



ANNUAL REPORT



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David Johnson

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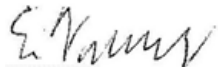
In our first strategic plan which was finalized in 2016, we determined that the overarching Goal of Pacific Rim Conservation was to reverse the decline of native bird populations in Hawaii and the Pacific and that we would do this by 1. reducing the threat of invasive species on native birds 2. protect and create areas containing important native bird habitat and 3. develop a strategic program in the Northwest Hawaiian Islands and initiate projects in the Pacific Region.

In reflecting on our work over the last three years, both our staff and board agreed that we had not only met, but exceeded many of the goals we set forth in 2016. This included expanding our reach beyond Hawaii to include the greater Pacific region (check out our new international section later in this report), developing and implementing new translocation techniques for imperiled bird species, and improving the science behind all of our methods. This work was also recognized externally by the Conservation Council for Hawaii who awarded PRC with the Koa Award for Conservation Leadership this year.

In the following pages we summarize our project results for 2019. We could not achieve these goals without our fantastic partners, generous funders, and dedicated staff and volunteers. We thank everyone who has been involved in our work the past year.

Aloha and Mahalo,


Lindsay Young
Executive Director


Eric VanderWerf
Director of Science



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PACIFIC RIM CONSERVATION 2019 YEAR IN REVIEW

BIRDS

15 bird species we worked with or protected in 2019, of which 8 are endangered locally, nationally, or globally.

1,394 nests of native Hawaiian birds monitored in 2018

187 wild birds banded as part of our research in 2018

We translocated **5 species** of Hawaiian seabirds this year whose breeding populations that are safe from climate change and non-native predators: **Black-footed Albatross, Hawaiian Petrel, Bonin Petrel, Tristram's Storm-Petrel, and Newell's Shearwater.**

Our work is science based.

In 2019 we published:

2 scientific journal manuscripts **3** management and monitoring plans
Many project reports

ECOSYSTEMS

18 Acres

of habitat restored by removing non-native weeds and replacing them with native plants



140 Acres

of forest bird nesting habitat protected by removal of non-native rats

PEOPLE

8 Full-time & **3** seasonal staff

18 Partners and funders

1000 K-12 students visited our project sites, and we visited the classes of 17 more.

35 school and community groups visited our project sites

10 public and professional presentations

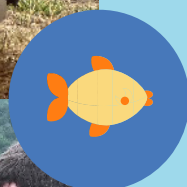
15+ number of media articles



FUN FACTS:

5 forms of transportation used to get seabirds from the Northwestern Hawaiian Islands to Honolulu:

(ATV and golf cart on Midway, zodiac at Tern Island, 500 miles by ship from Tern, 45 miles by car from Honolulu to JCNWR).



151 lbs of fish and squid per albatross per season

22 lbs of fish and squid used per day during translocation season

1972 lbs of seafood total used in 2019



328 visits by wild Laysan Albatrosses to our social attraction site



700+ miles hiked for conservation work



858 non-native predators trapped in bird nesting areas (Elepaio, Tropicbirds and seabird colonies)



NO NET LOSS: JAMES CAMPBELL NATIONAL WILDLIFE REFUGE SEABIRD TRANSLOCATION PROJECT



Bonin Petrel that returned to the release site as an adult in April 2019.

Black-footed Albatross chicks with decoy and speakers

PARTNERS:

U.S. Fish and Wildlife Service, James Campbell National Wildlife Refuge (JCNWR), Midway Atoll National Wildlife Refuge, Papahānaumokuākea Marine National Monument, U.S. Navy, and Hawaii Department of Land and Natural Resources .

Project website:

www.islandarks.org

The goals of the No Net Loss initiative are twofold: 1) to protect as much seabird nesting habitat in the main islands as is being lost in the Northwestern Hawaiian Islands because of the effects of climate change; and 2) to establish new breeding colonies of vulnerable seabird species that are safe from sea level rise and non-native predators. We do this by building predator exclusion fences, removing invasive predators, and then attracting or translocating birds into these protected areas. We currently are focusing these efforts at James Campbell National Wildlife Refuge (JCNWR) on Oahu, and have begun working on four priority species that are most vulnerable to sea level rise: Black-footed and Laysan Albatrosses, Bonin Petrel, and Tristram's Storm Petrel, all of which have a high proportion of their global population nesting in a few locations that are less than 2 meters above sea level. In 2016, we completed a 1,150-meter-long predator exclusion fence enclosing 16 acres at JCNWR. 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 240,000 breeding pairs of seabirds.

