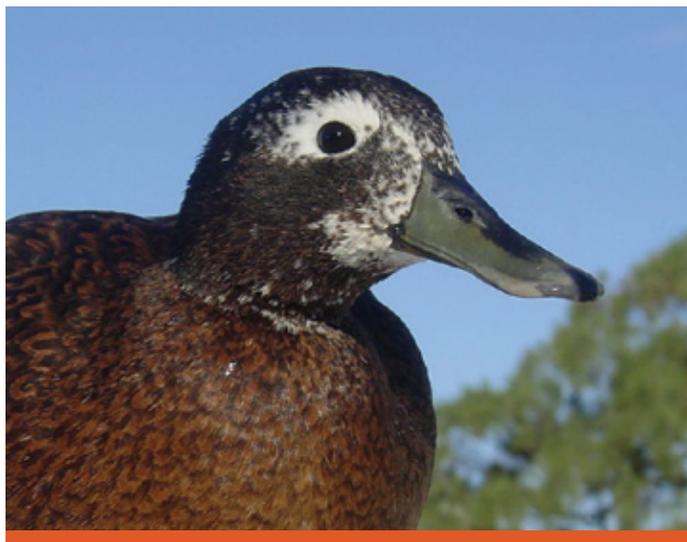




USGS PROMOTING CONSERVATION OF HAWAII'S UNIQUE BIOLOGICAL RESOURCES

Translocation of Endangered Laysan Ducks to Midway Atoll National Wildlife Refuge (2004–5)



Male Laysan Duck. (Photo by Evan Jorgenson, USFWS volunteer)

Background

Island ecosystems throughout the Pacific have undergone catastrophic species loss, largely due to the effects of alien or non-native species. Rats, in particular, pose significant threats to native species. In Hawai‘i, the appearance of rats (which are not native to Hawai‘i) in the subfossil record coincides with the disappearance of ground nesting birds. Sadly, only three of Hawai‘i’s 10 endemic waterfowl species still exist today.

The Laysan Duck (*Anas laysanensis*), also known as the Laysan Teal, is a critically endangered dabbling duck that is restricted to a single population on the remote and rat-free Laysan Island (Fig. 1). The Laysan Duck was listed as an endangered species in 1966 because of its small population, limited distribution, and dependence on a fragile island ecosystem. The same threats identified in 1966 continue to plague the species today.

Justification

The Laysan Duck was believed to be endemic to Laysan Island until 1995, when subfossil remains of the species were found on Hawai‘i, Maui, Moloka‘i, O‘ahu, Kaua‘i, and Lisianski islands. Discovery of Laysan Duck bones on these islands provided justification for re-introduction of the species to portions of its assumed former range.

Although the Laysan Duck can fly, its reduced power of flight and other adaptations prevent it from dispersing from Laysan Island. Conservation strategies based solely on protecting Laysan Island are risky, as natural events such as drought,

hurricanes, and tsunamis have the potential to eliminate the species. Disease outbreaks and predator introductions are also serious threats. Creation of at least one other wild population is a high priority in the Laysan Duck Recovery Plan.

Selecting and Preparing a Release Site

Nine potential sites in the Hawaiian Islands were considered for Laysan Duck release. A diverse team of scientists and land managers ranked the sites by evaluating 12 variables for each site, including: extinction risk, habitat quality, and predator absence. In 2003, Midway Atoll National Wildlife Refuge (Midway Atoll NWR) was chosen by the Laysan Duck Recovery Implementation Committee as the most suitable site for the experimental translocation, largely due its “rat-free” status and the logistic feasibility of restoring habitat and monitoring the ducks after release (Fig. 2).

Once the site was selected, USGS and USFWS collaborated on restoration of Midway Atoll NWR to benefit the Laysan Duck and migratory waterbirds. Efforts to enhance and create wetlands and restore native vegetation began long before the arrival of the Laysan Duck. In addition, volunteers removed weeds, and planted native bunch grasses to provide cover and nesting habitat for the ducks.

