



# 2022 ANNUAL REPORT



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2022 was yet another exceptional and busy year for Pacific Rim Conservation! Highlights include international translocations, translocated birds returning to breed for the first time, and the first successful fledging of a Hawaiian Petrel chick from within a predator-free area. To help others scale and achieve their restoration goals, we completed our high-level analysis of the Seabird Restoration Database and measured outcomes from the contribution of local efforts to global seabird restoration results. We were also humbled to receive the American Ornithological Society Schreiber Award which honors extraordinary conservation-related scientific contributions by an individual or small team. This award recognized our team for the sustained success of their conservation actions combined with their publication, individually and together, of a significant body of research on bird conservation and the biology of birds. We could not achieve these goals without our fantastic partners, generous funders, and dedicated staff and volunteers and we are grateful for everyone who supports our organization.

In the following pages we summarize our project results for 2022. We thank everyone who has been involved in our work the past year and look forward to more to come in 2023.

Aloha and Mahalo,

**Lindsay Young**  
Executive Director

**Eric VanderWerf**  
Director of Science



# PACIFIC RIM CONSERVATION YEAR IN REVIEW

## BIRDS

- 15** bird species we worked with or protected in 2022, of which 8 are endangered locally, nationally, or globally
- 13,261** nests of native Hawaiian birds monitored and protected in 2022 (118 Laysan Albatross, 13,001 Wedge-tailed Shearwater, 35 Oahu Elepaio, 99 Red-tailed Tropicbird, 6 Bonin Petrel, 2 Tristram's Storm-petrel).
- 120** wild birds banded as part of our research in 2022
- 3** species of Hawaiian seabirds translocated in 2022 to create breeding populations that are safe from climate change and non-native predators: Black-footed Albatross, Laysan Albatross, and Tristram's Storm-petrel.
- 7** peer reviewed papers. In 2022 we published in scientific journals, multiple management and monitoring plans, and many project reports.
- 9** predator exclusion fences built and/or maintained (Honouliuli NWR, James Campbell NWR, Kaena Point and Kuaokala on Oahu and Kahuama'a, Nihoku section of Kilauea Point NWR, Kilauea Point NWR, Honopu and Pohakea on Kauai)

## ECOSYSTEMS

### 20 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





## FUN FACTS:



First successful fledging of a wild Hawaiian Petrel chick in a predator free area at Nihoku, Kauai.

Broke ground on the largest predator exclusion fence to date in Hawaii at Kilauea Point NWR

The first returning translocated Black-footed chicks to James Campbell National Wildlife Refuge (JCNWR)

**3,099** total visits by wild Laysan Albatrosses to our social attraction site at JCNWR since 2015

**6** Bonin Petrel nests and the first two Tristram's Storm-petrel nests at JCNWR

**1000+** miles hiked for conservation work

**1000+** non-native predators removed from bird nesting areas

**104** Newell's Shearwater detections on Oahu

**850+** records of seabird social attraction and translocation documented worldwide, targeting nearly 1/3 of all seabird species





# NO NET LOSS:

## James Campbell National Wildlife Refuge Seabird Translocation Project

Project website: [www.islandarks.org](http://www.islandarks.org)

**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 Hawai'i Department of Land and Natural Resources.

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 Hawai'ian 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 O'ahu and have begun working on four priority species that are most vulnerable to sea level rise: Black-footed Albatross, Laysan Albatross, Bonin Petrel, and Tristram's Storm-petrel, all of which have a high proportion of their global population nesting in a small number of locations just a few meters above sea level.

From 2015- 2017, we translocated 51 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 47 Laysan Albatross chicks successfully fledged as a result of this program, and the first birds started returning as adults in 2018. We now have 13 Laysan Albatrosses regularly visiting the site from previous translocation cohorts. From 2017-2021, we moved 102 Black-footed Albatross chicks from Midway and Tern Island to JCNWR, of which 97 fledged. In 2018-2021, we moved 247 Bonin Petrel chicks and 158 Tristram's Storm-petrel chicks from Midway and Tern Island, of which 246 and 129 fledged, respectively. This year we moved 12 of the Tristram's Storm-petrel chicks to predator-free Moku Manu islet a few days before fledging in hopes that they will imprint on the islet and return to them as adults.

