ANNUAL REPORT

2016

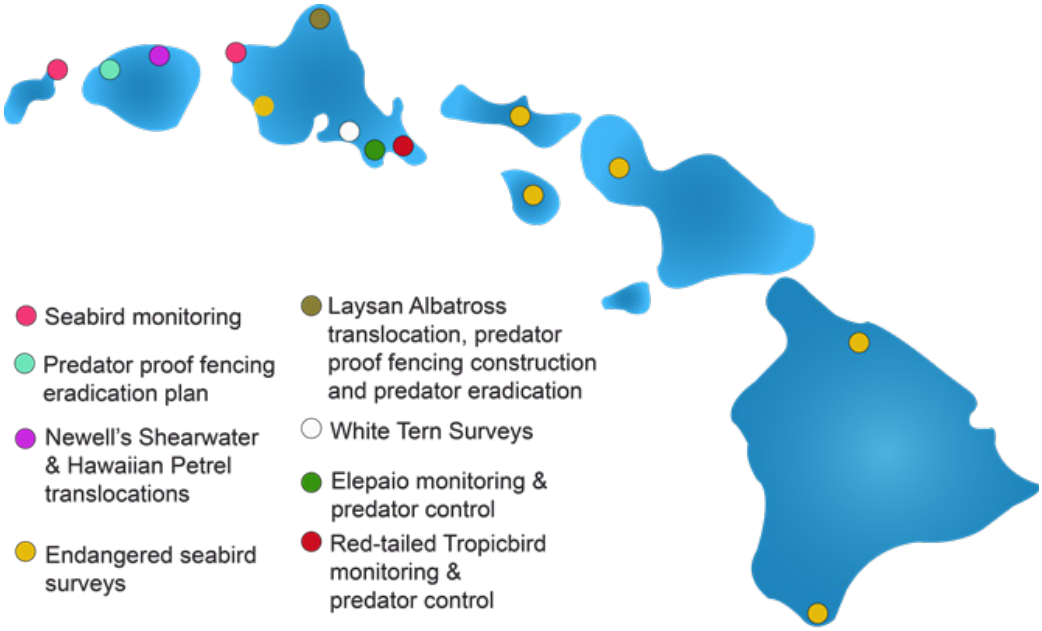
PACIFIC RIM CONSERVATION
RESTORING BIODIVERSITY

Pacific Rim Conservation's mission is to maintain and restore native bird diversity, populations, and habitats across the Pacific. We work together with local communities, government agencies, and other conservation organizations to achieve our goals. We do this primarily by creating 'islands' within islands where predators have either been removed and excluded through fencing, or are controlled on a long term basis. We then work to restore the habitat in these areas, and in some cases, bring bird species back that are no longer found there through translocation and social attraction. Throughout all of our work, we actively conduct research to better understand the methods and ecosystem changes to inform future conservation actions.

This year marked our ten year anniversary as an organization, and also marked some of our largest accomplishments to date. In the following pages we summarize our results for 2016. With your continued partnership and support, we will continue our goal to be leaders and innovators in science-based conservation in Hawaii and across the Pacific. Thank you!

Lindsay Young
Executive Director

Eric VanderWerf
Chair, Board of Directors



Pacific Rim Conservation Year in Review

BIRDS

- **13** number of bird species we worked with
- **200+** wild birds banded as part of our research
- We translocated **3 species** of Hawaiian seabirds this year to create new, safe breeding colonies: Laysan Albatross, Hawaiian Petrel and Newell's Shearwater.
- **Our work is science based.** In 2016 we wrote:
  4 Scientific journal publications
  5 Management plans
  Many project reports

ECOSYSTEMS

- **3700 ft** Length of predator-proof fencing built in 2016 to protect native ecosystems.
- This fence will protect newly translocated albatrosses on **65 Acres** of predator eradications & control.
- **18 acres** of habitat restored by removing weeds and replacing them with native plants.