From 2015- 2017, we translocated 50 Laysan Albatross chicks (raised from 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. A total of 46 Laysan Albatross chicks successfully fledged as a result of this program, and the first chick from the 2015 cohort returned in 2018. We expect more birds to return soon and to begin nesting at JCNWR in a few years. In 2017-2019, we moved 65 Black-footed Albatross chicks from Midway and Tern Island to JCNWR, of which 61 fledged. In 2018-2019, we moved 129 Bonin Petrel chicks and 71 Tristram's Storm-Petrel chicks from Midway and Tern Island, of which 129 and 67 fledged, respectively. In 2019 we saw the first individual Bonin Petrel and Tristram's Storm-Petrel return after just one year. We plan to translocate these three species for two more years.

To help establish albatross breeding colonies, we used a social attraction program involving 20 decoys of each species and solar-powered sound systems broadcasting albatross courtship calls. While no wild Black-footed Albatrosses visited the site, there were more than 300 visits by Laysan Albatrosses in 2017, 2018, and 2019. The first wild Laysan Albatross pair nested on the refuge in December 2017, and they were joined by a second pair in 2018.

NIHOKU ECOSYSTEM RESTORATION PROJECT



Translocated Newell's Shearwater chick

PARTNERS:

Kauai Endangered Seabird Recovery Project, U.S. Fish and Wildlife Service, American Bird Conservancy, Hawaii Department of Land and Natural Resources, National Fish and Wildlife Foundation, and National Tropical Botanical Garden.

Project website:

www.nihoku.org

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. Since 2015, we have cleared non-native vegetation from 75% of the fenced area (~4 acres) and planted more than 16,000 native plants representing 30 species to begin restoring the habitat.

From 2012-2019, 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 2019, 20 Newell's Shearwaters and 20 Hawaiian Petrels were translocated into the site and all but one of the Hawaiian Petrels fledged. Since translocation began in 2015, 154 listed seabirds have fledged from this site for a success rate of over 98% for the project.

In anticipation of adult birds starting to return to the site, intensive monitoring was undertaken with both visual, auditory and report camera surveys every two weeks for the duration of the breeding season. Visual surveys found Hawaiian Petrels transiting the site on four occasions and Newell's Shearwaters at least once; none of these birds were observed on the ground. Camera monitoring revealed that Bulwers Petrels have been using the site and were observed entering and exiting burrows on multiple occasions.



Translocated Hawaiian petrel chick

OAHU ENDANGERED SEABIRD SURVEYS



Kaluanui NAR

PARTNERS:

Hawaii Division of
Forestry and Wildlife,
Oahu Army Natural
Resources Program,
Conservation Metrics,
National Fish and
Wildlife Foundation

Hawaii's only two endemic seabirds, the Newell's Shearwater and Hawaiian Petrel are listed as threatened and endangered, respectively, under the Endangered Species Act. Threats to both species include light attraction and fallout, collisions with power lines and other structures, predation by non-native animals, and habitat degradation. Both species were assumed to be locally extinct on the island of Oahu despite limited survey effort, and fossil evidence indicating that extensive colonies existed post-human contact. Since 2016, we have deployed up to 15 automated acoustic recording units (song meters) annually island-wide in locations where modelling predicted the habitat would be suitable. We have obtained 10,511 recording hours since 2016. We have detected Newell's Shearwaters regularly at five sites; 2 on the leeward slopes of Mount Kaala, and three in the Koolau Range at Kaluanui, Poamoho and Opaepa. We also detected Hawaiian Petrels at 2 sites on Mount Kaala. All sites where we detected birds were in nearly intact native forest with very steep slopes, similar to areas where these species nest on Kauai. Birds were detected on multiple nights in several months of the breeding season, sometimes calling up to 18 times in a single night. In 2019, calls of Newell's Shearwaters were heard at Kaluanui NAR by a trained observer, indicating birds are present in the area. Evidence suggests that, at a minimum, both species are regularly prospecting on Oahu, and could potentially

be breeding on the island. If they are breeding, these individuals could represent a missing link in the population connectivity of both species across the island chain. Protecting any remnant populations would be of high conservation value given their recent catastrophic population declines.