This year we moved 12 of the Bonin Petrel chicks to predator-free Moku Manu islet a few days before fledging in hopes that they will imprint on the islet and return to them as adults. In 2019, we saw the first individual Bonin Petrel and Tristram's Storm-petrel return after just one year. In 2022, we re-sighted returning translocated individuals of all four species, including 13 Laysan Albatross, 4 Black-footed Albatross, 32 Bonin Petrel, and 12 Tristram's Storm-

petrels. This season we had 6 pairs of returning adult Bonin Petrels nest in artificial burrows or dig their own burrows and successfully fledge chicks. Six others Bonin Petrel pairs dug natural burrows inside the fence but did no reproduction was observed. We had two pair of returning Tristram's Storm-petrels nest and successfully fledge chicks from artificial burrows. We continued to employ two social attraction programs using solar-powered sound systems inside the predator fence: one for Black-footed Albatross and one for Laysan Albatross. The Laysan Albatross and Black-footed Albatross systems also included decoys. This season there were 472 documented visits and 7 nesting attempts by socially attracted Laysan Albatross, but none resulted in a fledged chick. Wedge-tailed Shearwaters have established a colony inside the predator fence, likely having been attracted by the sound systems. In 2021, we documented 46 active Wedge-tailed Shearwater burrows fledging 43 chicks. In 2022, we saw exponential growth with 97 active burrows fledging 88 chicks. When this project began in 2016, there were no seabirds of any kind visiting JCNWR. In 2022, 4 seabird species nested on the refuge (Bonin Petrel, Laysan Albatross, Tristram's Storm-petrel, and Wedge-tailed Shearwater).



Nesting Laysan Albatross



Wedge-tailed Shearwaters



# ISLA GUADALUPE BLACK-FOOTED ALBATROSS TRANSLOCATION PROJECT

Project website: [www.islandarks.org](http://www.islandarks.org)

**PARTNERS:** Grupo de Ecología y Conservación de Islas (GECI), U.S. Fish and Wildlife Service, James Campbell National Wildlife Refuge, Midway Atoll National Wildlife Refuge, Papahānaumokuākea Marine National Monument, Comisión Nacional de Áreas Naturales Protegidas (CONANP), Comisión Nacional para el Conocimiento y Uso de la Biodiversidad (CONABIO).

The Black-footed Albatross (*Phoebastria nigripes*) has a total breeding population of about 57,500 pairs, 95% of which nest on low atolls in the Northwestern Hawaiian Islands. Inundation of breeding colonies from sea level rise and storm surge associated with climate change is its most serious long-term threat to this species. Protection of suitable nesting habitat and creation of new colonies on higher islands are among the highest priority conservation actions. In collaboration with many partner agencies in the USA and Mexico, under the Canada/USA/Mexico Trilateral Island Initiative, in 2021 we began translocating Black-footed Albatrosses from Midway Atoll to Guadalupe Island, Mexico to create a new breeding colony. Guadalupe is a large, high island that is protected as a Biosphere Reserve and already supports a thriving colony of Laysan Albatrosses. In January 2022, we moved 36 eggs from Midway and placed them in Laysan Albatross foster nests on Guadalupe. Thirty-five of the eggs hatched, and 34 of those chicks fledged. Combined with the 27 chicks fledged from Guadalupe in 2021, this brings the total number of chicks fledged to 61. We plan to translocate 36 more eggs to Guadalupe in 2023 and 2024. Black-footed Albatrosses already forage in the cold waters of the California Current around Guadalupe, which are less likely to be affected by climate change than most other regions of the Pacific. Creation of a breeding colony in the eastern Pacific would increase the breeding range of the species and enhance its resiliency to climate change.





# NIHOKU ECOSYSTEM RESTORATION PROJECT

Project website: [www.nihoku.org](http://www.nihoku.org)

**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.

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 2012-2020, 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 2020, 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, 194 listed seabirds have fledged from this site for a success rate of over 98% for the project. With 2020 being the final year of translocations for this project, we have now moved onto the post-translocation monitoring phase.