PEOPLE

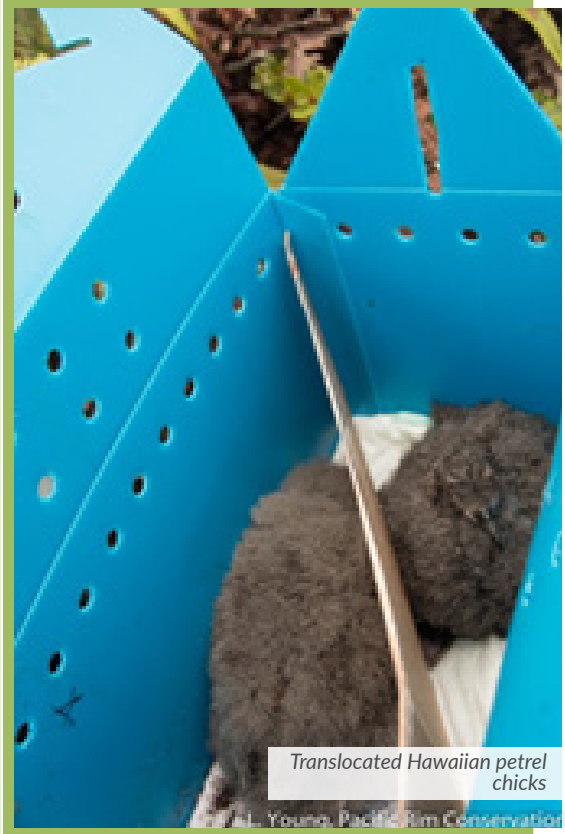
- We are small, but mighty. We accomplish our work with highly trained staff, a dedicated group of volunteers and great partners.
- **4** Full-time and **4** seasonal staff
- **1300** hours donated by our amazing volunteers
- It's important to involve the next generation. In 2016 **400+** K-12 students visited our conservation sites & we visited the classes of 400 more.
- **10 #** of public presentations
  10+ # of media articles

www.pacificrimconservation.org

Nihoku restoration area

Artificial burrows used for the translocation

Translocated Newell's Shearwater chick



Translocated Hawaiian petrel chicks

NIHOKU ECOSYSTEM RESTORATION PROJECT

Created in 2012 and located at Kilauea Point National Wildlife Refuge on Kauai, the Nihoku Ecosystem Restoration Project's mission is to establish the first fully protected colony of Newell's Shearwaters and Hawaiian Petrels in Hawaii. These are Hawaii's only endemic seabird species and are both listed under the Endangered Species Act of 1973. Causes of their declines include habitat degradation, invasive plants, predation by feral cats, pigs, rats, and introduced Barn Owls, and collisions with power lines and structures exacerbated by light attraction.

To create a protected colony of these species, we built a 2400 foot-long predator-proof fence enclosing approximately eight acres at Nihoku in late 2014, and we eradicated all mammalian predators shortly afterwards. In 2015 and 2016, we cleared non-native vegetation from 25% of the fenced area (~2 acres) and planted more than 10,000 native plants representing 30 species to begin restoring the habitat.

From 2012-2016, potential source colonies of Newell's Shearwaters and Hawaiian Petrels were located by the Kauai Endangered Seabird Recovery Project at locations around Kaua`i. In November 2015, the first cohort of 10 Hawaiian Petrels were moved via helicopter into the fenced area and nine were successfully reared until fledging in early December. In 2016, seven Newell's Shearwaters and 20 Hawaiian Petrels were translocated into the site and 100% of them fledged. In 2017 our goal is to translocate 20 more individuals of each species.

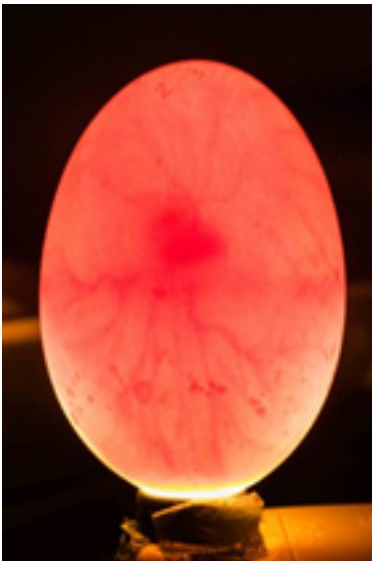
Pacific Rim Conservation serves as the overall project coordinator of the Nihoku Ecosystem Restoration project at Kilauea Point National Wildlife Refuge, which is a partnership with the Kauai Endangered Seabird Recovery Project, the U.S. Fish and Wildlife Service, the American Bird Conservancy, Hawaii Department of Land and Natural Resources, National Fish and Wildlife Foundation, and National Tropical Botanical Garden.