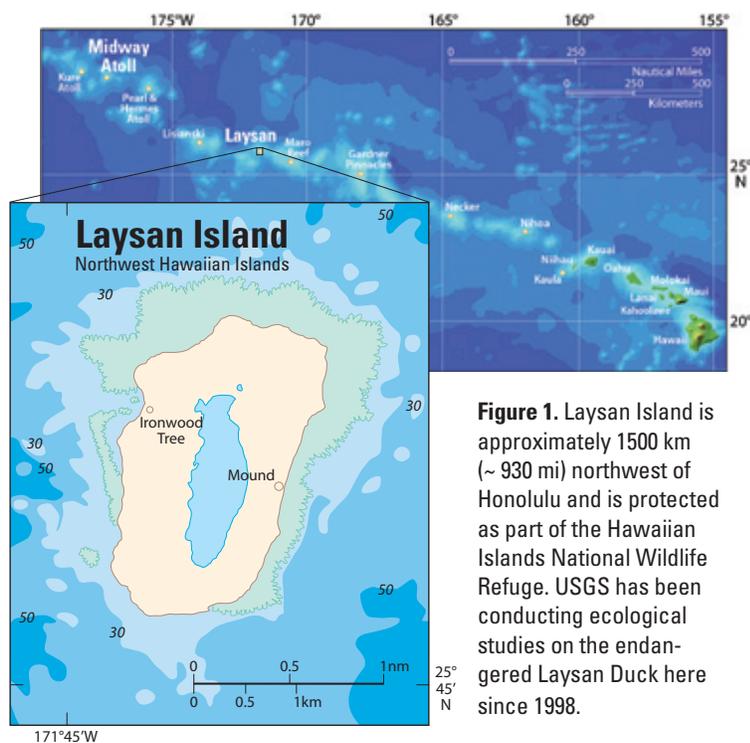


Figure 1. Laysan Island is approximately 1500 km (~ 930 mi) northwest of Honolulu and is protected as part of the Hawaiian Islands National Wildlife Refuge. USGS has been conducting ecological studies on the endangered Laysan Duck here since 1998.

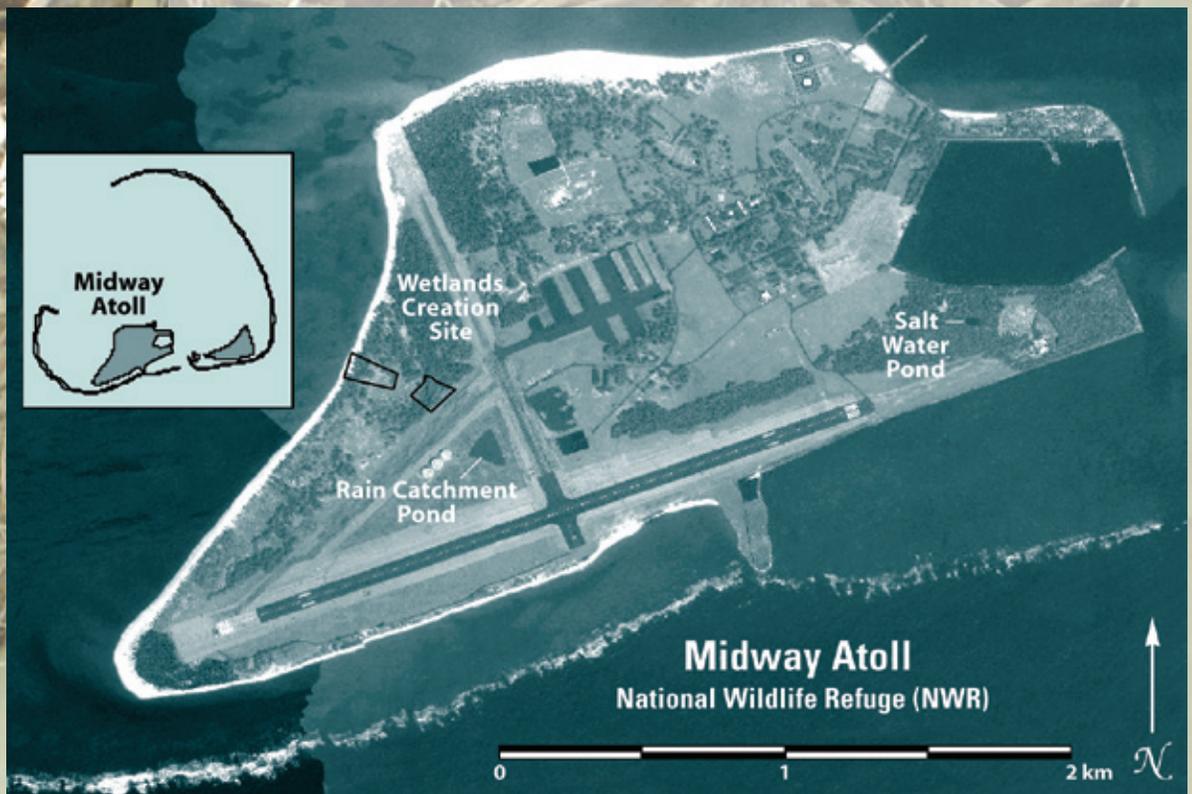


Figure 2. Midway Atoll National Wildlife Refuge is approximately 550 km (~ 340 mi) northwest of Laysan.