Songmeter at
Kaala NAR

OAHU ELEPAIO MONITORING AND RAT CONTROL



Two elepaio fledglings with their father in Wailupe Valley.

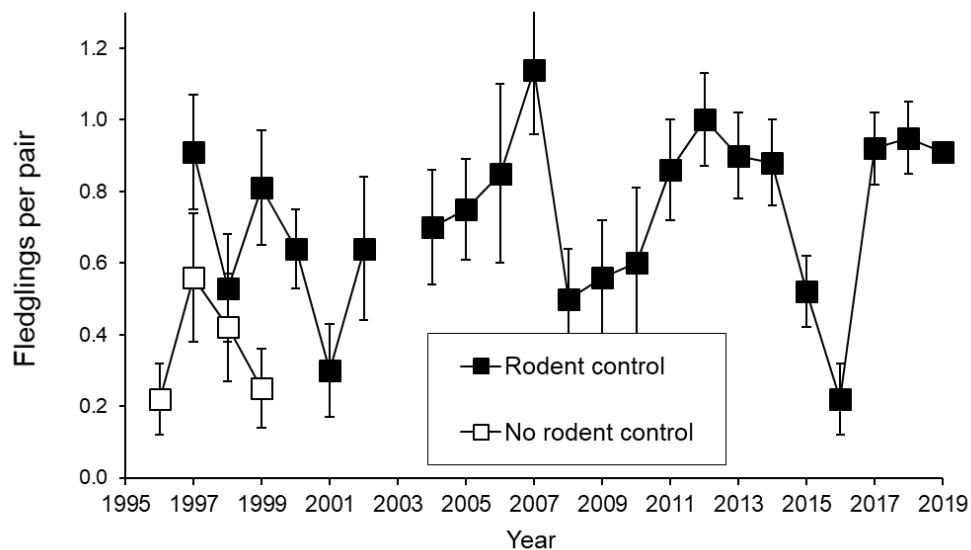
PARTNERS:

Hawaii Division of Forestry
and Wildlife

Project website:

www.elepaio.org

For the 24rd year in a row, in 2019 we 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 is an effective method for increasing nest success and survival of female Oahu Elepaio. We controlled rats in 26 elepaio territories in Wailupe Valley using snap traps and automated pneumatic traps made by the Goodnature company. The rat control program was effective again at reducing rat abundance, with 639 rodents removed from 26 January to 23 June. Elepaio pairs raised an average of 0.91 fledglings per pair, above the long-term average of 0.71. The nest success rate was 70%, which also is above the long-term average of 61%.



Rat control has been an effective method of increasing reproduction of Oahu Elepaio.

LAYSAN ALBATROSS MONITORING AND EGG FOSTERING



PARTNERS: Hawaii Natural Area Reserve System, US Navy

2019 marked the 16th year in which we have monitored Laysan Albatrosses on Oahu. In the 2018-2019 season there were 78 albatross nests at Kaena Point Natural Area Reserve and 44 nests at Kuaokala Game Management Area. The number of albatross chicks fledged at Kaena Point in 2019 was slightly below normal (37), and at Kuaokala mongooses killed 32 of 34 chicks despite intensive trapping efforts. Even the bones were gnawed until they were gone, leaving no trace of the predation. To rectify this problem, we obtained funding to build a predator exclusion fence at Kuaokala to protect the albatross colony from mongooses. The fenceline was cleared in November 2019 by the Hawaii Division of Forestry and Wildlife and we expect the fence to be completed by Pono Pacific in February 2020.

Additional efforts were made in 2019 to bolster the albatross breeding population at Kaena Point by bringing 20 eggs from a colony at the Pacific Missile Range Facility (PMRF) on Kauai, where Laysan Albatrosses nest next to an airport runway. In order to reduce the bird strike hazard to aircraft at PMRF, the U.S. Navy removes the eggs, and since 2008 we have placed these eggs in foster nests on Kauai and Oahu. We do this by candling eggs, which is shining a bright light through the shell to illuminate the interior and determine if the embryo is alive. If the egg in a nest at Kaena Point is infertile or the embryo has died, we replace it with a live foster egg from PMRF. Albatross cannot tell the difference between the eggs and always accept a foster egg. In 2019, we placed 17 eggs in foster nests on Kauai and 20 eggs in foster nests at Kaena Point.