Nihoku partners

JAMES CAMPBELL NATIONAL WILDLIFE REFUGE ALBATROSS TRANSLOCATION PROJECT

Over 99% of the global Laysan Albatross population nests on atolls < 5 meters in elevation, where they are at risk from sea level rise and other aspects of global climate change. Protecting and establishing new colonies on higher islands are among the highest priority conservation actions for this species. For several years we have partnered with the U.S. Navy to salvage and relocate Laysan Albatross eggs from the Pacific Missile Range Facility on Kauai (learn more here), where albatross nest close to a runway and are an aircraft collision hazard. We candle the eggs to determine whether they are fertile, and place some of the eggs in foster nests at other colonies on Kauai.

In 2015, we embarked on a new project in which we move Laysan Albatross eggs from Kauai to Oahu. The goal of the project is to start a new albatross colony where they will be safe from human threats and sea level rise. The eggs are housed temporarily in an incubator, then moved to foster nests at Kaena Point Natural Area Reserve. When the chicks are three weeks old, we move them to James Campbell National Wildlife Refuge, where we raise them hand until fledging.



A fertile albatross egg being candled

Eggs in an incubator

A chick just breaking out of its egg

Newly hatched translocated Laysan Albatross chick

Translocated albatross chick at James Campbell National Wildlife Refuge

In 2015 10 successfully fledging from the refuge, and 2016 19 of 20 chicks fledged. We expect these birds to begin returning to the refuge (not to PMRF) in 3-5 years and to start nesting on the refuge in 6-9 years.

To help boost this incipient colony, we used a social attraction program involving 10 albatross decoys and a solar powered sound system broadcasting albatross courtship calls, which resulted in 234 separate visits by wild adult albatrosses in 2016. We also constructed a 1150-meter-long predator proof fence enclosing 16 acres and capable of excluding all mammalian pests found in Hawaii, to protect the future albatross breeding colony and provide a safe location for other seabirds threatened by sea level rise. While 16 acres may seem small, it represents 75% of the nesting area of Tern Island in the Northwestern Hawaiian Islands which is home to more than 200,000 pairs of breeding seabirds.

In 2017 we plan to translocate an additional 20 Laysan Albatross chicks to JCNWR and also to begin bringing Black-footed Albatross chick from Midway in order to establish a colony of that species. Partners on this project include U.S. Fish and Wildlife Service, the U.S. Navy, the National Fish and Wildlife Foundation, the David and Lucile Packard Foundation, the American Bird Conservancy, and the numerous volunteers who have dedicated their time to helping to care for the birds.

We also began habitat restoration within the predator fence by planting several species of native plants.

Wild albatross visiting social attraction site at James Campbell National Wildlife Refuge

Newly completed predator-proof fence at James Campbell National Wildlife Refuge

WHITE TERN CENSUS AND CITIZEN SCIENCE

White Tern chick after banding

Banding a White Tern chick

In 2016 we conducted surveys of the official bird of the City and County of Honolulu, the White Tern (a.k.a. Fairy Tern or Manu O Ku). The goals of the project were to measure the size, growth rate, and distribution of the White Tern population on Oahu, assess any threats that might be affecting them, and provide information to the State of Hawaii and the City and County of Honolulu to help avoid trimming or cutting of trees being used by White Terns.

We also partnered with organizations including the U.S. Fish and Wildlife Service, Hawaii Audubon Society, arborists, and Iolani School to create the "Hui Manu-o-Ku", a group of conservationists and private citizens working together to enhance awareness, appreciation, understanding, and conservation of the Manu-o-Ku. The group developed a citizen science program in which individuals and schools can help monitor and protect the growing tern population in Honolulu by collecting data and uploading them into a searchable on-line database that includes and interactive map:

www.whiteterns.org.

As a result of the successful partnerships established during this project, we began banding White Terns to facilitate collection of more detailed demographic information about the species. This program eventually will elucidate aspects of White Tern biology that are poorly-known, such as survival, dispersal, and age a first breeding.