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. Eight translocated Hawaiian petrels and one Newell's Shearwater adult were found in the burrows. Of the eight Hawaiian Petrels, there were three pairs including one that hatched the first chick ever in a predator free colony. This marks the final and most important milestone of this project, to create the first predator-free breeding colonies of these two species in the Hawaiian Islands.



*First ever Hawaiian Petrel chick at Nihoku with its parent days prior to fledging.*



*Hawaiian Petrel nest (left) and first confirmed returning translocated NESH (right)*



# O'AHU ENDANGERED SEABIRD SURVEYS

**PARTNERS:** Hawai'i Division of Forestry and Wildlife, O'ahu Army Natural Resources Program, Conservation Metrics, National Fish and Wildlife Foundation



*Mount Ka'ala (left) and Poamoho (right) where NESH were detected during surveys 2022.*

Hawai'i's only two endemic seabirds, the Newell's Shearwater and Hawai'ian 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 O'ahu, despite limited survey effort and fossil evidence indicating that extensive colonies existed post-human contact. Since 2016, we have deployed up to 15 song meters annually in locations where modeling predicted suitable habitat and have obtained 30,198 recording hours. Additionally, from 2018-2022, we conducted 607 hours of auditory seabird surveys. We have detected Newell's Shearwaters regularly at Ka'ala and Kaluanui Natural Area Reserves, 'Opae'ula, and in the Ewa Forest Reserve. We have detected Hawaiian Petrels at Ka'ala and Kaluanui Natural Area Reserves and in the Ewa Forest Reserve. All sites where we detected seabirds were in nearly intact native forest with steep slopes, similar to areas where these species nest on Kauai. Seabirds were detected on multiple nights throughout the breeding season, sometimes calling up to 25 times in a single night. In 2022, we had a record 104 Newell's Shearwater detections, with 90 detections in the Ewa Forest Reserve. Evidence suggests that, at a minimum, both species are regularly prospecting on O'ahu, and are likely breeding on the island. The finding of a downed adult NESH downslope from known auditory detections this year, and multiple live HAPE in previous years further supports this. If these rare seabirds are breeding on O'ahu, these individuals could represent a missing link in the population connectivity of both species across the main Hawaiian island chain. Protecting any remnant populations would be of high conservation value given their recent catastrophic population declines.



# O'AHU 'ELEPAIO MONITORING AND RAT CONTROL

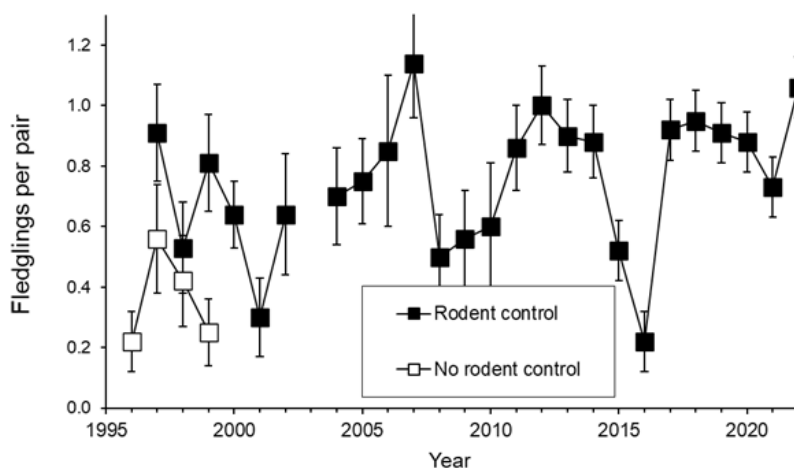
Project website: [www.elepaio.org](http://www.elepaio.org)

**PARTNERS:** Hawai'i Division of Forestry and Wildlife, Hawaii Natural Area Reserves System, Protect and Preserve Hawai'i.



2022 was the 27th year of 'elepaio monitoring and rat control in southeastern O'ahu. In order to maximize the conservation benefit of the project, starting in 2020 the goal was changed to place more emphasis on controlling rats in a larger number of 'elepaio territories, with a lower level of monitoring in each territory. In 2021, we obtained additional funding to expand the work to include State and private lands in Pia Valley in collaboration with the Hawaii Natural Area Reserve System and Protect and Preserve Hawaii, and in Kuli'ou'ou Valley with permission from the Hawai'i Division of Forestry and Wildlife.