Selecting Ducks for Translocation

Population Monitoring

Before removing ducks from Laysan, it was important to understand their population dynamics so as not to endanger the only source population. Laysan Ducks reached the brink of extinction in the early 1900s due to the devastating effects of introduced rabbits on the island's vegetation. Once rabbits were eradicated from the island, the duck population began to recover. However, the population has gone through other severe population bottlenecks. In 1993, the population crashed during El Niño drought conditions, which reduced food availability on the island. Since 1991, Laysan Duck populations have been monitored with

regular surveys. Earlier bird counts were used to make rough population estimates going back to 1961 (Fig. 3).

In 2004, there were approximately 576 ducks on Laysan Island.

Breeding

Reproductive success of Laysan Ducks on Laysan Island has been monitored since 1998. Adult birds were captured and given unique leg bands or radio transmitters to identify individuals and allow observers to follow their survival and reproduction. Weekly surveys were conducted to estimate the population size. On Laysan Island, 30% of ducklings typically survive to fledge (Fig. 4). Of 170 ducklings hatched in 2004, 54 fledged successfully, a number sufficient for removing ducks for translocation.

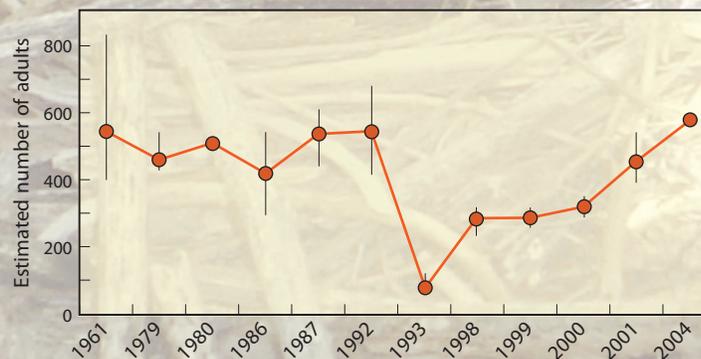


Figure 3. Laysan Duck population estimates for years with available data. (USFWS/USGS data)

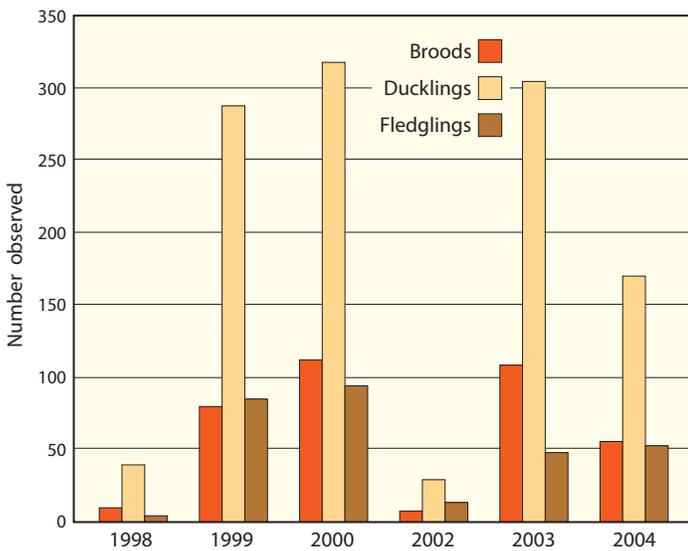


Figure 4. Reproductive success for Laysan Ducks on Laysan Island. Broods are families; ducklings are too young to fly; and fledglings are independent juveniles that have grown flight feathers. 1998 and 2002 were poor reproductive years, but 2004 breeding success was sufficient for the translocation of fledglings. (USFWS/USGS data)

Candidate selection on Laysan

Scientific studies and models showed that removing juvenile birds, as opposed to adults, was likely to have a negligible impact on the duck population on Laysan Island. In 2004, USGS collaborated with USFWS on translocation of the endangered Laysan Duck from Laysan Island to Midway Atoll NWR to establish a second wild population.