Mt. Kaala, Oahu where Newell's Shearwaters were detected

Songmeter being deployed on Molokai

ENDANGERED SEABIRD HABITAT ASSESSMENT

Hawaii's only two endemic seabirds, the Newell's shearwater and Hawaiian petrel, and the Band-rumped storm petrel, are all listed under the U.S. Endangered Species Act. Threats to these species include light attraction and fallout, collision with power lines, predation, and habitat degradation. Programs are already underway to mitigate light attraction, fallout and collision, but additional work is needed to provide protection from predation on the montane breeding colonies and/or determine areas that may be suitable for the creation of new breeding colonies. To accomplish this, in 2015 the US Fish and Wildlife Service produced a seabird habitat suitability model that identified the potential locations across the state where all three seabird species might be found. However, since many of the sites identified by the model had not been assessed on the ground for the presence of birds, and their potential to serve as management sites, we worked with the USFWS and partners on each island (Maui Nui Seabird Recovery Project, Hawaii Natural Area Reserves System, Hawaii Volcanoes National Park, Molokai Land Trust and the American Bird Conservancy) to visit these sites and determine if the habitat was suitable, fenceable and whether birds were present.

We did habitat/fencing suitability assessments and seabird monitoring (both automated recording and auditory surveys) at 13 sites, and assessed an additional 23 sites assessed aerially for a total of 38 locations assessed across four islands. Birds were detected on all islands, but in variable densities. On Oahu Newell's Shearwaters were detected at two sites- at Palikea and Mt. Kaala, but with limited calling. Similarly on Molokai, a single Shearwater call was recorded that may have been just transiting the area and was not near a site that could be fenced. On West Maui petrels were detected at six sites, once of which in high enough call rates to suggest breeding. Newell's Shearwaters were detected at two sites, but with low call rates. On Hawaii Island both Shearwaters and Petrels were detected in variable densities in Puu Oumi Natural Area Reserve Waimanu Valley. However, the birds appeared to be transiting the area and nesting on the sheer cliffs just outside the survey area. At the third sits on Hawaii Island on the southern slopes of Mauna Loa, Hawaiian Petrels and Band-rumped storm petrels were detected on songmeters in densities high enough to suggest breeding. Both species had been previously observed on the ground at this site, which is also suitable for fencing and further management could be pursued at this site. The detection of Newell's Shearwaters on all islands surveyed was surprising and warrants further investigation in future years.

Panorama of Lehua Islet.

LEHUA ISLET SEABIRD MONITORING

Lehua Islet, just north of Ni'ihau, is home to one of the largest and most diverse seabird breeding colonies in the main Hawai'ian Islands. However, the presence of Polynesian rats prevents some smaller species of seabirds from nesting on the island and predation by rats limits the reproductive success of species already found on the island. The removal of rats from Lehua Islet is planned and intended to encourage natural recolonization of the island by additional nesting seabirds, and to allow the island to act as a translocation site for other species of birds and plants.

In order to document the effects of rat removal on existing seabird populations, we partnered with Island Conservation and the Kauai Endangered Seabird Recovery project to monitor the reproductive success of seabirds that currently nest on the island, including Wedge-tailed Shearwater, Red-tailed Tropicbird, and Bulwer's Petrel, which are known to be susceptible to rat predation and thus will be good indicators of the success of the rat eradication effort. This data, collected in 2015 and 2016, will serve as a baseline that can be used for comparison with measurements collected after rats have been eradicated from the island.

Seabirds monitored on Lehua Islet in 2015 and 2016: Wedge-tailed Shearwater with chick (top), Red-tailed Tropicbird with chick (center), and Bulwer's Petrel egg depredated by a rat (bottom).