In 2022, we controlled rats in a total of 65 'elepaio territories in three areas of the southern Ko'olau Mountains of O'ahu, including 43 territories in Wailupe, 14 in Pia, and 8 in Kuli'ou'ou. This represents an increase of 3 territories from the 62 territories in which rodents were controlled in 2021. We deployed a total of 266 traps in the three locations combined, including 78 automated Goodnature traps and 188 snap traps. A total of at least 747 rodents was removed over an area of 272 acres, including 136 acres in Wailupe Valley and 136 acres in Pia and Kuli'ou'ou. The overall reproductive rate of 'elepaio in all three valleys combined was 1.06 young per pair, including 1.23 in Wailupe, 0.80 in Pia, and 0.0 in Kuli'ou'ou, which is substantially higher than the long-term average of 0.71 and is sufficient to allow about 7% annual population growth. We found a total of 35 nests, of which 16 successfully fledged chicks, 9 failed, and 10 were abandoned before eggs were laid or had unknown outcome, resulting in a nest success rate of 67%, which is slightly higher than the long-term average of 61%. In 2023, we plan to continue controlling rodents at the expanded scale in Wailupe, and to discontinue management in Kuli'ou'ou because the number of elepaio pairs there is very small, and to instead increase the number of elepaio territories managed in Pia Valley, which will be more cost-effective in terms of hiking time.



*Rat control has been an effective method of increasing reproduction of O'ahu 'Elepaio.*

# LAYSAN AND BLACK-FOOTED ALBATROSS MONITORING AT KAENA POINT

**PARTNERS:** Hawaii Natural Area Reserve System

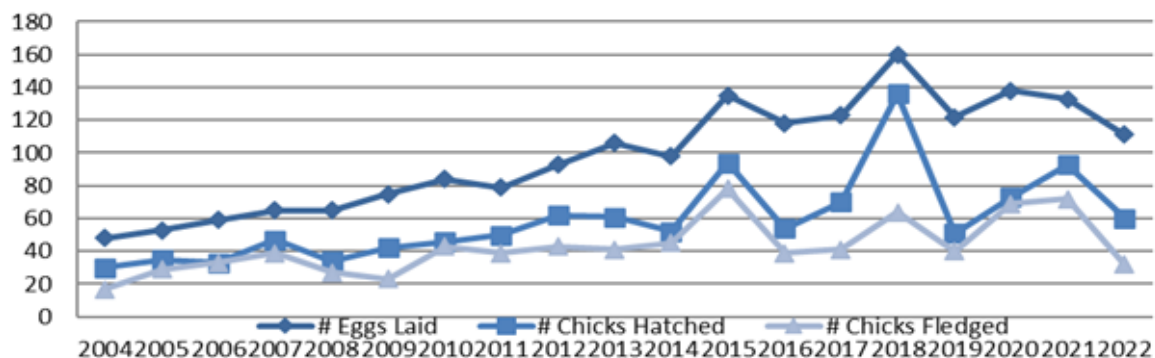


2022 marked the 19th year in which we have monitored Laysan Albatrosses on Oahu. In the 2021-2022 season there were 81 albatross nests at Kaena Point Natural Area Reserve and 30 nests at Kuaokala Game Management Area, which is was significantly less than 2021. In terms of reproductive success, both hatching rates (0.54) and fledging rates (0.53) were low which led to a record low 0.29 reproductive success rate. A total of 32 chicks fledged: 24 from Kaena and 8 from Kuaokala. This decrease was due to poor hatching rates which were associated with La Nina oceanographic conditions.

2022 was another record year for Black-footed Albatross visits at Kaena Point, with up to four individuals and our first ever breeding pair of Black-footed Albatrosses on Oahu in historical memory. Although the egg didn't hatch, which is not uncommon for first-time breeders, it is still a huge step forward for the conservation of this species.