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



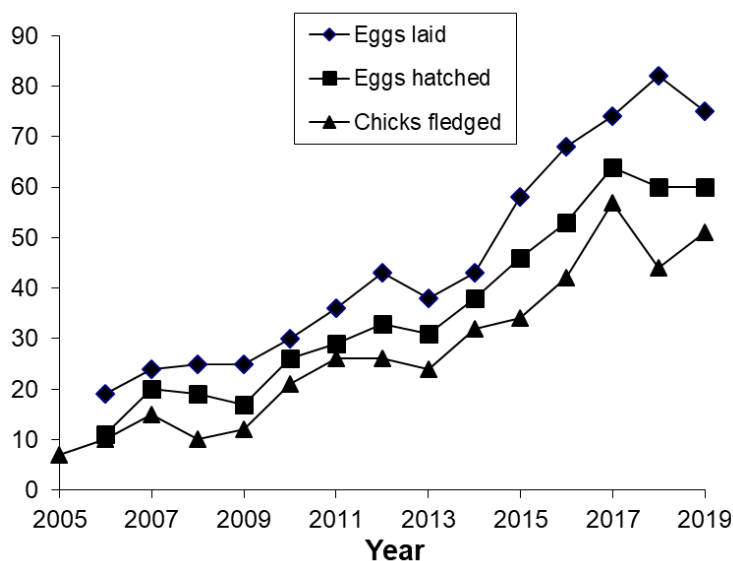
A newly hatched tropicbird chick.



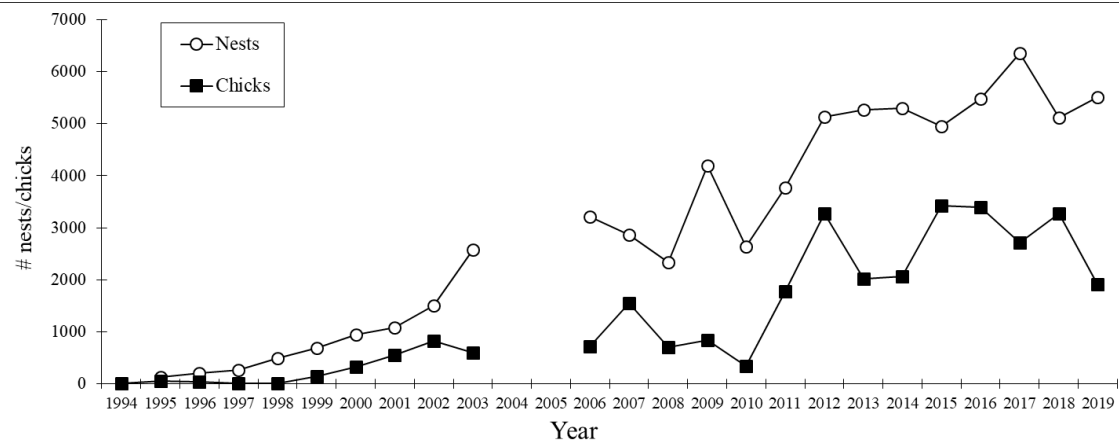
A large tropicbird chick with its parent.

For the 14th year in a row, we 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 we monitored nesting success of tropicbirds. This management has been highly effective and has allowed this small, struggling colony to flourish and grow. It 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 also has become valuable as a study site for this species because it is so easily accessible. We have worked with partners from the U.S. Geological Survey Southwest Fisheries Science Center and San Jose State University to track Red-tailed Tropicbirds at sea to better understand their foraging behavior and marine habitat use. Although the number of nests in 2019 was slightly lower (75) than last year, the hatching rate and fledging rate were higher and the number of chicks that fledged was the second highest since the project began (51). We are excited to be expanding this program in 2020 as a result of a generous donation from a local community member.

Predator control has allowed a struggling colony of Red-tailed Tropicbirds in southeaster Oahu to flourish and increase over the past 14 years .