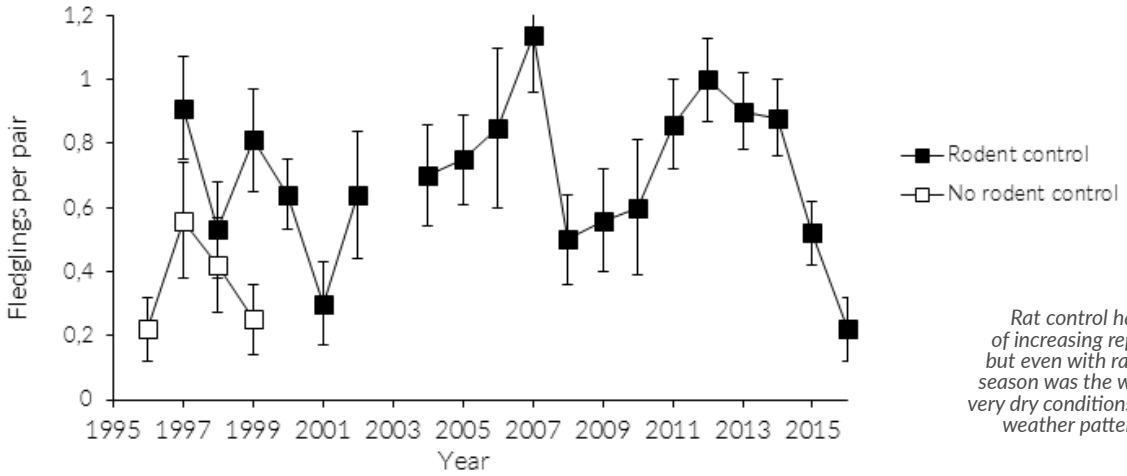
OAHU ELEPAIO MONITORING AND RAT CONTROL

For the 21st year in a row, in 2016 we again controlled rats in southeastern Oahu and monitored nesting success of the endangered Oahu Elepaio. Predation by invasive black rats is the primary threat to this endemic bird, and rat control has been shown to be an effective method for increasing nest success and survival of breeding female Oahu Elepaio. We controlled rats in 25 elepaio territories in Wailupe Valley using snap traps and automated pneumatic traps made by the Goodnature company. The rat control program was effective at reducing rat abundance, but despite this effort, 2016 was the worst year for Oahu Elepaio since monitoring began in 1996. Elepaio nest success was only 17%, well below the long-term average of 61%. Productivity averaged 0.22 fledglings per pair, also well below the long-term average of 0.73. The poor productivity of elepaio in 2016 was likely caused by very dry conditions associated with an El Niño weather pattern and consequent low availability of insect prey. A few elepaio pairs nested again during the fall, which is very unusual, in response to unseasonal rainy weather during the late summer, which helped to improve productivity somewhat, but this was still the worst year recorded.

A female Oahu Elepaio feeding two nestlings.

Automated rat traps made by the Goodnature company in New Zealand were used to improve rat control.

The average capture rate of rodents in Goodnature traps (0.139 per trap-night) was more almost five times higher than the capture rate in snap traps (0.028 per trap-night), though 15% of the automated traps developed gas leaks.