## Oahu Laysan Albatross #'s



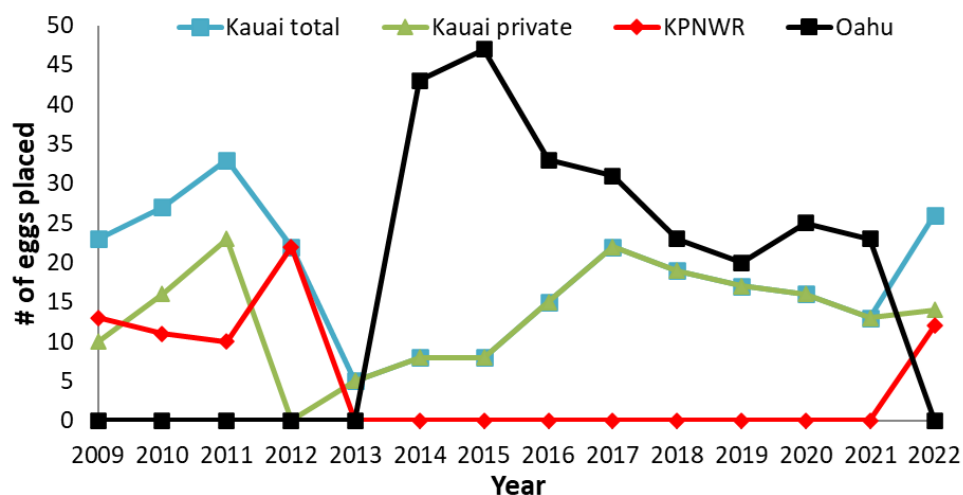


# LAYSAN ALBATROSS EGG SWAP ON KAUAI

**PARTNERS:** Hawaii Natural Area Reserve System, U.S. Navy.



The U.S. Navy has a requirement to discourage albatrosses from nesting around the airfield at the Pacific Missile Range Facility (PMRF) to reduce the bird air strike hazard (BASH) to aircraft. Pacific Rim Conservation (PRC) has been contracted by the U.S. Navy since 2008 to assess the viability of Laysan albatross eggs from PMRF and to place fertile eggs in foster nests on private properties on the north shore of Kauai in which the natural egg was not fertile. Of 65 eggs candled by PRC at PMRF in 2022, 26 were viable (40%), 24 were infertile (37%), and 15 were fertile but died in the incubator before they were candled (23%). All 26 viable PMRF eggs were placed in foster nests on Kauai, including 14 at three private parcels and 12 at Kilauea Point National Wildlife Refuge (KPNWR). For the first time since 2012, all viable eggs were placed in foster nests on Kauai and none were flown to Oahu, in large part because KPNWR was added back into the project.



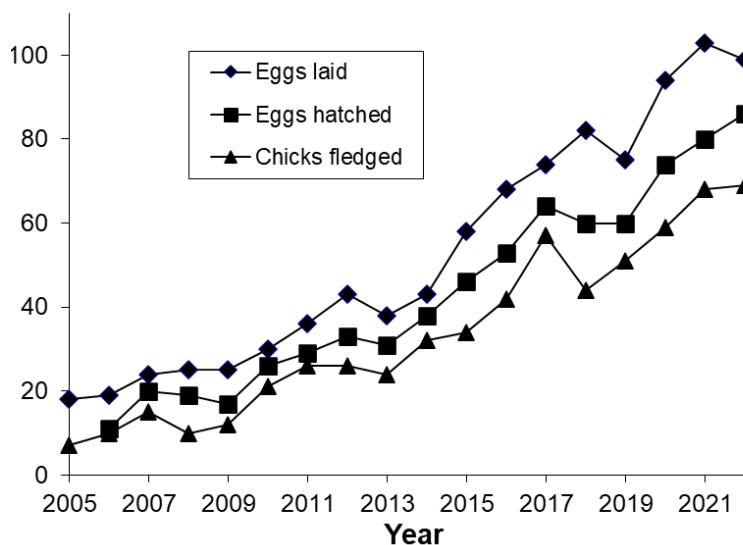
*Number of eggs from PMRF placed in foster nests each year at Kilauea Point National Wildlife Refuge, on private lands on Kauai, and on Oahu.*

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



For the 17th 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, marine habitat use, and potential risk from offshore

wind energy projects. In 2022, there were 99 Red-tailed Tropicbird nests in the colony, which resulted in 86 eggs hatched and 69 chicks fledged, for an overall nest success rate of 70%, which is typical of colonies where predators are absent or controlled. We deployed 4 mongoose traps, 4 automated Goodnature rat traps, and 4 rat snap traps, which removed a total of 73 predators, including 9 mongooses, 6 rats, 1 house mouse, and 57 predators of unknown species. A large mahalo to a generous donor from the local community who supported this project in 2022.