WEDGE-TAILED SHEARWATER MONITORING AT KAENA POINT, OAHU

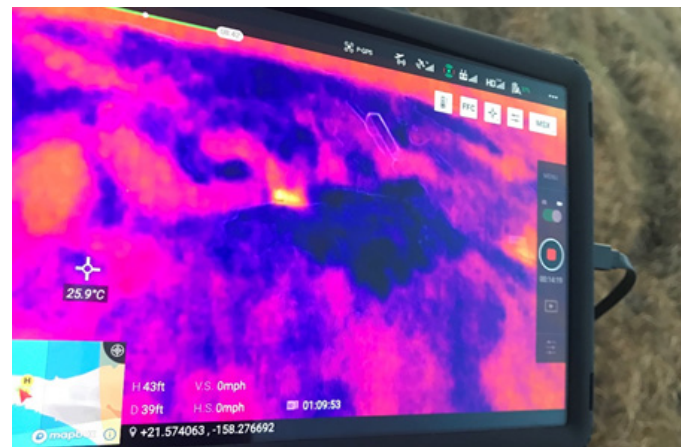


PARTNERS: Hawaii Natural Area Reserve System

We have been monitoring Wedge-tailed Shearwaters at Kaena Point Natural Area Reserve, in collaboration with the Hawaii Natural Area Reserve System, since 2006. Protection of Kaena Point from off-road vehicles allowed shearwaters to begin recolonizing the site beginning in the early 1990s. Predator control helped improve nesting success and allowed the colony to grow more rapidly starting in 2000. Construction of a predator-exclusion fence in 2011, the first one in Hawaii, allowed the population to increase dramatically, and it has remained high ever since. In 2019, we estimate that 1,908 chicks were raised from 5,513 nests.

2019 also marked the year that we started expanding our capabilities to detect new colonies as well as conduct more accurate counts of seabirds, all while using the Kaena Point Wedge-tailed Shearwater colony as a laboratory. Burrow-nesting petrels and shearwaters include some of the seabird species most vulnerable to extinction and species with some of the largest knowledge gaps. Much of this is due to their cryptic, nocturnal habits and their tendency to nest in underground burrows that are often in inaccessible locations. Locating nests, or in some cases even entire colonies, can be difficult. The use of unoccupied aerial vehicles (drones) in conservation biology has accelerated in recent years,

but few studies have examined the potential to combine traditional visible spectrum photography with infrared thermal imaging to survey wildlife. We tested the use of thermal imaging cameras mounted alongside traditional RGB cameras to detect the heat signatures of cryptic burrow-nesting seabirds. We conducted six test flights of a quad copter drone with a dual sensor RGB/infrared camera over survey plots in a Wedge-tailed Shearwater colony prior to sunrise at Kaena Point, Oahu, Hawaii. Within one hour of the flights, we then manually counted the burrows in each plot and confirmed their contents to verify the drone results. Initial results indicate the thermal images taken by the drone were able to detect the presence of birds in burrows by the signature of heat venting from the burrow entrance.



RED-FOOTED BOOBY SOCIAL ATTRACTION PROJECT AT MARINE CORPS BASE HAWAII



PARTNERS: Marine Corps Base Hawaii (MCBH), Oikonos Ecosystem Knowledge, US Fish and Wildlife Service, Ducktrap Woodworking

2019 marked the second year of a multi-year project aimed at determining the feasibility of using social attraction techniques and habitat management to relocate a portion of the Red-footed Booby colony at the Kaneohe Bay Range Training Facility to two areas located outside the firing area. This project was initiated by MCBH to reduce the impact of training activities on the nesting colony, which has shifted as the habitat has changed and now infringes on the firing range. To do this, we had 150 wooden Red-footed Booby decoys in a resting posture and a courtship posture custom made by Ducktrap Woodworking. We used the decoys and a solar-powered sound system broadcasting calls of a Red-footed Booby colony to mimic a natural colony at two sites chosen in consultation with MCBH. The first site is located inside Ulupa'u crater in sight of the existing colony in an area with kiawe and koa haole nesting habitat. The second site was located on the outer slope Ulupa'u Crater facing to the north in

ironwood and mixed shrub habitat. To document movements of birds roosting in the nesting trees identified for removal, we captured and placed colored leg bands on 30 Red-footed Booby adults roosting in the selected trees. We are continuing to monitor the social attraction sites using remote trail cameras and visual observations.



