

Translocation of wild Laysan duck *Anas laysanensis* to establish a population at Midway Atoll National Wildlife Refuge, United States and US Pacific Possession

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SUMMARY

A second population of the endangered Laysan duck *Anas laysanensis*, was successfully established on Midway Atoll by translocation and release of wild birds from the only extant population on Laysan Island in the Hawaiian archipelago.

BACKGROUND

The endangered Laysan duck (or Laysan teal) *Anas laysanensis* is an endemic Hawaiian dabbling duck. It has been extirpated from most of its former range within the Hawaiian archipelago and its last extant population was on Laysan Island, one of the northwestern Hawaiian Islands.

The first humans known to exploit the remote islands of Laysan and adjacent Lisianski, arrived in the 1800s and they subsequently killed hundreds of thousands of seabirds. Non-native grazing mammals were also introduced which denuded the islands' vegetation. The Laysan duck was hunted for sport and food, and this coupled with severe habitat degradation by introduced rabbits *Oryctolagus cuniculus*, and mice *Mus musculus* (on Lisianski) brought the species close to extinction. In 1911 the total Laysan duck population was just 11 birds, all confined to Laysan. After rabbits were eradicated from Laysan in the 1923, this population began to recover.

The Laysan duck was listed as endangered in 1967 because of its single small population, limited distribution and dependence upon a fragile ecosystem. There is now an estimated population of 576 (95% CI 503-682; 2004 data) adult ducks on Laysan. Biologists think this is close to the maximum carrying capacity of the island.

The species continues to face a high risk of extinction due to severe weather events, and

accidental introductions of new diseases, and non-native plants and animals.

In 2004, the U.S. Fish and Wildlife Service (FWS) published a revised draft recovery plan for the species. A high priority was to translocate wild Laysan ducks to Midway Atoll in order to establish a second wild population. This is thought to reduce the extinction risk, since two island refuges are unlikely to be struck by disaster simultaneously.

ACTION

Laysan Island: Laysan ducks *Anas laysanensis* were translocated from Laysan Island, a small island 2.4 km (1.5 miles) long by 1.6 km (1 mile) wide, located about 1,500 km (930 miles) northwest of Honolulu in the Pacific Ocean. There is a hyper-saline lake in the middle of the island, surrounded by sedges, dry coastal grasses and sand. Laysan has the fullest complement of bird species present in the Northwestern Hawaiian Islands with huge nesting seabird populations and migratory shorebirds visiting. Laysan Island is protected as part of the Hawaiian Islands National Wildlife Refuge which is a chain of islands, reefs and atolls extending about 1,200 km (800 miles) in a northwesterly direction from the main Hawaiian Islands.

Midway Atoll: Laysan ducks were translocated to Midway Atoll National Wildlife Refuge (NWR). Midway Atoll is also part of the northwestern island chain, located

approximately 2,000 km (1,250 miles) west-northwest of Honolulu. The island's habitat comprises dense upland vegetation, shrubs, tall grasses, sedge wetlands and fresh water seeps. The 8 km (5 mile) diameter atoll was chosen as a Laysan duck reintroduction site for several reasons: it lies within its presumed historic range; it is free of introduced rats *Rattus* spp. (rats, accidentally introduced during World War II, were eradicated by 1997 after the atoll was designated a National Wildlife Refuge) and other predators; it provides the logistical feasibility for post-release monitoring of translocated ducks; and there was potential for pre-release habitat restoration.

Habitat restoration: U.S. Fish and Wildlife Service staff and volunteers at Midway Atoll NWR spent 18 months preparing the site for the arrival of the ducks. The first step in site preparation was the removal of non-native ironwood trees *Casuarina equisetifolia* and verbena *Verbesina encelioides* plants, followed by the excavation of nine shallow freshwater seeps. Fresh water seeps were vegetated with the native sedges makaloa *Cyperus laevigatus* and many-spike flatsedge *Cyperus polystachyos*. In addition, 2,400 native bunch grass *Eragrostis variabilis* plants (used by the ducks for nesting on Laysan) were planted.

Duck aviaries: Fourteen aviaries were constructed using shade cloth. The aviaries measured 100 square feet, and held two ducks each.

Selection of individuals for translocation: A total of 42 mostly non-sibling post-fledgling juvenile ducks were captured on Laysan Island, and in October 2004 and 2005 made a 2-day boat ride to Midway. Candidate ducks were selected during reproductive monitoring on Laysan and fitted with a radio-transmitter to facilitate capture the night before translocation. Criteria for selection were based on weight, sex (a relatively even male-female ratio was desired), health, age and family history (a single duckling from each brood). Removal of the birds from Laysan Island was deemed not be a threat to the viability of the source population as pre-breeders were targeted, and the population on Laysan was high (close to, or at, carrying capacity) at the time of the removals.

Translocation of Laysan ducks: The birds were transported by boat chartered by the Hawaiian Islands NWR. Each duck had its own transport cage placed in their own cabin

aboard the vessel. During this critical step of the translocation phase, the birds were fed, watered and treated by biologists and a veterinarian every 10-12 hours. After 50 hours, the ducks arrived on Midway Atoll. They were held in the aviaries for 2-14 days in order to restore body condition with high calorie commercial duck mash, and giving time to become accustomed to local prey items available on Midway. Some birds improved, and others lost, body condition in the aviaries. Those that did not appear to adjust to commercial diet or appeared stressed in the aviary were released within 48 hours. Ducks were given a flight feather trim, and released with their aviary mate in groups of 2-4 at fresh water seeps. Release groups were monitored closely for 48 hours before the next pair was released. Supplemental food was provided several times per week for the first two months after release.

Monitoring: A radio-transmitter was attached to each bird in order to monitor their movements, behaviour, breeding and survival. The birds were also observed at distance using spotting scopes to prevent disturbance.

CONSEQUENCES

Survival: Nineteen of the 20 Laysan ducks brought to Midway in 2004 were alive and doing well in their new surroundings in June 2005. One fatality was caused by an interaction with an aggressive albatross (Diomedidae). Of the 20 ducks translocated in 2004, only six were females. A second translocation in 2005 was able to improve the sex ratio.

Nesting success: By 2005, five of the six females were nesting. This was unexpected as the females were young (Laysan ducks do not typically breed successfully until two years old) and lacked experience. By June 2005, females on Midway had produced nests with 10, 9, 8, 6, 6, and 5 eggs (average 7.3 eggs). The average clutch size on Laysan Island is 3.8 eggs. It is suspected the larger clutch sizes on Midway were due to the abundant food availability. By December 2005, 11 ducklings had fledged.

Conclusions: To date the translocation of Laysan ducks on Midway Atoll appears to have been successful. Translocation with both quick and slow releases (2-14 days), pre-release flight feather trimming to prevent immediate off island dispersal, creation and

enhancement of freshwater wetlands at release sites, and provision of supplemental food after a brief acclimatisation in holding in pens proved a successful release technique.

Intensive radio-tracking of all individuals of Midway's nascent population will provide information for adaptive management. Radio-

tracking is useful to evaluate survival, reproductive success and population health to provide metrics of population status. Intensive post-release monitoring is ongoing and lessons learned can be used to plan future translocations to additional predator-free islands.