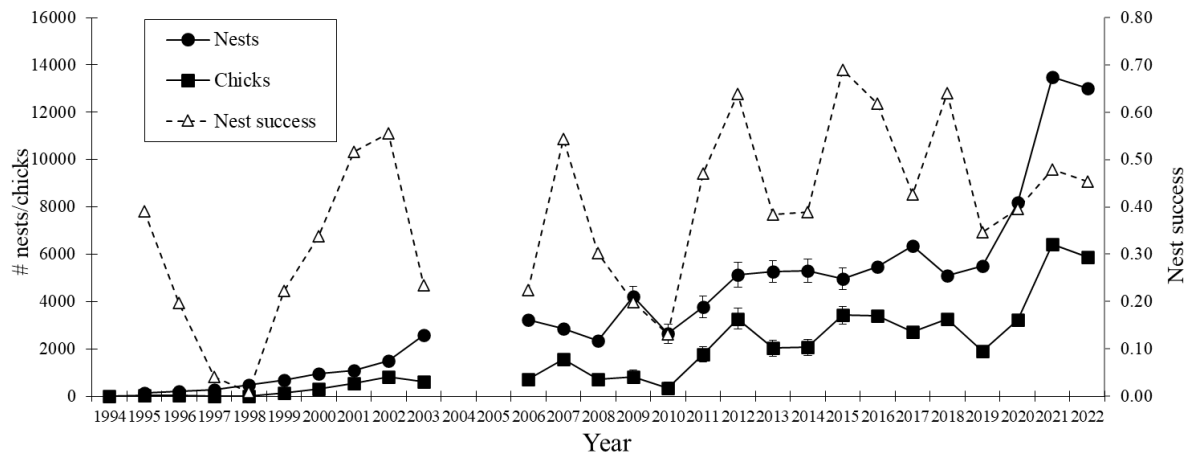


*Predator control has allowed a struggling colony of Red-tailed Tropicbirds in southeaster Oahu to flourish and increase over the past 17 years.*



# WEDGE-TAILED SHEARWATER MONITORING AT KA'ENA POINT, O'AHU

**PARTNERS:** Hawai'i Natural Area Reserve System



We have been monitoring Wedge-tailed Shearwaters at Ka'ena Point Natural Area Reserve in collaboration with the Hawai'i Natural Area Reserve System since 2006. Protection of Ka'ena 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, resulted in consistently higher nest success and allowed the population to begin increasing more dramatically, and it has remained high ever since. In 2022, we estimated that 5,898 chicks were raised from 13,001 nests, which is similar to 2021, both years showing a dramatic increase and record high numbers for the reserve.



# KILAUEA POINT NATIONAL WILDLIFE REFUGE PREDATOR EXCLUSION FENCE

Project website: [https://www.fws.gov/refuge/kilauea\\_point/](https://www.fws.gov/refuge/kilauea_point/)

**PARTNERS:** US Fish and Wildlife Service and Pono Pacific



In 2021, we began a multi-year project Kilauea Point National Wildlife Refuge to build a predator exclusion fence that protects the native ecosystems from invasive mammalian predators. Kilauea Point is home to tens of thousands of native birds ranging from the endangered Nene goose, 'Ua'u (Hawaiian Petrel), and A'o (Newell's Shearwater) to the Moli (Laysan Albatross) and 'Ua'u Kani (Wedge-tailed Shearwater), and all of whom are vulnerable to predation. Once complete, this will be the largest full predator exclusion fence in the Hawaiian Islands.