PUBLIC OUTREACH



As part of a grant from the Harold K.L. Castle Foundation and Malama Learning Center, PRC further expanded our outreach efforts by hosting 30 school classes and 5 community group tours to the translocation site at James Campbell National Wildlife Refuge, totaling 1,046 visitors. The goal of these tours was for the students and community members to visit our seabird translocation site and learn more about Hawaii's native birds. For schools that were unable to obtain their own transportation, we provided funding to secure transportation.

During the translocation site tours, the visitors learned why the chicks were translocated, how they are cared for by our animal care team and the

goal of the project: to create a self-sustaining seabird colony safe from sea level rise. During many of the visits, groups participated in service activities ranging from helping to care for the translocated chicks, creating and installing artificial burrows, beach clean ups, weeding and outplanting. We also partnered with U.S. Fish and Wildlife to host two refuge Open House days that were announced through social media postings, which opened the translocation site tour to 197 community members. Larger media through news articles, HPR radio interviews and an increased social media presence made it possible for the project to reach a larger audience across the state and country.

SEABIRD RESTORATION DATABASE



PRC staff and new seabird research interns who will be working on the project.

PARTNERS:

The Nature Conservancy,
Audubon Society, Northern
Illinois University, NZ
Department of Conservation

Project website:

www.seabirddatabase.org

Thanks to the generous support from the Packard Marine Bird Program, and the contributions of seabird experts from the United States and New Zealand, we built the Seabird Restoration Database, which seeks to improve knowledge transfer of active restoration techniques among practitioners and enhance seabird conservation by documenting the methods and outcomes from social attraction and translocation activities applied to restore and recover seabird populations around the world. Between 2020-2021 we will collate data from the literature, reports, databases and expert consultations to determine the species, locations, methods, and outcomes for active seabird restoration efforts. Once completed, the database will be made publicly available.



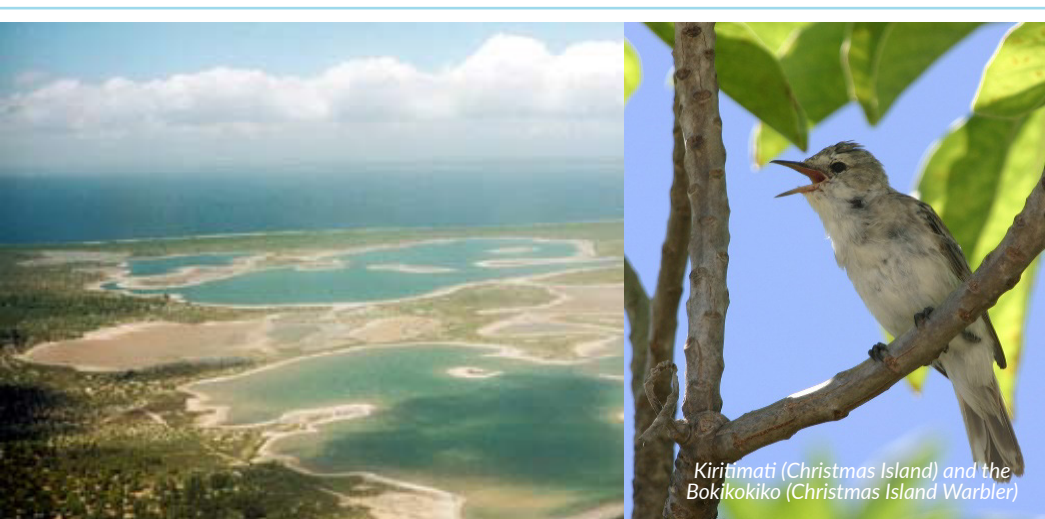
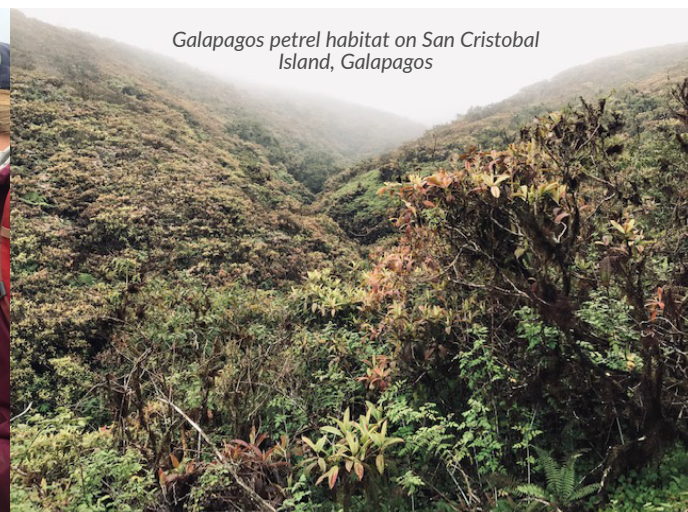
Map showing seabird restoration sites that have already been entered into the database.