Broods were checked daily during the breeding season (April–July) using spotting scopes to determine familial identities and survivorship. Thirty juvenile ducks from different families were fitted with radio transmitters. On the night of capture for translocation, the 20 best candidates (based on brood identification, body condition, and examination by USGS veterinarian) from the 30 radio-tagged individuals were then targeted for capture and translocation.

Translocation and Release

In October of 2004, the 20 ducks selected for translocation made an arduous two day voyage by ship to Midway Atoll NWR. All survived the journey. Upon arrival, the ducks were held in aviaries from 2–14 days to become accustomed to local food items, including invertebrates. Ducks were released in small groups. All were radio-tracked so that their movements, behavior, and survival could be closely monitored post-release. Supplemental food was offered several times per week for the first two months. To date, there has only been a single mortality;

Non-sibling juvenile ducks were selected for translocation to maximize genetic variability of the Midway population. (Photo by Michelle Reynolds, USGS)



in December 2004, a male duck died after being bitten on the head by a Laysan Albatross.

Translocated Ducks Breed on Midway

On Laysan Island, ducks do not typically breed until they are two years old and breeding was not expected at Midway Atoll NWR until 2006. So, biologists at Midway have been encouraged to observe that the translocated ducks are already breeding successfully. To date, nine nests have been discovered and at least 10 ducklings have fledged.

Implications for the Future

This work has contributed to the development of methods for the safe and effective translocation and release of an endangered duck in Hawai‘i. This has been an enormous first step in the recovery of a critically endangered species, and it promises to



Above. Radio transmitters were attached to the ducks prior to their release at Midway Atoll NWR so that their behavior and survival could be monitored. USGS biologist M. Vekasy attaches a radio while USFWS biologist J. Klavitter holds bird. (Photo by Michelle Reynolds, USGS)

generate valuable knowledge of the Laysan Duck that will be applied in future translocations of the species.

Knowledge of Laysan Ducks to date comes from Laysan Island, a harsh and unique environment when compared with the range of habitats this species occupied in prehistory. Translocation to Midway Atoll NWR provides scientists with an opportunity to evaluate the ability of the Laysan Duck to adapt to portions of its presumed prehistoric range, on an island lacking the extensive hyper-saline ecosystem of Laysan Island.



Juvenile Laysan Ducks were released in small groups at freshwater seeps on Sand Island, Midway Atoll NWR after a brief holding period in the aviaries. USGS biologist L. Laniawe releases a bird. (Photo by John Klavitter, USFWS)



Laysan Duck nest on Sand Island, Midway Atoll NWR (Photo by John Klavitter, USFWS)

Monitoring the translocated Laysan Ducks at Midway Atoll NWR will significantly increase our knowledge of the species' flexibility in life history traits and resource requirements. In particular, it will be useful to study the demography of a new, growing population as it becomes self-sustaining in an environment different from Laysan Island. It is the hope of USGS scientists that this preliminary work will make an enormous contribution to the recovery and conservation of the species.

Recommended Reading on the Laysan Duck:

Prehistoric Distribution

Burney, D.A. et al. 2001. *Ecological Monographs* 71(4):615-642.

Cooper, A. et al. 1996. *Nature* 381:484.

Olson, S.L. & A.C. Ziegler. 1995. *Pacific Science* 49(2):111-125.

Biology/Ecology

Reynolds, M.H. 2004. *Waterbirds* 27(2):183-192

Reynolds, M.H. 2002. *PhD Dissertation*, Department of Biology, Virginia Polytechnic and State University, Blacksburg, VA.

Reynolds, M.H. & T.M. Work. 2005. *Wildfowl* 53.

Work, T.M. 2004. *Journal of Wildlife Diseases* 40(1):110-114.

Endangered Species Recovery Plan

US Fish & Wildlife Service website:
www.fws.gov/endangered/recovery/



Above: USGS volunteer J. Breeden and USGS wildlife biologist M. Reynolds, capture, mark, and identify ducks at night on Laysan Island. (Photo by Jonathon Shore, USFWS)

Left: Translocated juvenile feeds in aviary before release at Midway Atoll NWR.



To learn more

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A family of Laysan Ducks swims in a pond on Laysan Island. (Photo by John Klavitter, USFWS)