Since 2021, PRC has conducted baseline invasive predator control and seabird biomonitoring at KPNWR. In 2022 we deployed as many as 25 live traps and removed 64 invasive mammals from the refuge, including 18 cats and 46 rats. monitored over a thousand seabird nests of various species at KPNWR: 600 Wedge-tailed shearwater nests, 300 Red-footed booby nests, 137 Red-tailed tropicbird nests, 14 Laysan albatross nests, and 2 White-tailed tropicbird nests. Several different methodologies have been employed to quantify the impacts of fence construction and predator eradication on the reproductive success of native bird species, from modified plot designs for species with larger populations (Red-tailed Tropicbirds, Red-footed Boobies), to monitoring individual birds of more concentrated species (Hawaiian Petrels, Newell's Shearwaters) through both direct observation and the use of camera traps. The fence will be completed in summer 2023, after which all invasive mammalian predators inside will be removed. All seabird monitoring efforts completed in 2022 will be repeated in 2023.



# SEABIRD RESTORATION DATABASE

Project website: [www.seabirddatabase.org](http://www.seabirddatabase.org)

**PARTNERS:** The Nature Conservancy, National Audubon Society, Northern Illinois University, the New Zealand Department of Conservation, Museum of New Zealand Te Papa Tongarewa

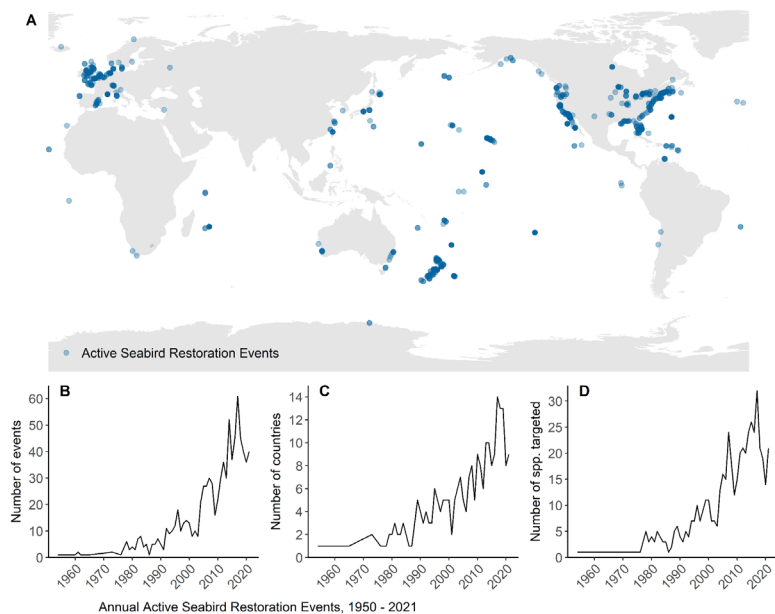


The Seabird Restoration Database seeks to improve knowledge transfer of active restoration techniques among practitioners and enhance seabird conservation by documenting the methods and outcomes from social attraction and translocation activities applied to restore and recover seabird populations around the world. In December 2021 we finished collecting and entering data into the database, which now contains approximately 850 records of active seabird restoration efforts targeting nearly 140 seabird species across 36 countries. These results are the product of extensive

systematic reviews of approximately 1,400 resources – including published and unpublished documents, blogs and media, databases, and other websites – and communication with over 600 experts, and could not have been achieved without the contribution of PRC staff, Database Partners, and our research interns. The data is now available as a searchable web map at [seabirddatabase.org](http://seabirddatabase.org). Users can freely visit the website and filter data by location, species, and method to learn about when, where, and how active restoration has been used to restore seabird colonies.

In 2022, we communicated the results of the Seabird Restoration Database with various audiences and in various formats, including via scientific publications. For example, we presented information about the Database and its utility for managers at the 2022 Virtual Pacific Seabird Group Conference, created a Seabird Restoration Database Logo to represent the project, and updated the public website with a new online map product and dashboard, which summarizes overall results.

We also submitted a manuscript for publication in the Proceedings of the National Academy of Sciences. The manuscript synthesizes global restoration trends, applies a systematic process to measure success rates and response times since implementation, and examines global factors influencing outcomes. We provide management recommendations based on the results and have used the manuscript to develop a follow-up study on the drivers of observed restoration outcomes. Finally, we were awarded a climate mainstreaming grant from the Wildlife Conservation Society to adapt the database to determine active restoration opportunities for climate-sensitive seabirds in the US Pacific. In 2023 we will continue to communicate the results of this effort, analyze data to understand the enabling factors driving outcomes, and work with interested parties in the US to develop climate-adaptation restoration priorities for US Pacific Seabirds.