INTERNATIONAL PROJECTS: JAMAICA, GALAPAGOS, NEW ZEALAND, KIRIBATI



As part of our mission to expand our work across the Pacific and to other island ecosystems, we engaged in four international projects in 2019 to assist other non-profit organizations with their work and plan for upcoming new projects with PRC. This included assessing the feasibility of building predator fences around important roosting caves to protect critically endangered bats in Jamaica in partnership with Bat Conservation international and the Jamaica National Environmental Planning Agency.

Working with Jocotocco and Island Conservation to assess the feasibility of predator exclusion fencing for the protection of a Galapagos Petrel colony. Galapagos Petrel are the most closely related sister species to the Hawaiian Petrel.



Assisting researchers on Codfish Island, New Zealand with monitoring and habitat restoration of the critically endangered Whenoa Ho (Diving Petrel) and working with the Nature Conservancy and government of Kiribati to plan for the translocation of Bokikokiko (Christmas Island Warbler) to Palmyra Atoll.

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:

- *Translocations of Newell's Shearwaters and Hawaiian Petrels to create a new colony*
- *Designing predator proof fences for Hawaii: Results of a survey of sanctuaries in New Zealand and Hawaii and ground testing of new fence designs*
- *Results of mammalian eradications within three predator exclusion fences in Hawaii*
- *Demography, survival, and at-sea habitat use of Laysan Albatross*

2019 peer-reviewed publications (all available for download on our website):

Young, L.C., VanderWerf, E.A., McKown, M., Roberts, P., Schlueter, J., Vorsino, A., and Sischo, D. 2019. Evidence of Newell's Shearwaters and Hawaiian Petrels on Oahu, Hawaii. *The Condor: Ornithological Applications*. 121: 1-7.

VanderWerf, E.A., Young, L.C., Kohley, C.R., Dalton, M.E., Fisher, R., Fowlke, L., Donohue, S., Dittmar, E., Establishing Laysan and black-footed albatross breeding colonies using translocation and social attraction, *Global Ecology and Conservation* (2019), doi: <https://doi.org/10.1016/j.gecco.2019.e00667>.



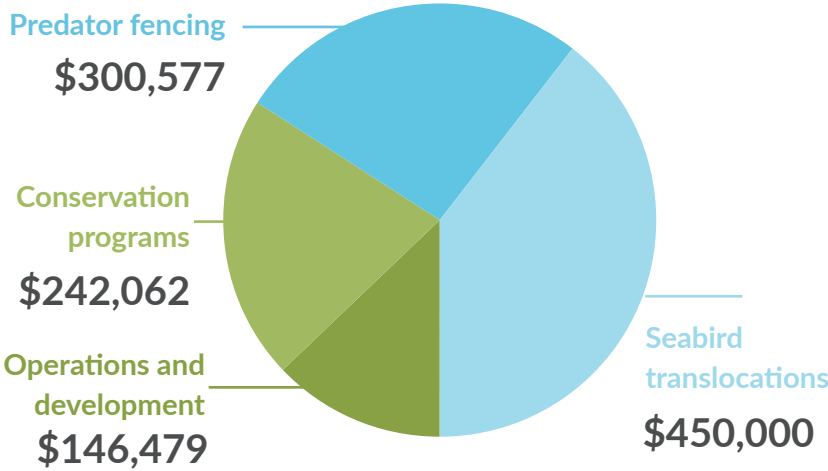
FINANCIAL INFORMATION

DIRECT REVENUE

\$1,139,118

DIRECT EXPENSES

\$1,188,486



FINANCIAL HEALTH

Assets	\$412,258.30
Liabilities	\$78,015.19
Net Assets	\$334,243.11

FUNDERS



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ISLAND CONSERVATION

Preventing Extinctions



EARTHJUSTICE



AMERICAN BIRD
CONSERVANCY



the David &
Lucile Packard
FOUNDATION