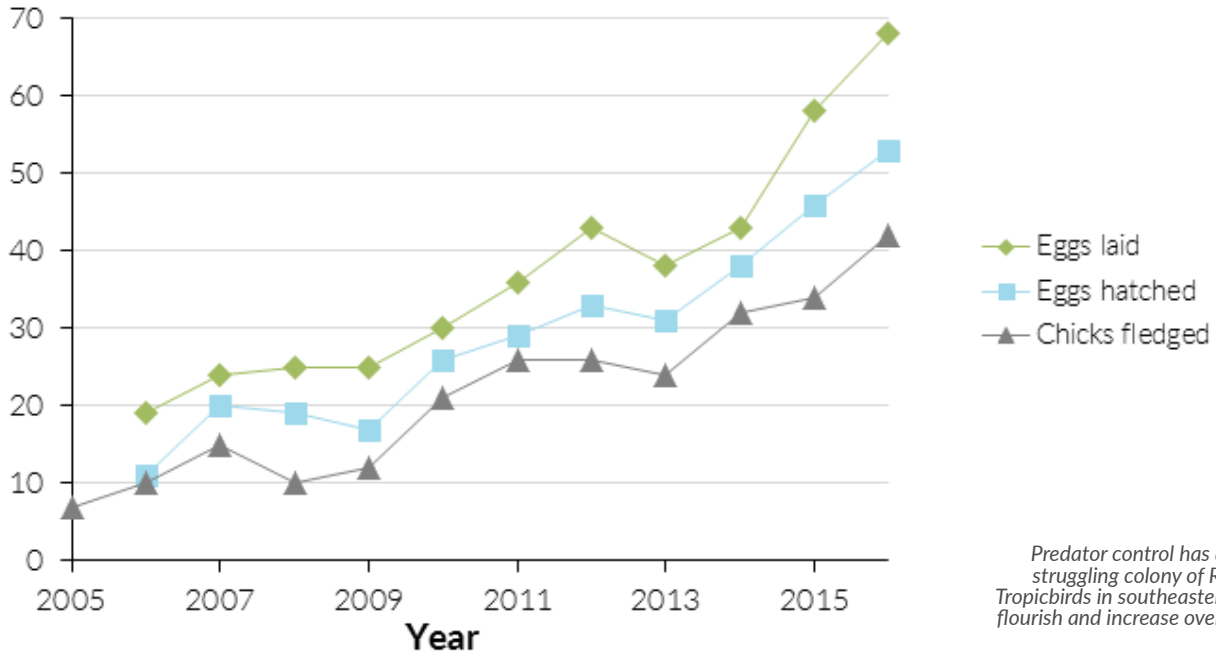


Rat control has been an effective method of increasing reproduction of Oahu Elepaio, but even with rat control the 2016 breeding season was the worst ever, probably because very dry conditions associated with an El Nino weather pattern caused low abundance of insect prey.

EFFECTS OF PREDATOR CONTROL ON REPRODUCTIVE SUCCESS OF RED-TAILED TROPICBIRDS

A Red-tailed Tropicbird in southeastern Oahu.

For the 11th year in a row, we again controlled predators to protect a nesting colony of Red-tailed Tropicbirds in southeastern Oahu. We used a variety of traps to remove mongooses and rats, and monitored nesting success of tropicbirds. This management has been highly effective, and has allowed a small, struggling colony to flourish and grow. This is now the third largest Red-tailed Tropicbird colony in the main Hawaiian islands, and may serve as a source of birds to recolonize other sites on Oahu. It has also become valuable as a study site for this species because it is so easily accessible.



Predator control has allowed a struggling colony of Red-tailed Tropicbirds in southeaster Oahu to flourish and increase over the past 11 years.

RESEARCH

We continue to actively collect data on all of our projects with the goal of publishing in the peer reviewed literature. Current research projects not already mentioned above and being written up for publication include:

- *Designing predator proof fences for Hawaii: Results of a survey of sanctuaries in New Zealand and Hawaii*
- *Results of mammalian eradications from within Hawaii's predator proof fences*
- *Demography, survival and at-sea habitat use of Laysan Albatross*

Recent peer reviewed publications

VanderWerf, E.A. and Young, L.C. 2016. Juvenile survival, recruitment, population size, and effects of avian pox virus in Laysan Albatross (Phoebastria immutabilis) on Oahu, Hawaii, USA. The Condor Ornithological Applications. In Press.

Paxton, E.H, Camp, R.J., Gorresen, P.M., Crampton, L.H., Leonard, D.L. and VanderWerf, E.A. 2016. Collapsing avian community on a Hawaiian Island. Science Advances. In press.

Yonehara, Y., Goto, G., Yoda, K., Watanuki, Y., Young, L.C., Weimerskirch, H., Bost, C.A., & K. Sato. 2016. Flight paths of seabirds soaring over the ocean surface enable measurement of fine-scale wind speed and direction. Proceedings of the National Academy of Sciences. In press

Young, L.C. and E.A. VanderWerf. 2016. The beginning of Black-footed Albatross colonization on O`ahu, Hawai`i. Elepaio. 76: 1-4.

VanderWerf, E.A., D.G Smith, C. Vanderlip, A. Marie, M. Saunter, J. Parrish & N. Worcester. 2015. Status and demographic rates of the Christmas Shearwater on Kure Atoll. Marine Ornithology. 43:199-205.

2016 PARTNERSHIPS AND COLLABORATORS

National Fish and Wildlife Foundation

Forestry and Wildlife Hawaii

Kaua'i Endangered Seabird Recovery Project

National Tropical Botanical Garden

ISLAND CONSERVATION

Preventing Extinctions

EARTHJUSTICE

National Park Service

AMERICAN BIRD CONSERVANCY

Department of the Navy United States of America

PONO PACIFIC

ECOSYSTEM RESTORATION SERVICES

The Wildlife Society

the David & Lucile Packard FOUNDATION

U.S. Fish & Wildlife Service

Department of the Interior

Maui Nui Seabird Recovery Project

Pacific Cooperative Studies Unit

PCSU

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