*Global active seabird restoration events, 1954–2021 from Spatz et al, under review in the Proceedings of the National Academy of Sciences*

# WHITE TERN CITIZEN SCIENCE

Project website: [www.whiteterns.org](http://www.whiteterns.org)

**PARTNERS:** Hawaii Department of Land and Natural Resources, Hawaii Audubon Society, Hui Manu o Ku

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) and began a citizen science program to help monitor the Terns. 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 continued to oversee an ongoing citizen science program monitoring Oahu's population of breeding White Terns. Started in 2016 the program maintains a database of all trees known to be used by the terns and all the breeding activity reported in them. More than 40 trained citizen scientists submitted over 5,600 breeding surveys in 2022, documenting breeding activity in over 800 of the more than 1,600 trees monitored last year. We continue to engage the community to increase awareness, appreciation and understanding of the White Terns and to promote their conservation. White Tern Walks conducted throughout the breeding season in various locations across the breeding range introduced residents and guests to the island to this historically and culturally significant native Hawaiian seabird. The White Tern Citizen Science Facebook group we maintain keeps a growing online community connected and informed. And in 2022 we partnered with the Conservation Council of Hawaii, Hawaii Audubon Society, USFWS, DLNR and others to organize the 7th annual Manu o Ku Festival.

The population of White Terns that breeds on Oahu continues to benefit from our partnership with a range of organizations and a corps of dedicated volunteers. We partnered with state and federal agencies to provide training for tree care companies operating on Oahu, equipping them to maintain the trees used for breeding without injuring nesting terns. Volunteers placed over 700 blue ribbons on trees across the breeding range, alerting trimmers to the presence of nesting terns. Our Manu o Ku Hotline responded to 65 calls from members of the public who reported downed terns, mostly chicks fallen from their nesting spots. Those that we could not reunite with parents were rescued and delivered to the Feather and Fur Animal Hospital, partnering with the Hawaii Wildlife Center to treat and rehabilitate orphaned and injured terns before being released back into the wild at the Honolulu Zoo.





# RESEARCH

We continue to actively collect data on all our projects with the goal of publishing in the peer reviewed literature and 2022 resulted in six peer reviewed publications and one full length book, with several more expected to come out in early 2023.

## 2022 peer-reviewed publications (all available for download on our website):

Young, L.C. and VanderWerf, E.A., eds. 2022. Conservation of Marine Birds. Elsevier. Cambridge, MA. 20 Chapters. 607 pages.

Young, L.C. and Balance, L. Ecology of Marine Birds. 2022. Chapter 1 in Conservation of Marine Birds (L. Young and E. VanderWerf, eds.). Elsevier

Spatz, D.R., Jones, H.P., Bonnaud, E., Kappes, P., Holmes, N.D. and Guzmán, Y.B., 2022. Invasive species threats to seabirds. Chapter 4 in Conservation of Marine Birds (L. Young and E. VanderWerf, eds.). Elsevier

Holmes, N.D., Buxton, R.T., Jones, H.P., Sánchez, F.M., Oppel, S., Russell, J.C., Spatz, D.R. and Samaniego, A., 2022. Conservation of marine birds: Biosecurity, control, and eradication of invasive species threats. Chapter 4 in Conservation of Marine Birds (L. Young and E. VanderWerf, eds.). Elsevier.

VanderWerf, E. A. S. Kress, Y. Bedolla-Guzmán, D. Spatz, G. Taylor, and H. Gummer. 2022. Restoration: Social attraction and translocation. Chapter 19 in Conservation of Marine Birds (L. Young and E. VanderWerf, eds.). Elsevier.

Young, L.C. and VanderWerf, E.A. 2022. Conclusions and future directions in the conservation of Marine Birds. Chapter 20 in Conservation of Marine Birds (L. Young and E. VanderWerf, eds.). Elsevier

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