to the phase of the moon, weather conditions, and proximity of the light source to the ocean.

Based on lessons learned in 2014, the base entered a new phase of its Dark Sky Initiative for the 2015 shearwater fledging season. All exterior lighting not required for security was turned off for the entire season. A waiver process was implemented by which project managers could request permission to use external lighting during the season on a case by case basis. PMRF environmental staff then worked with project managers to determine the minimal amount of light intensity and

Newell's shearwaters cannot take flight from the ground so must take advantage of either elevation to take flight or must climb a tree or rock outcrop to gain sufficient height to take flight.
Photo courtesy of Eric VanderWerf 2015 with Pacific Rim Conservation

An adult Newell's shearwater forages for food far off Kauai's coast.
Photo courtesy of Eric VanderWerf 2015 with Pacific Rim Conservation

hours of use required to conduct each operation safely.

The combined effect of modifying schedules, using shielded lights, reducing light intensity, and using green lights where applicable, have resulted in a dark sky over PMRF in 2015 and has greatly reduced the risk of grounding for the sea birds that fly over the base.

Teamwork is Key

"Considering the strong conservation ethic on Kauai, being able to show the community that PMRF and the Navy share that commitment in deeds, not just words, helps establish that PMRF is 'our' base and not just 'the' base," said Burger of his award.

"...Success at the most local level is critical to establish credibility and build productive partnerships in the future," Burger added. "The majority of the most valuable and protected natural resources on federal property are...found in the isolation provided by Department of Defense Ranges."

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Editor's note: PMRF was also recently recognized for its successful conservation programs by the Kauai County Council in 2014 and by the Hawaii State Legislature in 2015.